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Unified Communications FOR DUMMIES®

Unified Communications for Dummies®

by Tony Bradley and Satish Shah

Foreword by Eric Swift
General Manager, Unified Communications, Microsoft Corporation

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Satish Shah was a senior technology specialist for Microsoft's Unified Communications team. As Founder and CEO of UC Trainers, he is a global speaker, author, trainer, and consultant on UC.

Dedication

I dedicate this book to my children: Jordan, Dalton, Paige, Teegan, Ethan, Noah, and Addison. Each of you brings a unique and special joy to my life. Life with kids in general — but with seven kids especially — is chaotic, loud, stimulating, frustrating, motivating, and inspiring. I can't imagine life without all of the challenges and the rewards of being your father. Your inspiration helps me get through the downs and truly enjoy the ups in life. I consider it a privilege to learn from each of you each day. *Tony Bradley*

I would like to dedicate this book to my family; Lilam, Swati, and our dearly departed son, Sachin. Each one inspired me during the process, especially Sachin, spreading his infectious smile with those beautiful blue eyes looking over me as a guardian angel. We all love you and miss you, beta. *Satish Shah*

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I would like to thank my coauthor, Satish Shah. It has been an honor to call him my colleague when we were partners at the same company. He has been a tremendous mentor for me in the field of unified communications and a good friend. His contributions to this book helped not only to ensure that the book was completed and eventually published, but greatly increased the quality and value of the content.

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Foreword

At my first job I had a phone. Then they gave me the dreaded beeper to use when it was my weekend to monitor data center processing jobs. E-mail was used by a few of us in IT, but not consistently enough to be relied on for business critical issues. It was all simple enough that we knew how to get reach people when needed, but it wasn't always at the speed business demanded. My boss got in at 7 A.M. and I could usually reach her until 7:45 A.M. If there was a critical issue during the day, I had to call, or leave voice messages, or stroll by her office, or try to catch her walking out for lunch. Not exactly the model of business efficiency.

Since then, the work environment has changed dramatically. In the last 20 years, communications technology has leapt forward to the point where there are dozens of ways we can communicate with our managers, customers, colleagues, and business partners. But are we any more efficient in reaching who we need to and effectively collaborating? While traveling in India I had a consultant give me his business card. On his card there were eleven different ways to contact him. If I needed to reach him, which number/e-mail/IM/social networking site was I to use? And what if I left a message on one and he didn't check it for a few days? Communications is about getting business done; in a global market operating independently of time zones, failure to communicate in a timely fashion could cost you the competitive advantage.

And what about the time required learning all these systems? A simple conference call often requires several minutes of keying numbers and trying to figure out who is present on the call. A video conference takes so long to set-up that expensive room-based systems often sit unused and gathering dust unless you pay a staff member to set it up in advance. Web conferencing is fine if you use it frequently enough and all your colleagues are on the same system, but adding a new participant can be an exercise in frustration.

Because of these issues we often fall back to simple phone calls, SMS texting, instant messaging, and e-mail (which is convenient but we all know the frustration of phone tag and email overload!). And now with social networking sites proliferating, you might track three or four web sites to keep up with your professional and personal networks. Some managers wonder if their employees are still doing real work or just in a constant state of e-mail, phone calls, texting, and social networking!

There is a solution: a truly unified communications system that can remove silos of vertical systems infrastructure, multiple user interfaces, different communications methods, and the myriad of devices. One identity for all

your communications: a single inbox for all your messages (including voice, text, and e-mail) and one identity to present your availability to the world. IT can then manage and administer one communications infrastructure that integrates into your organization's business processes and applications.

The technology exists today. The authors of *Unified Communications For Dummies* have paved the path for your journey in this book. I have worked with Satish as a colleague and seen him present these topics with both clarity of vision and practicality of real world experience; he makes the business case to the C-level executives and provides IT professionals with the depth of how it really gets done using his vast knowledge and expertise in unified communications. Now as the author, he has captured the essence of unified communications so that both the novice and experienced executive and communications professional can understand and apply the principles in a simple step-by-step process. He paints the vision of where you can take your organization and shows the pragmatic steps to take, identifying the pitfalls to avoid along the way. Selling a vision is easy; delivering it requires the real world experience contained in these pages.

I am sure you will find the guidance in this book enlightening and educational, as I did. Best of luck in your own organization's unified communications journey!

Eric Swift

General Manager, Unified Communications, Microsoft Corporation

Introduction

Welcome to *Unified Communications For Dummies,* the book that's written especially for people who have this nagging feeling in the back of their minds that they should connect telephones and computers but haven't a clue about how to or where to begin.

You've found the right book. Help is here, within these humble pages.

This book talks about unified communications in everyday terms. The language is friendly; you don't need a graduate education to get through it. And the occasional potshot helps unseat the hallowed and sacred traditions of networkdom, bringing just a bit of fun to an otherwise dry subject. The goal is to bring the lofty precepts of networking down to earth, where you can touch them and squeeze them and say, "What's the big deal? I can do this!"

About This Book

This isn't the kind of book you pick up and read from start to finish, as if it were a cheap novel. If I ever see you reading it at the beach, I'll kick sand in your face. This book is more like a reference, the kind of book you can pick up, turn to just about any page, and start reading. It has 19 chapters, each one covering a specific aspect of unified communications — such as planning, or rolling out the system.

You don't have to memorize anything in this book. It's a need-to-know book: You pick it up when you need to know something. Need to know what presence is? Pick up the book. Need to know about communication clients? Pick up the book. Otherwise, put it down and get on with your life.

How to Use This Book

This book works like a reference. Start with the topic you want to find out about. Look for it in the table of contents or in the index to get going. The table of contents is detailed enough that you should be able to find most of the topics you're looking for. If not, turn to the index, where you can find even more detail.

After you find your topic in the table of contents or the index, turn to the area of interest and read as much as you need or want. Then close the book and get on with it.

Of course, this book is loaded with information, so if you want to take a brief excursion into your topic, you're more than welcome. If you want to know the big security picture, read the whole chapter on security. If you just want to know how to create a decent password, read just the section on passwords. You get the idea.

If you need to type something, you see the text you need to type like this: **Type this stuff**. In this example, you type **Type this stuff** at the keyboard and then press Enter. An explanation usually follows, just in case you're scratching your head and grunting, "Huh?"

Whenever I describe a message or information that you see on the screen, I present it this way:

```
A message from your friendly network
```

What You Don't Need to Read

Aside from the topics you can use right away, much of this book is skippable. I carefully placed extra-technical information in self-contained sidebars and clearly marked them so that you can steer clear of them. Don't read this stuff unless you're really into technical explanations and want to know a little more of what's going on behind the scenes. Don't worry: My feelings won't be hurt if you don't read every word.

Foolish Assumptions

I'm making only two assumptions about who you are: You're someone who works with a personal computer, and you either have a unified communications system, or you're thinking about getting one. I hope that you know (and are on speaking terms with) someone who knows more about computers than you do. My goal is to decrease your reliance on that person, but don't throw away his or her phone number yet.

Is this book useful for Macintosh users? Absolutely. Although the bulk of this book is devoted to showing you how to link Windows-based computers to form a network, you can find information about how to network Macintosh computers as well.

How This Book Is Organized

Inside this book, you find chapters arranged in four parts. Each chapter breaks down into sections that cover various aspects of the chapter's main subject. The chapters are in a logical sequence, so reading them in order (if you want to read the whole thing) makes sense. But the book is modular enough so you can pick it up and start reading at any point.

Here's the lowdown on what's in each of the seven parts.

Part I: Getting Started

The chapters in this part present a layperson's introduction to what networking is all about. This part is a good place to start if you're clueless about what unified communications is and why you're suddenly expected to use it.

Part II: Applying Unified Communications

Uh-oh. The boss just gave you an ultimatum: Figure out a UC plan by Friday or pack your things. The chapters in this section cover everything you need to know so you can match your needs with the available technology.

Part III: Implementing Unified Communications

After the fun of the courtship comes the daily domestic stuff. Step by step, I'll show you how to make all those pretty promises come true when you're ready to use all your new toys.

Part IV: The Part of Tens

This wouldn't be a *For Dummies* book without a collection of lists of interesting snippets.

Icons Used in This Book

Those nifty little pictures in the margin aren't there just to pretty up the place. They also have practical functions:

Hold it — technical details lurk just around the corner. Read on only if you have a pocket protector.

Pay special attention to this icon; it lets you know that some particularly useful tidbit is at hand — perhaps a shortcut or a little-used command that pays off big.

Did I tell you about the memory course I took?

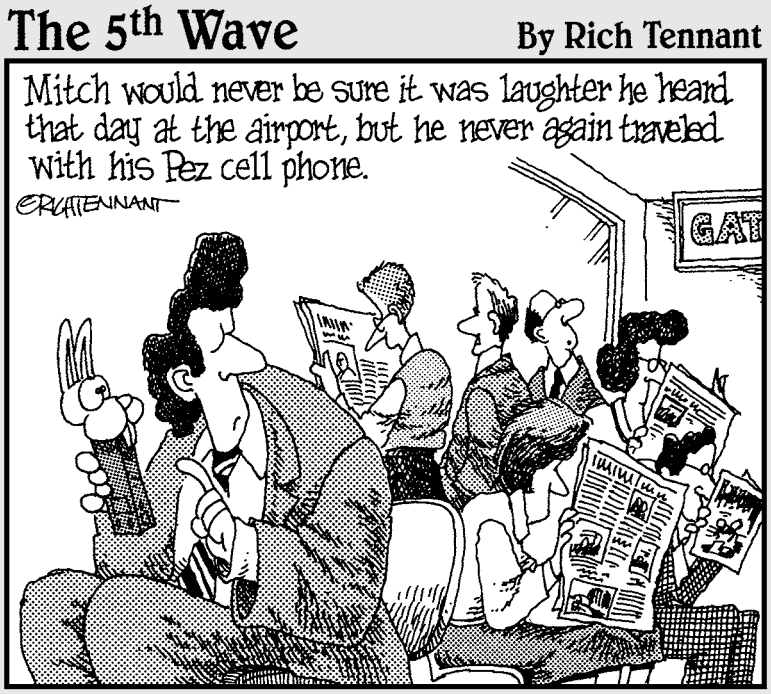
Danger, Will Robinson! This icon highlights information that may help you avert disaster.

Where to Go from Here

Yes, you can get there from here. With this book in hand, you're ready to plow right through the terrain. Browse through the table of contents and decide where you want to start. Be bold! Be courageous! Be adventurous! Above all, have fun!

Part I

Getting Started



In this part . . .

The chapters in this part provide a gentle introduction to unified communications, written especially for the user or manager who might be even more new to this than they're letting on to their colleagues.

It's okay. We'll keep it between us.

Chapter 1

Unified Communications from A to Z

In This Chapter

- Learning about the evolution of communications technology
- Merging communications methods
- Understanding the future of unified communications

One of the most important aspects of doing business is communication. ***Users*** need to communicate effectively with each other, whether it is

- A written memo
- A phone call
- An e-mail
- An instant message
- A text message on a mobile phone

Today's business has an arsenal of communications tools at its disposal. The problem is in using the communications tools efficiently and productively. Unified communications seeks to converge the various communications methods together to provide a seamless communications experience. With unified communications, co-workers can identify whether peers are busy or available and can choose to reach them by whichever method is most convenient or best suited for the moment. Unified communications represents a strategic advantage for those organizations that understand and leverage its potential before their competitors.

Evolving From Voice to VoIP

The voice network that we have today is quickly evolving and bears less resemblance with each passing day to what Alexander Graham Bell envisioned

in 1876. The world has grown up and we need a communications system that can keep pace with the 21st century.

PSTN

A network of wires has grown around the world to enable parties from Albuquerque to Zimbabwe to simply pick up a phone and dial a number in order to communicate. This network is the PSTN (Public Switched Telephone Network).You can easily place a call to anyone, anywhere with a standard phone.

PBX

Traditional business telephone systems use a PBX (Private Branch Exchange). The PBX manages calls within the business and connects business calls to the PSTN if necessary.

One of the primary advantages of a PBX was cost. If each employee phone within an organization were connected to the PSTN, then an internal call from one employee to another would have connection charges from the service provider. By managing inter-company calls internally, the organization avoided paying a provider to connect those calls.

The PBX connects to the PSTN through a *trunk* (see Figure 1-1) to enable inbound and outbound calls with the public phone system.

A PBX trunk isn't like an elephant trunk or a storage trunk. In voice communications terms, a trunk is a connection between two switched networks. A business PBX is typically connected to the PSTN using one or more trunks.

PBXs provide a range of functions for voice communications such as:

- Hunt groups
- Account code dialing
- Call forwarding
- Call transfer
- Call park
- Three-way calling

These are just a few of the more common PBX features. The PBX is the hub of voice communications for most businesses and provides a vast array of options for managing voice calls.

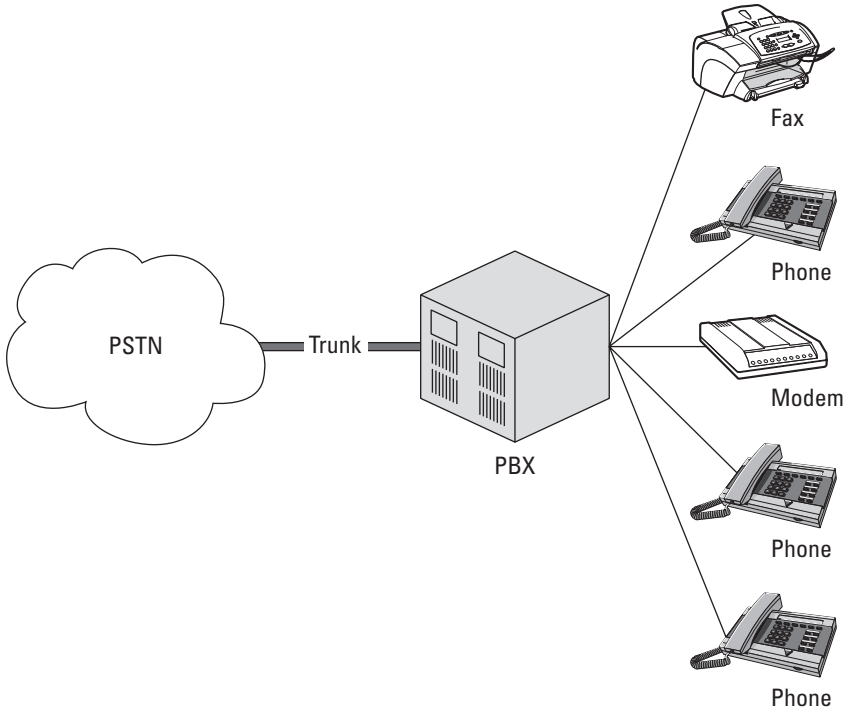


Figure 1-1: A PBX connects to the PSTN and provides communications switching and functionality for internal devices.

These functions help businesses communicate more effectively. For example, a phone number dedicated to customer sales can be set up on a hunt group that will ring all the extensions in the sales department to ensure that someone gets the call and that a potential sale isn't lost.

The Internet

In the early 1990s, a new era of communications was introduced with the advent of the Internet. Although the personal computer had been around for nearly 20 years, suddenly people and businesses could connect their PCs to the global network that we call the Internet and interact and communicate with each other.

Ironically, early connections from the PC to the Internet usually were over the PSTN:

- A modem converted the digital computer data into analog signals for transmission over the copper phone lines.
- Modem is short for *modulator–demodulator.* It's a device that facilitates the conversion of digital data to analog signals and from analog signals to digital data.

At the other end, another modem converted the analog signals back into digital data that the receiving computer could understand. With communications of all sorts moving from analog to digital, and with businesses already investing in switch and router technology, it didn't take long for the data and telephone engineers of the world to see that the packet-switching network could transmit voice data. Using the same infrastructure as the data network offered some significant savings, and the global interconnectivity of the Internet meant that voice communications could be less expensive as well.

The move of voice communications onto the data network became known as Voice over Internet Protocol (VoIP) because voice was now being transmitted over the IP (Internet Protocol) network. The transition from traditional PBX to IP PBX and from PSTN telephony to Internet telephony marked the beginning of the unified communications evolution.

Converging Communications

Unified communications is about more than voice. The road to unified communications is paved with more than the migration of traditional phone communications onto the IP network. New kinds of communications use the new technology.

You've got mail!

E-mail quickly emerged as one of the primary methods of communication for businesses and individuals alike. It surpasses voice communications for many organizations. One of the factors that made e-mail compelling when it was introduced is that it enabled users to communicate on their own terms. Traditional voice communication, commonly referred to as "phone calls," had a couple of significant drawbacks in the efficiency department:

- Phone calls are often an ineffective use of time:
  - The caller may waste time calling multiple numbers trying to track down a person and each failed attempt to contact the individual is simply more wasted time.
  - Answering a phone call is generally an interruption of something else.
- Phone calls are typically one-on-one conversations. If the same information needs to be conveyed to a whole team, the caller would need to either
  - Place multiple calls to repeat the same message
  - Set up a conference call

E-mail overcomes these shortcomings of voice calls:

- Senders can compose and send the message when it fits their schedule.
- Recipients can read and respond to e-mail when it fits their schedule.
- E-mail can be directed to many e-mail addresses at the same time.

E-mail has a couple of other benefits that aren't possible with traditional voice calls:

- It's an automatic written record of the conversation.
- E-mail can contain more than the message itself:
    - Hyperlinks can access documents on the World Wide Web.
    - File attachments can share documents, spreadsheets, and other data.

Communication at the speed of light

Although e-mail is delivered almost instantly around the world, you can't be sure that the recipient will actually download it or even read it. Actually, delivery and read receipts can be requested within most e-mail systems, but the recipient has the option of not responding to those requests so the absence of a receipt doesn't necessarily mean that the message wasn't received or read.

What's a person to do when he wants to communicate with someone in writing, and e-mail simply isn't fast enough? Use instant messaging. Instant messaging, or *chatting*, is a real-time conversation between two or more parties via the Internet. It's almost like a hybrid solution between voice and e-mail in that it offers the immediacy of a phone call with the written record and retention of an e-mail. Corporations didn't immediately jump on the instant messaging bandwagon. Consumers were the first to see the value of instant messaging and corporations joined the party later, in many cases reluctantly, as a result of demand from users. Users started off using services such as AOL Instant Messenger and ICQ (Figure 1-2) at home and then installed the applications on their work computers so they could still keep in touch during the workday.

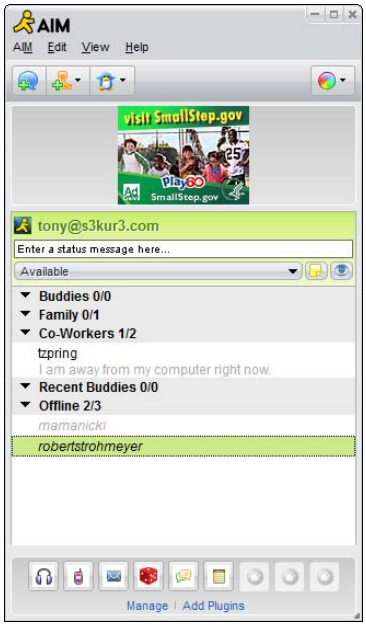


Figure 1-2: Instant messaging programs like ICQ became popular with home users then migrated to the workplace.

Instant messaging also offered a couple of other new advantages to the communications mix:

- The instant messaging software lets users see which of their contacts are currently online. Obviously, if a contact isn't online, there is no way to have an instant messaging conversation with that person. This rudimentary capability to determine the status of a given contact forms the basis of *presence* which is a key component of unified communications. Presence is discussed in more depth in Chapter 2.
- Instant messaging allows for more efficient multitasking. A user can simultaneously participate in a voice call and instant messages. Multiple simultaneous voice conversations aren't practical.

The call heard around the world

VoIP allowed a new twist on traditional handset-to-handset phone calls. Because a voice call on VoIP is nothing more than data packets traveling on the same IP-based network as all the other data, the computer itself can be used as the phone.

As long as there is a microphone to speak into and speakers to hear from, the computer itself can be the phone. The capability to make and receive calls can be incorporated into virtually any software.

One of the first places that this functionality began to appear was within the instant messaging clients. From the instant messaging software, users could click to open a text chat window or click to initiate a voice call. Aside from the novelty of using the computer for voice calls, this solution also offered the advantage that users could connect with and talk to people around the world without incurring any toll call charges. The voice call was just more data traveling around the Internet.

Tying voice calls into software provides other benefits as well, such as the capability to either

- Call someone by simply clicking a name in a contact list.
- Look up a phone number on the Internet and place a call by clicking the number.

Can you see me now?

If you add a camera of some sort, the computer can then connect you to your contacts via video for a virtual "face-to-face" chat (Figure 1-3).

For home users, video conferencing may be a novelty. It's nice to see family and friends who live across the country or around the world. Video calls can let grandparents watch as Junior opens the Nintendo Wii for his birthday, or let parents who have to travel on business see their children rather than just talking to them on the phone.

For businesses, however, video conferencing provides a variety of benefits, including the potential to save significant time and money. Companies spend huge sums of money to send people around the world to various meetings. They might be

- Internal corporate meetings
- Sales meetings with prospective customers
- Meetings with partners to discuss marketing strategy

Rather than spending for airfare, hotel lodging, rental car, and dining and other incidental expenses, on top of the lost productivity of the travel time itself, video conferencing can achieve the same sort of synergistic interaction for a fraction of the cost.

Figure 1-3: A video chat session using the Windows Live Messenger client software.

Future of Unified Communications

Even though there is confusion in the marketplace about which unified communications components make the most sense for a particular business, this book attempts to reduce that confusion. Presenting a clear business case for unified communications is easier said than done. Even though uniform standards may be lacking, the vendors have adopted Session Initiation Protocol (SIP) for components to converge and create unified communications. There is still a need for these components from various vendors to co-exist and integrate smoothly in the existing environment. Businesses will still need to define a clear ROI (return on investment) from unified communications to justify their investments.

Even with all these factors, the unified communications market continues to grow and play a defining role for many organizations' IT strategy. A 2008 report from UC Strategies claims that the unified communications market in 2007 was only about $200 million, but also predicted that the segment would grow about 1,200 percent to more than $2.4 billion by 2012.

All hardware and software vendors are vying for a piece of that $2.4-billion market. Major vendors such as Microsoft and Cisco have promising platforms that have begun the convergence to where a business can form a strategy of co-existence. It's true that none of the vendors' solutions alone may provide you all the unified communications components.

To provide a complete unified communications solution, organizations must combine VoIP infrastructure and unified communications components from various hardware and software vendors. A key issue for enterprises with an existing Microsoft infrastructure will be determining which options can integrate smoothly and enhance or extend functionality instead of creating headaches. Organizations must also consider how the combined solution will be maintained and scaled to meet future needs. I have attempted to provide solutions and alternative options so that you may choose to achieve the best results for your organization.

Chapter 2

All Present, Say Aye

In This Chapter

- Identifying the presence of users in the system
- Integrating presence with communications tools
- Streamlining business processes

Effective communications should improve the process of communicating and help people to communicate . . . more effectively. That isn't always the case, though. With traditional communications, things keep getting faster, but not necessarily more efficient.

For example, you can send a document to a customer via the postal service and that person will receive it in three to five business days. You can fax it and the individual will receive it in a couple of minutes. You can e-mail it and have it arrive within a matter of seconds. However, regardless of the speed with which the message arrives, you have no guarantee the recipient will be there to receive it.

Unified communications addresses this problem using the concept of *presence.* Presence is implemented differently from one unified communications vendor to the next, but the premise is the same — to provide users with a visual cue that enables them to quickly determine the current status and availability of their contacts.

There is no set combination of features or functionality that defines unified communications, but presence is the glue that binds them. In this chapter, I dive deeper into what presence is and how it helps to tie unified communications together and enable people to communicate more efficiently.

The Role of Presence

When a customer calls in to a contact center, it is important that the call get routed to an individual who is both available and knowledgeable in the right area to address the issue. Call center agents are labeled with their skill sets or areas of expertise, and they log in to the call center system so that

the system knows whether they're available. When they take a call, the call center system recognizes that they're busy and temporarily changes their status to unavailable so that other agents know they can't route any other calls to that person right now.

This method of distributing call center communications is a rudimentary example of the concept of presence, and a demonstration of how presence helps users to communicate more efficiently (see Figure 2-1). Rather than blindly sending calls to agents who aren't available or lack the proper skills, call center distribution helps to ensure that the call is addressed as quickly as possible by someone who has the skills and authority to resolve it.

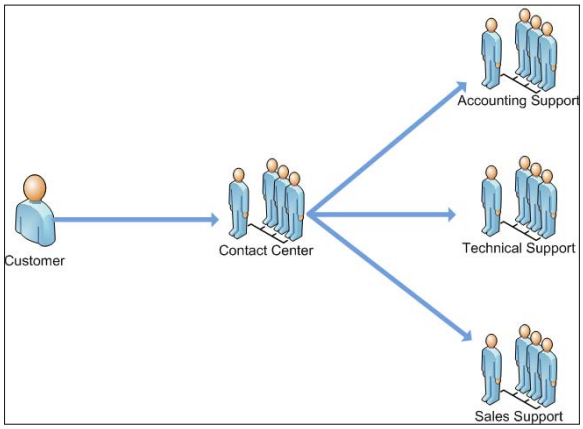


Figure 2-1: Call distribution in a call center helps to ensure calls are routed to agents who are both capable and available.

That's the role that presence plays within unified communications. Unified communications presence allows users to select the best method for the moment because they can see

- When their contacts are free
- What methods of communication are available

Evolution of presence

The concept of call distribution in a contact center has been around for a while. For an organization that exists to resolve issues, it makes good business sense to manage those issues as efficiently and as effectively as possible. Doing so results in both satisfied customers and the ability to handle higher call traffic.

Ordinary users still have issues that need to be addressed, and it would be beneficial to have those issues addressed by someone who is available and has the ability to address them. However, lacking the direct correlation of "more calls = more revenue," this simple fact escaped businesses for decades.

The first taste of presence for most end users came with the introduction of instant messaging. You can't communicate "instantly" with someone who isn't logged in, or who is otherwise occupied. So, instant messaging applications such as Windows Live Messenger and AOL Instant Messenger (AIM) adopted visual cues (see Figure 2-2) to identify which users are available and which aren't.

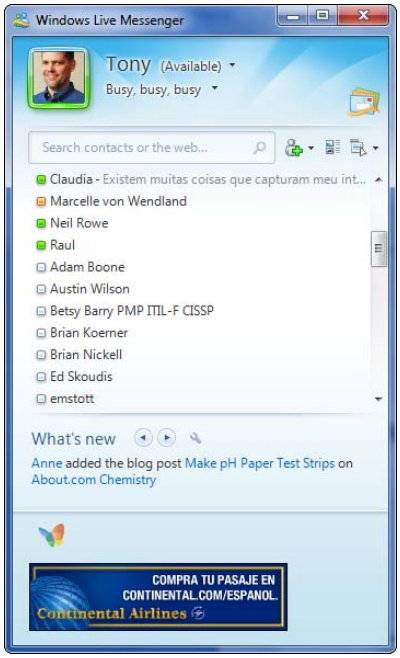


Figure 2-2: Windows Live Messenger shows unavailable users as grayed out.

In many cases, you can see

- Whether a user is currently available
- How long that user has been connected with the instant messaging service
- Whether that person is actively typing
- If the user has been idle and appears to have stepped away

All these facets of presence help you to determine whether a given contact is available and facilitate the capability to communicate instantly.

It has taken some time for users to adapt to instant messaging and the concept of presence. There is still a long way to go for many users. For example, many of them rely on instant messaging just to *ping* someone to say, "Are you available for a phone call?" or "Did you get that e-mail I sent you?" This sort of redundant communication is the opposite of communicating more effectively and efficiently.

Moving beyond "Are you there?"

Presence is a keystone of unified communications. The capability to identify who is available and determine the best way to communicate with that person at a given time is critical to the success of unified communications. But, in order for presence to provide real value, it has to do more than simply let you know whether a given contact is currently logged in.

The capabilities of presence have to

- Provide more information than simply "Are you there?"
- Integrate with the tools you already use and work as automatically as possible

The last thing users need are more tools to configure and schedules to update.

So, what features or functions should presence have?

- The capability to integrate with common calendar or scheduling tools and automatically update presence based on calendar availability
- Communication with phones — whether land-line or mobile — to be able to determine whether a user is currently engaged on a call
- Configurable groups that enable control over which users are allowed to communicate in which circumstances and how

  For example, a friend may not be able to interrupt or communicate when you're busy, while a project team peer or manager can.
- Centralized management of presence so that it can be reported across systems and applications and doesn't depend on a client application on a given computer
- The capability to integrate with other vendor systems and applications to extend presence functionality to all tools
- Federation with partners, vendors, suppliers, or other groups so efficient communication can be applied to external business interactions

Gluing Unified Communications Together

Presence is more than just the grayed-out names found in instant messaging applications. In more advanced unified communications platforms, presence can let you know

- Where people are at a given moment
- The topic of the meeting or call they're engaged in
- When they will be available again

Rather than relying on you vigilantly watching their presence to see when they become available — a monumental waste of time — flags can be set so that you can receive an alert when the user's presence status changes.

For unified communications presence to be able to provide relevant information about a user's status and availability, it must integrate with the user's calendar, phone, mobile phone, and other tools.

Calendar

To be effective, the unified communications platform should be able to automatically update presence based on the user's schedule. That means that presence should integrate with common business scheduling tools such as Microsoft Outlook or Lotus Notes.

Without some type of integration with your calendar program, you would be required to constantly update your status — manually. Every time you have a meeting or conference call, you would have to also update your status to reflect that. But, the capability of your unified communications platform to determine your status based on your schedule from your calendar automates that process and ensures that your presence information stays up to date (see Figure 2-3).

Office phone

Whether it's the phone on your desk or a software-based phone client on your PC, the presence status in your unified communications platform should be able to automatically detect when you're on a call and update your presence:

- At a minimum, your presence should be updated to show that you're unavailable any time you're on a phone call.
- To be an effective tool for enabling more efficient communication, presence should go one step farther and state "in a call."

Just knowing whether an individual is available is a very rudimentary version of presence. But, if I know that you aren't just busy, but on a call, I still may be able to communicate with you via instant messaging. The additional detail in the presence status enables us to multitask.

Mobile phone

Some unified communications platforms take this a step further by providing some sort of client or agent capability for mobile phones. Even when users are away from their desk — whether they're in a meeting down the hall or a client site across the country — these unified communications platforms help people to determine the availability and the best method of communicating with other users whose presence information indicates they are on a call. Presence information that lets users know that you are using your mobile phone may also impact whether they choose to engage you in an instant messaging session. Those little tiny keyboards aren't quite as effective for chat sessions.

Avaya and Microsoft have embraced the integration of the mobile phone. Avaya One-X Communicator software and the Microsoft Office Communicator Mobile client have similar capabilities on compatible mobile phones:

- Telephony
- Presence
- E-mail
- Instant messaging
- Contact directory

Avaya and Microsoft solutions for mobile phones have some differences:

- Avaya One-X delivers visual voicemail.
- Communicator Mobile provides single-click access to join audio conferences.

Microsoft has extended the reach of its unified communications to Nokia S40 and S60 devices and the Motorola Razr phones with the introduction of Office Communicator Mobile for Java. Previously, Communicator Mobile worked only on Windows Mobile phone platforms.

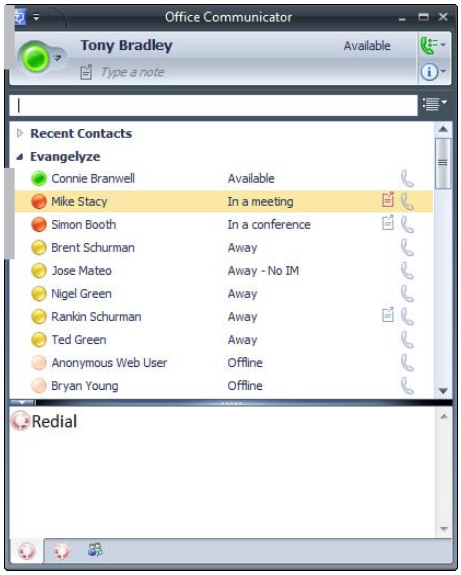


Figure 2-3: Calendar integration ensures that your status is updated automatically based on your schedule.

Business at the Speed of Presence

Presence, and unified communications in general, hold the promise of being able to help organizations work more efficiently, deliver more effectively, cut costs, and speed up processes. But, the realization of that promise is dependent on how it is executed.

Streamlining processes

Business follows processes. Whether an organization has clearly defined or nicely documented processes, it follows a process of some sort.

Business processes are often inefficient. They may involve

- Placing calls or sending e-mails to users who aren't even in the office
- Sending requests or issues to users who don't have the skills or authority to resolve them

Presence helps enterprises function more effectively when it's applied just as call distribution has been implemented in contact centers for decades. By ensuring that business processes are routed to the most qualified person currently available, the process can be streamlined and business functions can be executed faster (see Figure 2-4).

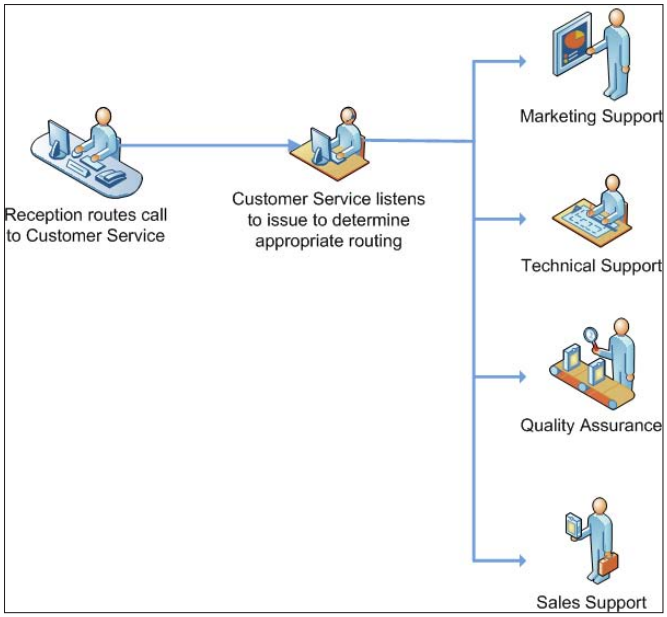


Figure 2-4: Illustration of the logic of efficient business process flow.

The capability for presence to help streamline business processes is partially dependent on the unified communications platform being used. Some platforms have more robust presence integration and provide more capabilities to groups or identify users, similar to the way contact center call distribution groups work. Assuming that the unified communications platform is capable, here are some questions that should be asked to design more effective business processes:

- What level of authority is needed?
- What knowledge or skill sets are required?
- Who is available?

Simply forwarding a process along to the next available person isn't effective because being available doesn't mean they know how to handle it. Forwarding a process to someone who is available and has the knowledge to address it isn't efficient unless that person also has the authority to address the situation.

Developing a unified communications culture

The weakest link in just about any process is the user. Unified communications and presence can help users to operate more efficiently, but they have to understand the tools available to them and apply them effectively to realize those benefits.

Business won't be more efficient and processes won't be streamlined if an organization invests in unified communications but the end user executes it poorly.

Unified communications is more than just a tool; it's a culture. Users need to be provided with training and guidance (refer to Section III of this book for more help using the unified communications tools) to enable them to make the shift from their traditional methods of communication, understand presence and how to apply it, and embrace unified communications.

Beyond the organization

The next step is to extend presence outside of the enterprise to customers, partners, vendors, and suppliers.

The time savings and efficiencies that can be gained from federating or integrating presence with external entities are changing.

Microsoft Office Communications Server 2007 (OCS 2007) provides the capability to

- Federate, or connect the OCS server with other external OCS servers (see Figure 2-5)
- Integrate the instant messaging functionality with public instant messaging platforms such as Windows Live Messenger and AIM

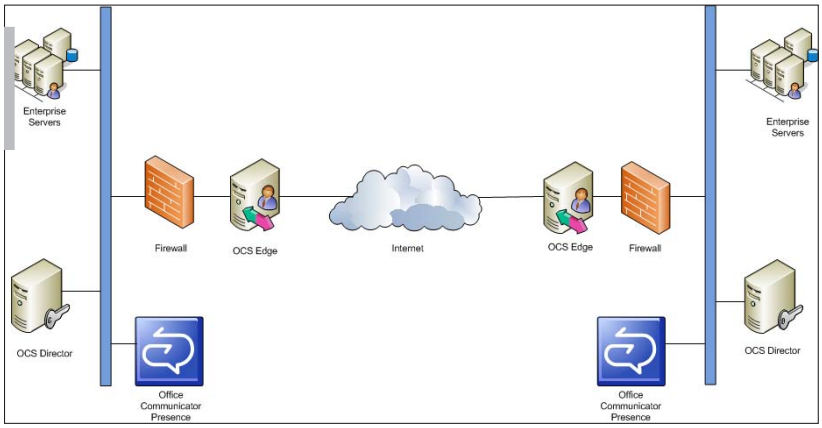


Figure 2-5: Diagram illustrating how OCS servers connect together to provide federation.

Chapter 3

Understanding the Business Benefits

In This Chapter

- Communicating more efficiently
- Increasing productivity
- Improving customer/partner satisfaction
- Consolidating network architecture
- Reducing costs

Everyone wants better, faster communication. Some people may already have it to a degree but want more — and the question is why? What is so great about this new phenomenon called unified communications?

Well, look at what is happening in the business world today. What challenges are businesses facing? Why should they look at the new world of work with these new tools and solutions called unified communications?

Communications Everywhere

Everyone is bombarded with different modes of communications today — PC on the desk, laptop on the road, BlackBerry or smartphone in the pocket, and a phone on the desk. The issues are which one to use when and how, and how to inform colleagues, customers, and partners when to use each mode. Did you ever receive a voicemail asking you to look at your e-mail or vice versa? I used to get urgent voicemails on my desk phone and cell phone to check my e-mails when a crisis occurred in the workplace.

In today's global economy, employees work with colleagues, customers, and partners across the world — in what is called "virtual teams." Communicating and collaborating with them has become business critical — maybe even a competitive advantage if you're doing it right. Customer and partner expectations necessitate that you be available almost anytime to stay competitive and deliver satisfaction.

Obviously, costs increase with the increase in number of communication modes that a company enables for its employees. In addition to the costs associated with the use of different modes of communications, the costs of management, monitoring, and compliance also increase exponentially.

If a company provides its employees with five modes of communications, there are five ways for someone to break in and steal the company's most critical data. Each mode of communication is a potential security hazard. How often have you heard about a bank employee's laptop being stolen with clients' secure financial data, making those clients vulnerable to someone doing something detrimental with the confidential information? Additionally, in light of major government bailouts, taxpayers are demanding that financial and healthcare providers be extremely transparent. The federal, state, and local governments, as well as the FDA, SEC, HIPPA, and Sarbanes-Oxley, all require companies to be compliant and archive their communications data for three to ten years.

Most unified communications vendors have been able to provide a software- or software-hardware–powered solution that unifies instant messaging; presence; audio-, Web-, and videoconferencing; e-mail; voicemail; and Enterprise Voice (VoIP) onto a single platform.

They have made it easier and simpler so companies adopting unified communications don't have to worry about multiple platform management, monitoring, or compliance headaches.

- **Instant messaging:** The capability to chat with colleagues, customers, and partners instantly based on their availability and preference
- **Presence:** Real-time availability to chat or talk
- **VoIP:** Transmitting voice over the Internet Protocol

End-users can use the similar clients on a desktop, laptop, the Web, or on smartphones that are streamlined for all the modalities and can easily transition from one to another without any loss of experience or data. They can even let people know how, when, and where to reach them. If they don't want to be disturbed, they can change their presence to **Do Not Disturb,** as shown in Figure 3-1.

Unified communications makes those IT guys happy because they can control, monitor, and manage less while reducing the total cost. (It makes the CIO and CEO happy, too!)

Figure 3-1: Presence showing Do Not Disturb.

More organizations are realizing the benefits of unified communications solutions as they start using them effectively and extending their reach to customers and partners. Unified communications solutions facilitate productivity improvements for employees wherever their work takes them. Unified communication solutions also enhance the way in which employees communicate and collaborate with each other and with customers and partners.

Increased Efficiency

As soon as an employer enables employees to connect and communicate with colleagues and customers or partners, the barriers of distance and time between them are removed. Employees can make decisions faster, and that leads to internal efficiency as well as with customers and partners no matter where they are located or in which time zone.

If a company is planning to deploy a unified communications solution to its employees, in today's global economy it is critical to consider mobility and remote access, especially for those employees who travel for business.

Road warrior Suzy was on her way to Seattle from New York and she checked her mobile communicator from her smartphone. Within minutes, she received an urgent Instant Message from John about a serious problem. Suzy immediately invited Larry from the Chicago office to the IM conversation. The three of them devised a plan to tackle the crisis. John agreed that he would update the plan and share it with everyone via e-mail. Suzy said she would review it as soon as she landed in Seattle. Using traditional processes, John would have e-mailed his original plan to everyone and waited for input from everyone. That method could have taken a minimum of a day or more since Suzy was traveling. Using the unified communications solution and anywhere/anytime tools, the team averted a crisis and reached an amicable solution in only 30 minutes.

Internal communications

A hospital in California was looking for a solution to improve its capability to communicate and collaborate more efficiently, especially in the radiology department. The radiology department recently had expanded to include radiologists from India and Australia to provide round-the-clock coverage. When patients were x-rayed in California, their x-rays were loaded in a Kodak system that allowed authorized colleagues access to them over the Internet. So a patient's x-rays taken at 5 p.m. in California by the technician and then loaded on the Kodak system were available to the radiologist in India or Australia after the California radiologist went home. Now the radiologist in India or Australia could analyze the x-rays and enter the diagnosis into the system. In the morning, when the California radiologist and technicians returned to work, those x-rays were viewed and the diagnosis was entered.

If the radiologist or the physician in California had questions or wanted to consult with the radiologist in India or Australia, or with an expert, he or she could participate in a Web conference (Microsoft Office Live Meeting or Cisco WebEx, for example), open and view the x-rays online, consult with the other participants, annotate a specific area on the charts by using annotation tools, and reach a well-informed conclusion. Just for an example, 4–6 p.m. in California would mean 9–11 a.m. in Australia (next day) and 5:30–7:30 a.m. in India (next day). Unified communication is a brilliant innovation that improves efficiency in communications and collaboration.

Today, it is common for project/product teams to be dispersed all over the world and in different time zones. Such teams are commonly known as "virtual teams." Unified communications solutions and tools enable the project/product virtual team to improve efficiencies and reduce the cycle time, especially because they have easy access to subject matter experts in real-time, no matter where they are located or in which time zone, with online presence. These same capabilities can be leveraged with virtual teams made up of the internal company resources as well as partner and customer resources, and reduce the cycle time for projects or products, while improving the quality of their communications and collaboration — typically at a lower cost!

Many organizations deploying unified communications solutions integrate their telephony infrastructure with the new instant messaging and conferencing solutions. These investments significantly improve employee communications because employees can choose how they want to connect and communicate with colleagues:

- Instant Message
- Click-to-call
- Audio-, Web-, or videoconferencing

It is possible with some of the unified communications solutions available today that some participants will use their computers and Voice over IP (VoIP) for audio in a Web-conference, while others may connect using a traditional phone for the audio part of the conversation or even connect from their car, train, or at the airport to just listen in on an audio conversation. The VoIP-based Web-conference has been extended to dial-in conferencing, thus opening it to everyone, no matter how the connection is made. These new dial-in capabilities have created efficiencies for both the presenter and participants regardless of where they are and what modalities they have available to connect and communicate.

Using your computer with the Instant Messaging client and tying voice and video calls into it garners you many benefits, such as simple one-click calling: There's no need to look in the address book, no need to dial a number.

Increased Productivity

Many organizations today have over half of their staff working remotely at home, in a branch office, or on the road. They carry their laptops, BlackBerries, or Windows Mobile–based smartphones with them wherever they go. Most popular unified communications solutions from Cisco and Microsoft allow them to receive calls made to their office number from any workspace: main office, branch office, home, or hotel. They can listen to their office voicemail messages from their Microsoft Exchange 2007 Inbox on their computer or from an IP phone, traditional phone, or mobile phone.

- These road warriors also utilize the capability to call into their e-mail mailbox (known as Outlook Voice Access provided in Microsoft's Exchange 2007 server Unified Messaging) using any kind of phone from anywhere to listen to their e-mail messages and voicemails, and manage their calendars. They remain productive no matter where they are:
  - In the car with their Bluetooth hands-free headset
  - At the airport waiting at the gate
  - In their hotel room
- Managing your calendar using Outlook Voice Access allows you to inform colleagues, customers, and partners via e-mail if, for instance, you are stuck in traffic and will be late for your meeting — all via any phone.

  This is particularly helpful — if someone is waiting for you in a conference room or on a Web-conference.

Microsoft Outlook is the e-mail client of choice for many organizations. Most unified communications vendors, such as IBM, Cisco, and Microsoft, integrate their solutions with Outlook so users can schedule audio and Web-conferences using their Outlook calendar and send invitations to other individuals using

Outlook. The invitees receive their invitations in their Outlook mailboxes and single-click to accept or decline the invitation. The invitation information gets added to the calendars, and invitees get a standard Outlook reminder 15 minutes before the meeting.

The unified communications solution is so tightly integrated with the user's desktop experience that it adds another way to improve productivity.

- A hospital in California was trying to find a better way to provide continuing education (called Grand Rounds) for its physicians, nurses, and other hospital staff — a requirement mandated by the state and medical board. Traditionally, everyone gathered in the cafeteria and a guest lecturer came from other hospitals in the area or flew in from out of town. Attendance suffered because many people had to drive 30 to 60 minutes or fly in to participate. They found Microsoft Office Live Meeting solution hosted Web-conferencing enabled everyone to either attend in person or participate from their offices over the Internet. The guest presenters could either present on location or remotely, right from their offices. Microsoft Office Live Meeting also allowed them to record each meeting for anyone to watch later. Translation: Increased productivity and attendance, and lower meeting costs.
- Newer unified communications solutions, as shown in Figure 3-2, allow managers to delegate their calls to their executive assistants or create a team-call group where multiple people's phones ring when a call comes in and anyone can answer the call. The first person who answers the call can
  - Transfer it to a subject matter expert if required.
  - Create a multi-party conference and look at an issue with colleagues, customers, or partners.

  The call gets answered on the first ring and the issue gets resolved immediately.

Figure 3-2: John can delegate his phone to Claire or create a team that receives the call when someone dials John but he is unavailable.

- If you were looking for someone at the office whose door is closed or who is in a meeting in a conference room, you may frequently walk by that person's office or the conference room so you would know when he or she is free to meet with you.

  Unified communication solutions change how you make that discovery. With unified communications, you can see the individual's presence state from your computer:

  - In a meeting
  - Busy
  - Do Not Disturb

  No need to walk around the office or conference room — all you have to do is Tag that person (electronically). The computer will tell you when he or she is online and available by sending you an alert-called "toast pop-up" because it is displayed on the bottom right pane of your computer. The presence state turns green. Now you can send an IM.

Improved Customer/Partner Satisfaction

Unified communications solutions support "Federation" or "Public IM Connectivity" features so that organizations can directly connect with their key customers and partners.

- **Federation:** Organizations that need to communicate with each other implement the same unified communications solution and agree to exchange secure IM and audio/video communications.
- **PIC:** An organization extends its unified communications solution to allow connection to public IM providers such as Windows Live Messenger, Yahoo!, or AOL Instant Messenger. (Additional licensing may be required.)

If an organization has implemented Federation or PIC, employees can easily see their customers' and partners' real-time presence and vice versa. They can be in direct contact with each other and can collaborate and communicate faster with a single click of the mouse. Customers' and partners' capability to see the online presence of employees they are doing business with creates a great sense of trust and satisfaction and reduces cycle time for projects, products, and contracts.

Following are other ways to improve customer and partner satisfaction:

- Organizations can use the unified communications solutions, especially audio, video, and Web-conferencing, to deliver sales and marketing presentations to customers and partners. Unified communication can also be used in customer support scenarios and project/product collaboration with customers and partners.

- Organizations can respond with speed to customer/partner questions and use real-time presence to find subject matter experts who can answer those queries quickly and easily. These advantages can increase the number of customers/partners served exponentially and result in dramatic satisfaction improvements.
- Enhanced communication between customers/partners and sales teams, in which sales staff have real-time access to subject matter experts through presence awareness, call forwarding, and other tools, means faster response to customer/partner requests for proposals (RFPs), requests for information (RFI). In turn, sales staff can respond to more such requests in less time than ever before.
- The voice functions, such as Response Groups, provide a method for an external call to be routed to anyone in a team, help desk, or customer service, and can be used for teams that are supposed to be available 24 hours a day. These teams have a person designated to be on-call so that the help desk staff can reach a resource to solve an issue.

Consolidated network architecture

Organizations can immediately garner real cost-savings by phasing in various components of the unified communications solutions one at a time, if desired.

I cover more about planning and implementations in Chapters 4, 5, 6, and 7. The basic principle with any of today's unified communications solutions is the capability to consolidate and unify various forms of communications devices and modes so a user experiences a seamless environment with a single desktop client. This integration and consolidation obviously results in cost savings from administration, management, and monitoring activities. It also eliminates the need and cost for different hardware and software solutions maintenance contracts.

In some cases, even the software licensing costs can be reduced by converting to a comprehensive or bundled licensing package.

- Is the communications system your enterprise uses today, such as PBX (Public Branch Exchange), located in each of your sites with its own voicemail system? Do you have some sort of interactive voice response system (IVR) also attached to the old PBX in some sites? It is possible that some of these systems are outdated and in dire need of a face-lift.

  If you were looking at or evaluating some sort of unified communications solution anyway, here is your opportunity to consolidate your systems centrally to the headquarters (or at least fewer locations) while using VoIP over your existing wide-area network (WAN) to support other locations.

- Most unified communications solutions from major vendors like Cisco and Microsoft offer an opportunity for voice communication system consolidation.

  If voicemail systems are tied to your PBX today, you may be interested in what unified communications vendors call "Unified Messaging" — the capability to consolidate voicemail into e-mail systems. Unified Messaging eliminates the need for separate hardware and software, and all voicemail and faxes go directly into the user's mailbox.

- Consolidation of your site/divisional servers is now possible with the use of 64-bit and virtual server architecture where appropriate. Centralized consolidation will eliminate costs of equipment and support at remote sites.

Here are other advantages of hardware/software consolidation:

- If various sites/locations in your organization have their own locally managed storage or archiving systems, they can be consolidated into fewer locations or centralized at the headquarters.

  Does your organization have distributed e-mail, voicemail, and other systems at each site/location? Consolidate them to the headquarters or fewer locations for significant savings in

  - Administration
  - Management
  - Monitoring

- Implementation of a unified communications solution that is integrated with your voice system's PBX will yield significant savings from the consolidation and reduction in administrative and maintenance costs. If you were planning to upgrade your traditional PBX to an IP-PBX, the unified communications solutions integration with that traditional PBX may extend the life of that PBX without incurring the costs of ripping and replacing the entire PBX.

Reduced costs

Recently, I attended the "virtual" launch of a brand new product; thousands of people from around the world were expected. The manufacturer wanted to demonstrate the true business value of unified communications — thus, a virtual launch. Customers and partners could participate remotely from the comfort of their home or office over the Internet. After registration, each attendee was sent a unique link to join.

Partners were invited to become sponsors and have a virtual booth where they could create their own keynote presentations and offer their literature for downloads. Product demonstrations could be delivered live or stored as videos for attendee viewing.

The unified communications vendor had its own keynote presentations and demos delivered live to the audience, plus marketing and technical materials available for downloads. The vendor even offered attendees a virtual briefcase in which to add all the documents that they wanted to download by visiting different booths virtually. They could download all the documents all at one time.

Use this link to try attending this event yourself. Click on Enter to join without registering or register and then sign in to download the docs in your briefcase:

```
http://www.microsoft.com/communicationsserver/r2-virtual-launch/event/default.
              aspx
```

This type of a virtual show can save many people thousands of dollars, time, and effort it would require to attend a live convention/launch of a product.

Bravo to the person or team that came up with this vision and executed it flawlessly. What it means is that customers or partners who missed an actual virtual event on the day it was scheduled can still participate later by viewing the event in recorded format at their convenience.

Technology companies have become more innovative today to help their customers and partners reduce costs while improving efficiency and productivity:

- Let's assume that your organization has traditional PBX with voicemail that needs to be replaced and the cost ranges from $500 to $1,000 per user for IP phones on each desk and backend IP-PBX replacement (including hardware, software, maintenance costs, and so forth). As I discuss earlier in this chapter, it's possible to integrate your traditional PBX with the unified communications solution (described in detail in Chapter 4) and use your WAN for voice communications, thus extending the life of the existing PBX. A unified communications solution with integration to your traditional PBX may cut costs in half. Assuming the above numbers, if you have 1,000 employees, you may yield savings between $250,000 and $500,000.
- Obviously, you need to look at those expensive maintenance contracts with PBX and voicemail systems that may cost you $50 to $100 per user or mailbox. Also look at the administration, management, and monitoring costs, ranging from $50,000 to $100,000 annually. It may be an opportunity to decommission them one location at a time with the unified communications solution implementation.

Look at case studies for unified communications costs savings from organizations in your industry at unified communications vendors' Web sites. You'll likely be pleasantly surprised to discover that many organizations have already done what you are thinking of doing.

- Will your organization enable telecommuting for your employees now that you are implementing unified communications solution in the workplace? With the unified communications solution in place, you can provide a remote working environment for employees. With the unified communications tools at their disposal, employees can easily collaborate and communicate with their colleagues and customers/partners regardless of where they are — in the office, on the road, or working from home. Telecommuting saves costs for the employees and the corporation by using the same office space for many employees, called "Progressive Office."
- Employees can reduce travel expenses by using Web-conferencing and reduce long-distance phone charges by using VoIP. For example, imagine a company with 1,000 employees. Say that 25 percent of the employees travel for business each year — five trips per year at an average cost of $1,000 per trip. Assuming that those employees eliminate one or two trips per year by using the Web-conferencing tools available with any unified communications solution, the resulting savings is $1,000 to $2,000 per employee. Multiply that amount by 250 (25 percent of 1,000), and the aggregate savings is $250,000 to $500,000.

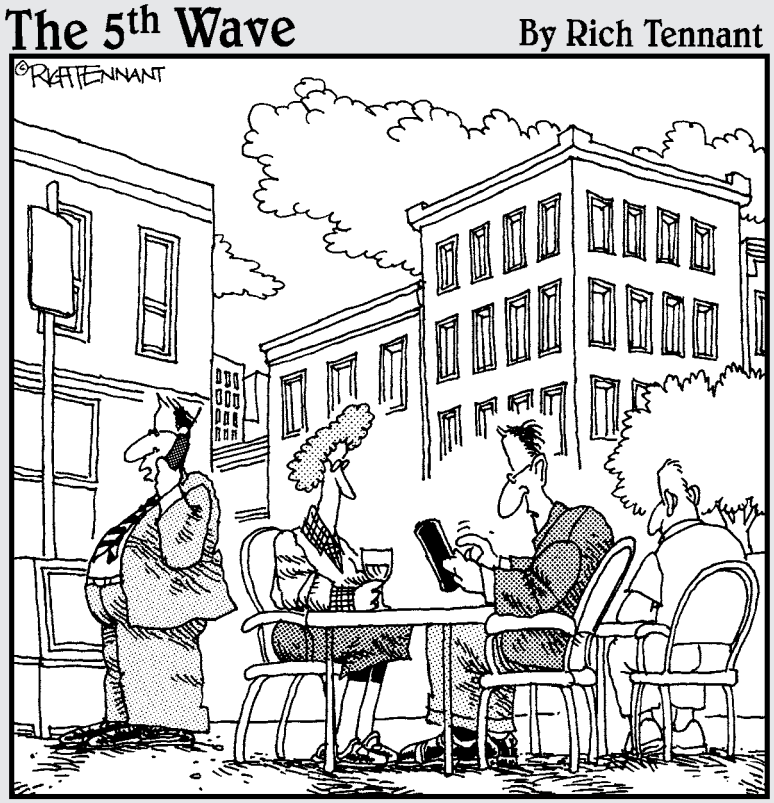
Check out how people around the globe are using Skype in their business and learn what Skype can offer your company at http://www.skype.com/business.

Today's marketplace includes several business or personal solutions like Skype that can be advantageous to small and medium sized businesses. Many major vendors offer similar solutions called Software as a Service (SAS) to provide businesses unified communications tools over the Internet as a subscription service. You don't have to install, manage, and monitor your own hardware and technology. You may even pay as you go or sign minimal contracts. Check them out.

Organizations can make their individual users and teams more productive by enabling them for unified communications. Unified communications makes it easier to contact colleagues for information, check for messages, and stay connected and productive even while out of the office. Unified communications-enabled employees and teams inside the organization become more productive in their interactions with customers and partners, too. Improving individual productivity and organizational efficiency that reduce costs is a winning formula for any organization, especially in today's economy.

Part II

Applying Unified Communications



"I find it so obnoxious when people use their cell phone in public that I'm making notes about it on my HPC for a future opinion piece."

In this part . . .

You discover the ins and outs of planning a shiny new system that rings your phone and tweets your text.

Yes, some technical information is included in these chapters. Fear not! I bring you tidings of great joy! Lo, a unified communications system is at hand, and you — yea, even you — can design it yourself.

Chapter 4

Planning Your Deployment

In This Chapter

- Assessing your existing communications
- Evaluating unified communications components
- Justifying the business case

A good plan can mean the difference between the success and failure for any project. This chapter focuses on planning your deployment and sharing how a well-thought-out plan created with a great project team will lead to successful implementation.

For your unified communications deployment to succeed, you will need to make a true assessment of your existing communications environment, and then evaluate which unified communications components are critical to your business.

My step-by-step instructions lead you through the planning process and assist you in making the right choices for successful implementation of a unified communications solution.

A unified communications project should be looked at as an ongoing process that you implement over time, introducing one or more components at a time. This implementation process allows your users and administrators time to learn and use it effectively. I estimate that it may take you 3 to 6 months to complete all phases of your deployment if yours is a small to medium business, and a year or more if it's a large organization. So before jumping in with both feet, make sure that you have a well-balanced team that will approach the unified communications solution carefully and thoroughly.

Surveying the Landscape

If done right, the unified communications solution will enable your employees to become productive without completely replacing everything in your existing communications infrastructure. But to get those bottom-line results, you will need to:

- Assess your company's business and technical requirements in light of the unified communications solutions that are available and the features they provide.
- Look at your existing telephone system, e-mail and voicemail, and your local area networks (LAN) and wide area network (WAN). Compare them against your business and technical requirements to assess where the gaps are. After you identify where the gaps are, you can evaluate unified communications solutions in the marketplace and decide which comes closest to meeting your business and technical requirements while allowing you to keep at least part of your existing infrastructure.

  Even if your existing telephone system has some miles left in it, it's possible that it is still really time to retire the old system. Consult with your unified communications vendor to make sure that the new phone system you are considering is compatible with their unified communications solution.

Regardless of the size of your enterprise, a unified communications solution will immediately start delivering benefits and improve employee productivity.

Proper planning and lots of testing along the way, including a small pilot program before full implementation, are keys to success.

You aren't the only one thinking about unified communications; many enterprises have launched their unified communications journey or are in the middle of planning and implementing. As a matter of fact, Forrester Research cites a 21 percent increase in unified communications pilot programs since 2007.

Many organizations thinking of implementing a unified communications solution may already have some components in their infrastructure that can be leveraged. Also, if you bought licenses for an older version of a vendor's unified communications solution and also purchased insurance that entitles you to free upgrades for 3 years, then you have a compelling reason to move forward. Perhaps your organization is considering upgrading only your e-mail and voicemail system, or your telephone system. You can leverage your

current and future investments by adding unified communications components that make sense for your business and take advantage of the savings and productivity improvements.

To exploit the software- and hardware-powered unified communications solutions, look at it as a journey: Divide your plan into phases (discussed later in this chapter). Each phase may be implementation of some unified communications component, such as

- Instant messaging and presence
- Conferencing
- Integration of the telephony system with unified communications

Each phase will deliver benefits to your organization while your users become acquainted with the new technology. Your users will find new ways to engage with their colleagues and customers and partners (if enabled). In this global economy, everyone needs a competitive edge. A unified communications solution may be the perfect edge.

Each component of the unified communications solution will deliver its own set of benefits. You will see clear value in planning out each phase of the process with careful thought and team consensus:

- It may take time to get the plan in place and get your infrastructure ready for the unified communications solution implementation. It is critical to plan for each unified communications component, and then let the users adopt and experience it for a time before implementing the next component.
- Invest time in evaluating the software choices available in the marketplace and weigh different options against your business and technical requirements as well as the cost before selecting the solution. Most unified communications vendors provide professional services that include evaluation, planning, design, implementation, and testing the solution. They may also recommend their trusted local partners. Ultimately, it all means a great competitive advantage for your organization if you become the successful early adopter.

Consider the unified communications solutions to allow your organization to innovate and adopt new ways to manage your business — for example, how your sales team delivers contracts and proposals to the customers or how customer service works with the customers and partners to ensure that every call is answered and questions are resolved the first time.

Unified communications will involve a paradigm shift in how your individual users, teams, and your enterprise perform and require the cultural changes. To be successful, it's critical to involve:

- People from your IT department in the project team and the pilot team
- Key decision-makers and users from your various businesses or business functions so their business requirements are considered during the evaluation phase and eventual implementation

Because unified communications provides the capability to integrate your existing telephony and voicemail system, you should consider involving your telephony/PBX folks in the pilot and project team.

The overall plan for unified communications deployment should include some sort of user adoption training or activities, such as brown bag lunch sessions, to make everyone understand how to use the new unified communications tools and to whom to turn for assistance. You may even consider some sort of incentives, and then start measuring the success of your unified communications solution by monitoring metrics that the unified communications solution allows you to gather.

TIP

In most organizations, some people immediately embrace new technology and start reaping the benefits. They also become the departmental wiz, the "champ" in that technology, to whom everyone else turns for help. You need such people on your "user adoption" and training team. You need to train them first ("train the trainers"). Once trained, they will become your internal champions for leading their departments, divisions, or business units to success in adopting the new unified communications tools. You may even create some sort of internal contest or competition amongst these champions so that more users adopt the new tools and start on the road to success for the unified communications solution. The only way to actually gain the true benefits of unified communications is user adoption. The faster it happens, the sooner you will be counting the dollars and time you are saving for your organization.

Assessing Your Existing Communications

It's important to assess your organization's existing communication systems and network infrastructure.

Directory

Does your organization have a single enterprise directory that everything else integrates with, or do you have separate disparate databases for each component in your enterprise?

Many enterprises have consolidated their directory structure into a single, comprehensive enterprise directory structure, commonly known as the Active Directory from Microsoft or a LDAP standard-based directory.

If you are using a single enterprise-wide directory that everything integrates to, you are already ahead of the game compared to others.

E-mail

What e-mail system does your enterprise have? Most common are Microsoft Exchange Server 2003 or 2007, Lotus Notes, and some form of hosted e-mail system like Gmail, Hotmail, or Yahoo!.

If your enterprise is using either Microsoft Exchange Server or Lotus Notes, you are already integrated with an enterprise directory of some sort — maybe even Windows Active Directory.

PBX/PSTN system

Many enterprises have legacy PBX systems that aren't yet IP- (Internet Protocol) based. Other enterprises may have begun converting their PBX to an IP-based PBX from, for example, Cisco, Avaya, or Nortel. If your enterprise has the latest IP-based PBX, you are on your way to leveraging that investment and achieving the unification of your IP telephony with other communications tools.

It is critical to know whether your current PBX system is a traditional TDM-based or latest IP-based:

- Does it extend to national and international connections?
- How are your remote sites connected to the PSTN network?
    - Do they have their own PBX and voicemail systems?
    - Are they using the centrally managed system at the headquarters?
- How is each PBX system is managed?
- What are the cost elements?

Following are descriptions of some terms/acronyms used in this chapter and elsewhere in the book:

- **PBX:** A Private Branch Exchange connects all internal phones centrally so the users only need to dial a 4- or 5-digit extension number to reach a colleague.

- **PSTN:** A PBX connects to the PSTN (Public Switched Telephone Network) to enable internal users to reach external entities by making local, national, or international calls by dialing a number with 7 or 10+ digits.
- **TDM:** PSTN networks use circuit-switching to transmit multiple calls on the same line.

  Time division multiplexing (TDM) divides each call into multiple parts (frames) and transmits each part one at a time in a time-slot at a higher bandwidth.

Prepare an inventory of each site, noting how many users and what type of PBX/telephony infrastructure each site has. Each site could have its own small- to medium-sized PBX, including its own voicemail system, database directory, administration, and so forth.

How are calls being routed from your PBX to the outside world? What type of dialing plans have you subscribed to for national and international dialing? If you have multiple sites and users, consider a corporate policy regarding who at each site is allowed to call local, national, and international numbers. It will save your enterprise a lot of money once you figure out and implement some policies in the unified communications solution that you are implementing:

- Is the phone on each desk a legacy phone, or has it been upgraded to an IP-based phone?
- Do you have standard phones in conference rooms, or are they conference phones — like Polycom or Cisco?
- Do you have videoconferencing in the conference rooms? Is this technology either
  - A point-to-point connection?
  - A multi-point connection?

Voicemail

Is it a voice-mail system provided by your PBX vendor such as Avaya, Nortel, or Siemens, or is it integrated with your e-mail system? The most common scenario will be that your PBX vendor has provided some sort of voice-mail system that requires you to dial your phone to retrieve your voicemails and manage them, such as

- Archive
- Delete
- Forward

A few PBX vendors that provide voice mail have already integrated it with Microsoft Office Outlook so that the voice mails actually show up in your e-mail inbox with an `.avi` file attachment that you can play on your computer.

Also, most PBX vendors that provide voice-mail systems provide an indicator on your phone that you have new voice mail waiting — the blinking red light that many of us have become addicted to and can't live without.

Instant messaging and presence

Does your enterprise currently have some sort of enterprise IM implemented with presence? Is it internally managed or hosted by providers such as Windows Live Messenger, Yahoo! Messenger, or AOL Instant Messenger?

Enterprises that have Lotus Notes for their e-mail system may have Lotus Sametime as their IM system.

Conferencing

Does your company use audio-, video-, and Web-conferencing? Most enterprises today have some sort of audio conference bridge provided by telephony providers such as AT&T or Verizon. A few may have internally managed systems, like Latitude, MeetingPlace, and InterCall, that provide internal management and maybe even integrate it with the Microsoft Outlook calendar. Does either of these scenarios describe your organization's setup?

Many companies have hosted Web-conferencing from WebEx (Cisco), Microsoft Live Meeting, or Citrix GoToMeeting, which requires annual contracts, a fixed fee per month, plus additional fees for exceeding fixed minutes, much like cell phone contracts.

Voice

If your enterprise has implemented VoIP (Voice over Internet Protocol)-based communications, you are already partway into your unified communications journey.

Look at your current telephony environment and figure out what you have, how many sites, and how many users at each site. During this planning cycle, you need to evaluate where you are, what you want to accomplish in the new environment, and how you want to achieve it. Here is your chance to rethink

your enterprise strategy about communications and who can do what. To reduce costs when you implement the unified communications solutions, you may consider allowing only certain users to call long-distance and international. Most new unified communications solutions will allow you to define policies that group employees into those who call:

- Only local area codes
- Local and national
- Local, national, and international

Enterprise LAN and WAN

If your organization is a single-site, small organization, chances are that you have a local area network (LAN) that connects to the Internet via services provided by your Internet Service provider (ISP). Your existing LAN allows all the desktop computers as well as the servers in the back closet/room to connect into the local network and share components like printers and other peripherals. Using a broadband router, your LAN connects to the Internet via the ISP. Having a LAN is sufficient for you to consider adding some of the unified communications components to your environment. When I discuss the impact of the unified communications solution on your network, you will see whether you need to add any additional components to beef up your LAN or the Internet connection to get improvements in employee productivity and enterprise efficiency.

If your organization has multiple sites (national or international), then you probably have a LAN in each site that connects to a Wide Area Network (WAN). The WAN allows each local site to communicate and collaborate with other sites so your employees can connect with each other. To implement a new unified communications solution, it will be critical for you to gather the following information about your LAN and WAN:

- How many sites are there, and how many users are at each site?
- Are servers implemented in any of the sites?
- Are IT administrators located at any of the sites?
- Are there different e-mail systems, or any sites that are already using some unified communications components?

  It is possible that one or more sites may have a contract for hosted Web-conferencing or audio conference bridge, for example.
- Does each site have a separate telephone system (PBX), voice-mail system, directory, and/or administration?

Evaluating Unified Communications Components

In the initial planning phase, several key decision factors will affect how you choose to deploy the unified communications solution in your organization. Evaluate your organization's particular business and technical requirements, and decide what features of unified communications you want to enable. Most unified communications solutions vendors have created components that can be implemented in phases. For example, you can gain benefits of instant messaging and presence without implementing enterprise VoIP. Instant messaging and presence should be the first unified communications component you implement.

Determine what features you want to deploy

All unified communications solutions provide you with ways to unify and simplify instant messaging, presence, and conferencing: audio-, video- and Web-conferencing for users within your internal organization. Some unified communications solutions also will allow you to extend your unified communications solution to communicate with external users:

- Customers
- Partners
- Vendors/suppliers

TIP

These are known respectively as "Federation" and "Public IM Connectivity"; they're covered in Chapter 2.

You may want or need to archive your instant messages and audio/video communications for compliance or security reasons. The unified communications solution may provide archiving functionality out of the box, or you may have to look at third-party solutions that integrate with the solution that you have selected.

We have consolidated some key features of unified communications in Table 4-1 that you can use as a reference and compare it with features that your organization needs. For example, if your business depends on your capability to

communicate with your customers, partners, and vendors/suppliers instantly, then instant external communication is a critical business requirement.

Table 4-1 Unified Communication Components

If you want to provide this functionality	*Deploy this server role*	*Deploy this client*
Instant messaging and presence for internal users	Front end server	Communicator
On-premise Web conferencing	Front end server	Communicator Web conferencing client Outlook add-in for scheduled conferences
A/V conferencing	Front end server	Communicator Web conferencing client Outlook add-in for scheduled conferences
Archiving and Call Detail Records	Archiving and CDR Server	No requirement
External User Access	Proxy/Edge Server	Communicator
Federation	Proxy/Edge Server	Communicator
Public IM Connectivity	Proxy/Edge Server	Communicator
Web conferencing with external users	Proxy/Edge Server	Communicator Web conferencing client
A/V conferencing with external users	Proxy/Edge Server	Communicator Web conferencing client
IM and presence through a browser based client	Web Access Server	Communicator Web Access
Enterprise Voice	Voice Server and basic media gateway	Communicator Communicator mobile

Evaluate your organization's specific needs

Before you begin any deployments, you must consider the specific needs your business may have. They are different for each organization:

- Importance of high availability — 24/7 — of your unified communications solution. Can your business survive any downtime?

  If high availability is business critical, then you also should look at disaster recovery. What happens if there is a natural disaster in your area and your data-center/computer room is impacted?
- Geographic distribution of your organization

  Do employees need access to the solution remotely — while on the road, in a hotel, or at home?
- Do you have any specific service level agreements?
- Do you want to support external user access: customers, partners, and suppliers/vendors?
- Do federal, state, and/or local regulations require you to comply by archiving your communications?
- Does your business need Enterprise Voice (VoIP)?

Importance of high availability and disaster recovery

Some businesses cannot sustain any downtime from their unified communications solution: 24/7 availability is business critical for them. If you are in that category, make sure the unified communications solution you are evaluating will provide it. In general, high availability requires additional hardware/software. That means your cost will increase, but you can be assured that you will not experience any downtime. If your business can sustain itself with minimal downtime, say, a few hours to a day, and simplicity and economy are more important, then a single server may be an appropriate choice. Let's define some terms first:

- **High availability:** 100 percent availability of the unified communications solution; no downtime
- **Disaster recovery:** Processes and procedures implemented to recover from a natural disaster

- **SLA:** IT department may contract with the rest of the business in a company to provide certain levels of service, such as
  - Responding within 4 to 8 hours for any trouble-ticket created by users
  - 99.99 percent uptime for business critical systems

Geographic distribution

The geographic distribution of your company will affect the implementation of the unified communications components and how you do it. For example, if you have strong wide area network (WAN) links between your sites, assess how much is used on a regular basis and how much is truly available.

Adding the unified communications components will add a new load on your local area network (LAN) as well on the WAN. Let's say that your WAN is already very much overloaded and putting new load on it could bring it to its knees. In this case:

- Consider placing unified communications servers locally in each one of your sites or at least those sites that are low on WAN bandwidth. Especially, the addition of audio and video features will require greater bandwidth, and your users will have a better experience with a local server.
- Consider who absolutely needs or should have audio, video, and Web-conferencing capabilities, and avoid enabling everyone for it.

Number of users in each location

It is critical for your design and deployment team to know the number of users in each location today as well as the planned growth to determine if your unified communications deployment should include local servers in each site or centralize them.

Consider local servers on site if

- You have more than 200 users in a remote site that is expected to grow and you want to put a media gateway that connects to the PSTN or SIP trunking so you can reduce long-distance toll charges as well as bandwidth usage on your WAN.
- Your users in that local site have high availability requirements for enterprise voice.
- You plan to support external participants' access to Web conferences and audio/videoconferences and you expect a high amount of usage in this site.

Support for remote access and external user access

Most organizations have employees and managers who will need access to the unified communications tools remotely:

- On the road
- In hotels
- From home

Many organizations allow their employees to telecommute these days, and so enabling remote access may be a requirement for your organization. If you choose to enable your employees to access the unified communications solutions from anywhere or enable external user access — say, for customers and partners — then you will need to plan for a proxy/edge server in your perimeter network topology.

The terms that follow are defined broadly:

- **Remote Access:** Capability of users to access unified communications systems when they aren't connected directly to company's network — on the road, in a hotel, or from home
- **External Access:** Employees can connect with customers and partners for same level of presence and instant messaging access if they use same vendor's unified communications solution or have public IM: Yahoo!, AOL, or Windows Live Messenger solutions
- **Perimeter Network:** Company's internal servers are separated from external servers using firewalls

Support for enterprise voice

You can integrate your PBX/PSTN system with enterprise voice so your users can use communicator to single-click call anyone from their contact list. This call will travel from the user's computer over your WAN (Voice over Internet Protocol) and hand off to the local, national, or international telco network to complete the call. If you plan to do that, you must consider the need for a media gateway device that enables connection between the unified communications solution and your PBX/PSTN network.

Each unified communications solution will offer different choices and topologies to deploy the enterprise voice in your unique environment.

Media gateways are devices that provide translation of traditional telephone conversations into SIP (Session Initiation Protocol) that the unified communications system understands.

Scalability

Any solution that you implement that requires hardware and software will need to grow when the number of users increases or the actual usage increases. For example, let's say that in the case of the unified communications solution that we are speaking of, the company hires hundreds of new employees and needs the unified communications solution to grow or scale. The need to grow or scale is a requirement because the company added substantial new load with the new employees all using IM; presence; audio-, Web- and videoconferencing; and so forth. The unified communications solution typically should be able to grow or scale by adding hardware.

A unified communications solution is considered *scalable* if the performance and its ability to sustain additional load (through usage or new users) improves proportionally to additional hardware.

- *Scale vertically* (scale up) means adding additional processors and memory to an existing server in the topology.
- *Scale horizontally* (scale out) means adding more servers to the topologies, such as adding a server to an existing pool in the unified communications solution without shutting down the system.

For the sake of the unified communications solution topologies I am discussing, horizontal scaling should support additional load on the unified communications system by adding servers in a pool. Horizontal scaling doesn't require shutting down the unified communications server to add additional processors or memory. All that's being done is installing and configuring an additional server to the pool of servers already configured for the unified communications solution.

Network bandwidth requirements

The audio-, Web- and videoconferencing functionality of the unified communications solution will be a bigger consumer of your network's bandwidth and will add load that you will need to be very careful about. If your business requires all or some employees to be enabled for the conferencing functions

and some of them start using high-quality devices like VGA or HD Webcams, then be prepared to add additional bandwidth on your LAN or WAN as required. Plan for

- Expansion in the number of users in your company at various sites
- Increased usage as the users become more familiar with the unified communications tools

Graphics terms are defined below:

- **VGA:** Video Graphics Array resolution, typically 640 x 480 pixels
- **HD:** High-definition resolution output

Survivability

We spoke of high-availability earlier, where an organization needs the system to be available 24/7 and it cannot sustain if the unified communications system crashes for any reason.

Survivability means that the unified communications solution must remain live or available in case of a natural disaster such as earthquake, tornado, or flood. It's also known as *Disaster Recovery.*

Many organizations call it business continuity planning (BCP) or have disaster recovery as a component of their overall BCP. Most organizations define a BCP site where business may continue if their main site is down because of a natural disaster.

New unified communications features to consider

Vendors of unified communications solutions always introduce new features that enable capabilities you have been used to in your legacy environment but that required a hardware/software combination. Now those features are delivered through software innovation. Can your business benefit from them?

Call delegation

In the old days, most managers had their administrative assistants to answer the phone for them, find out who is calling, and ask if the manager wanted to take the call. Administrative assistants acted as the screeners and managed

the phone console for multiple bosses. Many managers liked that concept and felt that it allowed them to be more efficient. So the unified communications vendors, listening to their customers' suggestions, have now implemented it.

Managers can delegate phone call handling to one or more administrative assistants or other delegates of their team. When a delegate answers a call, the manager is notified that the call has been answered, along with the name of the delegate who answered. Delegates can transfer the call to the manager by speaking to her first or directly, and maybe even transfer the call to the right person in the department based on the context of the call. It allows everyone to work more efficiently and productively, and the customer/partner who is calling gets to speak to the right person the first time rather than going to voicemail. Managers get their work done more efficiently, and the administrative assistants can assist in managing multiple managers' calendars and schedules.

If your organization doesn't have administrative assistants anymore (many organizations today don't), managers can certainly transfer their calls to a team member or multiple people who report to them.

Team Calling

Similar to Call Delegation, a team leader of help-desk team or customer service team can select an entire team to answer the incoming call. As a result, when a team receives a forwarded call, each member's phone rings, and all members can see who forwarded the call. When a team member answers the call, the phones of all other members stop ringing. Once again, the premise is that the call gets answered and the person answering can forward to a subject matter expert based on the context and whoever is calling gets someone on the first try and gets an answer to their question/issue right away. This feature can be used in many different contexts but the ultimate goal is to get calls answered the first time rather than ending up in voicemail and the callers get satisfaction that work is progressing.

Group Chat

Chat enables users to engage in persistent, ongoing IM conversations. In Group Chat, the conversation persists, along with all IM conversations, files, Web links, and other associated data. This persistence makes it possible to maintain complete records of each session.

You can compare it to the concept of chat rooms where you can virtually enter at any time, if permitted, and still see all the information that has been exchanged so far. Even if you leave, the information remains intact.

You also can invite customers or partners to participate if enabled through "Federation." Imagine maintaining a continuing flow of information among project or product team members, both internal and external.

Making the Business Case

A high-tech company deployed instant messaging, presence, and conferencing to over 80,000 employees distributed throughout the world. The company expects that the first phase of the deployment will yield over 20 percent just by cutting its external audio conferencing expenses.

In a harsh economic environment, everyone looks for a leg up on the competition while seeking to cut costs and optimize resource usage while improving employee productivity and enterprise efficiency. This section highlights and provides details on how your enterprise can justify the investment in unified communications to gain that competitive advantage while reducing costs.

Specifically, I dive into a few areas of cost savings that you can immediately apply to your business and come up with direct and indirect cost reductions that will justify your investment in a unified communications solution:

- If you are paying for a reservationless audio conference bridge or for hosted Web-conferencing, you can completely eliminate them or reduce them drastically after you implement the IM, presence, and conferencing tools provided by the unified communications solution.
- If you enable telecommuting for your employees, you can reduce the costs of your office facilities.
- Immediately reduce or eliminate travel costs and replace them with Web-conferencing or videoconferencing.
- Reduce or consolidate your communications systems — PBXs, voicemail systems, and duplicate infrastructures at your sites/locations.
- Leveraging unified communications tools, improve the individual and team productivity, and your savings could be 20 to 30 minutes per day or more.

TIP

The savings potential that we have suggested to our customers in the past from their unified communications investments has resulted in customers recovering their investments in less than a year. Always implement the solution components that return the highest cost-savings.

I define each savings opportunity here in general, and as I have said earlier, your individual mileage may vary. You can use these general guidelines to perform your own savings calculations to arrive at an overall business justification for your enterprise.

Travel

Your enterprise can reduce or eliminate employee travel by leveraging unified communications tools. You can easily do this without disrupting your business effectiveness. You may even save costs for your partners and customers because they won't have to travel, either. If your company collaborates with customers and vendors to create contracts and proposals, you can replace those trips with tools like videoconferencing or desktop sharing and save cash and time.

Instead of everyone traveling to one place while you are working through the contract requirements and creating a first draft, review, second draft, review and so on, use the Web-conferencing feature from unified communications:

- Everyone can view and edit the content of the contract together.
- You can post the content, if necessary, for someone who didn't attend.
- A unified communications Web-conference can be easily recorded for later viewing.

Without anyone traveling, you could very well have a completed final version of the contract in less time than it would take if multiple trips for everyone were required to get the same work done.

Actual savings will come from reduction in travel expenses by targeting those employees who travel the most and enabling them with all the unified communications tools, including high-quality headsets or Webcams so their Web-conference audio and video quality is the best. For example, imagine a company with 1,000 employees. Say that each year, 25 percent of the employees travel for business five or six times, at an average cost of $1,000 per trip. Eliminating one or two trips annually by using the Web-conferencing tools available with any unified communications solution translates into a savings of $1,000 to $2,000 per employee, multiplied by 250 (25 percent of 1,000) for a total savings of $250,000 to $500,000.

Conferencing

Is your organization paying for a third-party audio-, video- or Web-conferencing service? When your organization moves to a unified communications solution that provides on-premise audio-, video-, and Web-conferencing, you can immediately start replacing many of those conferences over time, perhaps as soon as 3 to 6 months. You may want to consider investing in high-quality Webcams or headsets to enable users to use VoIP for those meetings/conferences, which eliminates the audio-conference bridge costs.

Even though external audio-conferencing services only cost ten cents per minute and external videoconferencing services costs 30 cents per minute, it can still add up to substantial amounts based on your current usage. Look at an example for 1,000 users:

Assume that you are paying $75 per user per month to the audio/video service provider. Say your cost of the new unified communications solution for audio-, Web-, and videoconferencing is $25, that will result in savings of $50 per user:

> $50 x 1,000=$500,000 potential annual savings for a 1,000-employee company.

Telephone tolls and cell phone charges

Does your organization pay for your employees' long-distance calling charges or cellular phone bills? Long-distance calls could cost you between 10 cents and 45 cents per minute and cellphone bills could average $100 to $200 per month. If only 50 percent of employees' long-distance and cell phone bills are paid by a company of 1,000, and they reduce usage by 50%, cell phone costs alone could deliver a potential annual savings of $450,000.

Now that you are looking to deploy unified communications, your users will be able to use the secure VoIP for their audio calls anywhere in the world, using your existing data network instead of paying the long-distance toll call providers. They can even use presence to check if their colleagues across the world are available before actually making the VoIP call without wasting any bandwidth on your data network. I don't pick up the phone as much anymore; instead, I use my communicator to check presence of a colleague or a customer/partner (if federated) and then ping that person using IM.

Find people in your company who have higher cellular bills and target them for this savings first.

Office facilities costs

Any organization that is deploying unified communications solution and is willing to allow its employees to telecommute can target reduction in the costs of the office facilities, especially:

- Fixed costs like rent and security staff
- Variable costs like telephone, electricity, heating, and air-conditioning

Many organizations can use the unified communications solutions to enable employees to work remotely, at least part of the time, with few shared "progressive offices" available when those employees must come to the office.

Organizations can simultaneously reduce costs of office facilities and increase employee satisfaction and productivity.

A leading telecommunications company in Europe estimates that saving just 30 minutes per week for each of its 1,500 employees amounts to $1.48 million in productivity gains annually.

A global Internet Protocol (IP) Solutions provider estimates that the average employee saves 20 minutes a day due to more efficient communications, including time to market on product development cycles and increased productivity across projects. A manufacturer of folding tables and chairs reduced overall voice mail and traditional phone maintenance costs by $851,000 annually.

Deploying the System

Most unified communications solutions include provision for what is called "Unified Messaging" — a way to integrate call answering and taking voice mail messages, maybe even automatic attendant service and access for users to retrieve their messages from anywhere. These voicemail messages then show up in your Outlook mailbox. You can either

- Play them.
- Have Caller ID information that allows you to directly answer that call.

Microsoft Exchange Server 2007 and Cisco Unity provide most of the features of Unified Messaging. Unified Messaging also enables all incoming faxes to be received by the server and dropped in the recipient's mailbox, eliminating the need for fax machines. In today's unified communications solutions, you may still need the fax machines for outgoing faxes, unless you are already using computerized fax-sending solutions.

Divide your unified communications deployment into at least three phases:

1. Use presence to reduce interruptions and find people when they're available.
2. Lower your costs and reduce travel, while increasing collaboration.
3. Centralize and customize telephony for mobile workers and telecommuters.

The rest of this chapter is your guide.

Phase 1: Implement presence and instant messaging

IM and presence make up the core building block on which the rest of the unified communications components depend. No matter what component of unified communications may be the mission critical for your business requirements, you still must start with IM and presence, so why not make that your Phase 1 implementation goal?

Your end users will get streamlined communications enabling them to contact the right person, the first time, when they use the presence capabilities. For example, as seen in Figure 4-1, John can make sure that Larry and Claire are available (green) before contacting them. If one or the other's presence shows red (busy, do not disturb, in a meeting), John can tag them so he gets notified when they are available rather than wasting time trying to reach them and getting voicemail. Depending on the unified communications solution you choose, presence may even be extended to other common applications you use every day, such as Microsoft Word, Excel, PowerPoint, Sharepoint, and so forth, so you don't have to leave the application you are working with to check someone's presence. Instead, you always find the right person, the first time.

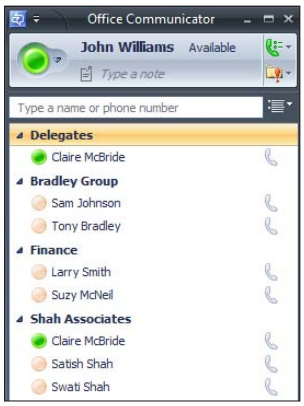


Figure 4-1: John can see Larry and Claire's presence in his communicator client.

Phase 2: Implement conferencing

Most organizations looking at a unified communications solution plan to implement the familiar audio-, video-, and Web-conferencing integration into their unified communications deployment so users get the advantages of

jumping into an audio or video call with one or more colleagues to discuss an important

- Issue
- Project
- Proposal
- Idea

Tackle the implementation of conferencing into your unified communications solution in phase 2, after you have deployed IM and presence. IM and presence are required building blocks for conferencing, and your users will actually be able to use the communicator client on their desktop or any popular application to first find those colleagues available and then invite them into either

- Audio conference
- Video conference
- Web conference

The conferencing component delivers productivity and efficiency for the users and reduces costs. This conferencing component is installed on the unified communications server that sits in your organization's back room. You take advantage of additional capabilities from the same hardware and software that you installed in Phase 1 and enable more features.

Compare that to the cost of your audio conferencing bridge from AT&T or Verizon and videoconferencing from third-party companies. If your organization was using hosted Web-conferencing solutions like WebEx (Cisco), Live Meeting (Microsoft), or GoToMeeting (Citrix), those costs are basically gone now that your internal server has enabled on-premise conferencing. No more bills to pay, especially the overages if you go over the fixed minutes that you signed up for.

You may invite someone locally, nationally, or internationally from your computer when you invite them into a conference — audio, video or Web. All use the computer with headsets or built-in Webcams, and the data and voice that you transmit travel over your data network — LAN and WAN — using Internet protocol (IP):

- Users can invite two people or ten, from around the world
- There is no need for anyone to travel anywhere, lowering your costs while increasing collaboration between colleagues.

In this phase, I recommend that you deploy audio-, video-, and Web-conferencing broadly to your users and start reducing or completely eliminating the reservationless audio bridge costs.

Consider extending the conferencing capabilities to your external customers and partners. Imagine your sales and marketing team running Webinars for your products and services on a monthly basis and reaching thousands of existing or new customers and partners from the comfort of their offices. If it is appropriate, they can even invite subject matter experts (from your company or outside) to present and demo or simply answer questions. Web-conferencing tools allow you to share a presentation or an application from your computer to hundreds of people in your audience, and no one has to leave the office to participate. Talking about cost savings, you are now even saving your customers and partners from having to travel somewhere.

Phase 3: Implement voice

The enterprise voice component of unified communications delivers software-powered VoIP, transmitting data and voice both on your IP network. These capabilities also integrate with your existing messaging (e-mail) and telephony infrastructure to provide a totally unified experience for the end users.

The enterprise voice component significantly reduces the load on your PBX/PSTN network usage as your users start using their computers to talk and collaborate with their colleagues. Most of the unified communications vendors have released devices that provide very high quality voice and video to integrate with your unified communications solution. My experience using these enterprise voice devices — Bluetooth-enabled headsets, IP phones, USB speakerphones, and HD or VGA Webcams — has been very positive. (I cover some of them later.) I have a built-in Webcam that came with my Dell laptop, and I use it every day to participate in audio- and videoconferences. I also am very impressed with Polycom's USB speakerphone that connects easily with my Communicator.

If you've already started upgrading your PBX to IP telephony and started putting IP phones (phones that use your data network, LAN, instead of the telephone network) on users' desks, then you have a leg up and you can integrate that IP PBX with your unified communications solution and leverage that investment faster than you may have anticipated.

As shown in Figure 4-2, John is able to call any phone numbers that have been published by Claire directly from his communicator client easily.

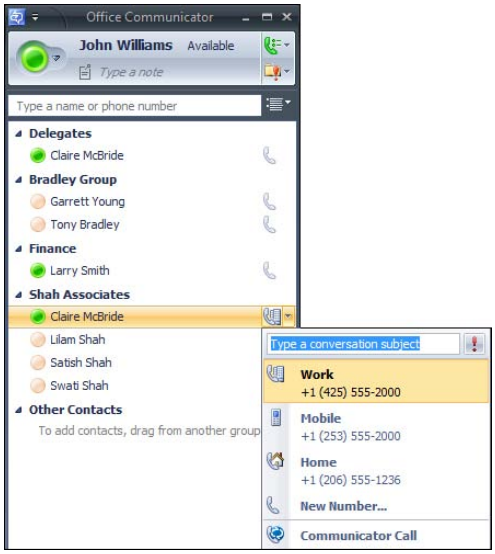


Figure 4-2: John can single-click call Claire's different phone numbers.

Taking everything into account

Figure out which style of company you are and what type of deployment category you may fit into. In this section, I categorize businesses into three groups and discuss the planning and deployment scenarios for each. Obviously, these are sample categories and deployment ideas; you may pick and choose what fits in your business and technical requirements. As discussed earlier, unified communications solutions are "componentized" so you may choose a component from another category that fits better in your particular situation.

These categories are grouped based on complexity and size of an organization:

- **Small and medium businesses unified communications solution** applies to companies that have fewer than 5,000 employees, don't need high-availability, and will deploy internal-only IM, presence, and conferencing.
- **Large businesses unified communications solution** applies to companies that have more than 5,000 employees, need high-availability, and are planning to centralize all servers into a single physical site.
- **Global businesses unified communications solution** applies to companies that have more than 5,000 employees, need high-availability, scalability, external user access, and want enterprise voice.

Small to medium deployment scenarios

The simplest form of unified communications deployment fits the business requirements of a small to medium sized organization. In this scenario, it is most important to the organization that the unified communications solution be simple and economical. I lay out this simple topology so that it can be used by the organization to start from and add other building blocks on top later, if appropriate. Each subsequent section discusses deployment scenarios that take on more complexity and add functionality and the components necessary to enable it.

Small deployment: IM, presence and conferencing for internal users only

The simplest topology provides IM, presence, and conferencing internally for a small user base. It may consist of a single server deployment to start with.

This topology is appropriate for small to medium organizations with fewer than 5,000 users or pilot deployments in which the main goals are simplicity, economy, and ease of management, and where high availability isn't a requirement. Figure 4-3 shows a simple deployment.

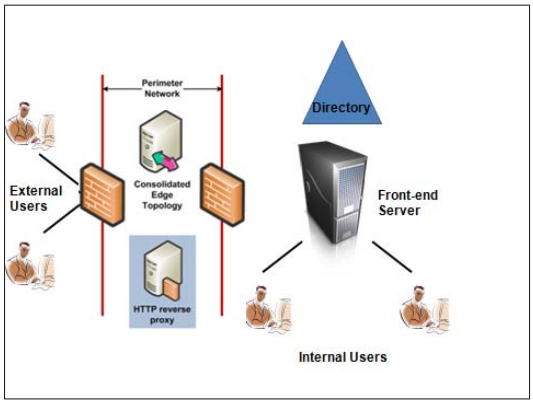


Figure 4-3: Simple deployment for small to medium organizations with single server.

Small deployment with support for external user access

Now add external user access to the preceding small to medium business deployment of a single unified communications server. It will allow you to support IM, presence, and conferencing both for internal users and external users, adding to the initial building block of single server deployment.

In this topology, you add a server in your perimeter network (DMZ), called a *proxy server* or *edge server,* that connects you to the external world by having a secure connection to the Internet. This topology enables you to configure

- Remote access
- Federation
- Public IM connectivity

If you plan to invite external users to conferencing, then you also need to deploy an HTTP Reverse Proxy component in your perimeter network, as shown in Figure 4-4. This component carries the HTTP and HTTPS traffic to the Web components.

For this topology:

- The perimeter network has
  - A single edge server
  - A HTTP Reverse Proxy server
- All three edge server roles are installed on a single computer:
  - Access Edge Server
  - Web Conferencing Edge Server
  - A/V Edge Server

Figure 4-4 shows a simple deployment with support for external user access.

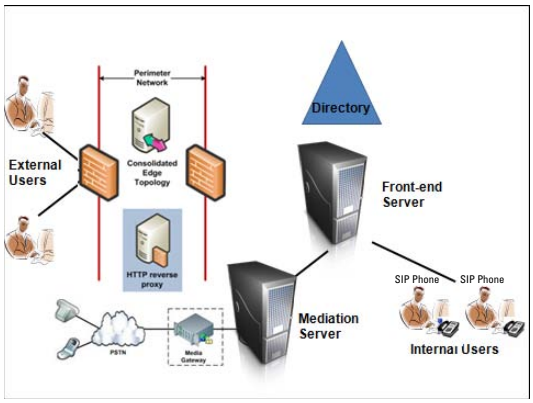


Figure 4-4: Simple deployment with single server and external user access.

Medium-sized deployment: External user access and voice

In this scenario, a small to medium sized company wants to support IM, presence, conferencing both for internal users and external users, and the voice (VoIP) functionality. Here, you can build upon the simple deployment with external access, and add a connection to your PBX into the single server. As discussed earlier, you can even leverage your existing PBX that hasn't been upgraded yet to an IP PBX by adding a media gateway.

Like the simple deployment with external access, as previously described, a single edge server is deployed in the perimeter network and the single server is connected to the PBX via media gateway for voice functionality.

Figure 4-5 shows a simple deployment with support for external user access and voice.

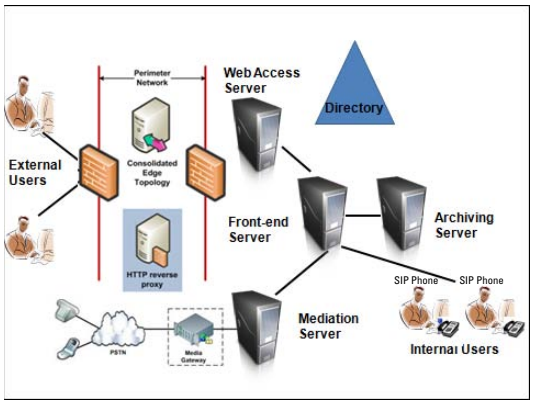


Figure 4-5: Simple deployment with external user access and voice.

Medium-sized deployment with external access and voice in multiple locations

Using the preceding scenario of a medium sized deployment with external access and voice in a single location, I now will add the appropriate components to support a medium sized company with the following requirements:

- IM, presence, and conferencing both for internal users and external users
- Voice functionality for multiple locations

Some locations for this medium-sized company have at least 200 employees and are growing, so it is recommended to consider adding the additional media gateway and voice server at those locations to support the local users for voice.

Also, you must consider each location's requirements for high-availability and traffic for audio-, Web-, and videoconferencing, and then decide whether other unified communications components like the edge server should be deployed locally.

A voice server connected to a media gateway will connect to the PBX in the local office, and then connect to the PSTN network. The voice server's job is to translate media between the gateway and the single unified communications server.

Some unified communications gateway vendors may provide advanced media gateways that combine the functions of the voice server and media gateway integrated into the gateway itself.

Medium-sized deployment: Archiving, external access, Web access, and voice in multiple locations

Your organization may be required by federal, state, or local agencies to archive all communications:

- IM
- E-mail
- Voice

So in this scenario, a medium-size company wants to support the following functionality:

- IM, presence, and conferencing both for internal users and external users
- Voice functionality for multiple locations
- Internet access to IM functionality using a Web browser
- The ability to archive IM messages or usage data and capture call detail records
    - **Web access for IM:** User's ability to use a browser from any computer to access IM, presence, and audio conferencing
    - **Archive IM or usage data:** Capture all IM conversations text as well as the date/time stamp for audio and video conversations
    - **Call Detail Records:** Capture of all VoIP conversations: who, when, how, and so forth, for each audio-, video-, and Web-conference
    - **HTTPS:** Secure and encrypt transmission of data over the Internet

I can use the same topology I used in Figure 4-5 with the additional unified communications component — Archiving Server — that enables archiving and CDR capture via the new server role. I also add a server role called Web

Access Server to enable user's access to the IM feature over secure Internet access (HTTPS) via a browser. Users can access the same IM functionality from a Web browser when they're

- On the road
- Working from a customer site
- Use a non-Windows computer

In the sample topology diagram, the Archiving and CDR Server is collocated on the same server hardware. Based on which unified communications vendor you choose, the requirements for the servers may vary a little and you may not be able to collocate these two servers on the same box. Figure 4-6 depicts a sample topology.

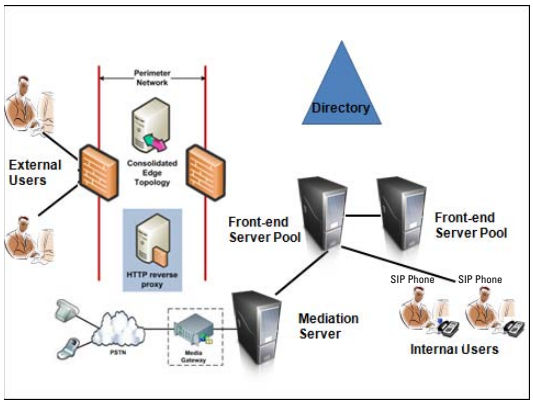


Figure 4-6: Medium-sized deployment: External and Web access, voice, and archiving.

Centralized enterprise deployment scenarios

For large enterprises that are centralized into a single physical site but require high availability internally, topology will change to provide for 24/7 high-availability. The simplest design that will provide high availability internally is to deploy multiple IM/presence servers (also called front-end servers) in a pool. These front-end servers can be load-balanced with a hardware load balancer and connected to multiple database servers.

The following deployment scenarios are supported:

- Enterprise deployment: IM and conferencing for internal and external users
- Scaled deployment with high availability

Enterprise deployment supporting IM, conferencing and voice with high-availability

In larger enterprises, when instant messaging, presence, and conferencing are considered mission critical, high availability is a requirement. Any enterprise pool with multiple Enterprise Edition Servers can provide basic high availability.

In its simplest configuration, a consolidated topology, each Enterprise Edition Server in a pool runs all server roles: Front-End, A/V Conferencing, and Web Conferencing, as well as IIS for the Web Components. A consolidated pool can support up to 30,000 users. The advantage of the consolidated configuration over the expanded configuration is ease of management.

Chapter 5

Unifying Voice

In This Chapter

- Unified messaging
- Working with voicemail
- Managing and routing calls
- Integrating the PC and desk phone

The telephone is one of the most common and widely used communications devices in existence. Ever since Alexander Graham Bell uttered the famous line "Mr. Watson, come here — I want to see you" to his assistant Thomas Watson in March 1876, the telephone has been a staple of communications around the world.

As the leading communications technology, it has earned a position as the keystone of most unified communications deployments. As communications technology evolves, it doesn't mean that voice communication will become a thing of the past. On the contrary, as unified communications expands the functionality of voice communications, it will evolve and enable organizations and individuals to have more control and flexibility in how they use it.

This chapter explores how unified communications has impacted voice communications beginning with unified messaging and the convergence of communications to a single inbox. It then covers the new ways that unified communications and unified messaging enable you to work with voicemail messages, and explores how you can be contacted using a single phone number by managing how calls are directed. The chapter wraps up with an overview of how unified communications integrates the PC desktop with the traditional desk phone and the benefits of that merger.

Understanding Unified Messaging

Unless you have been living under a rock for the past 20 or 30 years, you should be familiar with the concept of voicemail. We have come a long way, though, from the days of using an analog audio tape on a machine physically connected to the phone.

Top five benefits of unified messaging

Unified messaging provides a number of benefits for users:

1. **A single inbox.** Unified messaging can deliver all types of messaging and communication to a single inbox. The single inbox is easier for administrators to maintain, and provides flexibility for users to manage and interact with all of their communications.
2. **Efficient communication.** Users can communicate more efficiently by having access to all communications at one time and being free to share, forward, or manage them in the way that's most convenient or effective for the given communication.
3. **Cost savings.** Merging streamlines the communications administration and consolidates the infrastructure onto fewer physical servers, saving money for the enterprise.
4. **Access from anywhere.** Unified messaging provides alternative methods of accessing communications. By merging e-mail, voice, and other communications, users can get voice messages in e-mail, have e-mail dictated over the phone, or access communications via the Web.
5. **Effective search.** Rather than sifting through different applications and execute multiple searches, users can quickly conduct searches of all communications and easily locate the data they are looking for.

Local telephone service providers have offered some type of digital voicemail feature for decades. However, that voicemail service generally is tied to a specific phone number. It's possible to dial in and retrieve voicemail from virtually any phone in the world, but you are restricted to listening to and saving or deleting messages one at a time, sequentially. It certainly isn't the most efficient system in the world.

One inbox for all

Unified messaging takes the concept of voicemail to a whole new level. Rather than having to dial into one system to get voicemail and access a different system to receive faxes, and log into a server to get e-mail messages, unified messaging enables you to have a single message store or inbox for all communications.

The concept of unified messaging and the features it delivers vary from vendor to vendor, but in general these are some of the capabilities you can expect:

- **Automated Attendant.** An automated attendant is like a virtual receptionist or operator. The automated attendant may work on either touch-tone menu input or voice-response recognition and can make it simpler and more intuitive for callers to reach the department or individual they are seeking.
- **Receiving Voicemails.** Rather than being stored on a separate phone server or system, voicemail messages are stored in a common inbox along with e-mail and other communications. Voicemails can be played directly from within an e-mail or may be attached to the e-mail as an audio file (Figure 5-1). Receiving voicemail in the e-mail inbox also expands the options for accessing voicemail; it can be retrieved
    - From a phone
    - From the e-mail client
    - Through Web-based e-mail access
    - Through e-mail access on a mobile phone
- **Receiving Faxes.** If you receive faxes on a stand-alone fax machine that spits out actual paper copies of the message, this won't help you much. However, if you rely on a fax server, the faxes can be rerouted to a unified messaging inbox. Old-fashioned faxing requires that you be physically present at the site of the fax machine in order to receive it; unified messaging faxes can be accessed anywhere, any time, in all of the same ways previously mentioned for accessing voicemail.

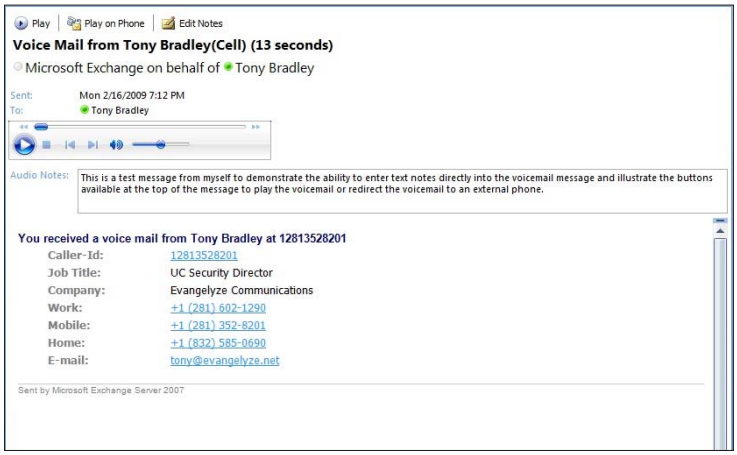


Figure 5-1: Exchange Unified Messaging has an embedded audio player.

- **Voicemail Notification.** Traditional voicemail typically relies on either a flashing light on the telephone handset or a stutter tone when the phone is picked up to notify you that there is a pending message. With unified messaging, the user receives the voicemail in e-mail, making it accessible from anywhere in the world at any time, plus the softphone client generally has some sort of voicemail notification to alert the user that there's a new voicemail.
- **Direct Access to Voicemail.** Some enterprise phone systems have this capability already, but it is still a cool feature. With voice tied into unified messaging, you can leave voicemail for a co-worker without actually ringing their phone. If you want to leave messages for someone without interrupting that person or just want to leave a reminder without having an actual conversation, the capability to connect directly to voicemail can come in handy.
- **Route Playback to Phone.** Even though unified communications and unified messaging can give you the capability to play your messages back on your computer either through the softphone client or by playing an embedded or attached audio file from an e-mail, you might not always want to do this. If you are in a coffee shop or sitting in an airport, you may want your messages to be private. Unified messaging allows you to initiate playback of voicemail messages on your computer, but reroute them to your desktop or mobile phone.

WARNING!

A unified messaging inbox uses significantly more space than a traditional e-mail inbox. Adding audio/video content and images (such as faxes) can quickly fill standard message storage. As you implement unified communications and unified messaging, you will need to account for this and expand the storage capacity.

You've Got (Voice)mail

With unified communications and the convergence of voicemail with e-mail and with the PC desktop, you have new ways to interact with voicemail messages. You're probably used to some sort of light on your desk phone or a stutter dial tone when you lift the handset to alert you when a new voicemail message is waiting.

Depending on the unified communications platform, those notifications may be extended to the desktop by either

- **Unified communications client.** The unified communications softphone or instant messaging client application typically has some sort of notification to alert you when a new voicemail message is available.
- **Windows systray.** The unified communications software may tie into the Windows desktop and provide some sort of message waiting indicator in the systray of the Microsoft Windows operating system.

Playing voicemail from the unified communications application

The integration of voicemail and e-mail provides additional options for listening to voicemail messages. The softphone or unified communications client application typically provides the capability to access and listen to voicemail messages. For example, with Microsoft Unified Communications you can contact the voicemail system directly from Microsoft Office Communicator with a single click.

Microsoft Office Communicator 2007 R2 has a Change Greetings option which provides one-click access to enable you to change the greeting message for your Exchange voicemail. You can record a new message and work with the voicemail settings directly from the Microsoft Office Communicator application.

Getting voicemail in your e-mail

Voicemail is an essential feature to have for a phone system. The capability to leave a voicemail is certainly better than having the phone ring indefinitely with no way to reach the user. However, voicemail has its drawbacks as well.

Generally, users only receive their voicemail when they use the phone that the voicemail was left on. Most voicemail systems also provide some method of remotely retrieving messages by calling in to the voicemail system, but those features are rarely used unless someone is going to be away from the office for an extended period of time.

With unified messaging, voicemails are delivered to the same inbox as e-mail and other communications and can be retrieved using an e-mail client. Users often have e-mail delivered on their mobile phones and many organizations have Web-based access to the enterprise e-mail system, so the capability to receive voicemail in e-mail means that you have access to your voicemail virtually anytime and anywhere.

Some unified communications systems attach voicemail messages as an MP3, WAV, or other audio file format to an e-mail.

Other unified communications platforms, such as Microsoft Unified Communications, embed the voicemail in the e-mail itself. In fact, when using Microsoft Exchange with Unified Messaging and Microsoft Outlook, voicemail messages have an embedded audio player so they can be played directly from within the e-mail without the need for any additional audio utilities.

Integrating with other applications

Another benefit provided by unified communications and the merger of voicemail and e-mail is the capability to integrate with other applications to provide relevant information in addition to the voicemail message itself.

The e-mail message containing the voicemail generally will contain any Caller ID info that was collected during the incoming call. Typically, the Caller ID info is also clickable, meaning that you can place a return call to that number with a simple mouse click.

Some unified communications implementations take this benefit a step further, though, by resolving the Caller ID information against your contact list or against a customer relationship manager (CRM) database of some sort.

This functionality can help you be more efficient and effective by adding valuable information to the message. Rather than having just a phone number with a voicemail message, you can have the caller's

- Name
- Company
- Title
- Notes from previous contacts
- Sales history

With Microsoft Outlook and Microsoft Exchange voicemail, you can also click *Play on Phone* to have the voicemail system call you on your phone if you want to listen to the voicemail messages with more privacy than you may have by blaring them over your computer speaker. If you're in a coffee shop or other public area, this can be a handy feature.

Hang on, let me grab a pen

Odds are good that at some point in your life you have listened to a barely intelligible voicemail message in which someone left information such as directions to a location or a phone number, and it was difficult to hear the details. With traditional voicemail, you had little choice but to continuously replay the message and record one deciphered tidbit at a time while writing it down on a sticky note or a scrap of paper.

Being able to play the voicemail as an audio file — whether embedded within the e-mail itself or attached to an audio file — gives you much greater flexibility by enabling you to

- Pause
- Rewind
- Repeat
- Adjust the volume

Most desk phones enable you to adjust the volume, but doing so is often more complex or cumbersome than adjusting the volume on the PC, and the PC can produce much louder volume than the phone.

Products like Microsoft Exchange Server enable Outlook users to add thoughts and type notes that stay attached to the voicemail. Instead of small scraps of paper that are lost, the notes entered into Outlook with a voicemail message stay there. You can refer to the notes you entered and recall unique details or pertinent facts related to that message, whether you access that voicemail either

- Next week
- Next month
- Next year

More importantly, the data entered into the notes of the voicemail is indexed and becomes searchable text. You can locate old voicemail messages much more quickly and efficiently by typing some information into the notes that can serve as relevant search terms should you ever need to find the voicemail again.

Sharing messages

Another limitation of traditional voicemail messages and faxes is that their use typically is limited to the recipient. Granted, a fax could be re-faxed to another recipient, but that generally involves printing it, and then rescanning and transmitting it, which wastes ink, paper, and time. In most cases, messages can't be forwarded or shared as voicemail.

Because unified messaging enables you to receive your voicemails and faxes embedded or attached to e-mails in a single, unified inbox, it also enables you to work with those message types any way you can work with e-mail messages.

With unified messaging and a single inbox you have greater control and flexibility for sharing communications with others. Some examples of this flexibility include:

- Voicemail can be forwarded to other individuals or groups that may be more appropriate to address an issue.
- Voicemail can be escalated to management to resolve problems.
- Faxed purchase orders can be forwarded to appropriate departments for handling.
- Voicemail and fax messages can be backed up and archived for future reference.

The capability to store, forward, and distribute all forms of communication, including voicemail, faxes, and instant messages, creates opportunities for users to increase productivity. At an organizational level, unified messaging, and the capability to share messages in this way, enables processes to be automated and business to be executed more efficiently.

Single Point of Contact

Have you ever missed an important phone call? Have you ever needed to get in touch with someone urgently, but were unable to find that person? Did it take multiple calls to various numbers to finally track down the individual? The voice capabilities of unified communications help to minimize or eliminate these issues.

With unified communications, you can take advantage of features that enable others to determine if you're available and to reach you no matter where you are. For starters, Presence (see Chapter 2) helps people to identify with a glance if you're available to accept a phone call immediately.

If you know from users' presence status that they're either on a call or in a meeting and can't receive a phone call at this time, you can opt for alternative communications methods. You may be able to communicate via instant messaging or e-mail.

This section focuses on a different, but related, aspect of unified communications: the ability to direct a single phone number to multiple destinations.

Think about that for a minute. Consider the information you currently have stored in your contact manager. Some users might have five or more phone numbers:

- Work phone
- Work fax
- Work mobile phone
- Personal mobile phone
- Home phone

If you need to get in touch with someone, you might call each one of those numbers in succession (with the possible exception of the fax line) and still have no assurance of reaching that person. If the call is urgent, you may further complicate matters by leaving a voicemail message at all of the numbers. All in all, an inefficient system for contacting someone.

Using the functionality available in unified communications, you have a variety of options at your disposal to control how your incoming calls are managed. In effect, a single point of contact can be achieved by routing all calls to a single phone number.

Two primary functions available with virtually any unified communications platform can be used to consolidate phone numbers:

- **Call Forwarding:** You can use call forwarding to route incoming calls to an alternate number.

  Call forwarding typically can be configured to either

  - Forward all incoming calls immediately.
  - Forward calls only after you don't answer after a specified number of rings on the number that was initially dialed.

- **Simultaneous Ring:** With simultaneous ring, you can assign an alternate number that will receive the incoming call at the same time that it is ringing on the number that was initially dialed.

Some of the more robust unified communications platforms take things a step farther by allowing custom rules that forward and reroute calls. For example, calls from an individual or group can be forwarded to a mobile phone to ensure they are received while other calls can be routed to a different group or individual to be addressed in your absence or simply be allowed to go to voicemail.

Merging Phone and PC

Although the clock seems to be ticking on the traditional desk phone, you would be hard-pressed to find an enterprise that has simply ditched the phone in favor of purely software-based communications. For now, organizations are more interested in finding ways to leverage their existing investment in their voice communications infrastructure and integrating the pieces they already have with their chosen unified communications platform.

The goal of unified communications is to simplify and integrate communications so that users can work more efficiently and increase productivity. Having a desk phone and a software-based phone sitting on the same desk requires that users have some level of integration and work cooperatively toward those goals.

Remote call control

With remote call control (RCC), you can integrate your unified communications platform with your existing Private Branch Exchange (PBX) phone system. RCC enables you to leverage some of the capabilities of unified communications without requiring you to migrate to a VoIP-based phone system.

Essentially, an RCC integrated system ties the existing PBX infrastructure in to the unified communications environment:

- When users make or receive a call using their desk phone, the presence status in unified communications is updated to reflect that they are on a call.
- The unified communications softphone application can be used to make and receive calls and otherwise interact with the desk phone.

The functionality of RCC is dependent on the capabilities of the PBX system being leveraged, but may include

- Placing calls
- Receiving calls
- Initiating call waiting
- Placing calls on hold
- Viewing Caller ID
- Transferring calls
- Forwarding calls
- Accessing a missed call notification

Dual-forking

Dual-forking is similar to RCC: It enables an enterprise to leverage the existing PBX infrastructure and integrate it with the unified communications experience.

Dual-forking by itself provides a variety of capabilities to enable you to use the unified communications environment to work with the PBX-based desk phone and vice versa. Dual-forking can also be used in conjunction with the RCC scenario, as described previously, to provide a more robust integration between the two infrastructures.

Chapter 6

Employing Instant Messaging

In This Chapter

- Reviewing the evolution of instant messaging
- Incorporating instant messaging in corporate enterprises
- Instant messaging and unified communications
- Using instant messaging to improve communications

Have you used any form of instant messaging yet? Have you heard of

- America Online (AOL)?
- Yahoo! Instant Messenger?
- MSN Messenger?
- Windows Live Messenger?

If not, please ask a teenager or a twenty-something individual and you will find out what that generation is using and how are they using it. You may even try one of the free IM solutions just to learn. Who knows — maybe you will like it so much that you won't be able to live without it, either.

This chapter starts with the history of instant messaging and how it has evolved. I highlight what corporations are doing with instant messaging today and what I recommend you look at to get the most benefit out of instant messaging.

Evolution of Instant Messaging

Instant messaging (IM) is a way for two or more people to communicate with each other instantly — in real-time — by each typing text. In most cases, these people are connected with each other via the Internet, but in some

cases it is possible that they all work for the same company and are connected to the company's local area network (LAN). It is also possible that they don't have access to the Internet and so they can only communicate via IM with their colleagues in the company.

Instant messaging solutions also provide you access to the real-time presence (availability) of the people whom you have added to your contact list. For example, John Williams works in the marketing department of his company and always works with Suzy McNeil and Claire McBride, both of whom are also in marketing. Occasionally, John works with Larry Smith in Finance. After John adds Suzy, Claire, and Larry to his contacts list, he can very easily see their presence online.

Instant messaging (or chatting, as it used to be called by the teenagers) became popular in the early 1990s when vendors upgraded the text-based IM applications to a Graphical User Interface (GUI). In 1992, CU-SeeMe offered the very first IM solution that even allowed you to use audio and video while chatting. But, America Online really should be credited for revolutionizing the industry by offering AOL Instant Messenger in 1997.

Microsoft launched MSN instant messenger soon after Yahoo! launched its own IM, and IBM released one of the very first enterprise solutions, known as Lotus Sametime, in 1998. A consumer solution known as **Pidgin** emerged around the same time; it supported many popular IM protocols and became a popular desktop client that you could use to connect to different vendors' services.

Figure 6-1 shows an image of what the early IM clients looked like and illustrates that they even allowed you to add contacts to your client application from different places like

- Work
- Friends
- Family

Pidgin has about 3.5 million active users, AOL has over 50 million, and MSN (now called Windows Live Messenger) has more than 200 million. IBM Lotus Sametime has over 15 million active users (in private corporations).

WebEx revolutionized the market with its introduction of Web-conferencing—audio/video and application sharing features added to the IM functionality. Microsoft followed with its Live Meeting service, and Citrix with GoToMeeting. All of these services are provided for a fee, moving away from the earlier free-services business model like MSN or Yahoo!.

Chapter 2 discusses the concept of *presence* — the capability to see which of your contacts are available online at this instant so you can send them a quick instant message. IM also allows a user to easily multi-task; for example, you can have separate IM conversations with multiple people at the same time. Many times when I was on the phone with a customer who asked me a licensing question — which I am not an expert on — I could easily IM one of my licensing experts and ask for an answer.

Many employees, especially young college graduates, are demanding unified communications solution tools because they have been used to them while in college and high school. They want the same (or better) capabilities in the workplace. Many employers are listening to these demands from employees who have learned the value of these tools, and have started evaluating and deploying these unified communications solutions. Companies are also recognizing the business value and savings to be gained when they use these IM tools to communicate efficiently with their customers and partners, especially if they are geographically dispersed.

If you haven't experienced it already, you soon will see the business value as well as the individual productivity improvement you can gain by using some or all of the tools mentioned in this and earlier chapters:

- Instant messaging
- Audio-, video-, and Web-conferencing
- Voice over Internet Protocol (VoIP) based calling

Figure 6-1: Pidgin Instant Messaging client interface.

It will also soon become evident that if you are using e-mail today to communicate, IM conversations will save you time and effort while getting your answers quickly because most IM conversations tend to be short and don't drag into multiple subjects. You will probably use IM and presence to get a quick answer to a question or jump into an impromptu short application/desktop sharing session with a colleague or customer/partner. I used my IM contact list of customers and partners while I was at Microsoft to keep in touch with them occasionally so that we were all on the same page — especially when we were engaged in projects.

Another great benefit of IM and presence is that you can change your presence manually so that you can focus on a project or proposal deadline and remove yourself from being disturbed. Sort of like closing the door of your office and hanging a "Do Not Disturb" sign. You can very easily change your presence status to "busy" or "do not disturb," thus flagging your unavailability to communicate. As shown in Figure 6-2, John really has to finish the tasks on his to-do list and doesn't want any disturbance so he hangs a "Do Not Disturb" sign for his status (availability).

Figure 6-2: John turns his presence (availability) to "Do Not Disturb."

As a business evaluating unified communications solutions, you obviously have some choices to make: Should you either

- Stay with free or lower priced hosted consumer solutions, like
  - AOL
  - Yahoo!
  - Windows Live
- Implement your own enterprise solution, like
  - Cisco Unified Presence Server
  - Microsoft Office Communications Server 2007

The answer depends on your industry:

- If your company is in an industry such as financial services, healthcare, or any of the industries that have to meet stringent federal, state, or local regulations for security, archiving, and compliance, then you would be better off implementing your own server-based solution.
- If you aren't in an industry that is strictly regulated and you have smaller budgets to work with, you can start out with one of the consumer IM solutions like AOL, Yahoo!, or Windows Live to get your feet wet and learn.

  After you see the business value and need more security or more features, you can look at either

  - Your own in-house implementation
  - One of the hosted unified communications solutions provided through Microsoft, GoToMeeting, Cisco, and so forth.

Instant Messaging in Corporate Enterprises

You may be reading this book because you are facing the challenges that many executives and information workers in similar businesses are experiencing:

- You are a small business but need to communicate with customers and partners nationally or around the globe.
- You are a medium-sized company that has employees spread around the country or the world who need to communicate and collaborate effectively.
- You are a large enterprise that has many different solutions implemented for communicating and collaborating but none are integrated.
- You need quick and fast response to customer inquiries or sales opportunities inside your organization and able to compete with competitors to gain competitive advantage.

Before the introduction of the unified communications solutions at my employer, the only option I had to communicate and collaborate with my colleagues, customers, and partners was e-mail. I first sent project documents and proposals to my colleagues and management for review, and then waited for their feedback. If I needed an answer right away or we were under some strict deadline, I made my e-mail high priority. If I didn't get an answer or feedback on my proposal when I expected it, I started calling all parties involved, including my manager, and leaving voice mail. If I really got frustrated, I even called their cell phones. If I didn't reach them, I left urgent messages.

Of course, after my repeated voice mails and maybe a 911 in my e-mail subject line, they all started calling me back at my desk. If I didn't answer my desk phone, they called my cell phone. Many times, I was in an urgent meeting with a customer or business partner. It wasn't anyone's fault that we couldn't connect easily or quickly; unfortunately, during those years, we didn't have the instant messaging and presence solutions that would have gotten us out of the mess of missed connections.

Your employees, customers, and partners may be spread nationally or globally and the competitors are looking for any and all advantages they can gain to communicate and collaborate better. To beat the competition and become an agile business, you need to recognize the business value of unified communications solutions and become smarter and faster in responding to your customer and partner requirements.

Many corporate executives and decision makers have become believers in the promise of unified communications, especially after they have seen the actual product demos and literature. Industry pundits like Gartner and Forrester Research are forecasting that by 2012, the unified communications market will be a $10-billion market and 5 million users in the corporate world will be using some form of unified communications solution on their desktops. The research shows that more than 50 percent of enterprises now report that they are evaluating, installing, or running unified communications solutions.

Manufacturing

A U.S.-based manufacturing company with 15 sites and about 1,500 employees learned that each site had its own PBX. When customers called a branch office, they could be transferred multiple times before reaching the right person. There was no easy way for employees at the branch offices or the headquarters to communicate and collaborate with each other. Employees at one site needed to call long-distance to get to the employees at other sites or the headquarters.

The manufacturing company realized that a unified communications solution could provide a way for all employees, regardless of their location, to look up a colleague's presence and transfer the customer calls to someone who could immediately respond. Even better, the person responding could find experts if needed to answer a critical question by looking up their presence and IM them — thus being able to close the sale in one single phone call from the customer.

The manufacturer installed the Cisco unified communications solution. The company already had a Cisco network; using the network as the platform for communications simplified management and administration.

Real-time presence of experts became the clear competitive advantage. During a single call, employees resolved any issues by providing the expert's advice and secured the contract before hanging up the phone.

Advertising and Marketing

A leading international advertising and marketing firm needed a way to collaborate on key projects internally as well as with customers and partners internationally. Many of these collaborative sessions could be scheduled in advance, but a few could be last-minute, impromptu meetings that were a matter of success or failure. The company had 15,000 employees in 165 cities worldwide. Its major clients included IBM, American Express, SAP, Cisco, and others.

The company realized that its collaboration needs could be satisfied by investing in some of the hosted Web-conferencing solutions like WebEx, Microsoft Live Meeting, and so forth, but being forward-thinking, the decision-makers researched other full-featured unified communications solutions so they could take advantage of presence and IM to become productive and faster than their competition.

In 2006, they upgraded to Cisco Unified Communications Manager 6.0 and Unified Presence Server 6.0 to take advantage of presence information, which lets employees consult an online directory on their laptops to see whether co-workers are available and how best to reach them. The company also implemented the mobile communicator to allow traveling employees access to all the unified communications tools while on the road and still be accessible and communicate.

The company also realized that being an early adopter of the unified communications solutions attracted younger college graduates because of the advanced communication and collaboration tools offered.

In 2008, the company upgraded again to Cisco Unified Communications Manager 7.0 and added Cisco Unified Personal Communicator and Cisco Unity Connection. Approximately 500 employees have eliminated the need for a traditional phone by using their MacBook Pro laptops with Cisco Unified Personal Communicator, a desktop application that integrates all communications services that employees use frequently, including instant messaging, presence, voice message access, click to call, videoconferencing, user directory, and call history.

Enterprises, big and small, are taking advantage of unified communications solutions to provide their employees new ways to perform their jobs while improving their productivity and improving customer and partner satisfaction. They are achieving these results by using

- Instant messaging
- Presence (availability)
- Audio-, Web-, and videoconferencing
- Enterprise VoIP to make calls over the Internet protocol

Wholesaler

A Canadian wholesaler realized that managers were traveling a lot to attend meetings in the U.S. to visit dealers. They evaluated popular Web-conferencing solutions: WebEx and Microsoft Office Live Meeting. They selected Microsoft Office Live Meeting and started using the hosted service.

By May 2007, Microsoft Office Live Meeting and Round Table — a panoramic camera that delivers a 360-degree view of the room — were in use throughout the company. After learning that Microsoft Office Live Meeting can be run internally on Office Communications Server 2007, the company deployed the on-premise solution.

By holding meetings online instead of in person, the company saves $300,000 annually. In addition, ongoing training sessions, which also were held in Montreal, Canada, were costly for the company to conduct because they included overnight visits. By using Microsoft Office Live Meeting and RoundTable camera, they reduce another $100,000 in travel and meeting costs.

Best practices for instant messaging in the enterprise

While evaluating or actually using the unified communications tools, you may look at the suggestions below as tips and tricks for an efficient way to improve productivity.

Managing your contacts and contact list

After you start using the unified communications tools, especially the communicator client on your desktop, you will see that your contact list (buddy list) will build and grow. This list may include colleagues whom you typically communicate with, customers and partners (if enabled), and family and friends (if enabled).

Keep your contact list small and compact so you can easily find someone in your own list. For example, say you're working on a project with Sam Johnson from the Bradley Group. After the project is done, you should remove Sam from your list. It is very possible that now you are working on a project with Swati from Shah Associates and want to add her in your contact list. Keep your contact list updated with the people in your company whom you typically work with.

As shown in Figure 6-3, John wants to find Suzy McNeil, his coworker in the Marketing Department. John simply starts typing Suzy in the communicator's Find (Search) box, and anyone whose first name is Suzy shows up in the search results box. John highlights Suzy McNeil's name and right-clicks on it. Because John has created a Contact Group — Marketing — already, he easily adds Suzy to the Marketing Group.

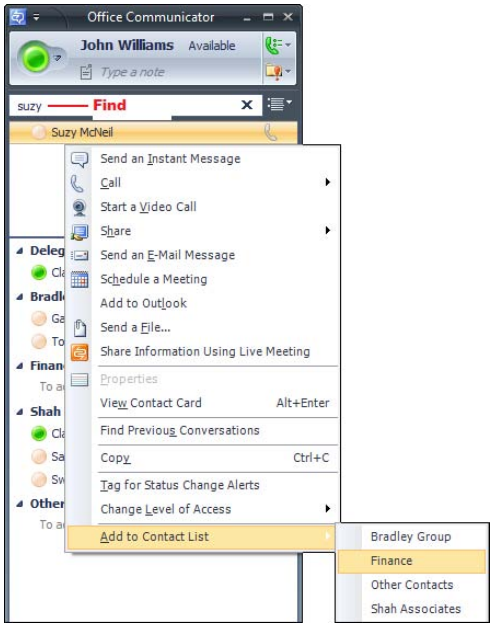


Figure 6-3: John finds Suzy and adds her to the Marketing group.

Creating contact groups

You can create groups of your company's departments that you generally work with so you can easily IM the whole group or send an IM to someone in that group. Putting co-workers, customers, and partners in their own groups will allow you to find them easily after your contact list has grown.

Figure 6-4 shows that John has created groups for Finance and Marketing, the two departments that John communicates with all the time.

If your company has enabled "federation" or "public IM Connectivity," then you can even create groups for your customers and partners who use similar unified communications solutions or have IM accounts on AOL, MSN, or Yahoo!.

In Figure 6-4, John has added two groups:

- "Bradley Group" because he typically works with Tony Bradley and Sam Johnson of the Bradley Group
- "Shah Associates" because John works with Swati, Lilam, and Satish Shah on a regular basis

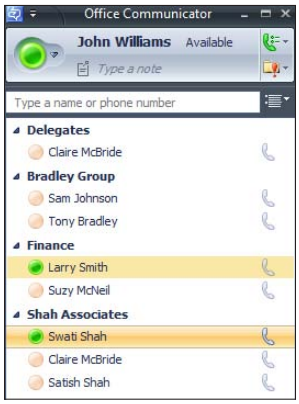


Figure 6-4: John created groups and organized his contacts in groups.

To add a public IM contact or a federated contact, your organization must be configured for public IM connectivity or federation. Contact your system administrator to make sure you have been enabled for public IM or federation.

Create new groups

In the Contact List, right-click a group name, select **Create New Group,** type a name for the group, and then press ENTER. To add contacts to the group, simply drag them from an existing group or from the Search Results box.

Manage your presence and access levels

Each contact in your Contact List has a **Presence** button to the left of his or her name that reflects availability and willingness to be contacted.

View a contact's contact card

By simply clicking a contact's Presence button, you will be able to see details about that contact's title, office, calendar information, as well as phone numbers and the best way to contact that person. John can see Claire's contact card by clicking the presence icon next to her name, as shown in Figure 6-5.

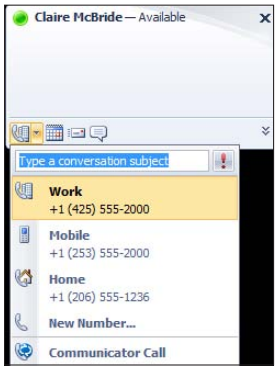


Figure 6-5: John can see Claire's contact card.

View a contact's phone calling options

Click the arrow to the right of the Call button associated with the contact, as shown in Figure 6-6.

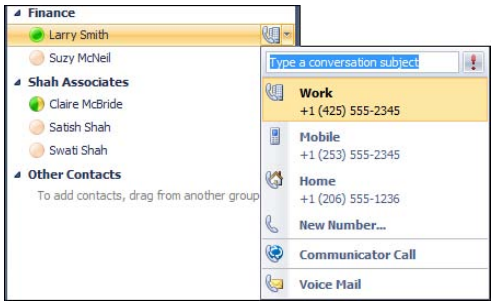


Figure 6-6: John can see Larry's phone numbers that are available.

Control access to your presence information

As seen from Claire's contact card above, along with presence, most unified communications solutions also show your phone numbers and calendar information to anyone looking at your contact card. You can control who can see your mobile or home number and calendar information. Communicator may enable you to set **Access Levels** — different tiers of access that you can assign to your teammates versus the rest of the company.

Change a person's access level

Right-click a contact's name, click **Change Level of Access,** and then select a level, such as **Team** for your teammates, as shown in Figure 6-7.

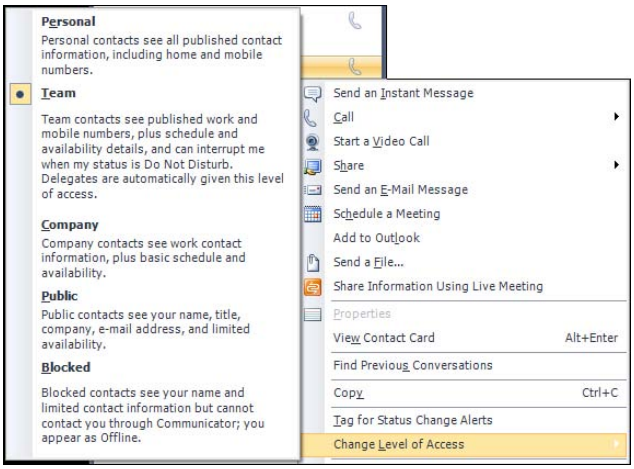


Figure 6-7: Different Access Levels available and what they mean.

Block a person from contacting you

When someone adds you to his or her contact list, you may get an alert that says Mary wants to add you to her contact list — do you want to allow her to do that? If you know Mary and want to allow her, you can say yes and at the same time add Mary to the proper contact group in your contact list as well as assign her an access level.

But if you don't know Mary, or for some reason you don't want Mary to be able to see your presence or communicate with you, you can block her.

In the Contact List, right-click a contact's name, click **Change Level of Access,** and then select **Blocked.**

Contacts who can interrupt you

You can manage a list of people whom you want to be able to interrupt you even when your presence status is "Do Not Disturb." If Suzy and Larry are those people, you can click on Suzy's name first. While pressing the **CTRL** key, click on Larry's contact, and then **right-click your selection,** select **Change Level of Access,** and select **Team.**

Customize your presence information

Most communicator clients provide a set of personal presence attributes that you can customize and make available to other contacts to help them communicate with you:

- Presence status.
- Location.
- A personal note.

Add and publish phone numbers

Once you have added people into your **Team** access level, it is a good idea to let them contact you on your mobile number, especially when you are on the road. Most communicator clients will allow you to publish multiple phone numbers — work, mobile, and home. You should at least publish the work and mobile phone numbers for the team.

For your executive assistant, boss, or someone else whom you want to have your home number:

- Assign that person the Personal access level.
- Publish your home number.

The Personal access level allows contacts to see your home number.

Manually change your presence status

Obviously, from time to time, you will want to close the door to your office and hang a "**Do Not Disturb**" card — such as when you are working on a critical proposal or are in an impromptu meeting with the boss. In the old days, you may have done just that — stick a yellow sticky note saying "Please Do Not Disturb" on your door or cubicle entrance. But now that your company has advanced to the electronic era of online presence, you should set your presence status in communicator by clicking your presence button, and then selecting the appropriate status, such as "**Do not Disturb.**" Figure 6-8 indicates that John Williams will "Be Right Back."

Set your location

It is always a good idea to let people know where you are working from today. Most communicator clients allow you to select your location to let your co-workers know that you are

- On the road
- Working from a client's office
- Working from home

Click your Presence button, point to **Current Location,** and then either

- Select a location — office or home
- Create a custom location, such as
  - Client's office in Chicago
  - On the road in New York

This gives your colleagues an idea of how best to reach you.

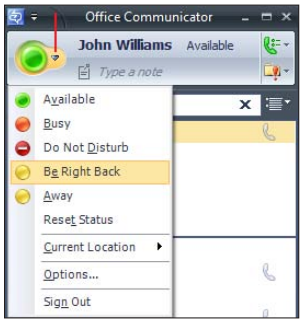


Figure 6-8: Manually changing the presence status.

Create a customized note

You can add a personal note to give more precise information. For example, if you have to leave your office unexpectedly, you can set your presence status to **Be Right Back** and add a custom note that says how long you will be gone. It takes only a few seconds to keep your information up-to-date. That's a good habit to get into.

Click in the **Type a note** box (see Figure 6-8), and then enter a note. Click outside the box when you are done.

Your presence information and access levels

Each communicator contact, including you, has a full set of presence attributes that describe availability, activity, and willingness to be contacted. Presence attributes also include contact information such as phone numbers, personal notes, and location. The amount and type of presence information that you make available to others is controlled by Access Levels. For example, when you assign a contact to the **Team** Access Level, that contact has access to your mobile phone number, calendar "free or busy" information, and your location (refer to Figure 6-7).

Sending and receiving instant messages

IM can take the place of e-mail or a phone call. You can avoid the possibility of having to leave a voice mail and getting into a phone-tag scenario when you use IM.

Only send an IM after checking others' presence (availability). Remember that you can save the IM conversations yourself and if you need to, send a file to a colleague during an IM session.

Always type a **Conversation Subject** when the IM window opens, so the recipient knows the context of the IM and pays appropriate attention.

Customize your instant messages

When you are in IM communication with others, create a customized personality for your IMs. Most communicators will allow you to customize the font and color for your instant messages — plus you can save your choices.

Add an emoticon

To emphasize a point, you may add an emoticon to your IM. Place the mouse cursor where you want to add the emoticon, click the emoticon button, and then select the emoticon.

Send an instant message to a group

Creating groups for your contacts has another benefit:

- If you want to send an IM to the whole group — Marketing or Finance — right-click the name of the group, and then select **Send an Instant Message.**
- If you want to send an IM to two or more people, click the first contact, hold the CTRL key, and select the second contact. Right-click and select **Send an Instant Message.** (See Figure 6-9.)

Receiving an Instant Message

Become alert for the beep (sound) or a pop-up display (also known as toast) alert in the lower-right pane of your screen when someone is sending you an instant message, as shown in Figure 6-10.

- To accept the IM invitation, just click on that alert and an IM window will open on your screen. You will be able to see the initial message the sender typed, and then you can type your response.
- To decline the IM invitation, you can click the Redirect button, and then click **Set to Do Not Disturb** to show that you are unable to engage at this time. You should typically use this feature when your status shows you as available, but you are in an unscheduled meeting or an important conversation. The new presence status lasts until the beginning of the next hour.

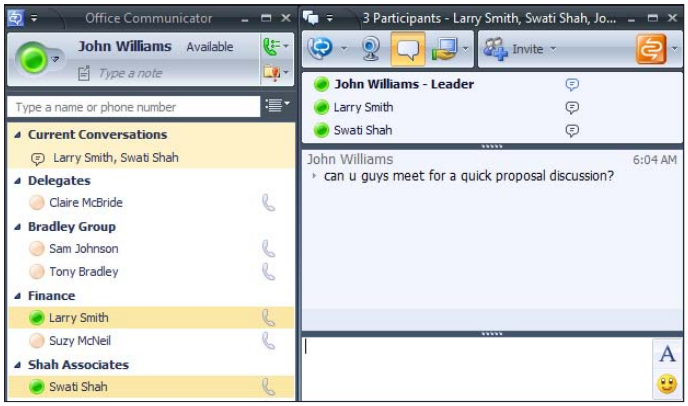


Figure 6-9: John selects Larry and Swati and types an IM to both of them.

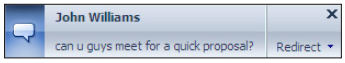


Figure 6-10: Larry receives this pop-up alert in the lower-right side of his screen.

Find old IMs or conversation history

Once in a while, you will need to find old IMs. Follow these steps:

1. **Go to the menu of your communicator, select Tools, and then Options. On the Personal tab, near the bottom, you will see an option to Save my conversations in Outlook Conversation History folder. Check this box, as shown in Figure 6-11.**
2. **Open Outlook.**

   Under all Mail items, you should see a conversation history folder, as shown in Figure 6-12:

   - In the middle pane, you will see all the IM conversations you have had with all the people.
   - On top of the middle pane, you can see a place to search the conversation history.
3. **Type a name or subject or something you remember you spoke about.**

   You should be able to find the actual IM conversation that you had.

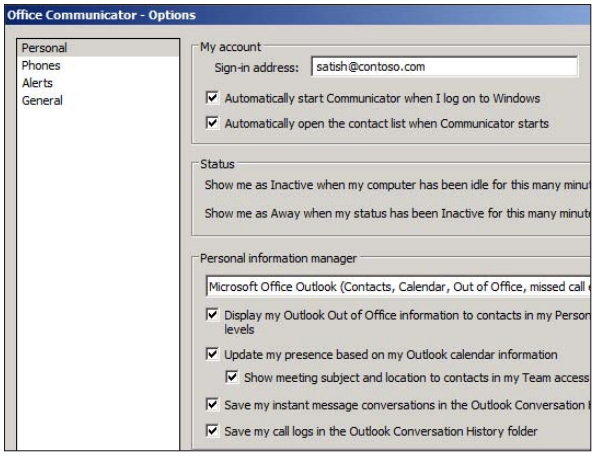


Figure 6-11: Save my conversations in Outlook Conversation History folder.

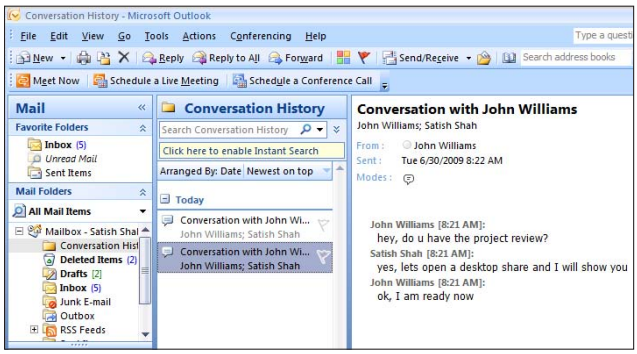


Figure 6-12: Conversation history folder in Outlook.

Instant Messaging and Unified Communications

Unified communications refers to the convergence of all different forms of communications — instant messaging; audio-, Web- and videoconferencing; presence; e-mail and voicemail; and phone — into a single seamless interface.

The integration of all modes of communications into a single tool enables you to start with an IM conversation and then either

- Transition into an audio-video conversation
- Start sharing an application on your desktop with a colleague

There are significant gains in individual productivity and team efficiency achieved by using the right mode of communication based on other users' information about

- Presence
- Location
- Calendar information

For example, similar modes of communication are available to you when you are on the road — you can use the mobile communicator client or use the Web-based communicator client.

The productivity gains are achieved as a result of your ability to see others' presence and only communicate with them when they are available, thus reducing the latency in your communications. If you need to speak with Suzy and you find that Suzy's presence shows busy, in a meeting, or in a call, you simply tag Suzy and you will be automatically notified with a pop-up alert when her status changes to available. You don't have to keep checking for Suzy manually.

If you represent an organization that has implemented the entire unified communications solution or are evaluating unified communications solutions, the following sections help you take the right steps to reap the benefits of all the unified communications features available, not just instant messaging.

The following are a few scenarios of when you can take full advantage of the unified communications solution that you have implemented or are planning to implement so you get the maximum benefits for your investment:

- Executives and managers are traveling to internal company meetings nationally or internationally.
- Experts are traveling to meet with customers or partners to discuss specifics of projects or proposals.
- Training instructors are traveling to deliver training to branch sales people or technical engineers.
- Weekly, monthly, or quarterly audio conference calls are scheduled with the use of an external audio bridge from AT&T, Verizon, or other providers.
- Employees travel within a local region to attend meetings on a weekly, monthly, or quarterly basis which may take someone more than an hour just in travel time.

Implement these new business processes to save time, effort, and money for the company:

- **Eliminate or reduce executive travel:** Let their executive assistants schedule Web-conferences using Outlook. Give the executives and managers good quality Webcams (VGA or HD) and headsets so their participation in the Web-conferences will be of the highest quality. Train the executives and managers on how to use application sharing, whiteboards, polling, and so forth during the meetings so they are extremely effective and have a great experience during their meetings.

  Eliminating one trip in the U.S. alone could result in a savings of $1,000 to $1,500; eliminating a single international trip could save your company $3,000 to $10,000. Eliminating one trip could also save the execs a day of commute time alone — or more than a day if the trip would have been international.
- **Eliminate or reduce experts' travel:** Let the local/regional salesperson travel to meet with the customer or partner and have the experts attend via a Web-conference and share their presentation/demos.
- **Eliminate or reduce instructors' travel:** Let instructors deliver training via live Web-conference or desktop sharing. A huge advantage of using the Web-conference for training delivery is recording. Instructors can record the first live training session that they deliver. Afterward, branch employees can use the recorded training as reference or for those who missed the live session. The time and dollar savings are significant if you have several branch locations or deliver a lot of training.
- **Eliminate or reduce audio bridge costs:** Convert all externally managed audio conference calls to on-premise conference calls delivered through the unified communications solution. Savings will vary based on your actual usage.
- **Eliminate or reduce employees' local travel**: Convert these meetings to Web-conferences or audio conferences hosted on-premise through the unified communications solution. Average savings could be 1 to 2 hours for each participating employee.

This section focuses on unified communications features other than instant messaging: audio-, video-, and Web-conferencing and how organizations can effectively use them to eliminate or reduce certain costs:

- **External costs of conferencing and telephony:** Use the on-premise unified communications server based tools to eliminate fees paid to external third-party companies.
- **Travel expenses:** Up to 40 percent reduction in travel even within the same region, where previously employees used an automobile.
- **Time and effort required to make better business decisions:** Instant access to subject matter experts when needed.

You and your team are ready to launch a new product in the marketplace. As the deadline approaches, you are looking for different modes of communications to stay in touch with the team, customers, and partners.

Explore the entire set of tools that you have in your unified communications toolbox and use the one that makes sense for the type of communication you need to have.

Most communicator clients allow you to make several types of audio calls, such as computer-to-computer calls or computer-to-phone calls. They also allow you to make outbound audio calls and receive calls by using your computer or your traditional phone.

Making audio calls

On the communicator client, always check the availability of your contact first and then call. There are several ways to call a contact in communicator:

- **Communicator call:** Always try this option first because it will use your local area network (LAN) or wide area network (WAN) and not cost anything.
- **Call alternate number:** You can click the arrow next to the call button to select an alternate phone number to call (for example, mobile) if you have been given access.

Receiving audio calls

When someone invites you to an audio call, you get a pop-up alert on the lower-right pane of your computer screen. Here are things you can do when that happens:

- You can take the audio call on your computer using the computer's speakers and microphone or using a headset (this is a computer-to-computer call).
- If you are in a meeting in a conference room, but this call is critical for you to take, simply click **redirect** to transfer it to your cell phone. Leave the room while you answer the call.
- If you are in a meeting in a conference room and you really don't need to take the call at that time, click **redirect** to transfer to voicemail or to an IM conversation so you can tell the other party that you are busy and will follow up later.

Forwarding calls

John is excited about his company's ad being released in the market. He has a meeting scheduled with Suzy to discuss the details about the launch in the conference room. Just as he is about to step out for the meeting, he sees a pop-up alert for a call from Wilson, a member of the media team, asking for clarifications on the ad distribution. John wants to talk to Wilson, but doesn't want to keep Suzy waiting in the conference room. Therefore, John clicks the **redirect** button, forwards Wilson's call to his mobile phone, and talks to Wilson while he is walking to the conference room.

Most communicator clients offer the flexibility of forwarding audio calls to

- An alternate phone number, such as
  - Mobile phone
  - Hotel phone
  - Home phone
- Your voicemail
- Another contact

Making video calls

You can make video calls using your communicator. It is simple as long as you either have

- A built-in Webcam on your laptop
- An external Webcam connected with a USB connector

While answering your call, the contact can see your video feed, even if he or she doesn't have a Webcam. If the contact has a Webcam connected to a computer, you can see the video feed for that person in your Conversation window.

If a Webcam isn't connected to your computer, you need to set one up by running the Set Up Audio and Video Wizard. To run the wizard, click **Tools,** and then click **Set Up Audio and Video.**

Conferencing

IM conversations are designed to support the way you usually communicate with others. For example, if John started an IM conversation with Suzy, he can easily invite Larry or Wilson or both to the ongoing conversation. When John invites a third or fourth person into an IM conversation, John creates an ad-hoc conference. Once the conference has started, John can easily escalate it to audio and video communication modes, if appropriate.

It would be appropriate to have informal IM, audio, or video conference with colleagues and external users (if enabled) when needed.

It's wise to evaluate Web-conferencing options if you are planning a formal presentation or would like to share or demo an application to the audience.

Most Web-conferencing vendors like WebEx, Microsoft, and Citrix allow you to download a plug-in so you can schedule your conference calls or Web-conferences using Outlook's calendar functions.

Scheduling conference calls or Web-conferences using Outlook

This is probably one of the most important features released by unified communications vendors to make you productive while giving you a familiar way to do things. You can now use Outlook's calendar functions to schedule conference calls and Web-conferences.

You may even be able to invite external users if permitted by your company and allow your customers and partners to join those scheduled conference calls or Web-conferences.

To schedule a conference call, follow these steps:

1. **Open Outlook and click Conferencing.**
2. **Choose Schedule a Conference Call to a meeting invitation.**
3. **In the meeting invitation, enter the names of the participants in the To box, enter the subject of the conference call in the Subject box, and select the date and time of the call.**
4. **To assign leader rights to the participants, click the Leader button.**
5. **Assign access to all the participants by clicking the Access button.**
6. **Click Send.**

Using Instant Messaging to Improve Communications

Most instant messaging solutions provide the tools and features that help you be more productive. IM solutions help you find and connect with people from different geographical locations and time zones using the communications mode that works best for you. Here are ten ways that instant messaging and unified communications can streamline your communications and give you greater flexibility and control.

- **Presence:**
  - Tells you if your colleague, John for this example, is available, in a meeting, on a call, or even out of the office.
  - Allows you to decide how best to contact him.

  Assuming that John is out of the office and his presence status shows offline or away, the best way to reach him urgently would be to call him using his mobile number. If it isn't urgent, you can tag John from your communicator. When he reaches his destination and connects using communicator, you will get an alert that John is available and you can start your IM with him. Presence allows you to make the right choice and reach John the first time.
- **Customers and partners:** If your company has implemented the infrastructure to enable federation and public IM connectivity, you are now able to view the real-time presence of your customers and partners. You can decide the best way to contact them and what mode to use. You can share the critical proposal or contract with them online and get things done faster versus sending it via e-mail and waiting for a response.
- **Desktop sharing:** If you are engaged in any critical project or proposal discussions, what better way to collaborate and review that project document or proposal than using ad-hoc desktop sharing with other people. Of course, you will only want to start this ad-hoc session after checking everyone's presence and then asking all of them if they have 15 minutes (or whatever amount of time you think you will need).
- **Audio conferences:** After you start an IM conversation with one or more people, it may get difficult to stay focused if everyone is just typing away; you may decide it is better to upgrade to an audio or videoconference. Now that you are in the audio conference, you can
  - View the list of participants.
  - Find the active speaker.
  - Mute and un-mute.
  - Promote a participant to presenter to share controls.

Sometimes an audio or videoconference allows you to gauge someone's audible reaction or facial expression better than you can through an IM.

- **VGA and HD Video:** If you are delivering training or sales presentations, invest in high-definition (HD) or VGA Web cameras. You can deliver a richer conversation by sharing video in high definition.

A dual core central processing unit (CPU) and VGA Webcam are required for VGA support and a quad core machine and HD camera are required to use the HD capabilities.

- **Forward to the team:** If your unified communications solution allows, while you are away, just forward your calls to your team.
  - Team members will see the call being transferred on your behalf in the incoming prompt.
  - You'll get a notification in e-mail for any call answered by a team member.

  Customers or partners who are calling for you will always get someone on the first try who can answer their questions while you are unavailable. Someone should be available to answer the call even when a few people may be busy.

- **Delegates:** If your unified communications solution allows, you can forward your calls to a delegate who can screen your calls. Delegates can take the call, find out who is calling, and consult with you to see whether you can take the call before actually transferring the call to you. Delegates can add notes to the call history or take other follow-up notes when they are consulting with you. You are better informed about the call before you answer. Delegates can also originate calls on your behalf, and then only transfer to you when appropriate.

- **Integration with your IP desk phone:** If your company has upgraded your desk phone to an IP phone, you can take advantage of it with the integration into your unified communications solution. When you are in an audio conversation with one or more persons using your communicator client, you can leverage that IP phone as your audio device. Call controls, including conference, hold, and transfer, are synchronized to give you a seamless experience.

- **Voicemail:** If your company has integrated your voicemail system into the unified communications system, you can access your voicemail from
  - The communicator client
  - Office Outlook
  - Any regular phone

  After you open a voicemail in Outlook, you can return the call directly from Outlook because you have the Caller ID information right there.

- **Integrated Web-conferencing:** From communicator, select and invite multiple people to an ad-hoc Web-conference where you or others can
  - Share presentations, spreadsheets, documents
  - Engage in brainstorming by using white-boards, polling, and so forth.

  If the function is enabled, you can even invite customers or partners to the ad-hoc Web-conference.

Chapter 7

Remote Connections

In This Chapter

- Benefits of connecting remotely
- Accessing universally on the go
- Interacting with voice

You understand the benefits of unified communications and how they can help your organization operate more efficiently and boost productivity. You have grasped the concept of presence and how to leverage presence information to choose the most appropriate form of communication. You know how to use your phone, e-mail, instant messaging, and other tools to communicate effectively . . . as long as you are sitting at your desk.

Of course, it's still nice to establish some healthy boundaries between your job and your personal life, so you don't want remote connectivity to be used against you so that you are available 24/7. However, working remotely is on the rise for a variety of reasons, and unified communications needs to be able to extend beyond the walls of the office to deliver functionality to users no matter where they may be working.

In this chapter, I look at the tools and functions that enable you to use unified communications anytime and anywhere. You learn about accessing e-mail and instant messaging using a Web browser, accessing e-mail and calendar functionality from a phone, and using unified communications from mobile phones.

Saving the environment . . . and the bottom line

More and more, organizations are allowing employees to work from home offices and other remote locations. For some, it is about saving the environment; for others, it's about saving a dollar. In either case, it also boosts employee morale and generally results in higher productivity.

Saving the environment:

- Fewer cars on the road
- Less fuel consumption
- Reduced exhaust and greenhouse emissions

Saving the bottom line:

- Minimal office space required
- Lower electricity and cooling expenses
- Reduced travel and lodging costs
- Fewer pieces of furniture and office equipment required

Implementing unified communications and encouraging employees to work remotely wherever possible is a great way to save the planet and the corporate pocketbook at the same time.

Extending the Reach of Unified Communications

Whether remote employees are working from a home office, a branch location, or sitting in a hotel room or coffee shop with their laptop, they still need to be able to communicate with

- Team members
- Managers
- Other peers within the company

You can't allow just anyone from the public Internet to access your unified communications system, though, and you don't want to have those servers exposed to the public Internet where they may be vulnerable.

The solution is to leave the primary components of the unified communications platform safely behind a firewall on the internal network, while having some sort of public-facing server outside of the internal network to facilitate remote connections. Ideally, that server should be in a DMZ (demilitarized zone) so that it has a firewall to protect it from unauthorized access (see Figure 7-1).

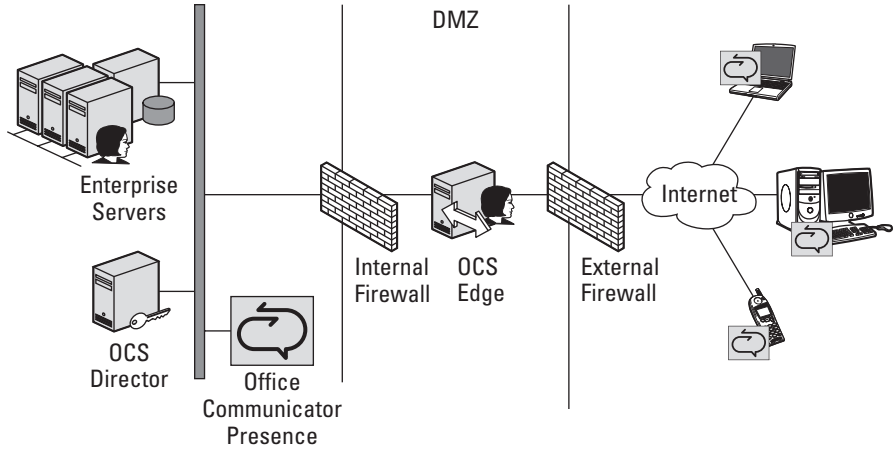


Figure 7-1: Network topology for Microsoft Office Communications Server for remote connectivity.

Communications between the internal unified communications environment and external or remote clients are typically protected in some way. For example, Microsoft Office Communications Server uses TLS (Transport Layer Security) over SIP (Session Initiation Protocol) to protect signaling traffic and SRTP (Secure Real-Time Transport Protocol) to encrypt and protect media traffic.

I dive deeper into the protocols and methods that the different unified communications platforms use to handle encrypting and protecting communications traffic in later chapters, particularly Chapter 13.

With unified communications set up to communicate with external or remote clients, users outside of the internal network can still leverage the features and benefits of unified communications. Whether you are working from home, sitting in a local coffee shop, or connecting from a client site around the world, as long as you can access the public Internet you can still use all of the unified communications features:

- E-mail
- Instant messaging
- Voice calls
- Desktop sharing
- Audio/videoconferencing

Unified Communications on the Go

If you are connecting remotely using your primary computer or laptop, then the remote connectivity just discussed will enable you to access and leverage the various unified communications functions just as if you were sitting in the office connected directly to the network. But, what do you do when you are working remotely and you don't have your computer?

Unified communications provide Web- and mobile phone–enabled tools to allow you to access the communications functionality any time and anywhere. Depending on the unified communications platform, you may be able to either

- Access e-mail or instant messaging functions from the Web
- Provide your mobile phone with software to make use of the unified communications functionality

Accessing E-mail via the Web

No matter where you are, the Web is probably nearby. Public libraries provide PCs for public use that have Web access. Many hotels provide Web-connected PCs in the lobby for patrons to use. If you are visiting a client or partner, you can probably borrow a PC for a while.

Of course, loaner PCs don't have your e-mail software installed or your e-mail account information configured so they won't necessarily help you see if that important message you are expecting has arrived or if there are any urgent new messages you should be aware of.

You may already have a Web-based e-mail account through one of the consumer-oriented services such as

- Yahoo! mail
- Windows Live mail
- Google's Gmail

In fact, in the absence of an enterprise Web-based e-mail solution, many users rely on their personal Web-based e-mail to communicate while they are working remotely or are disconnected from corporate e-mail resources.

With Web-enabled e-mail such as Microsoft's Outlook Web Access (OWA) (see Figure 7-2), you can access your e-mail from anywhere, anytime as long as you have access to a Web-connected device. Platforms such as Microsoft Exchange and Lotus Notes provide Web-based options that enable you to access and work with your e-mail almost identical to the experience you have working with the native e-mail applications.

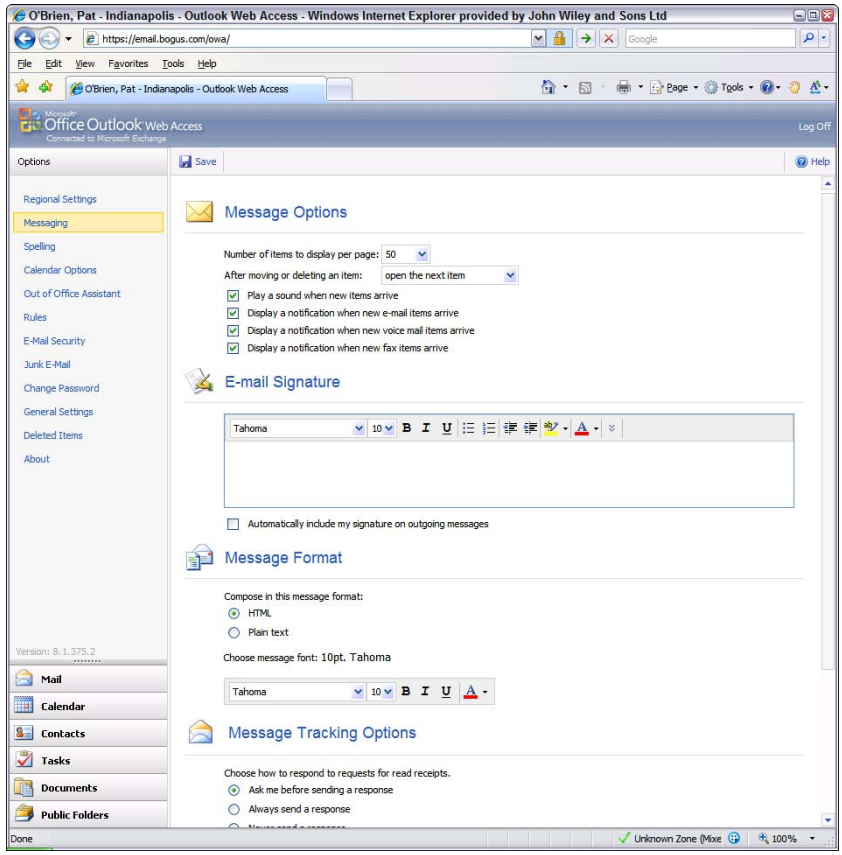


Figure 7-2: OWA provides access to e-mail via the Web.

OWA enables you to access your e-mail, contacts, calendar, and tasks, and work with the Exchange Server just as you would from within Outlook.

Communicating with instant messages over the Web

Accessing e-mail and contacts and calendar data from the Web is great, but sometimes you want to be able to leverage the instant messaging capabilities as well. Again, you may already have a personal instant messaging account using services such as

- Yahoo! Messenger
- AOL Instant Messenger (AIM)
- Windows Live Messenger

In situations where there is no enterprise Web-based instant messaging solution, many people use their personal instant messaging accounts to communicate in a pinch.

Tools such as Microsoft's Communicator Web Access (CWA) allow you to access the instant messaging and some of the other functions of the native Microsoft Office Communicator client. One of the biggest benefits of using an enterprise tool such as CWA over a personal instant messaging account is that you will be able to have access to your same set of contacts that you would if you were on your normal PC and you can view the presence information for your peers and co-workers.

Unified communications from your mobile phone

No matter where you go, there is a good chance you will have your mobile phone with you. The mobile phone has become a compulsory item for leaving the house, right up there with keys and wallet. If you are anything like me, your mobile phone is with you 24/7. That being the case, what better place to provide connectivity with your unified communications platform?

The major unified communications providers such as Avaya, Cisco, and Microsoft all provide client software that can run on mobile phone devices. For Microsoft, the tool is Microsoft Office Communicator Mobile. It provides a mobile version of the Communicator client software so you can access your contacts, see their availability via the presence information, and communicate using instant messaging from your mobile phone.

Another cool feature that is provided through mobile devices for some unified communications platforms is the capability to place calls through the enterprise voice system rather than through your mobile phone. This can be beneficial if you have limited mobile phone minutes or you need to place an international call that might be cost-prohibitive from the mobile phone.

Talking Your Way Through Unified Communications

What are you supposed to do if you are traveling for an important meeting with a customer and your laptop dies? Or, what if you are on the way from your hotel to the customer's office, but you are running late and you don't have the client's phone number handy? How can you access your e-mail or calendar information?

Some unified communications platforms provide the capability to interact with the unified communications system using your voice. As long as you have access to a phone, you can still get your e-mail, contacts, calendar information, and more. Microsoft and Avaya provide this functionality.

Avaya's one-X Speech enables you to listen to and return voice mail and e-mail messages, access contact information, and "click-to-call" to initiate a call, schedule or modify appointments on your calendar, manage your tasks, and more.

Similarly, Outlook Voice Access (OVA), a feature of Microsoft Exchange Server 2007 Unified Messaging, enables you to retrieve e-mail messages and interact with e-mail and calendar data using voice-activated or touch-tone responses.

Let's examine some common features and how you can apply them to communicate more effectively and improve your productivity:

- Voice mail messages
- E-mail messages
- Calendar information

Microsoft enables you to speak voice commands to navigate the menus within Unified Messaging using Automatic Speech Recognition (ASR). Although Microsoft Exchange Server 2007 and Unified Messaging can be configured to use languages other than English, the ASR feature is available only in English. If you configure Unified Messaging to use a language other than English, you will have to interact with the system using touch-tone inputs rather than speech recognition.

"Reading" and reviewing e-mail

With a voice interaction system available, you can either

- Listen to your e-mail messages
- Reply to messages
- Forward messages to either
    - Other users
    - An alternate e-mail account
- Create new e-mail messages

If you are expecting an important e-mail and don't have access to your e-mail client or the Internet, you can use your mobile phone (or any available phone) to dial into the system and retrieve your e-mail by having your messages read to you by the system.

While the system is reading the e-mail messages to you, you can interact with the system using voice commands by saying:

- "Reply" to reply to the sender of the current e-mail
- "Reply all" to reply to the sender and all other recipients of the current e-mail
- "Forward" to forward the current e-mail to another user or alternate e-mail address

These are the primary commands that are common among systems. Depending on the unified communications platform, there may be additional options as well.

Listening to e-mail

After dialing into the system and entering any applicable PIN or password information to authenticate, you can access your e-mail over the phone. The system will begin by reading the subject, time of receipt, and sender information from the first unread e-mail message. At that point, you can interact with the system to read your messages using the following:

- "Next message" will stop reading the current e-mail, mark it as read, and proceed to read the next unread e-mail message.
- "Mark unread" stops reading the current e-mail and proceeds to the next unread e-mail message, but leaves the preceding e-mail marked as unread.
- "End" tells the system to skip to the end of the current e-mail message being read.
- "Delete" instructs the system to delete the current e-mail message.

TIP

Although it's a voice-response system, in most cases you can also interact using touch-tone equivalents. If you are ill and can't speak, or if you are in a noisy environment where the background noise interferes with the capability to speak with the system, you can simply use the numbers on the phone dialing pad.

Responding to e-mail

After you have listened to an e-mail message, you may want to respond. If you aren't already in the e-mail listening mode and there is a particular message you need to respond to, you can simply follow the steps for listening to e-mail in the preceding section and say "next message" until you get to the correct e-mail message. After either listening to the complete message, or saying "end" to skip to the end of the e-mail, you can use one of the following voice commands to respond:

- "Reply" allows you to send an e-mail response to the sender of the e-mail message you are listening to.
- "Reply to all" sends your response to the sender of the e-mail, as well as all other recipients.
- "Forward" enables you to forward the e-mail message to a third party or alternate e-mail address.

Managing Your Calendar

Voice interaction isn't just for e-mail. You can also use voice to interact with and manage your calendar. You can

- Listen to your scheduled appointments
- Respond to meeting requests
- Create calendar items
- Forward events to other users

The voice interaction can be helpful for situations such as getting stuck in traffic and needing to notify other meeting attendees that you are running late, or when an urgent matter arises and you need to simply clear your calendar of scheduled events for the day.

Checking your calendar

You can dial in to the voice response system and access your calendar to check your schedule for today, or any other given day. The system will read you the event details from the items scheduled on your calendar. To access your calendar, follow these steps:

1. **Dial in to the voice system.**
2. **Enter your PIN to access the system.**

3. **Say "calendar for today" to listen to the calendar items from today's schedule.**

   You can also just say "calendar" and the voice interaction system will ask you to clarify which day you would like information for.

4. **Listen to the details for the events on your schedule.**
5. **Say "end" to skip to the end of the details for the current event being read.**
6. **Say "next" to move on to the next scheduled event.**

"I'm running late"

If you happen to be running late getting to an important meeting and you don't have access to your computer, say, for instance, you are stuck in traffic, you can call into the system and use the voice interaction in Microsoft Exchange with Unified Messaging to let the other meeting participants know you will be late.

Follow these steps:

1. **Say "calendar for today."**
2. **Listen to the events from your calendar and find the meeting you will be late for.**
3. **Once the system has read the calendar event details, say "I'll be late."**

   The Unified Messaging automated voice attendant will ask "how later?"

4. **Reply with a timeframe such as "15 minutes."**

   The Unified Messaging automated attendant will ask "do you want to record a message?"

5. **Say "yes" or "no" and record a message explaining your delay if you choose.**
6. **Tell the system to "send it."**

   All meeting participants will receive an e-mail from you notifying them that you will be late by 15 minutes.

Canceling a meeting

You can't cancel someone else's meeting, but assuming that you are the creator or organizer of the meeting, you can use the voice interaction of

Microsoft Exchange with Unified Messaging to cancel the meeting if necessary. After you have dialed in to the voice interaction system, entered your PIN, and followed the steps for accessing your calendar and finding the event that you would like to cancel, do the following:

1. **Say "cancel meeting."**

   The voice interaction system will ask that you confirm that you wish to cancel the meeting.

2. **Say "yes."**

   The Unified Messaging automated attendant will ask "do you want to record a message?"

3. **Say "yes" or "no" and record a message explaining the cancellation if you choose.**

4. **Tell the system to "send it."**

   All meeting participants will receive an e-mail from you notifying them that you have canceled the meeting, including the explanation or message if you chose to record one.

Cancel my meetings

You may have a crisis at work that requires your full attention or perhaps an urgent personal matter that will unexpectedly have you out of the office for a period of time. In either event, you can use the voice interaction system to clear your calendar for the day in one fell swoop rather than having to go through and deny or cancel each scheduled event individually. Follow these steps:

1. **Access the system and say "calendar for today."**

2. **Say "clear my calendar."**

   You can specify the number of days that you wish to clear.

3. **The system will ask if you would like to record a message to include with the cancellation notices.**

4. **Say "yes" or "no" and record a message if you choose.**

5. **Say "send it" to send out notifications to meeting organizers and attendees, letting them know that you're cancelling your meetings.**

Managing meeting requests

This task is actually a combination of interacting with both your e-mail and your calendar. While you are listening to your e-mail messages, you may come across an invitation to attend a scheduled meeting. You can choose whether to accept the meeting, and if you accept it the event will be added to your calendar, along with the details for the scheduled event. Follow these steps:

1. **Dial in to the voice interaction system and enter your PIN for access.**
2. **Say "e-mail" to listen to your e-mail messages.**
3. **When you receive an e-mail that is a meeting request, you can respond with "accept" or "decline."**
   - If you accept, the event details will be added to your calendar and the meeting organizer will be notified.
   - If you decline, the meeting organizer will be notified but the event will not be added to your calendar.

Replying to meeting organizer

If you need to share information or remind a meeting organizer of important details to discuss during the event, you can reply to the meeting request to send a message to the creator or organizer of the event. Follow these steps:

1. **After the system has read the calendar event that you wish to reply to, say "more options."**

   One of the additional options is the option to reply to the message.
2. **Say "reply" to send a message to the meeting organizer.**
3. **Record your message.**
4. **Say "send it" to send a message to the meeting organizer which includes the audio message that you just recorded.**

Working with contacts

Another function that you take for granted when sitting at your computer and may need to access while you're roaming about is the capability to search through your contacts. For example, you may be on vacation enjoying a piña colada on the beach and suddenly realize that you forgot to share critical information with your manager that she will need for an upcoming client meeting.

After you dial in to the voice interactive system, you can work with your contacts using the following steps:

1. **Say "directory" to access the corporate directory or "contacts" to access your personal contacts list.**
2. **Speak the name of the person you want to contact.**

   If more than one person matches the name you are searching for, the system will list them for you.
3. **Select the appropriate contact from the list.**
4. **Say "call office" or "call mobile" to call the contact's office or mobile phone number.**

The business environment today is more mobile and global in nature than ever. Employees who used to sit next to each other in an office now team up virtually from home offices and connect on the go from wherever they may be. Unified communications provides a variety of features and functions to enable you to leverage the communications tools no matter where you are.

Chapter 8

Conferencing

In This Chapter

- Exploring the evolution of conferencing
- Starting a voice conference call
- Joining a voice conference call
- Videoconferencing
- Web-conferencing

A picture is worth a thousand words. In the business world, that often is true. This chapter explores how audio-, Web-, and videoconferencing evolved and where it is today. I share the options available to you as a corporate user, and how corporations are taking advantage of conferencing in the business. And lastly, I share some best practices when using and leveraging conferencing in the business world.

Evolution of Conferencing

A **conference call** is a telephone call where all parties dial into either a toll-free number or a toll number. Usually, most companies use a specialized service provider like AT&T or Verizon, that maintains the conference bridge and provides a toll-free number and PIN codes that participants dial to access the meeting or conference call.

Sometimes it is called *reservationless conferencing.*

In this type of conference call, the organizer or leader may request an operator to:

- Manage the entry and exit of participants
- Announce who joined the conference call
- Mute and un-mute participants

  Provide the capability for some participants to only listen, not speak or ask questions. Many companies make announcements to their employees where participants just listen.

Most desktop phones allow three-way calling or even conference five or six people into such a call, but the organizer or leader must call and connect each person into the conference call. There aren't many people using these capabilities inherent in their desk phones because the feature is cumbersome to manage.

Many companies will have a conference or speakerphone in a conference room. To participate in an audio conference call with other sites or customers and partners, everyone gathers into the conference room and uses the specially designed speakerphone.

Businesses are using conference calls daily to meet with remote parties, both inside and outside of their companies. Common applications are:

- Client meetings or sales presentations
- Project meetings and updates
- Regular team meetings
- Training classes and communication with employees in different locations

Conference calling is viewed as a means of cutting travel costs and allowing workers to be more productive without going out-of-office for meetings.

Conference calls are used by nearly all publicly traded corporations in the U.S. to report their quarterly results. These calls usually allow for questions from stock analysts and are called *earnings calls.* A quarterly conference call has a predictable structure:

1. A disclaimer states that anything said in the duration of the call may be a forward-looking statement, and that results may vary significantly.
2. The CEO, CFO, or Investor Relations officer then reads the company's quarterly report.
3. The call is opened for questions from analysts.

Conference calling evolved into videoconferencing as companies realized the need for video — a picture is worth a thousand words — and vendors innovated ways for businesses to use it. A **videoconference** allows two or more locations to interact via two-way video and audio transmissions simultaneously. Videoconferencing enables individuals in faraway places to have meetings on short notice. Time and money that used to be spent in traveling can be used to have short meetings. With the introduction of the Internet and VoIP (Voice over Internet Protocol) technology, use of the desktop videoconferencing has grown significantly. It enables low-cost, face-to-face business meetings without leaving your desk, especially for businesses with wide-spread offices around the world. Figure 8-1 shows an example of videoconferencing.

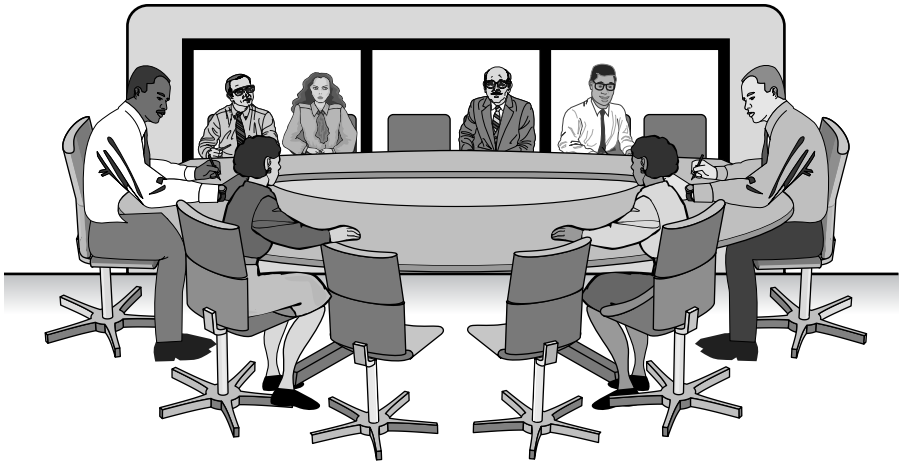


Figure 8-1: An example of videoconferencing.

Knowing that videoconferencing delivers tremendous value in many business scenarios, it is still new technology for many employees who may be reluctant during a videoconference.

Managers should use the technology in front of their employees to assist their employees in overcoming the anxiety. They may even consider practice sessions or rehearsals with employees when an important customer or partner videoconference is scheduled.

As a presenter/leader of a Web-conference, if you are describing or showing details of a medical procedure or equipment, then:

- Use zooming options to focus on the equipment or procedures being described.
- Make your presentation available to the participants for download from the Web-conference console.

Many vendors recognized the value that businesses were realizing from the use of videoconferencing, and they soon innovated what is now known as Web-conferencing. Companies that are the pioneers in the development of popular Web-conferencing solutions are NetMeeting (Microsoft), WebEx (now part of Cisco), Placeware (now part of Microsoft and called Office Live Meeting), and GoToMeeting (Citrix).

Web-conferencing combined the audio and video into a live meeting over the Internet, where you can make presentations or product demonstrations. In a Web-conference, each participant sits at his or her own computer and is connected to other participants via the Internet. This can be either:

- A downloaded application on each attendee's computer
- A Web-based application with which the attendees connect to a Web site address (URL) to join the conference

A **Web-conference** can be collaborative, in which the presenter includes polling and question-and-answer sessions to allow full participation between the audience and the presenter. In most cases, the presenter and participants all dial into an audio conference call bridge provided by AT&T, Verizon, or other provider. There now are Web-conferencing technologies that incorporate the use of VoIP technology to allow for truly Web-based communication.

Businesses are using Web-conferencing for sales and marketing presentations, product demonstrations, and product/project team collaboration — and no one needs to travel anywhere. Everyone gets the same view of the presentation or data without leaving the comfort of the office. Businesses can look forward to significant savings from reduction in travel expenses, reduction in facilities and office expenses, and reduction or complete elimination of the audio conference bridge costs to third-party providers.

Unified communications have consolidated the various forms of audio-, video-, and Web-conferencing that business were using into a seamless single interface where the users can decide which mode of communication is the right one at that instant. They can easily press a few keys with their mouse and connect with their colleagues, customers, and partners. With unified communications innovations to use Voice over Internet Protocol (VoIP), businesses can immediately eliminate traditional telephone-based audio from many Web-conferences, converge to the VoIP technology, and thus save a lot of money.

Starting a Voice Conference Call

I assume that you have implemented a unified communications solution that allows you to use instant messaging, with the added features of audio-, Web-, and videoconferencing.

When you want to start a voice conference call with one or more people, you have options to consider:

- Is this an ad-hoc conference call with some business urgency so you need to do it right now?
- Is this a conference call that you can schedule ahead of time and give everyone advance notice?

Ad-hoc voice conference calls

The business world has many scenarios in which you need to conduct a voice conference call instantly with colleagues and customers or partners. Say you are working on a critical project, proposal, forecast, or budget. You need to speak with the other participants to get the issues or questions on the table, make a quick decision, and then move forward.

To conduct a quick ad-hoc conference call, follow these steps:

1. **From Communicator, find the people you need in this ad-hoc conference. Check their presence (availability) and hopefully everyone is green (available).**
2. **For multiple participants, hold down the CTRL key and click each person you want included in the conference call.**
3. **Right-click and select Start a Conference Call. You then have an option to select Communicator (VoIP) call or start the conference call using one of your phone numbers.**

   Select Communicator (VoIP) call if you have a headset or if you can use your computer's speakers and microphone.

   Figure 8-2 shows John calling Larry and Swati into a conference call using his communicator.

   The people who have been invited into a conference call receive an alert on the lower-right corner of their computer screen that tells them John Williams is inviting them to a conference call.

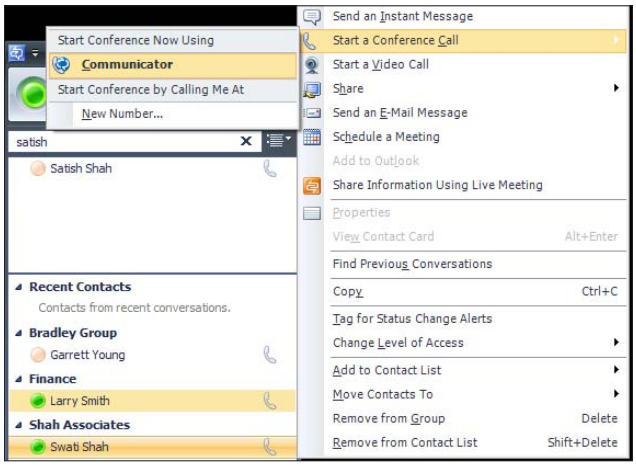


Figure 8-2: John invites Larry and Swati into ad-hoc conference call.

4. **They get an option to Join From, and when they click it they can**
   - Join using their Communicator
   - Select any of their phone numbers that have been published
   - Set their status to Do Not Disturb if they can't take the call

   As shown in Figure 8-3, Larry is working from home and selects his home number to be used for this conference call.

   Swati decides to join the call from her Communicator client, as shown in Figure 8-4.

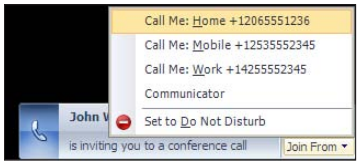


Figure 8-3: Larry receives the conference call from his home number.

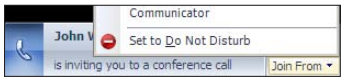


Figure 8-4: Swati receives the conference call from her Communicator.

After all participants have connected into the conference call, their presence status changes to In a Conference and they see conference call control buttons on their screens, as shown for John in Figure 8-5.

5. **Using these controls, John can choose from the following actions:**
   - Put the conference on hold or end the conference
   - Mute his line
   - Invite others to the conference call
   - Make someone else the leader of the conference call
   - Mute others or remove them from the conference

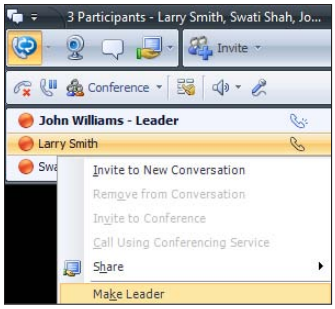


Figure 8-5: John's presence status and conference call controls.

While businesses are facing multiple challenges — globalization, maintaining a connected workforce, and increased competition — the perfect way to maintain a competitive advantage is to use the unified communications audio-, Web-, and videoconferencing tools to enhance the user experience.

Scheduled voice conference calls

Most unified communications solutions today have integrated with Outlook calendars to leverage the calendaring functions in Outlook: checking everyone's calendars for the best day and time to meet, creating the invitation, sending the invitation, and allowing participants to accept or decline the invitation.

If you are the meeting organizer, you can use Outlook's calendaring to find the best day and time; after sending the invitations, you can track how many people have accepted or declined your invitation. The unified communications audio-conferencing solution will also add the audio bridge number for everyone to dial along with a unique conference code for this particular conference. If the organizer wishes, he or she can even add a PIN number for each participant to use — especially great if this is a highly confidential meeting.

TIP

Schedule the conference call, if possible, to give participants time to get it on their calendars:

- You will have better participation
- It will allow everyone to prepare for his or her part in the conference call so your results can be stronger.

As shown in Figure 8-6, Outlook now has a button that allows you to Schedule a Conference Call. If you click that button, the standard calendar request form opens up and allows you to enter the names of participants you want

to invite and the subject of the call, and select the day and time that is most convenient for all. Outlook has a scheduling assistant function that allows you to see when most people in your invitee list are available so you may select that day and time.

Figure 8-6: John's Outlook has the Schedule a Conference Call button.

As Figure 8-7 shows, the Outlook conferencing invitation was altered by the unified communications solution — automatically adding an audio bridge number for everyone to dial along with a unique Conference ID number. So in this case, your unified communications solution server is acting as the audio bridge service provider so you don't have to pay AT&T or Verizon for the service.

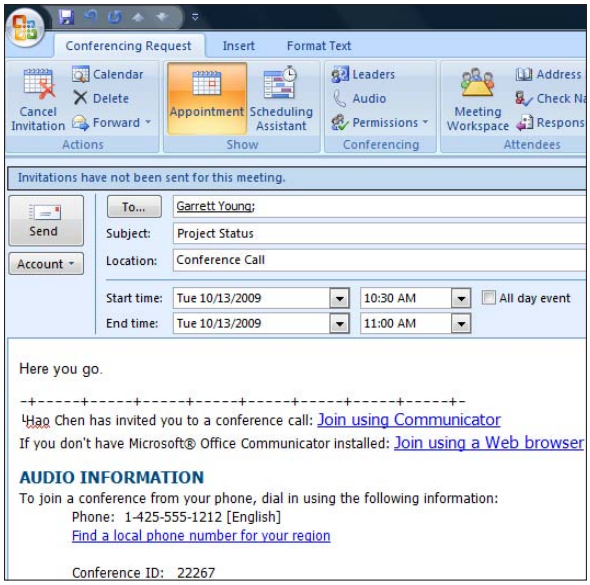


Figure 8-7: Outlook invitation has added a conference bridge number and conference ID.

Sound quality issues

Whether you are using high-quality headsets or your computer speakers and microphone, make sure that the equipment you are using doesn't disrupt the conference call. Even if you are using a traditional phone or cellular phone, always be careful about the static and external noises. This means, however, that any static or disruptive noise that can be picked up through your phone line will affect the conference, so you must ensure that you are speaking in a quiet environment.

A few guidelines can prevent sound quality problems:

- Avoid speakerphones. They pick up background noise.

  Speakerphones pick up lots of background noise, and sometimes cause "clipping" because of the limitations of the equipment. If you are using a speakerphone, try to find one that is "full digital duplex." This will allow all parties to speak at the same time with no clipping. And if no one in your room needs to speak, use the Mute button on the phone to prevent background noise from disrupting the meeting. When someone needs to speak, simply release the Mute.

- Avoid mobile or cordless phones. They pick up static.

  If possible, use a phone with a handset that is hard-wired into the phone lines. Be sure to *test* the working condition of your equipment before an important meeting! Cellular or cordless phones are more likely to cause static or other distracting noise that they pick up in the airwaves.

- Turn off call waiting.

  Most conference calls are set to play a tone as an announcement of a new person entering the conference or someone leaving it. If your phone line starts beeping with call waiting, it can be very confusing and disrupting to the meeting! Most call-waiting features can be deactivated by dialing *70 before dialing into the conference. Check with your local phone service provider if you are unsure how to deactivate this function on your phone.

- If a cell phone call is required, find a stationary location where the signal is strong.

- Avoid noisy environments:
  - If you're calling from home, close out pets and children.
  - Don't bang on your keyboard, shuffle papers, eat, or drink.
  - At the office, find a quiet room instead of an open cubicle area.

If you have sound quality problems during a call, try these options:

- Hang up and dial back in. Generally these sorts of problems clear themselves up when the bad connection is terminated.
- Use the Mute button on your local phone.

  This may help isolate the problem. Then only "Un-mute" when you need to speak.
- If the problems still persist, try using another phone.

Joining a Voice Conference Call

So you have been invited to a voice conference call. Figure 8-8 shows the invitation that John sent to invitees.

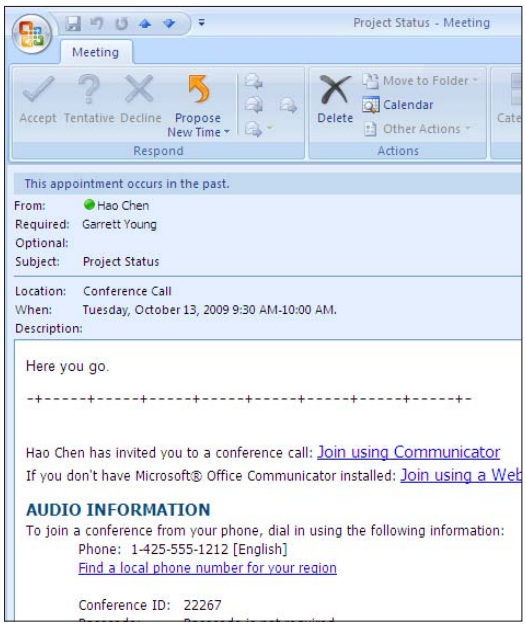


Figure 8-8: Outlook invitation received by invitees to a conference call.

First order of business for the recipients is to either accept or decline the invitation.

If you accept the invitation, Outlook automatically adds it to your calendar. The organizer will receive your acceptance through Outlook. On the day of the conference call, 15 minutes before the actual meeting, you should see a pop-up message on your screen reminding you of the meeting. Maybe a few

minutes before the actual meeting, you want to open the invitation and look at the agenda and the details of how to join the conference call. Prepare for your part of the conference call to make it a successful one.

You will have two options to join the audio conference call:

- You can join using your Communicator client (refer to Figure 8-8), meaning that you are using headsets or your computer's speakers and microphone.
- You can connect using any phone, a landline phone or a cellular phone.

  If you aren't in front of your computer at that time, you can still join just the audio portion of the conference call from your car or from a location where you don't have an Internet connection to use your Communicator client.

Videoconferencing

Many business situations require you to consider using videoconferencing, especially if this is the first time you are meeting with a customer or partner. Instead of a dry conference call, you decide to jazz it up with video.

Videoconferencing can be a simple point-to-point communication between two parties in private offices or it may involve multiple locations (multi-point). It enables you not only to transmit audio and video, but also to share documents, presentations, and white-boards.

Videoconferencing should be considered when

- A live conversation is needed.
- Visual information is an important component of the conversation.
- The parties of the conversation can't physically come to the same location.
- The expense or time of travel is a consideration.

Education

Students and lecturers have a unique opportunity to come together with the help of videoconferencing and remove the geographical barriers between them. Either one can connect from practically anywhere in the world. It is great advantage for smaller schools or training facilities where they can share lecturers with other schools and teach classes on French or Japanese — with the instructor connecting from France or Japan.

Here are some examples of how videoconferencing can benefit people around campus:

- Students and instructors or guest lecturers can join from anywhere in the world.
- An instructor who is out of town can still teach a class from another location.
- A faculty member can participate in a Web-conference from a different building on the campus.
- People at the school or university participate in budget, project, or research sessions as guests even though they are not physically at the school.
- Dean of Admission can interview potential student candidates virtually so they don't have to travel the distance to the university.
- Students can interview with prospective employers in another city.

Medicine and health

Chapter 3 has the perfect example of how unified communications solutions help this industry. In that example, a hospital in California uses Web-conferencing to bring radiologists from India and Australia together with each other for consultation.

Special cameras that are fitted onto microscopes or endoscopes allow physicians in one hospital to consult with physicians in another hospital thousands of miles away using videoconferencing or Web-conferencing.

Business

Businesses can use videoconferencing for meetings with colleagues, customers, and partners across the world, especially using the VoIP technology to do it from their desktop computers. If your company has offices located around the U.S. or the world, you can benefit greatly by using unified communications tools to communicate.

TIP

If your business is new to this mode of communication, consider using it for sales presentations, product/project team meetings and collaboration, allowing employees to telecommute and reduce office expenses, meet with customers and partners remotely, and cut down on travel costs.

Law

Some court systems now allow videoconferencing for the testimony of individuals who cannot travel because of illness or physical hardship. Lawyers from anywhere in the world consult with other lawyers or clients using videoconferencing, enabling them to provide their expertise regardless of the distance between the individuals.

Media relations

Marketing organizations use videoconferencing to announce product launches and provide the public and press an opportunity to ask questions from anywhere in the world.

Journalists can participate in an international press conference from anywhere without leaving their offices or their countries. They just need to sit in front of a computer connected to the Internet and ask their questions to the speaker.

Government

You may have witnessed the videoconferencing between presidents of the U.S. and other countries in the popular television series "24." The technology they are using is the Cisco TelePresence System (see Figure 8-9), which allows for a number of people to participate from two different locations. The telepresence systems use the ultimate in television-quality cameras and HD monitors to deliver the highest quality.

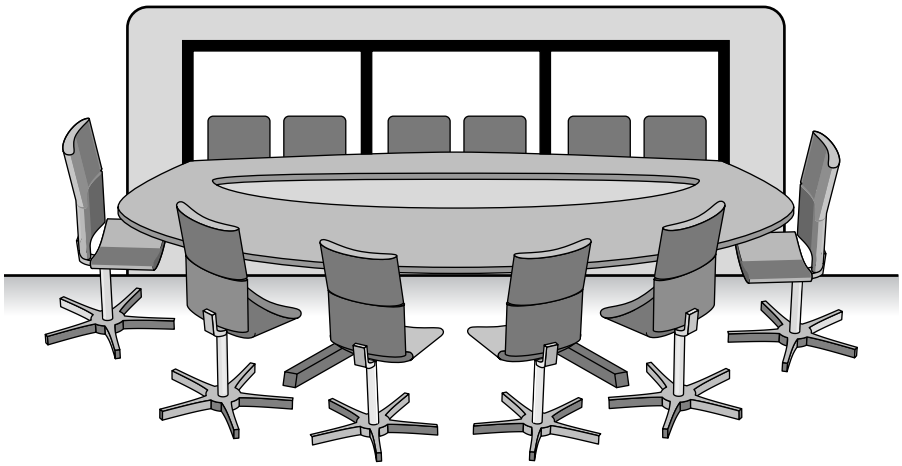


Figure 8-9: An example of the Cisco TelePresence system.

Web-Conferencing

Web-conferencing is used to conduct live meetings, presentations, and product demonstrations via the Internet. Presenters or leaders of the Web-conference and all participants connect from their own computers:

- Some Web-conferencing solutions ask you to download an application that runs locally on your computer.
- Others allow you to connect using a Web-based version for which no download is required.

WebEx really revolutionized Web-conferencing with their innovative solutions that allow a presenter and participants to use their Webcams to share video with everyone and use VoIP for audio communications. WebEx also provides audio bridge services for everyone to talk using traditional phones. WebEx was subsequently acquired by Cisco and has integrated the Web-conferencing solution with their instant messaging and presence systems.

Microsoft acquired a company called Placeware that had a similar Web-conferencing solution and re-created it with a new name: Office Live Meeting. When Microsoft announced its unified communications solution, the company also had integrated Web-conferencing with its instant messaging and presence engine to provide a seamless experience for the end user.

Citrix has a similar solution, called GoToMeeting, but the company doesn't have any unified communications solution for instant messaging or presence.

Common features of Web-conferencing

Many features are commonly found in most Web-conferencing solutions:

- **Slide show presentations:**
  - PowerPoint slides, an Excel spreadsheet, or a Word document is presented to the audience.
  - Markup tools and a remote mouse pointer are used to engage the audience while the presenter discusses slide content.
- **Live or Streaming video:** Full motion Web cam, digital video camera, or multi-media files are pushed to the audience.
- **VoIP:** Voice over Internet Protocol real-time audio using headsets or computer speakers and built-in microphone.
- **Web tours:** URLs, data from forms, cookies, scripts, and session data can be pushed to other participants, enabling them to be pushed through Web-based logins, clicks, and so forth.

This type of feature works well when demonstrating Web sites where users can participate, like taking a survey.

- **Meeting Recording:** Presentation activity is recorded on a PC, MAC, or server side for later viewing and/or distribution.
- **White-boarding with annotation:** Allows the presenter and/or attendees to either
  - Highlight or mark items on the slide presentation.
  - Brainstorm by drawing pictures and writing text notes on a blank white-board.
- **Presenters can open up the meeting for Q&A:** Participants can type their questions and the presenter/moderator can either
  - Review the questions and answer them live via audio.
  - Type the answers for all to read.
- **Polls and surveys:** Allows the presenter to conduct questions with multiple-choice answers directed to the audience.
- **Screen sharing/desktop sharing/application sharing:** Participants can view anything the presenter currently has shown on the screen.

Some screen-sharing applications allow for remote desktop control, allowing participants to manipulate the presenter's screen, although this isn't widely used.

Web-conferencing is often sold as a service, hosted on a Web server by the vendor. Offerings vary per vendor, but most hosted services provide a cost per user per minute model, a monthly flat fee model, and a seat model. Some vendors also provide a server side solution which allows the customers to host their own Web-conferencing service on their own servers. If your vendor provides Web-conferencing running on the same server as the instant messaging and presence capabilities, then you have an advantage of serving everything inside your own premises and don't have to purchase externally hosted services. For you to host the Web-conferencing service on your internal servers, those servers need to be strong enough to handle the additional load.

Common uses of Web-conferencing

Here are some ways companies are using Web-conferencing to reduce costs while improving user experience:

- A hospital in California wanted to improve the patient experience when patients visited the radiology department. The hospital outsourced the radiology to India. When it's 5 p.m. in California, it's 5:30 a.m. in India. Radiologists in India start their work at 6 a.m. IST, when it is 5:30 p.m.

in California — and time for the radiologists in California to go home for the day. If a patient's x-ray or CT scan was taken before 5 p.m. Pacific time, the digital image is stored in the Kodak system. If it is urgent, the technician in California marks it as such. That alerts the radiologists in India to look at the x-rays or CT scan and record their diagnosis. During the hours of 6 p.m. to 6 a.m. Pacific time, the radiologists in India are reading the x-rays and CT scans that were taken during the day in California and recording their diagnosis in the system.

If a physician in California needs to consult with the radiologist in India or with other physicians anywhere in the world, that doctor can use Office Live Meeting to connect everyone in the Web-conference, and each person can annotate the x-rays or CT scan displayed on the screen and discuss the diagnosis further with the others who are participating in the consultation.

- When I was at Microsoft, my teammates were spread throughout the U.S., mostly in each major U.S. city. I was working from the San Francisco office. My manager had us meet each month in a budget and forecast meeting using Microsoft's Office Live Meeting. Each of us typically updated a shared spreadsheet stored on a file-share with our individual forecasts and budgets for the quarter.

  We each connected at the designated day and time into the Live Meeting from our location or from wherever we were at that time. I may have joined from the Microsoft office or my home, and once in a while if I was out of town visiting a customer, I would join from the client's office. My manager would open the spreadsheet in the Live Meeting in a shared mode and allow each one of us to make changes to it as we discussed the upcoming quarter. At the end of the meeting, we had an updated budget and forecast for the next quarter for the entire U.S. Our manager's manager and some other managers joined us as guests each month to discuss new products coming out from their teams over the next quarter. Once in a while, someone from the sales training or technology planning would join us to train us or ask our opinions about new processes or products. Within an hour, we were able to get our shared budget and forecast completed for the next quarter regardless of where each teammate was located at the time or where our managers were on that day.

- As a unified communications technology architect, I was responsible to work with my sales team in the entire Pacific northwest region. Sometimes our U.S. salesperson would be visiting customers in Idaho, Oregon, or Washington state. I had meetings with Nike, based in Portland, Oregon, or Starbucks, based in Seattle, Washington, where I had to demonstrate the Microsoft unified communications solution. Rather than traveling to Portland or Seattle, I scheduled a Live Meeting and invited everyone, including the client, into the Web-conference. At the time of the meeting, our salesperson was at the client's facility and connected his laptop to the Microsoft Live Meeting and also connected it to the projector in the conference room. Everyone in the room in

Portland was looking at the presentation that our salesman had loaded in the Live Meeting room, and he presented it for the first 20 to 25 minutes. When he turned it over to me, I was able to share my desktop and demonstrate the unified communications solution to everyone while answering the client's questions.

- If your company sells products or services, you can consider using the Web-conferencing solutions for "webinars," where you can invite hundreds of customers based on the capacity of the unified communications solution you are using. You may even use common marketing services companies that may assist you in inviting customers in a specific region who meet certain criteria: manufacturing companies with revenue over $50 million, for example. After everyone has joined into the Web-conference, you have the opportunity to present anything you want using PowerPoint presentations or any other software application demonstrated over the Internet and also allow the participants to give their opinions when you use the polling or survey capabilities. The participants can ask questions by simply typing them in or asking over the audio so everyone else can hear their queries.

  Have at least two people from your company: — one to present/demo while the other watches the Q&A and answers them, or he or she holds questions until the final 10 to 15 minutes for you to answer them.

  It's always a great idea to have a backup person also.

- It is common in internal meetings that span geographies for colleagues working on projects or products to meet and discuss while looking at the same screen and give feedback or review the next phase of the product or project. The Web-conferencing solutions allow you to share the control of the program with anyone present so it's a great way to collaborate. Anyone can share his or her desktop and show what others need to see.

- If you have deployed Web-conferencing in your company, one use you should think about is the internal help-desk that assists employees with fixing their problems faster. When an employee calls the help desk with a computer-related problem, the help desk can take control of the user's computer, check the problem, and fix it without an actual visit to the user's desk. This allows the help desk to be remote and still fix the user's computer problems faster.

- If your company provides customer support or services where accessing a customer's computer makes it easier for the support person to fix the problem, you can now use the Web-conferencing software to do it. First, invite the customer to a Web-conference, and then allow that individual to give you control of his or her desktop. Now the technician has a easy way to resolve the problem.

Any Web-conferencing solution should allow you to at least do the following:

- **Team Collaboration:** Share documents or desktop and pass control, use white-board to brainstorm, take notes during a meeting.
- **Sales Presentations:** Customers and partners can join from anywhere and you can poll them for their opinion.
- **Lead Generation:** Invite new customers to see your products and services.
- **On-Line Training:** Allows you to train your customers and partners.
- **Recording:** Must be able to record your meetings so others can view them whenever they have time or they need a refresher.
- **White-boarding:** Must be able to open up an electronic white-board and allow everyone in the Web-conference to participate and share ideas.
- **Polling and Surveys:** Must be able to take polls and surveys with participants so you can gather their opinion after the meeting and learn valuable information about what they liked or disliked about your. product or services

Managing Web-Conferencing

Many businesses have been using Web-conferencing to enhance their employees', customers', and partners' experiences without worrying about the geographical distances between them. They may be using Web-conferencing solutions from vendors that host the solutions, like

- WebEx
- Microsoft Live Meeting
- GoToMeeting

These vendors provide the hosted services at reasonable fixed costs for your employees based on the number of organizers or seats, and it may cost between $15 to $59 per user per month.

Watch for additional costs charged when you go over your fixed minutes.

Now, with the new unified communications solutions that have been introduced by the vendors, you will have a choice of hosting the audio-, Web-, and videoconferencing internally on your own servers and manage everything yourself. It could be a cost-effective solution for your business if it makes sense to host the unified communications servers on-premise. In earlier

chapters, I discussed instant messaging and presence provided through the implementation of servers on your premises. If you do that, your unified communications solution may also include audio-, video-, and Web-conferencing on the same server. The most cost-effective solution for a business is to implement all the communications modes internally and thus eliminate the external costs of hosted audio-, video-, and Web-conferencing.

Ad-hoc Web-conference

A hosted Web-conferencing solution, WebEx, shows the different options available. When I downloaded the WebEx trial software, it automatically added buttons to my Outlook so I could "Start a Meeting Now" or "Schedule a Meeting" from Outlook.

To start an ad-hoc Web-conference, follow these steps:

1. **Click the Start Meeting Now button in Outlook.**

   As seen in Figure 8-10, the WebEx MeetMeNow window opens and allows you to send invitations to the attendees via e-mail, as well as a URL that you can give someone over the phone or through an instant message.

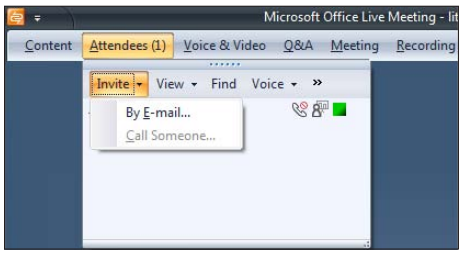


Figure 8-10: WebEx meeting window allows you to send e-mail invites.

2. **After the attendees have joined in the Web-conference, the leader can start sharing the video, a presentation, or any applications running on the leader's desktop.**

   The presenter/leader console can be used to control the options and even pass control to an attendee if appropriate, to allow for that individual to share data with you.

Scheduled Web-conference

I am using a Microsoft Office Live Meeting solution to show you the example of how to Schedule a Web conference. Live Meeting has a plug-in to add the scheduling buttons to your Outlook so you can "Meet Now" or "Schedule a Live Meeting" from Outlook.

To schedule a Web conference, follow these steps:

1. **Click the Schedule a Live Meeting button in Outlook.**

   An Outlook calendaring form opens that allows you to add the attendees you want to invite to the Web-conference.

   Use Outlook's scheduling assistant to find the best day and time for all to attend.

2. **Add subject and a location. Because this is a Live Meeting Web-conference, there is basically no meeting place; participants join from their own desks.**

   The invitation will have a Join the meeting (LM link [URL]) hot link, an audio conferencing phone number, and a unique conference ID that is assigned to this conference.

   The invitees receive the invitation and can either accept or decline it. A calendar item is added to their calendars if they accept.

3. **On the day of the Web-conference, the presenter and participants join by clicking the Join the Meeting hot link; the Live Meeting console is loaded on each person's computer screen.**

   The presenter/leader console can be used to upload content to be shared with the participants, including presentations, a program or desktop, white-board, poll, Web site, and so forth.

   A presenter can load a PowerPoint presentation, start the audio-video options, and even write action items in a shared notepad that everyone can use to take notes during the meeting and then save, if needed, as minutes of the meeting.

Chapter 9

Collaborating and Sharing

In This Chapter

- Sharing your desktop
- Integrating with Office applications
- Collaborating with co-workers and partners

One of the major reasons that businesses are interested in unified communications solutions is because UC provides a platform for collaboration — sharing presentations and applications on your computer with co-workers, customers, and partners. Especially in today's economy, it has become even more critical for businesses to find solutions that will reduce travel expenses while improving employees' productivity and efficiencies.

In this chapter, I show you how best to use the UC tools to collaborate and share important business aspects.

Sharing Your Desktop

Recently, I purchased a Dell laptop and as soon as I received it, I installed Windows 2008 Server operating system. Next, I started installing Office Communications Server 2007 R2 to set up my lab on it and soon realized that when I installed the operating system, some of the drivers for wireless and sound may have been overwritten. They stopped working. I installed new drivers from the DVDs, but no luck. I called Dell and was connected with a support professional.

The support professional asked me if I would be willing to share my desktop with her. I agreed, and then she sent a link that allowed me to share my desktop with her. She looked around the laptop and asked if it was okay to install some new drivers. She went to the Dell support site and found my laptop model and the 64-bit drivers for sound and wireless, plus a few more that she thought were appropriate. After installing all the drivers, she rebooted the laptop. When I signed back on, my wireless and sound worked fine. I thanked her and asked where she was based. She said in Manila, the Philippines.

Here is a great example of the UC tools that allow two or more people to share their desktops with each other for trouble-shooting and solving computer issues regardless of where each person is located. Tani from Manila solved my problem while I was at my home office.

Collaboration enables employees in a company to work with colleagues, customers, and partners using various UC tools: instant messaging; presence; audio-, video- and Web-conferencing; and enterprise voice (VoIP).

Users can collaborate with others in two ways:

- *Asynchronous collaboration* means that you upload documents into a portal (internal or external Web site). Others also upload documents to the same portal if given permission to do so. Then each individual is allowed to download them for review, edit, and re-upload the updated documents to the Web site. Users are doing the activities at their own time and no one is interacting with each other in real-time.

  Examples of asynchronous collaboration software include Cisco WebEx Connect, Microsoft Office Groove, and Microsoft SharePoint. Say that a product team is creating product marketing documents. Each team member may create a document and upload it to the portal and allow the rest of the team to review it. Each team member can take his or her time to review and give feedback to the author. The author's responsibility is to then take everyone's feedback, consolidate it into the document, and create the final version.

- *Synchronous collaboration* is real-time during which two or more people interact with each other at the same time. The earlier example I cited with a Dell support person is an example of synchronous collaboration. Perhaps the most commonly associated form of synchronous collaboration is desktop sharing or Web-conferencing using tools such as Communicator desktop-sharing, Cisco WebEx Meetings, or Microsoft Live Meeting.

  Synchronous or real-time collaboration is becoming a popular form of collaboration, especially with tools like WebEx and Microsoft Office Live Meeting. The tools have extended their portfolio of features to take the place of in-person meetings and still get the same experience — but at a lower cost.

Assuming that you have implemented a UC solution in your company or you may be piloting or evaluating UC, you should have instant messaging and presence to start with as the basic building block for collaboration. You have multiple options of how you actually start sharing your desktop with others.

Ad-hoc sharing of your desktop

You may need to instantly review something you are doing with a colleague and get a quick resolution. Here are steps you can follow:

1. Say John wants Suzy and Larry to review his budget forecast before he sends it to the rest of the team. From Communicator, first he checks their presence to make sure that they are available, and then sends them both an instant message to ask if they have time to join him now to review the budget forecast.
2. After everyone agrees and is in the IM conversation, John clicks on the sharing icon to start sharing his desktop, as shown in Figure 9-1. He gets a warning that all participants will now be able to see his desktop. John clicks OK.

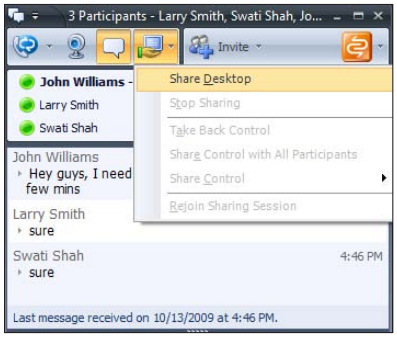


Figure 9-1: John clicks the desktop sharing icon.

3. Larry and Suzy get an alert to John's invitation to view the desktop sharing session, as shown in Figure 9-2. They need to accept the invitation to see John's desktop.

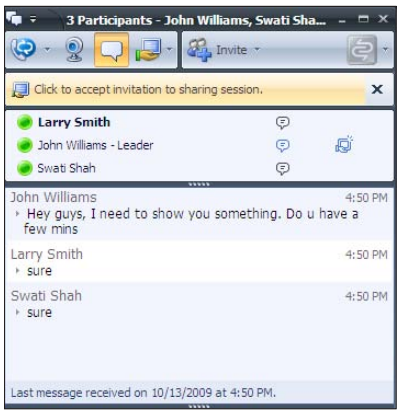


Figure 9-2: Larry gets an alert to John's sharing session.

4. After Suzy and Larry accept the invitation to the sharing session, they see John's desktop, as shown in Figure 9-3. You can see the budget forecast spreadsheet that John is sharing and that John is in control.

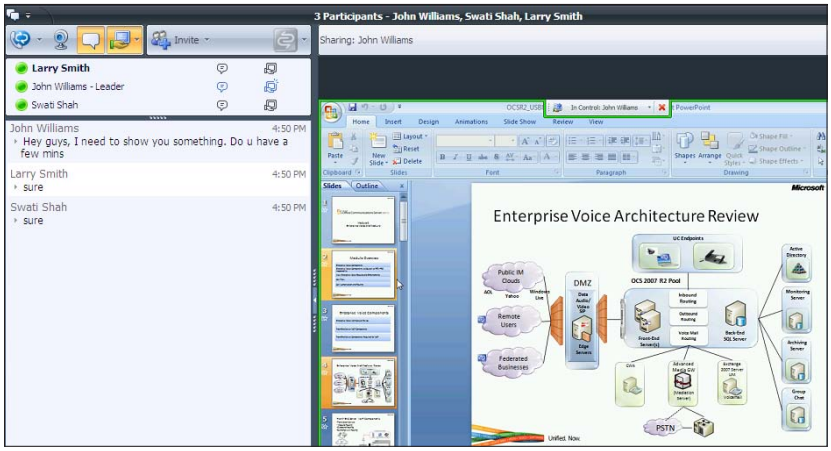


Figure 9-3: Suzy and Larry can see John's desktop and John is in control.

5. On John's screen, he can click on the down-arrow next to **In Control: John Williams,** as shown in Figure 9-4, to open up the options for sharing control. He can share control with all participants or select Larry or Suzy to pass control to. Even Suzy or Larry can request control of John's desktop. Of course, John is in control always, so he can deny or take control back whenever he wants to.

Figure 9-4: John can share control with others.

TIP

Only pass control to one person at a time. It could get confusing if multiple people are changing your data at the same time.

This example shows it would be very easy to use your instant messaging solution to start sharing the desktop on an ad-hoc basis based on other people's presence availability. If you are sharing a spreadsheet (refer to

Figure 9-3), after the editing is done by all in the collaboration session, the spreadsheet can be saved by anyone who has the control — it will be saved on John's computer because he initiated the sharing session.

When you are using desktop sharing or Web-conference, you can initiate the session and invite users from your contact list as well invite others via e-mail. They don't even have to have the same UC software. If your company's UC solution allows you to invite external participants, then you can invite them to the ad-hoc session.

For team collaboration, store the original spreadsheet or document on a shared drive or a portal that everyone has access to. Follow these steps:

1. Start the collaboration by opening the document from the shared drive, and then allow for all participants to share control.
2. Each team member takes turn updating the data for his or her region or product line.
3. Everyone reviews the data before saving it again to the same shared drive or the portal.

This scenario works for any team sharing common goals.

Scheduled sharing of your desktop

Most people prefer to schedule a meeting in advance so that it gives them and others time to prepare. On a few occasions, you must meet instantly with your colleagues to discuss an issue or task that can't be delayed.

Obviously, when you deliver training or product/project updates to a team or collaboratively meeting for brain-storming with a team, you want to schedule a collaborative session. You will find many more reasons to use a scheduled session of collaboration where you give everyone advance notice, as well as use Outlook's scheduling assistant to find the best day and time for everyone to participate. You may even invite customers and partners, if appropriate and this functionality is enabled for you to do so at your company.

Scheduled sharing of the desktop

If the situation permits, it's always better to schedule a meeting so that everyone gets adequate time to prepare for the meeting. Follow these steps:

1. From Outlook, select Schedule a Live Meeting or Schedule Meeting (WebEx) option.

2. Select the people you want to invite, and then click **Scheduling Assistant,** as shown in Figure 9-5.

   Scheduling Assistant will help you find the best day and time for everyone to participate. Determining when most people can participate ensures a productive meeting.

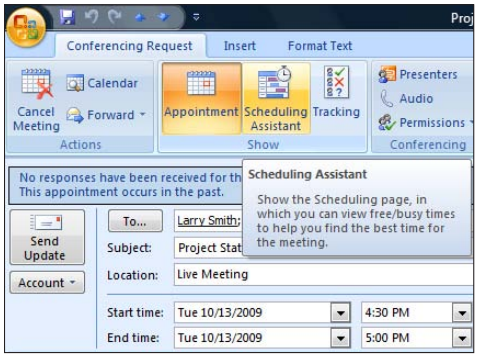


Figure 9-5: Scheduling Assistant finds a day and time when most people are available to meet.

Include a detailed agenda so everyone knows what will be discussed during the meeting and whether there will be multiple presenters. Including an agenda gets everyone on the same page and emphasizes the importance of attendance as well as attention, especially if the meeting will include training.

3. When invitations are sent to all, they will also get a hot link to **Join the Meeting** using the Web-conferencing solution that your company has implemented.

4. Everyone who has been invited to the Web-conference will join on the day and time by clicking on the hot link in the invitation, as shown in Figure 9-6.

   The invitation includes the audio information as well as the unique conference ID assigned to the conference.

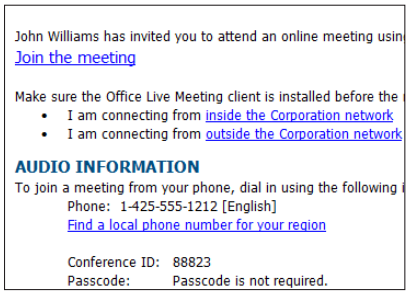


Figure 9-6: Invitation with hot link to Join the meeting and audio and conference information.

5. When everyone is in the Web-conference, the leader can start by sharing his or her desktop.
6. After the sharing session starts, the leader will have options to pass control to another presenter or project/product team members to demonstrate a part of a document, spreadsheet, or application being developed.

Most Web-conferencing software solutions allow the presenter to share either

- An entire desktop
- A specific application/program running on the desktop

Figure 9-7 shows that presenters can share selected areas of their desktop so everyone doesn't see the entire desktop.

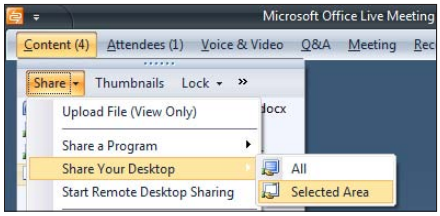


Figure 9-7: Presenters can share a selected area of their desktop.

Some desktop sharing solutions allow presenters to push everyone to a full-screen view, while other solutions allow the participants to select a full-screen view on their desktops. Obviously, some participants don't object to be forced into a full-screen view of the presentation but other participants may object. As a presenter, it's important to keep that in mind.

During the meeting, the presenter can lead everyone into the sharing of a program, desktop, a white-board, a poll, a Web site, or a screen snapshot based on the need and goal of the meeting.

TIP

Remove anything on your desktop that you don't want others to see, or use **share selected area** of your desktop as discussed earlier. If you have any type of background scenery or family photos on the desktop, for instance, it may be appropriate to remove them before the desktop sharing session. High-quality graphics, pictures, and background colors take extra bandwidth and time to transmit to others' computers. Such nonessential elements also distract people from the real reason they were invited into the Web-conference.

Integrating with Office Applications

There are more than 200 million users of Microsoft Office worldwide. That said, wouldn't it be great if you could share your desktop or collaborate with others while you are working in a Word document or Excel spreadsheet? Why leave Word or Excel in order to determine presence of colleagues, customers, and partners so you can collaborate with them?

You don't have to!

Most of the major vendors of UC solutions have integrated presence with Office applications; some may even allow you to integrate presence with other applications. So now, you can start instant messaging or desktop sharing with others right from Word or Excel.

The UC vendors have taken advantage of a feature built-in to Word and Excel called Smart Tags to turn that presence info on for you while you are these applications. To be specific, when you hover over someone's name in Word or Excel, that individual's presence information is high-lighted and you can right-click on that person's name to send an IM or start sharing your desktop and collaborate.

Look at the following example.

In Figure 9-8, a Word document is open and looks like a Project Status Report prepared by John Williams. It shows that Suzy McNeil and Larry Smith are team members for this project. If you are reviewing this document and came up with a question or thought that requires you to discuss it with one of them, you can put your mouse over John's name because he is the Project Manager for this project. If John's presence icon shows that he isn't available, then you can hover over Suzy or Larry's presence icon. Larry's presence icon is green, so he is available.

Now you can right-click on Larry's presence icon and a whole menu of UC options will open up, letting you start an IM or call Larry Smith at his published numbers. What a great way to communicate with someone without leaving Word, as shown in Figure 9-9.

You can do the same in Excel, PowerPoint, or any other Office application as well as in SharePoint. Most times, presence awareness will work out of the box. However, the following steps turn it on if it hasn't been set by default.

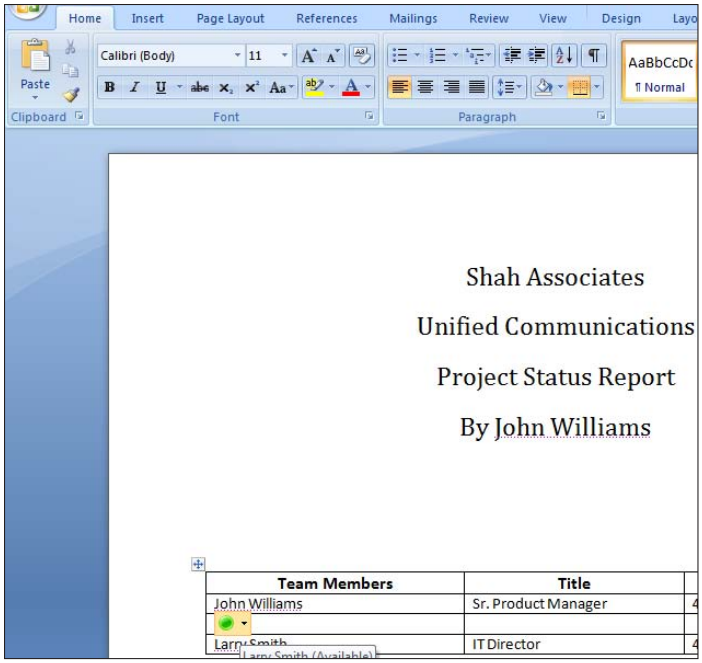


Figure 9-8: Larry's presence (availability) is shown in Microsoft Word.

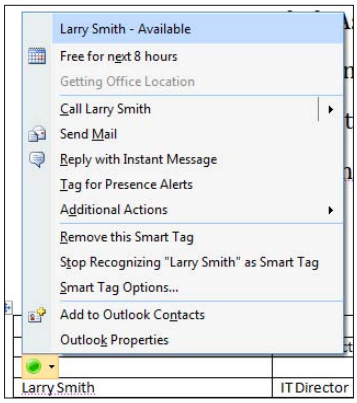


Figure 9-9: Communicating directly from Word.

How to turn presence awareness on in Word or Excel

You can enable presence in Microsoft Word or Excel. Follow these steps:

1. **If your Communicator client isn't running and logged in, start it.**
2. **From an open Word document or Excel spreadsheet, go to the Office button in the upper-left corner.**

   The button is shown in Figure 9-10.

Figure 9-10: Microsoft Office button.

3. **Choose Word Options or Excel Options at the bottom of the dialog box.**
4. **From the Word Options or Excel Options screen, select Proofing.**
5. **From the proofing screen, select AutoCorrect options.**
6. **Click the SmartTags tab. Under Label text with smart tags, check Person Name (English) and Person Name (Outlook e-mail recipients), as shown in Figure 9-11. Click OK.**

   When you hover over anyone's name in **Word, Excel, or other Office programs,** the individual's presence icon will light up to indicate actual availability.
7. **Right-click on the presence icon.**

   You will see all the available options to communicate.

Advantages of incorporating online presence

Enabling presence in Word or Excel enhances a user's capability to improve collaboration between group members and increase efficiency in business processes. By integrating instant messaging and presence information in Word, Excel, or a SharePoint site, group members can see who is online and instantly know whether they are available for a quick question or brief meeting. Individuals can streamline work processes by immediately notifying team members of document or timeline changes or establish group collaborative sessions by using instant messaging.

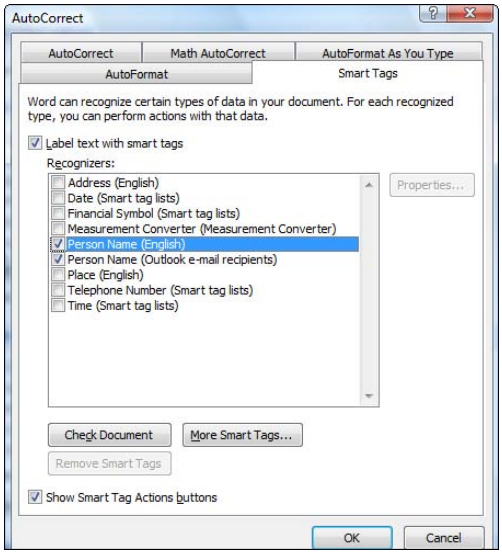


Figure 9-11: On the Smart Tags screen, select Person Name (English) and Person Name (Outlook e-mail recipients).

Organizational considerations

It's important to balance the benefits of increased collaboration among group members with the requirements for security and compliance, particularly in regard to the deployment of an instant messaging client. Planning for presence should include assurance that both internal and external communications to and from the instant messaging client are consistent with company-wide policy for security and compliance with regulatory guidelines and business practices.

For example, in some highly regulated industries, instant messaging conversations must be retained in accordance with record-keeping requirements for electronic communications. Companies that are subject to Sarbanes-Oxley regulation must archive instant messaging conversations as a part of their records-retention requirements.

Software requirements

Because online presence status is rendered by Office, Office 2003 or later is required on all client computers. Additionally, one of the following instant messaging clients must be installed on client computers to enable real-time communications:

- Microsoft Windows Live Messenger
- Microsoft Office Communicator 2005 or newer

Windows Live Messenger users will see online status for their Messenger contacts only. If Office Communicator is installed, the end user will see the online status for all contacts.

E-mail account requirements

To display online status, the presence feature uses a Session Initiation Protocol (SIP) address to communicate with the instant messaging client.

Only SIP addresses can take advantage of additional presence features, such as

- Sending and receiving e-mail
- Displaying free/busy information from the online status indicator

If a SIP address isn't available, a .NET address (MSN Messenger) or an Exchange Instant Messaging address (Windows Messenger) can be configured on an individual basis.

Collaborating with Co-workers and Partners

Unified communications opens up many new ways to work with co-workers, customers, and partners, especially with the geographically dispersed workforce that most companies have. UC provide you with tools for working remotely and communicating efficiently and collaboratively.

This section details how you can use the UC features to communicate more efficiently with your colleagues and also improve your customer and partner satisfaction dramatically. I share the specific steps needed to establish a collaboration strategy for your internal organization as well the external marketplace.

Collaboration means cooperation — people getting together to achieve a common goal. It could be between team members who are working on the same project, product, strategy, or a marketing campaign — whatever the theme is, everyone wants to achieve the same end result. Collaboration means everyone is at the same level; there are no leaders or managers, but there may be a moderator to keep things moving in a collaborative session.

There are many business scenarios to collaborate with colleagues, customers, and partners. The best way to achieve effective collaboration is to treat everyone as an equal contributor or partner. As a business leader, you may

want to provide your employees with training and awareness about the best ways to collaborate so that they achieve greater results for your company.

That said, sometimes a collaborative meeting in which everyone is treated equal can easily get out of control or boring if someone isn't pushing the agenda along and motivating everyone to participate. So you may want to think about assigning someone to be a meeting coordinator/moderator to keep these meetings interesting, on-target, and productive.

Here are some best practices for collaborative meetings:

- Assign different team members to be the moderator for each recurring meeting. They will send the invitations, create the agenda, and then moderate the actual meeting to achieve the goals set out in the agenda. They also should be responsible to take meeting minutes and post or send them to everyone later.
- It's critical for the meeting moderator to keep it on schedule and follow the agenda. It's possible to lose control in collaborative meetings. Keep everyone on topic and don't allow discussions to drag on.
- Check with all participants at the start of the meeting to see whether they are comfortable with the agenda and if a topic needs to be added or removed.
- In a Web-conference, some participants will join remotely and others will be in a conference room. Make sure all who join using phones (especially speakerphones) mute the phones when they aren't speaking.
- Polling or surveys are available in most Web-conferencing software and allow you to get a consensus from everyone easily on a topic of discussion. Does everyone feel a particular feature is a must in the product even if that moves the delivery date, or can the feature be optional?
- Use electronic white-boards, available with UC tools, to brainstorm for new ideas. Regardless of location, everyone can contribute ideas by using annotation tools.
- Most UC solutions allow you to take notes during the meeting, so the moderator or someone else assigned as the scribe should do that to keep track of what was discussed, action items, results of polls taken, list of documents or items to be shared with everyone, and equally important — agenda topics for the next meeting and who will lead it. All this information can easily be turned into meeting minutes and shared with everyone.
- People may join the meeting late or have to leave early. That means they need to be updated about information discussed during that meeting in their absence. One effective way to do this is to publish the meeting minutes along with an invitation for the next meeting.

Save the shared documents, chat, polling results, whiteboards, and so forth that are used during the meeting. Depending on which Web-conferencing software you use, you may be reminded before you end the meeting to save everything.

The following are some examples of collaboration in different types of businesses or professions:

Business

UC tools have revolutionized the ways in which an organization collaborates internally and externally. Businesses recognize that instant collaboration improves employees productivity and team efficiency that could gain a competitive advantage. The UC solutions that leverage the Internet and VoIP have opened up the opportunity for a business to extend it to include key customers and partners and achieve new forms of collaboration that was unheard of five years ago. If you provide any type of customer service or technical support for your customers and partners, UC tools provide you the opportunity to improve and make it faster while reducing your costs. Here are some scenarios in business for which collaboration tools can be used:

- Project/product team collaboration, both internally and externally
- Customer/partner training
- Customer/partner service or help desk (internal and external)
- Marketing/sales presentations (Webinars)
- Budget forecast review meetings

Education

Educational institutions can provide their students and teachers with collaborative UC tools that allow the students or teachers to participate from anywhere in the world, removing all geographical barriers.

- UC solutions such as WebEx Training Center allow students to work on their own computers while teachers are able to look over their shoulders and assist with trouble-shooting, connected remotely over the Internet.
- As a trainer for the Microsoft UC solutions, I have delivered training for learning centers that enable students to connect remotely from anywhere and I deliver my presentations using Live Meeting. Students perform their lab exercises remotely, and I have access to look over their shoulders and assist them if the need arises.

- Microsoft Office Live Meeting service allows a lecturer to start with a general topic, and then 30 minutes into the lecture, allow students to break out into what is called breakout rooms — different virtual rooms where different topics are discussed or different courses are taught — simply by clicking a few buttons in the original Web-conference that they joined remotely.

Publishing

Any publishing activity would require the collaboration of multiple people at the same time to reach consensus and then publish a magazine, a book, or a newspaper. Look at some examples how UC tools can be leveraged in the publishing industry:

- A photographer or illustrator and a writer can use the sharing and collaboration tools discussed earlier to share ideas. Both WebEx and Live Meeting allow sharing of live media during a Web-conference so they can run some videos before deciding what parts to use for the final version.
- Editors, reviewers, photographers, and writers can collaborate on an ad-hoc basis or in regularly scheduled sessions to hash out publication schedules and action items or review actual material to get to the final stages of publication.
- Authors and their editors or agents can get together remotely and work on the outline of the book or an article before the author starts writing. The agent may also get involved to hash out the contractual details.

Science

Researchers and scientists are known to be early adopters of technologies that further their goals, and UC is not new to them. Many original IM tools were widely used in the scientific arena to collaborate and communicate with colleagues across the world. It's possible that the recent advances in the UC tools have further advanced the possibilities of collaboration among researchers and scientists and brought them together for joint publications of articles, research activities, and so on.

Technology

Innovation of the UC tools discussed throughout this book were the results of the engineers and architects of UC actually having them to further their advancements. The people at Microsoft, Cisco, and IBM who innovated the

tools like instant messaging; audio-, video-, and Web-conferencing; and VoIP integration were able to do it faster and cheaper because of access to these tools themselves.

I was an early adopter of the UC tools while I was at Microsoft and provided the product teams with insight about the use of the tools from a usability perspective. It is imperative for a technology company to be able to innovate and test its own products organically before they are available to the marketplace, ready for the masses.

For technology companies, it is critical to have instant access to experts throughout their organization for customer and partner inquiries as well as their own internal needs. For product development, what better way to collaborate than having instant access to the whole team, no matter whether they are — in India, Australia, China, or Israel. If a software developer needs assistance, all he has to do is look at his Communicator and see who is online and ping that person instantly. By having UC integrated with VoIP and Internet, the cost of reaching someone across the world has become insignificant compared to the investment; no technology companies should keep their employees from leveraging these tools today.

Chapter 10

Single-Click Access

In This Chapter

- Communicating with an all-in-one interface
- Examining available client software
- Integrating unified communications with applications

One of the Utopian promises of unified communications is to enable users to communicate anytime, anywhere, using the most effective and efficient means possible at the time, all from a single application or communications interface.

The goal of unified communiacations is to

- Tame the chaos of trying to manage multiple phone numbers, e-mail addresses, instant messaging accounts, and other methods of communication
- Help people to be more productive.

All For One, and One For All

Unified communications allows you to use a single application to interface with various forms of communication. You can see who is available and determine the most appropriate method of contacting that person, and then — with a single click — you can either

- Initiate a phone call, an e-mail, or an instant message.
- Invite the user to an audio or video conference call.

Ideally, the all-in-one unified communications client should also provide a means for you to receive and manage your incoming communications from one application:

- When someone calls, you can answer with the unified communications client.

- You can view e-mails with a click.
- If you have voicemail or incoming faxes, your unified communications client will notify you and provide a way for you to view and manage those communications.

The following sections look at the features you can expect to find in a unified communications all-in-one client, and the kinds of functionality they deliver to help you communicate more efficiently and be more productive.

Presence

You may have noticed a theme at this point: *Presence* is a keystone of unified communications. Just as many of the original instant messaging clients include functionality to let you know who is currently available online, presence in unified communications lets you see the current status of your contacts.

Unlike the instant messaging client, however, unified communications presence typically provides more detailed information about the status. Rather than simply showing whether someone is online or offline, presence provides information such as In a Meeting or On a Call. In addition, presence can be tied to your personal calendar so that it automatically modifies your presence based on the appointments and events you have entered into your schedule.

Some unified communications clients also enable you to group users into different categories and filter the level of detail that users can see about your presence. For example, you may want casual acquaintances to see you as busy while allowing your manager or co-workers to see your actual status and communicate with you.

Instant messaging

Instant messaging is the foundation of most unified communications all-in-one client applications. At first glance, there isn't much difference between the way that an instant messaging client like Windows Live Messenger (see Figure 10-1) looks and the way that a unified communications client such as Microsoft Office Communicator (see Figure 10-2) looks.

Even some of the functionality is similar. The instant messaging application evolved into more of a communications hub than just an instant messaging client and was essentially a catalyst in the broader evolution of enterprise unified communications and the concept of the all-in-one communications interface.

The instant messaging functionality of the unified communications client enables users to chat in real time with one another. Some applications can invite multiple users to participate in a multi-party group chat session.

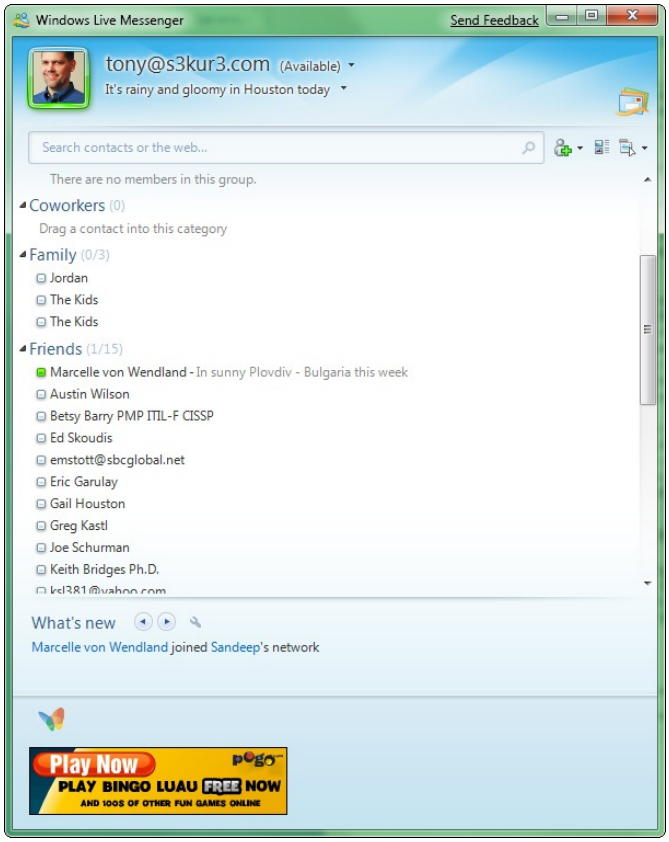


Figure 10-1: The Windows Live Messenger software from Microsoft looks similar to a unified communications application.

E-mail

E-mail is one of the primary methods of communication used by today's consumers and enterprises. To be truly all-in-one, the unified communications client application should provide a way to interface with e-mail.

Most unified communications client software can initiate an outbound e-mail. By clicking a contact within the unified communications application, you can choose from the communications methods available to contact an individual. Usually, sending an e-mail is one of the choices.

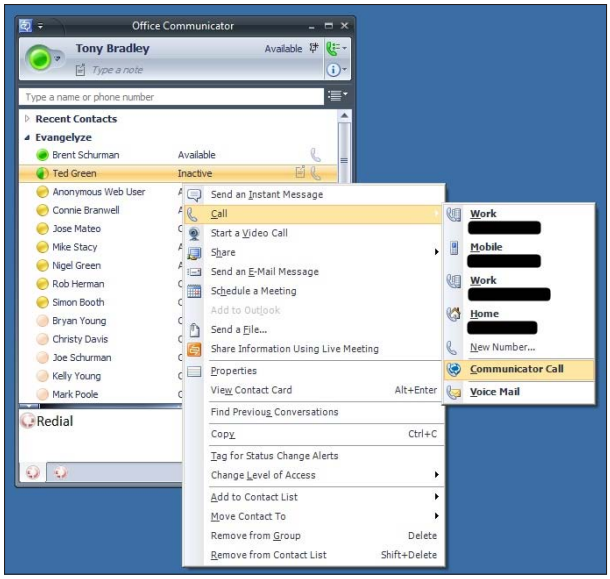


Figure 10-2: Use the unified communications application to display a list of available phone numbers to call.

Clicking this option will open up a new e-mail message using your default e-mail application and automatically fill in the e-mail address with the information for the user you selected. You can then type whatever message you need to convey and send the e-mail on its way.

Ideally, an all-in-one unified communications client also enables you to view your incoming messages or at least notify you when there's new e-mail in your Inbox. This functionality is necessary for the unified communications application to truly be all-in-one. Otherwise, you need to have both the unified communications client software and your default e-mail client open simultaneously in order to see all inbound communications.

Telephony

The other cornerstone of consumer and enterprise communications is the traditional voice phone call. The unified communications client software must integrate with the voice communications and provide an interface for the user to receive phone calls, place outbound phone calls, and listen to voicemail messages.

By combining unified communications presence with any other status information entered by users (such as a note stating that they are offsite at a client meeting or working from a home office), you can decide which of the available phone numbers is the best option to reach the user (see Figure 10-3).

Figure 10-3: Providing a subject for the call helps the recipient determine whether to take the call right now.

The unified communications client is usually a softphone or software-based telephone that can make and receive voice calls using the computer.

For a computer to be a software-based phone, it must have a means of audio input and audio output. In other words, the computer must have a microphone and sound card/speakers so that you can hear the phone call and speak to the other party.

A cool function of placing calls through the unified communications client software is that you can assign a subject to the call (refer to Figure 10-3) so that it has some context and helps the recipient determine if it is a priority to discuss right now.

Some unified communications clients, such as Microsoft Office Communicator, allow you to place a call directly to a recipient's voicemail. This can be useful if you need to share information that's best suited for a voice call, but you don't want to interrupt the user to communicate it.

Audio conferencing

Conference calling (multi-party voice calls) has been around for decades. Many consumer phone plans can conduct a three-way conversation by essentially patching two separate phone calls from one source together.

Enterprises frequently conduct conference calls of various sorts. They may be virtually any meeting involving more than two parties, such as

- Project team calls
- Meetings with customers or partners
- Shareholder or board of director calls

These calls typically involve either

- Subscribing to some sort of hosted service that manages the conference calling capabilities
- Purchasing expensive equipment to handle conference calling internally

One of the capabilities found in some of the unified communications client applications is the capability to select multiple contacts and initiate an audio conference call on the spot. The software will dial all of the chosen parties to conference them in. You may have the option of either

- Conducting the audio conference call using the softphone function of the unified communications software
- Having the unified communications system call you back on your desk or mobile phone.

Videoconferencing

Videoconferencing is quickly growing in popularity. Although audio conferences are a viable option for engaging a group of people in a discussion, sometimes objects need to be seen, such as architectural models or product prototypes. It is also beneficial in business dealings to see the facial expressions and body language of the partner or customer whom you are engaging with.

Videoconferencing also offers a practical replacement for travel. Rather than flying executives and salespeople around the world to meet with customers face to face, companies can simply conduct those meetings via videoconference calls. The face-to-face aspect is maintained without the expense of airfare, lodging, rental cars, and meals.

Video calls require

- Video camera or Webcam
- Microphone
- Sound card
- Speakers

Desktop sharing

Another aspect of online conferencing and collaboration is the capability to share applications or the desktop of a participant's computer. Whether conducting a one-on-one call, or a multi-party audio or video call, you may wish

to discuss financial projections on a spreadsheet or collaborate on a presentation for an upcoming client meeting.

Unified communications client applications typically are capable of sharing the desktop of a computer, or sharing select applications or files so that other meeting participants can see them on their screens.

Some applications may also provide the capability to designate control to allow other parties to either

- Manipulate the keyboard and mouse.
- Modify the shared file.

User directory

A function that helps you work more efficiently when using a unified communications application is the capability to quickly find the people you need to communicate with.

Because the unified communications software generally resembles an instant messaging client, you may have a list of contacts that you communicate with on a regular basis. You can even group them by company, department, project, or however else it makes the most sense to you.

You obviously have quick access to the people you add to your contact list. But, what about other people in your company who aren't on your contact list? The unified communications software is typically integrated with Active Directory or whatever other user directory exists for the unified communications infrastructure.

That means that you can also quickly search for and contact anyone else in the user directory by typing the name, e-mail address, or phone number.

The Microsoft Office Communicator software searches both the back-end user directory of the company and the personal contacts stored in your Outlook profile. By simply typing "jim," you can display a list of all names in both the Active Directory user data and your Outlook contacts whose first or last name begins with "jim." After you identify the right contact, you can right-click and select from all of the available methods of communication and then either

- Send an e-mail.
- Start an instant messaging session.
- Place a voice call.

Contact history

The unified communications software should retain a history of the communications between you and other parties. One of the advantages of an instant messaging session or e-mail communication over a voice call is that there's a written record of what was discussed. A voice call could be recorded, of course, but even then it doesn't provide the same degree of functionality that you can achieve by searching archived communications using keywords and quickly identifying the information you are looking for.

The unified communications system should automatically retain such communications. Many organizations have both

- A business use for archiving the information
- A compliance requirement to retain communications data

An all-in-one unified communications application should provide a quick and easy way for you to search your previous communications and access previous conversations.

Unified Communications Clients

Don't get rid of the phone on your desk or throw away your mobile phone just yet. The vision of unified communications and the concept of the all-in-one communications interface is grand in scope, but you aren't quite there yet.

The unified communications interface is useful as a communications hub while you are sitting at your computer. However, there may be times when you'd rather not have your phone call broadcast over your computer speakers so you'll use your desk phone instead. There will also be times that you are away from your computer and have to rely on your mobile phone to communicate. The following sections take a look at the unified communications applications available from some of the major unified communications vendors and the functions they currently offer.

Avaya

Avaya has a background as a communications hardware provider. It had been in the business of enterprise voice and telephony, evolving to IP-based telephony solutions, prior to diving into the unified communications market.

Avaya's One-X Desktop Edition is its software-based phone and unified communications client interface. One-X provides basic presence information along with voice and instant messaging capabilities. In addition, One-X enables most of the calling features found in traditional phone systems and advanced functionality. Here are some of the features found in Avaya One-X:

- Call hold
- Music on Hold
- Transfer (attended and unattended)
- Conference (third party added)
- Click to dial (from Internet Explorer)
- Call Management (incoming and outgoing)
- Find Me
- Call Forwarding
- Message Waiting Indication (MWI)
- Call Park and Retrieve
- Automatic Call Back (activation and canceling)
- Call Forwarding All Calls (activation/deactivation)
- Call Forwarding Busy/Don't Answer (activation/deactivation)
- Extension to Cellular
- One-step Recording (via voice mail)
- Priority Calling
- Send All Calls (activation/deactivation)

Avaya One-X is also available in a mobile edition that allows users to access many of the functions of Avaya unified communications from their mobile phones.

Cisco

Cisco is best known as a provider of networking infrastructure and network hardware such as routers and switches. Cisco also provides IP PBX hardware and IP telephony equipment. They have expanded the scope of their IP-based communications offering to include a complete unified communications suite which includes the Cisco Unified CallConnector for Microsoft Windows client software.

Cisco Unified CallConnector for Microsoft Windows provides an interface for making and receiving calls from a Microsoft Windows–based computer. Cisco also integrates with Microsoft Windows applications such as Outlook and the Internet Explorer Web browser through toolbars.

The software displays presence information for contacts to notify you whether contacts are available and to help you determine the most effective method of communicating with them. It then lets you initiate a voice call, an e-mail, or an instant messaging session with a simple mouse click. Like the Avaya One-X software, Cisco Unified CallConnector for Microsoft Windows provides software-based access to virtually all of the IP telephony features found on desktop phone handsets.

IBM

IBM has a different approach to unified communications. IBM views unified communications as a software function rather than an extension of IP telephony or network infrastructure. With Lotus Sametime, IBM provides a unified communications console that delivers a comprehensive variety of communications tools from one application.

The Lotus Sametime client (see Figure 10-4) resembles a typical instant messaging application with presence information to let you know the availability of your contacts, but diving deeper you will find that it provides much more. The Sametime client application also allows you to conduct multi-party chat sessions, make and receive VoIP phone calls, conduct video calls, and more.

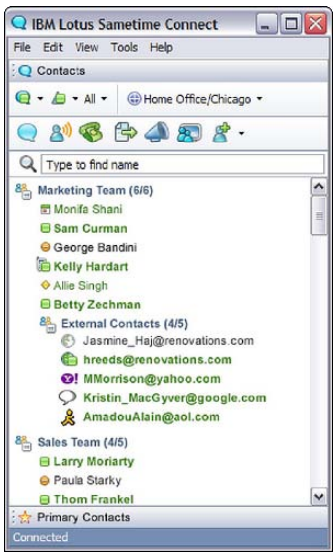


Figure 10-4: The Lotus Sametime client provides a familiar interface that users can relate to.

IBM's unified communications client provides integrated chat histories and contact search capabilities. Sametime is also capable of Web-conferencing, file transfer, and interoperability with public instant messaging networks.

Microsoft

At first glance, Microsoft Office Communicator looks similar to a standard instant messaging client. Right-clicking one of the names in your Communicator contact list reveals that Communicator is capable of much more than just instant messaging, though. Figure 10-5 shows the various options available for communicating with this one contact.

Microsoft Communicator displays presence information using color-coded circles.

- Green means that a user is available.
- Yellow means that the user is away or inactive.
- Red indicates that the user is busy.

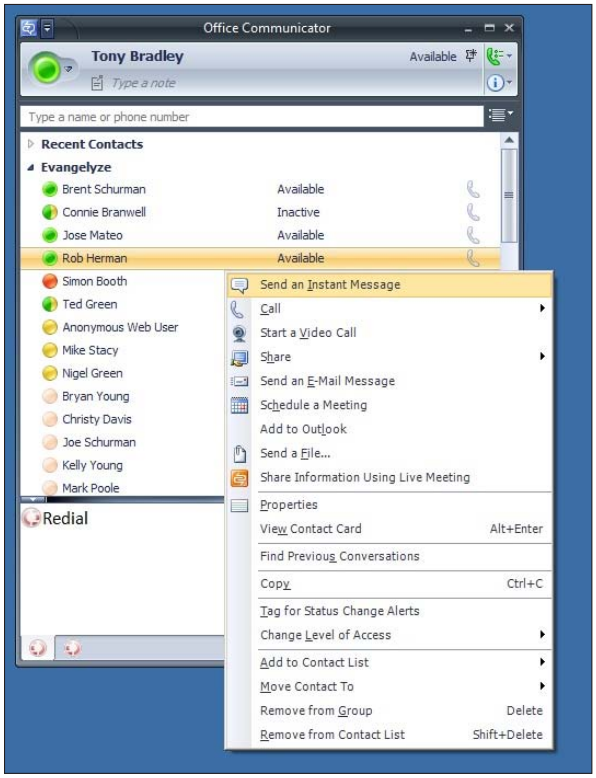


Figure 10-5: Office Communicator provides a variety of options for communicating with a contact.

Microsoft Communicator Mobile

Microsoft Communicator Mobile provides access to virtually all of the same unified communications functions as Microsoft Communicator, but from your mobile phone. With Communicator Mobile, you can update your status and view the current presence information for your contacts. When you make or receive a call on your mobile phone, Communicator Mobile automatically updates your status to "In a Call" and changes the color of your presence to red.

Clicking a name in Communicator Mobile displays a quick look at the user's availability for the next few hours according to that contact's Outlook calendar and brings up a menu of options to select from in order to communicate with that user. You can send an instant message, initiate an e-mail, or place a call to any phone number listed for that contact.

Microsoft Communicator Mobile has some cool features:

- You can place a softphone-to-softphone call, called a Communicator Call.

  This feature places a SIP-based (Session Initiation Protocol) call between your Communicator Mobile and the user's Microsoft Office Communicator client software rather than using your mobile phone minutes or forcing the user to shift gears or stop using the computer in order to answer a phone.

- Microsoft Communicator Mobile can be configured to allow users to place calls to third parties through the enterprise voice system.

  Rather than placing a call directly and using up mobile phone minutes or incurring expensive roaming or international calling charges, you can place the call from the corporate VoIP system, which can save the company a significant amount of money.

Microsoft Communicator integrates with your Outlook calendar and automatically updates your status when you are occupied in meetings or conference calls.

With a couple of clicks of Communicator, you can

- Do the standard communicating via instant message, voice call, or e-mail.
- Share applications or let other contacts share your desktop.
- Initiate a video call or ad hoc conference call.

You can assign users or groups to different access levels within Communicator. Customers may be able to see only basic presence information, while co-workers can see your general availability, and you can enable members of your team or your managers to see detailed information from your calendar. You can also block users so that you appear offline to them.

Communicator lets you tag contacts for status change alerts. When contacts that are designated for status change alerts sign on, or sign off, or their presence status changes in any way, you will receive notification via a pop-up

message and/or sound. You can use this to monitor team member productivity and see when contacts are online, or to alert you when a contact you need to communicate with becomes available.

Integrating with Applications

One of the factors of unified communications that can help you be more efficient and productive is how it integrates with the tools and applications you rely on. The capability to place a call or send an e-mail by clicking a link within an e-mail or Excel spreadsheet saves you from having to copy and paste the information or write it down so you can switch to some other application to initiate communications.

You may think it seems tedious, bordering on lazy, to nitpick about the 30 seconds here and 30 seconds there that users might expend in looking up phone numbers or contact information the old-fashioned way and switching to the appropriate program and communicating. Those 30-second increments add up, though. Multiplied many times per day times hundreds or thousands of users, those 30 seconds hinder efficiency and impact the bottom line.

A core unified communications protocol is SIP. SIP is similar to HTML (hypertext markup language) and provides many of the same capabilities: You can create links and leverage SIP connections from within other applications. The following sections explain some of the ways that unified communications integrates with office productivity and other desktop software applications to provide a seamless communications infrastructure that helps users work more efficiently.

Office productivity

Unified communications functionality can be embedded into office productivity applications such as Microsoft Word and Microsoft Excel. Microsoft and IBM, approaching unified communications primarily from the software side and being the developers of office productivity suites, lead the pack in this regard. IBM, in particular, provides integration with its own office suite as well as with Microsoft Office applications.

Users can seamlessly transition between unified communications-enabled software and initiate communications with users. For example, links can be embedded to allow a user to call, e-mail, or instant message the creator of an Excel spreadsheet. This functionality may be useful if you have a question about calculations contained in a financial projection spreadsheet. Rather than switching to a different application to look up the contact info for the author and then switching again to your e-mail or instant messaging client or picking up the phone to contact the person, you can quickly see if the person is available and make contact with just a mouse click.

E-mail

E-mail clients such as Microsoft Outlook and Lotus Notes are an integral part of unified communications. E-mail is one of the primary forms of communication used by consumers and enterprises so it makes sense that e-mail would occupy a significant role in unified communications.

With unified communications integration, though, e-mail provides new facets of communication as well. For example, with Microsoft Office Communications Server and Microsoft Outlook, presence information is displayed for the contacts that an e-mail is from or to. As you are reading the e-mail and have questions you need to clarify or issues you want to discuss, you can tell at a glance whether the individual is available (see Figure 10-6). The presence info is dynamic. It changes in real time as the individual's status changes. It isn't a static snapshot of presence at the time the e-mail was sent.

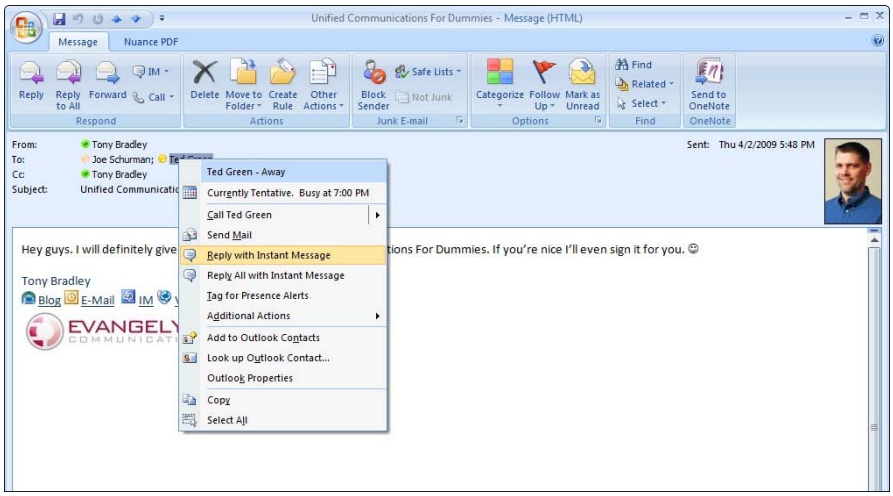


Figure 10-6: Right-clicking a recipient in Outlook displays communication options.

Whether they are available or not, you can right-click names to display a menu of communication options, including replying by e-mail or instant message or placing a call to a contact. For e-mail messages with multiple recipients, you can, with a single mouse click, either

- Invite all parties to an instant messaging chat session.
- Call all parties to join a voice conference call.

Custom solutions

One of the ultimate benefits of software-powered voice and software-based unified communications is that they enable developers to create custom solutions that extend the unified communications functionality:

- Many such applications are available.
- Other new, innovative solutions are being developed daily.

Here are a few examples:

- Gold Systems has developed a voice-powered password reset application that integrates with Microsoft Office Communication Server. Password Reset leverages OCS and extends the functionality to provide users with a virtual help desk that is available 24/7. Companies can improve efficiency and productivity while cutting costs by implementing a solution like this that lets users manage the password reset process themselves.
- Evangelyze Communications' SmartSuite includes SmartVoIP, SmartSearch, and SmartSIP. One that was selected as an Internet Telephony Product of the Year for 2008 is SmartChat. Instant messaging is a core function of Microsoft Office Communication Server. Evangelyze Communications extended that capability to create a click-to-chat application that can be embedded within Web sites. With SmartChat, companies can provide a direct means for customers to interact with a help desk or customer service center to get their questions answered.

Part III

Implementing Unified Communications

The 5th Wave By Rich Tennant

In this part . . .

After you build your system, the chapters in this part show you how to make it fly. You'll be more connected than a Hollywood talent agent.

Chapter 11

Eat the Elephant One Bite at a Time

In This Chapter

- Leveraging your existing environment
- Examining sample scenarios
- Developing a plan for unified communications

Unified communications can mean different things to different organizations. There are a variety of potential components that comprise a unified communications implementation. Which combination will work for your organization is a subjective decision (see Figure 11-1). VoIP and instant messaging are key components in most cases. E-mail, including unified messaging which lets users get voicemails as audio file attachments, is another common component. But they aren't mandatory.

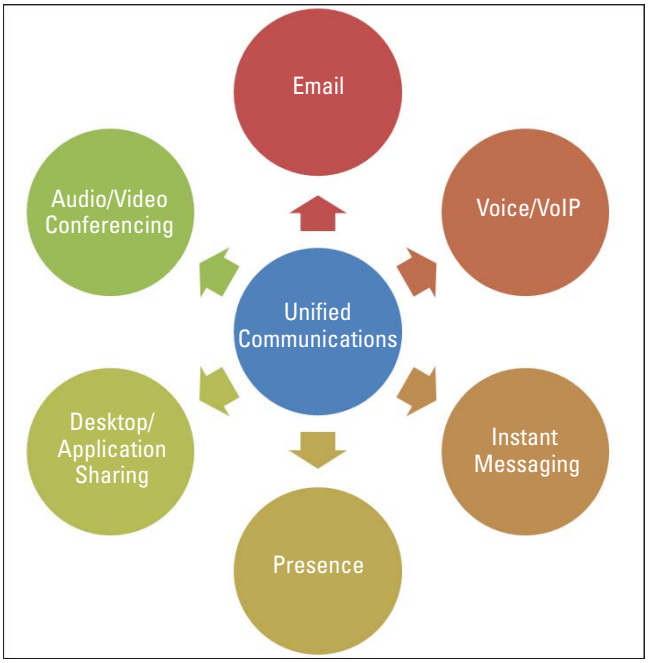


Figure 11-1: There is no "right" combination to achieve unified communications.

Presence (read Chapter 2 for more about Presence) is the tie that binds a unified communication implementation. Presence lets you easily identify the status and availability of your contacts. Ideally, presence should be integrated throughout the various applications you use so that you can quickly identify who is available and initiate communications, no matter what you are doing.

The nice thing about the modularity of unified communications components is these pieces can be deployed in a phased approach. You can eat the proverbial elephant one bite at a time. This modular approach also enables you to spread the cost over a larger period of time, instead of replacing the entire communications infrastructure all at once. In this chapter, we will take a look at some of the approaches you can take to build a unified communications environment starting with what you already have. We will also talk about why it is still important to have a plan and an ultimate goal in mind even when approaching unified communications one step at a time.

TIP

The modularity of unified communications is beneficial for organizations that have an existing investment in some of the components, but want to expand the functionality and integrate with other components to achieve unified communications. Leveraging existing hardware and software makes the overall solution more cost-effective.

Another advantage of being able to approach unified communications in phases is that installing many new technologies simultaneously makes them more complicated to troubleshoot and tune. If you deploy a variety of new hardware and software technologies simultaneously, it is difficult to determine which new device or application is the root of the problem. The phased implementation allows time to ensure that one component is functioning properly before moving on to the next one.

Assessing Where You Are

While unified communications is modular enough that you can implement it in whatever combination or order works best for you, you still have to determine what combination or order works best for you.

Before you start making decisions and laying out plans for your unified communications project, consider the following:

- **What have you got?** You should begin by compiling a list of the equipment and capabilities you already have as it relates to unified communications. Assess assets like:
  - PBX / IP-PBX
  - Desk phones

- Email server
- Instant messaging
- Audio conferencing
- Videoconferencing
- Voice service provider
- Server hardware and software
- Desktop PC hardware and software
- Mobile devices

✓ **What do you want?** Why are you considering unified communications? Determine which features or capabilities are important to you and make a prioritized list of the unified communications components you would like to implement. This list can help get you started:

- Presence
- VoIP
- Email
- Instant messaging
- IP desk phones
- Soft phones
- Unified messaging
- Audio conferencing
- Videoconferencing
- SIP trunking
- Mobile unified communications client
- Single-number communications

✓ **How will what you want impact what you've got?** If you already have a reliable voice system and you want to integrate it with e-mail to provide unified messaging, how will that impact productivity? Compare what you have and what you want to determine where they overlap and intersect, so you can develop an efficient implementation plan that minimizes the disruption of normal business.

Starting From Where You Are

The following scenarios explore how you can leverage your existing investment in hardware and software and incorporate additional technologies to build a unified communications infrastructure. We'll analyze situations starting

with e-mail as a base, adding VoIP to an existing unified communications foundation, and building on VoIP to expand to a fully functional unified communications environment.

Building on E-mail

Let's start by looking at a scenario where you have an e-mail platform you like, and you want to build on that to begin implementing a unified communications infrastructure. The current situation is

- Small company
- Using Microsoft Exchange Server 2007 for e-mail
- Not very technologically advanced and does not have an extensive network infrastructure
- Employees rely on Microsoft Outlook as the client software for e-mail, contacts, and calendar scheduling.
- Phone system is a traditional analog POTS (plain old telephone system).

How can you use the hardware and software you already have, and begin to build toward a unified communications platform at the same time?

Because you already have Microsoft Exchange Server 2007, an obvious place to start is by adding the Microsoft Exchange Server 2007 Unified Messaging role to the Exchange server. Unified Messaging combines all messaging types into a single storage space.

This one-stop shopping for communications is a big step in the right direction toward realizing the promise of unified communications. Rather than checking e-mail in one place and voicemail in another, and picking up faxes in a third, all these messages are delivered to the Exchange Inbox, and they can all be retrieved from the Outlook client software.

This functionality is even more important when you consider that it opens the potential for users to be able to get their communications anytime and anywhere (Chapter 7 covers using unified communications remotely).

Combined with Outlook Web Access (OWA) or Exchange ActiveSync delivery to mobile devices, Unified Messaging lets users retrieve voicemails and faxes from

- Any computer connected to the Web
- Any e-mail-capable mobile device

Exchange Server 2007 with Unified Messaging also provides Outlook Voice Access (see Figure 11-2). Outlook Voice Access is an interactive voice response system that works with Outlook. Users can

- Hear their e-mails over the phone.
- Check calendars.
- Reschedule appointments using any phone in the world.

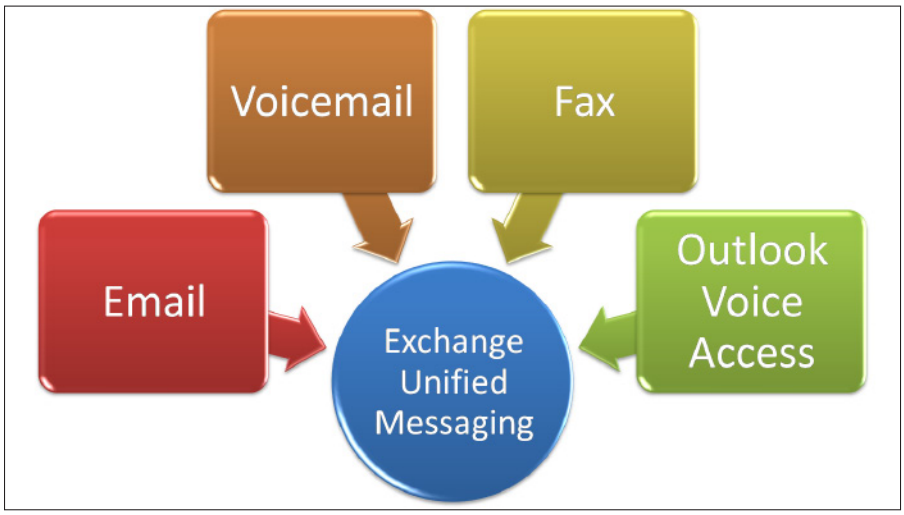


Figure 11-2: Unified Messaging expands communications options for Exchange.

Installing Unified Messaging

Unified Messaging requires Microsoft Exchange Server 2007. Before installing the Unified Messaging role, you should ensure that the Exchange Server is upgraded to Service Pack 1 (SP1). Service Pack 1 adds a number of new features and capabilities to Exchange Server 2007, many of which expand the functionality of Unified Messaging and provide a more robust unified communications environment.

After you have verified that Exchange Server 2007 SP1 is applied, check your Exchange Server 2007 server to see which roles are active, and whether the Unified Messaging role is already present, by using the Exchange Management Shell. Type the following to display the server's roles:

```
c:\ Exchange> get-exchangeserver <servername> | FL
```

The Exchange Server can operate multiple roles as long as the physical server has the resources to manage the load (such as processing power, memory, and storage space).

To add the Unified Messaging role to an existing Exchange Server 2007 system, navigate to the bin directory of the Microsoft Exchange installation (typically found at `%programfiles%\Microsoft\Exchange Server`) and run Setup.cmd from a Command Prompt. You can also modify the Exchange Server installation through the Control Panel.

You can get more detailed instructions from this Microsoft TechNet article: How to Modify an Exchange Installation.

Giving unified communications a voice

Now let's consider another example. This time you have some unified communications foundation and want to add voice communications.

This is the current situation:

- Using Microsoft Exchange Server
- Using Microsoft Office Communications Server for
  - Instant messaging
  - Online conferencing
  - Presence
- Implemented Unified Messaging on Exchange Server
- Traditional analog PBX phone system

The existing voice system, an old-fashioned analog PBX, is not integrated into the Microsoft unified communications infrastructure. To connect the analog PBX to the existing environment, you must deploy an OCS 2007 Mediation Server and install an analog gateway that is certified to work with Microsoft Office Communications Server.

Mediating Between Protocols

The Microsoft Office Communications Server 2007 Mediation Server role is designed to mediate between the various voice and VoIP protocols used by PBX and IP PBX platforms and the Microsoft Office Communications Server. The Mediation Server is able to convert PSTN (public switched telephone network), TDM (time division multiplexed), and SIP (session initiation protocol) protocols from the gateway into the SIP over MTLS (mutual transport layer service) protocol that OCS 2007 uses.

There are some additional considerations to keep in mind when integrating analog voice with the existing Microsoft Unified Communications environment:

- The number of DID (direct inbound dial) numbers that can be assigned in OCS 2007 will be limited by the number of actual analog lines coming from the PBX.
- Caller ID info will not be communicated in most cases; neither the called nor calling party information will be transmitted to OCS.

There are other issues as well between OCS and the use of the available analog lines. It may not be possible to designate which analog line should be used for which outbound calls. This can also impact inbound calls in that calls coming in to a designated analog line may ring busy to the caller even though the individual being called is actually available. Some gateways have additional functionality to accommodate these issues.

Taking these issues into consideration, adding the Mediation Server and an appropriate analog gateway to the existing Microsoft Unified Communications environment allows this organization to incorporate voice into their unified communications and expand their unified communications functionality.

Integrating existing VoIP with Microsoft Unified Communications

For this scenario, assume that you have an existing Voice over IP (VoIP) environment for voice communications, but lack the other components of unified communications. The initial situation looks like:

- VoIP solution already in place
- Email platform already in place

The approach for this organization is largely a matter of business needs or personal preference. To begin with, the organization should look at the available unified communications components and decide what they ultimately want to have in place. They should look at what the various unified communications components have to offer and how they will improve efficiency or impact business processes.

You have a solution in place for email, even if it is not Microsoft Exchange / Outlook. You could take the approach of installing Microsoft Exchange Server 2007 and Unified Messaging to integrate with the current VoIP infrastructure.

However, because you already have a functional email system, perhaps you would gain more benefit from starting with Microsoft Office Communications Server 2007. OCS 2007 will provide instant messaging capabilities and Presence. If it is integrated with the VoIP infrastructure, users will be able to also make and receive phone calls from their computer using Microsoft Office Communicator.

Regardless of the approach you take, you can benefit from the modularity of unified communications. Whichever component you start with, you can take the time to integrate it and ensure it is running smoothly before moving on to the next one. You can spread out the investment in new technology, and adopt unified communications at a comfortable pace that enhances, rather than hinders, business productivity.

Measure Twice, Cut Once

As you embark on building a unified communications environment, plan carefully before sawing or cutting so you don't mess it up and have to start all over.

Regardless of the existing hardware and software in place, how many users are involved, or how many sites the organization has, there are some basic principles behind every successful migration.

Begin with the end in mind

Your unified communications implementation plan should begin with the big picture or ultimate goal in mind. While it might be possible to simply add one piece at a time and see how it goes, your options may become more limited with each component you add. You may end up venturing down a path that forces you into design decisions or causes you to have to start over.

Taking an ad hoc approach can be both costly and frustrating. Some hardware and software components work well together. Some don't. Without a long-term vision to work toward, a decision early in the process to go with a specific vendor or solution may preclude you from being able to explore options at later stages that might benefit your unified communications infrastructure.

Aside from the compatibility and integration of the various unified communications components, you also have to consider the network and domain infrastructure. You have to ensure, as you proceed through each phase, that the Active Directory structure and network domains are constructed in a way that will work efficiently for the final unified communications result.

Implement sufficient capacity

Unified communications is not very forgiving when it comes to server processing power and network bandwidth. Streaming audio and video are resource intensive. Audio and video quality can suffer greatly if packets are delayed by even a millisecond.

- When you are rolling out one piece of the unified communications infrastructure, or if you are just conducting a test of a unified communications technology, a given server and network architecture might work.
- However, as users are added to the unified communications infrastructure server and network, capacity can quickly be overwhelmed.

You don't have to deploy all of the hardware at once, but you should project capacity based on

- The total number of users
- The expected bandwidth

If you architect a solution without sufficient server horsepower and network bandwidth, the communications quality will be unacceptable and the unified communications project will fail.

Develop redundancy or failure

Communications are a critical function for most organizations. As you merge all of the communications for the organization into one infrastructure, if that infrastructure fails in any way communications will fail as well.

For a complete unified communications environment that can mean losing email, voice communications, instant messaging, audio and video conferencing, and more, all in one fell swoop.

When relying on hardware and software for voice communications, a loss of power can make it impossible to call for emergency services, such as 911.

For both business and safety reasons, you should consider the disaster recovery and business continuity scenarios that might impact your unified communications and make sure that you have adequate redundancy or failure options in place. At the very least, policies and procedures should be documented to provide instruction for how to communicate if the unified communications infrastructure is unavailable.

Consider future expansion

Architecting, planning, and implementing a well-designed unified communications environment can be very gratifying and yield significant benefits for the organization. But the glory may be short lived if the unified communications platform can not be grown or extended to meet demand.

If the business is successful, it will grow. Employees will be added. Perhaps remote or branch office locations will be established. The company may even acquire competitors and other smaller entities. All of these events will require that the unified communications environment be flexible enough to grow with the business and that additional users and capacity can be added on the fly.

Keep in mind how much the unified communications environment can be customized or extended. One of the benefits of software-powered voice and unified communications is the ability to design custom solutions that enable communications to fit the business process rather than the business process being confined to what the communications system is capable of.

Not all unified communications platforms are created equally when it comes to extendibility. Some are more proprietary and limited. Make sure you understand the limitations of the design decisions you make and that the unified communications system you build is capable of meeting the needs of your business.

Start with a pilot test

Start with a small sampling of users for a pilot test, rather than just diving into the deep end, especially when you're dealing with something that could potentially affect all communications.

The pilot group should be representative of the organization. There should be members of the pilot group from various departments throughout the company to make sure that the test encompasses as many of the regular functions and processes necessary to conduct business as possible. Feedback should be collected from the pilot group, and modifications made to the overall plan and architecture to address any serious concerns that are discovered.

Assuming that any initial pilot test is successful, the pilot implementation should not have to be replaced. It should be built on to expand the implementation to fit the needs of the organization rather than just the pilot group. That requires considering other factors, such as sites, domain architecture, and network architecture as a part of the initial pilot test.

Chapter 12

Configuring Voice

In This Chapter

- Applying Enterprise Voice components
- Engaging the traditional voice administrators
- Integrating PBX/PSTN systems
- Deploying unified systems

Most businesses have a network that is used to connect users' computers to the corporate servers and other peripheral devices, such as printers and fax machines. This network is called a data network because all the data is transported over this network. The geniuses at technology companies like Cisco and Microsoft figured out they can also use this data network to transport voice and conduct audio and video conversation. In the context of unified communications, some vendors call it Enterprise Voice when they use software to transport Voice over Internet Protocol (VoIP):

- It integrates audio and video conversations with
  - Traditional e-mail
  - Calendaring
  - Instant messaging
  - Conferencing
- End-users experience a seamless desktop client to take advantage of all the unified communications tools.
- Administrators have simple management tasks through the use of a single management console.

As a business decision maker, you derive new benefits when you integrate your voice needs with your other unified communications needs like IM, presence, and conferencing. You leverage the investment you made in the data network and see it extended to your audio and video conversations and substantially reduce your company's long-distance and cellular phone charges.

Enterprise Voice Components

This chapter discusses the deployment and configuration of the voice components and the new features it enables for the enterprise to achieve the business benefits.

In Figure 12-1, you see a reference architecture that shows a complete picture of all the components of a total unified communications solution.

Translation Service

The technology geniuses who work with telephony realized that people like to dial internal numbers and external numbers in different ways. For example, some companies' users dial five digits to reach someone internal while other companies use four digits. To dial external numbers, some companies require first dialing a 9 to reach an outside line; others dial 8 or nothing at all. All these methods of dialing needed to be standardized according to the telephony geniuses, who came up with a standard that is called E.164. E.164 format in the U.S. would look like +13125551212 if you were dialing a local Chicago number with area code 312 and 555-1212 as the local number.

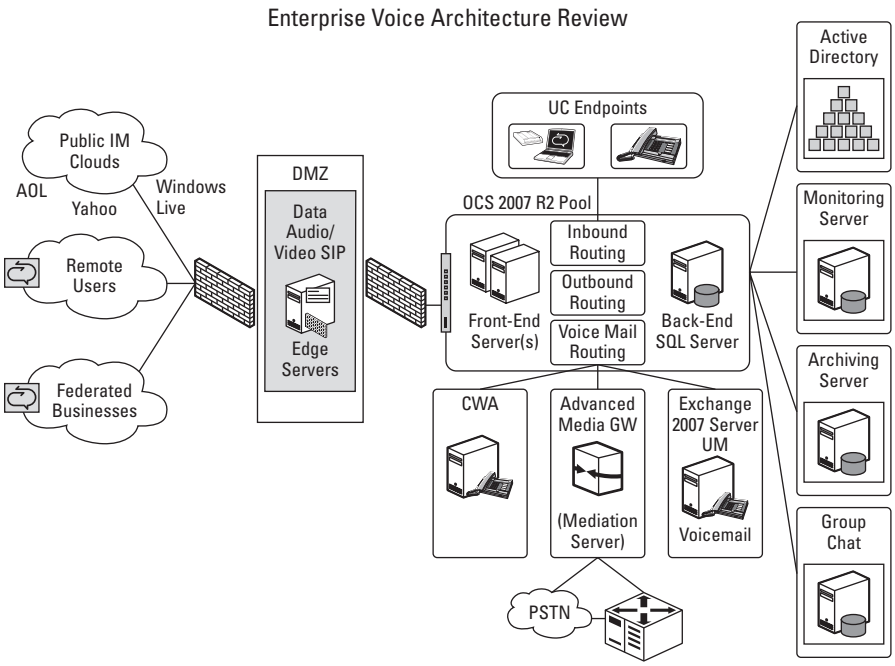


Figure 12-1: Reference Architecture of a unified communications solution.

Unified communications servers that provide you the Enterprise Voice capability from the same desktop client need to also adhere to the E.164 standard so calls go to the correct destination. The software geniuses who designed these unified communications servers call it the *Translation Service (TS);* it translates a dialed number into the E.164 format.

The TS needs to know

- Where the user is actually located — like Chicago, Singapore, or London.

  This is called a *location profile.*
- What to do if someone dials
  - A three-digit number such as 911, 411, or 511.
  - A four-digit number (internal extension)
  - A seven-digit number (local number)
  - A ten-digit number (long-distance)

  In each case, the service needs to know how to translate the number to the E.164 format.

These translation rules defined by the administrator are called *normalization rules,* and the process of translating is known as *normalization.* Location profile and normalization rules are discussed later in this chapter.

All the dialing is done through the communicator client after the end-user has been enabled for Enterprise Voice.

In different countries or localities, gateways or Private Branch Exchanges (PBXs) may not support the E.164 format. In such cases, the administrator must define the format to be used by the TS.

Inbound Routing

After enabled for unified communications, John Williams can use his Communicator client to forward all calls he receives to his mobile or home phone or his voice mail. Each user who is enabled for Enterprise Voice in a company can do the same. When administrators install the unified communications server in your company, the Inbound Routing component is installed automatically; its job is to handle the incoming calls and route them to the correct destination based on the user's preference.

If your company also has installed Exchange 2007 server with its Unified Messaging component, then the voice mails are routed to the UM server that is installed at your company.

Outbound Routing

If John Williams uses his Communicator client and calls Suzy or Larry, who are part of his own company, the calls need to be handed to the company's Private Branch Exchange (PBX). If John dials an external number, it needs to be routed to the external Public Switched Telephone Network (PSTN).

When administrators install the unified communications server in your company, the Outbound Routing component is installed automatically and routes calls to the PBX or the PSTN. Before actually routing a call to the PSTN, Outbound Routing also determines if the user is authorized to make this call; some users may be enabled for long distance, and some may not be.

Depending on where the call is going, administrators may define least-cost routes so the call charges are minimized. You must make sure that the network or telephony administrators duplicate your existing PBX routing logic.

Exchange UM Routing component

Some companies may have installed Exchange 2007 Unified Messaging to enable their users to receive their voice mail or fax transmissions in the Outlook mailbox.

If you have that case, then when John receives a call and doesn't answer it, UM Routing will route the call to the UM server.

PSTN Integration component

When John receives a call from an external source, the call comes on the PSTN. The PSTN hands the call off to the PBX that typically would route it to the actual user's phone. That was before Enterprise Voice implementation. Now, with your Enterprise Voice implementation, the call needs to go to John's Communicator client and alert him. Similarly, when John uses his Communicator to call an external number, it needs to be handed off to the PSTN to route to the right destination.

PSTN Integration seamlessly manages the integration between these two environments without the user knowing what is going on.

Some companies may need to employ a media gateway for all the translations to work correctly; those scenarios are covered later.

Address Book Service

Each time a user makes a call using the Communicator client, a global directory of addresses is used to retrieve the called user's information. Typically, this address book would be the corporate address book called Active Directory. The software geniuses figured out that it would be more efficient if each user's copy of the corporate directory had only the specific information that each user needed, like phone numbers.

Address Book Service creates this copy every night, and then stores it somewhere so all Communicator users can easily download it to their own computers. After a copy is downloaded to a user's computer, it takes only mini-seconds for the Communicator to find the right information about a user for the call to be made.

Private Branch Exchanges (PBX)

The PBX is a telephone exchange that makes connections among the internal telephones of your organization and also connects your organization to the PSTN that your company has deployed. Your telephony or network expert can confirm for you whether your PBX is based on Time-Division Multiplexing (TDM) or Internet Protocol (IP).

IP PBXs were developed in the 1990s with the realization that existing data networks can be used for transporting voice — Voice over Internet Protocol (VoIP) — and thus reducing the costs of long-distance calls traveling over phone lines. Cisco is a pioneer in developing the IP PBXs and is considered a leader in that technology.

Some IP PBXs support Session Initiation Protocol (SIP) directly without an intermediate media gateway. All of the unified communications solution providers have designed their unified communications servers to use SIP for the transport of all IMs, presence, and conferencing data.

Direct SIP or SIP trunking enables your enterprise to connect your voice network to a third-party service provider that offers PSTN origination and termination. Doing so eliminates the needs of any IP PSTN gateways in your environment.

For the configuration of your unified communications voice components, it is critical for you to know whether your company has an old TDM PBX or an IP PBX. The easiest way to find out which one you have is to look under the desk and see if your phone is connected to the telephone network via

- Traditional phone cable (RJ11) for TDM PBX
- Network cable (Ethernet) for IP PBX

If your company has a TDM-based PBX, to enable the Enterprise Voice features in your unified communications solution, you need to use a media gateway that converts the TDM to SIP. Media gateways are discussed later in this chapter.

Engaging the traditional voice administrators

Any project for which you enable new technologies that integrate software applications with hardware infrastructure like telephony system always requires a team of people with knowledge and expertise in both to collaborate with each other for successful deployment. I highly recommend that you assemble a team composed of people from both the software applications side and the hardware infrastructure (telephony) side.

Later in this chapter, I discuss dialing plans, normalization rules, and more, all of which are required components for you to gain the benefits from implementing your unified communications solution. It is mission critical that those components are implemented correctly and work as required for your business to get the best user experience while saving money for the company. To achieve that end goal, you must collaborate with your traditional PBX administrators.

Another advantage of working with the PBX admin team is to enable them to clearly understand the company's goals and benefits that the new unified communications solution will achieve.

Your company may have already implemented least-cost routing, hunt groups, dialing rules, and so forth, in your existing PBX environment — functions that you don't want to throw out but instead, preserve and duplicate them in the new unified communications environment. So getting the intimate knowledge and expertise that your existing PBX team has about how your company's telephony system operates is absolutely essential.

TIP

Include the PBX team as part of your overall project team for the implementation of the voice components of the unified communications solution.

Interoperability between your existing PBX and PSTN with the unified communications solution presents a number of challenges that need to be overcome so users have a seamless experience and will continue to reap the benefits.

Challenges in PSTN Integration

PSTNs only support TDM protocol, while most unified communications solutions require the use of SIP. Once again, the technology geniuses of the unified communications industry sort of came together and agreed that SIP is the standard for IM, presence, and conferencing.

Unified communications solution designers also decided to protect your investments in their products by providing adequate security during the signaling and transmission of voice media.

To overcome the above challenges, the unified communications vendors came up with unique solutions.

Mediation Server

Microsoft Office Communications Server 2007 is one of the leading unified communications solutions available. The product designers came up with a new component called the *Mediation Server* to deliver signaling and media translation. A Mediation Server connects the Communications Server to a PBX.

If your company is using a legacy PBX (TDM protocol only), then you will need a converter or media gateway to convert that TDM signal to SIP. A typical organization may need multiple gateway–Mediation Server combinations, depending on the number of office locations, the number and distribution of Enterprise Voice users, network traffic, and performance requirements. See Figure 12-2.

Media gateways

A media gateway sits between the Mediation Server and the TDM PBX; it converts the TDM signal into SIP. There are three types of media gateways (see Figure 12-3):

- **Basic Media Gateway** provides only the gateway functions and requires you to have a separate server box to install the Mediation server on.
- **Hybrid Media Gateway** provides a way to collocate the gateway and a Mediation server on the same server box.
- **Advanced Media Gateway** provides a way to incorporate the Mediation server logic on the same mother board as the gateway.

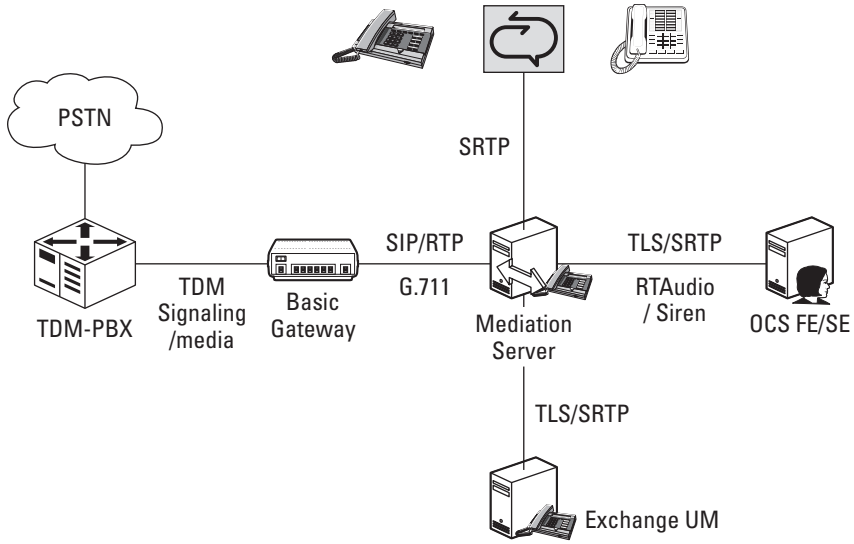
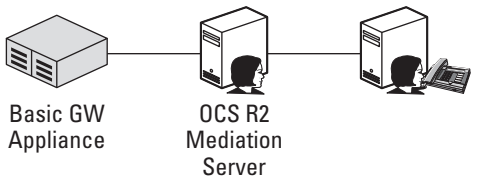


Figure 12-2: Mediation Server as a solution to integrate unified communications with PSTN/PBX.

- Basic Media Gateway

  Basic gateway appliance and separate OCS R2 Mediation Server



- Basic Hybrid Media Gateway

  Rich gateway appliance running OCS R2 Mediation server

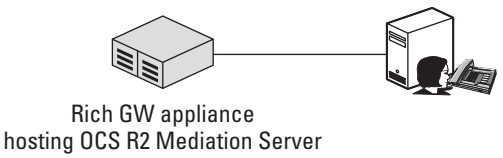


Figure 12-3: Different media gateway options available.

The number, size, and location of media gateways will be the most important and potentially costly decision your team must make for deploying Enterprise Voice infrastructure in your environment. The main questions to answer are:

- What type of gateway should you deploy?
- How many media gateways are needed?

  The answer depends at least in part on the size of the gateways and where you plan to deploy them.
- What size should the gateways be?

  The answer depends in part on how many you plan to deploy and where you plan to put them.

- Where should the gateways be located?

  The answer depends in part on the topology and geographic distribution of your organization.

None of the previous questions can be answered independently. Answers to all four depend ultimately on how much telephone traffic you anticipate and how that traffic is distributed across your organization. But that is only the beginning: You must also consider your gateway topology options.

The media gateways that most organizations consider deploying range in size from 2 to as many as 960 ports.

Follow these guidelines to estimate the number of gateway ports your organization will require:

- Light telephony users (one PSTN call per hour) should allocate one port for every 15 users.

  For example, if you have 2,000 users, you need 134 ports allocated among multiple gateways.
- Moderate telephony users (two PSTN calls per hour) should allocate one port for every ten users.

  For example, if you have 2,000 users, you need 200 ports allocated among one or more gateways.
- Heavy telephony users (three or more PSTN calls per hour) should allocate one port for every five users.

  For example, if you have 2,000 users, you need 400 ports allocated among multiple large gateways.

A minimum of two gateways should be deployed in the event one goes down. Beyond that, the number and size of gateways that you should deploy will vary widely but you can base your decision on the above logic and the telephone traffic your company generates.

TIP

Consider deploying the combination of a mediation server and gateway closer to the location of your users. For example, if you have more than 200 users in any one site, consider deploying a mediation server-gateway combination at that site, especially if the users require high-availability and are heavy users of telephony (three or more PSTN calls per hour).

SIP

SIP is the industry standard protocol used by most unified communications solution vendors. Each mode of communication — IM, presence, conferencing, video, and voice, all uses SIP for its transport. Even signaling for the

incoming and outgoing phone calls between the PSTN and unified communications client is converted to SIP by the media (PSTN) gateway.

- **Direct SIP** (see Figure 12-4) enables a qualified IP PBX to directly connect to the unified communications front-end server (for example, Office Communications Server) without requiring the media gateway (for example, Cisco Call Manager v6.X and higher are qualified IP PBX to directly connect to the Office Communications Server using Direct SIP).
- **SIP Trunking** enables the front-end server (for example, Office Communications Server) to connect directly to an IP Telephony Service Provider. There is no PBX or media gateway.

  SIP trunking (see Figure 12-5) has a couple of advantages:

  - Simplifies and reduces costs for Enterprise Voice
  - Eliminates the PBX and media gateway

As shown in Figure 12-5, for SIP trunking, an Internet Protocol virtual private network (IP VPN) is required to connect between your enterprise network and the PSTN service provider. The IP VPN provides security and IP connectivity. You could also configure it for quality of service if the service provider gives you that option.

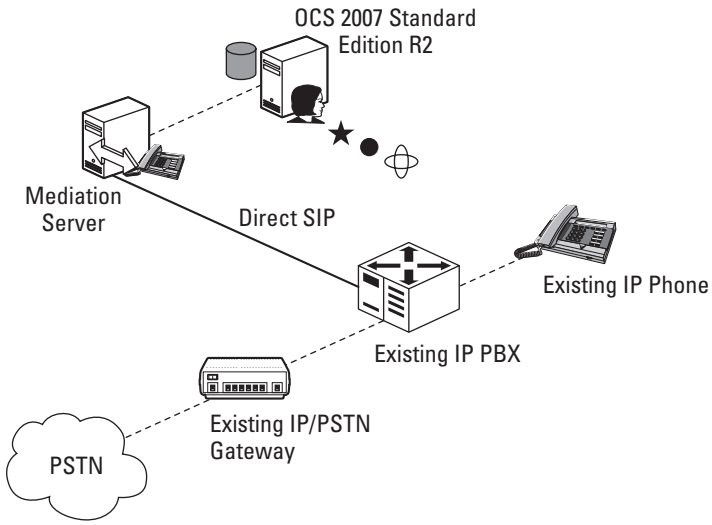


Figure 12-4: Direct SIP connection.

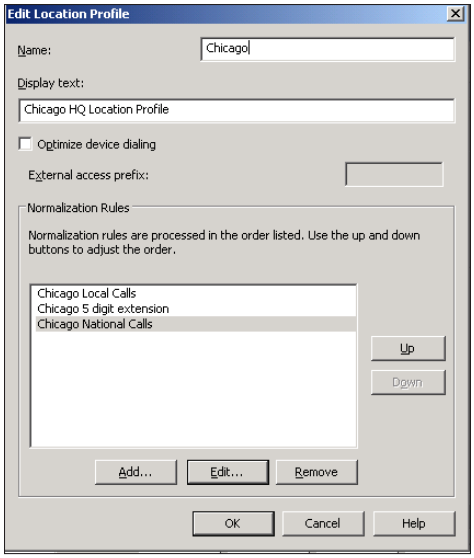


Figure 12-5: SIP trunking implementation.

With SIP trunking implementation, the Mediation Server still provides media and signaling translation. But now, the SIP traffic and media traffic between your enterprise network and the SIP trunking service provider network flow through the IP VPN and the Mediation Server.

TIP

Wherever you install a voice client (like Communicator), I recommend that you maintain a backup option for users to call 911 in case of power failure or outage of your unified communications solution. You may consider a cell phone or standard telephone connected to a PSTN line.

User authorization and outbound call routing requirements

In your existing telephony system (PBX), any calls made by users from their desk phones are routed to the proper destination: Internal calls go to the PBX, and external calls go to the PSTN. For these calls to successfully reach their destinations, your existing telephony system has

- Outbound call routing rules
- Rules or policies that determine which users can call long-distance or international numbers and which users are limited to local calls

Now that you are implementing and configuring your unified communications system for Enterprise Voice, you need to duplicate the outbound routing rules and policies so users can continue their dialing habits with the new unified communications client, sometimes also called a softphone client.

Look at how the unified communications system actually routes the outbound call through the Enterprise Voice infrastructure:

1. Say that John Williams uses his Communicator client to place a call to an external contact at 415-555-1212.
2. The unified communications server normalizes the number to E.164 format (+14155551212), invokes routing rules based on John's location profile (Chicago), verifies that John is allowed to call long distance (based on user policy), and directs the call to the appropriate mediation server (based on routes defined).
3. The mediation server translates the media and routes the call to the media gateway (if present) or to the IP PBX (Direct SIP).
4. Gateway, based on topology, applies local dialing rules or PBX dialing rules and passes the call to the PSTN.

There are new terminologies used in describing the outbound route of a call originated from a user's unified communications client (Communicator) destined for the PBX or the PSTN. Figure 12-6 includes a diagram that shows this call flow.

Different unified communications vendors may call the outbound routing components by different names, but in principle, the concepts are similar and each follows similar steps:

1. A **location profile** represents unique dialing habits and numbering plans in a company.

   For example, a company that has sites in Chicago, Singapore, and London with 200 or more users in each, may create three unique location profiles. If your company already has a traditional legacy PBX, you may use its dial plan and routing rules to configure the location profile.

2. A **normalization rule** translates a dialed number to the standard E.164 format.

   For example, in Chicago, users may dial 911 for emergency or five digits for internal extensions and seven digits for local numbers. All of these need to be correctly translated to the E.164 format. So for the Chicago **location profile,** you may define the above three **normalization rules** so all calls get translated correctly and get routed appropriately. But Singapore users may have special needs, such as

   - A different emergency number
   - Four-digit dialing for internal extensions

For these reasons, it would be wise to create a unique **location profile** for Singapore and assign appropriate **normalization rules** to it.

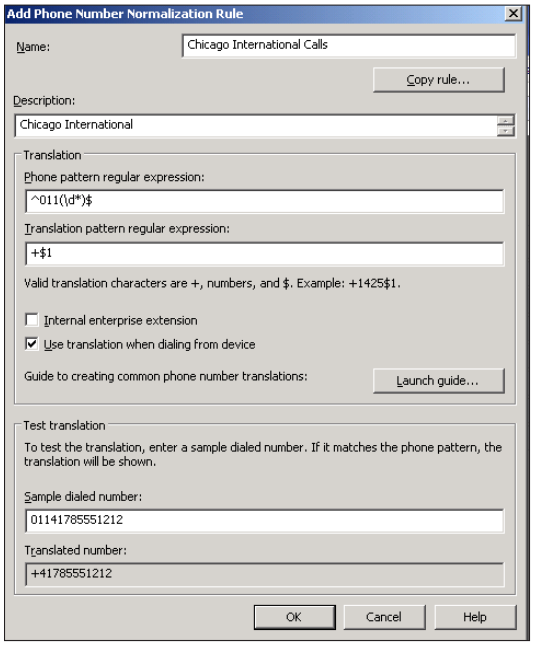


Figure 12-6: Outbound call flow through the unified communications system.

3. A **phone usage record** specifies a class of service (local, long-distance, or international) that a user or groups of users are authorized to make.

   Most organizations can easily divide their users in multiple groups: those allowed to call long distance and those allowed to make local calls only. A phone usage record is added to a **voice policy,** and each user in a company is assigned a voice policy. Assume that John's company has created three phone usage records: local, long-distance, and international.

4. A **voice policy** is made up of one or more phone usage records, and then assigned to a user or a group of users.

   For example, John's company defines a voice policy called **Local Only.** The company adds the local phone usage record to this policy. The company also defines a voice policy called **Long Distance and International.** It adds local, long-distance, and international phone usage records to this one policy. Now, if Suzy is authorized to only call local numbers, she is assigned the voice policy called **Local Only.** If the company authorizes John to make all calls, he is assigned the **Long Distance and International** voice policy.

5. A **voice route** associates target phone numbers with particular IP PSTN gateways and phone usage records.

   Say that you have users in various sites — for example, Chicago (2,000), Paris (500), Rome (300), and Madrid (50). You should plan to locate one or more mediation server and media gateway combinations at Chicago, Paris, and Rome. Because Madrid only has 50 users, you can create a route for all calls to Madrid to go through the Paris mediation server. Paris would be known as a *breakout point.* A call from the U.S. to Madrid first travels on the company's wide area network (WAN) all the way to Paris, and then it is connected to the PSTN provider in Paris to connect to Madrid. So your company is only paying the toll charges for a call between Paris and Madrid instead of from the U.S. to Madrid, which would cost a lot more.

The following example illustrates the relationship between the various outbound routing components. You may find it helpful to refer to Figure 12-7 as you go through the configuration process.

Say that Contoso company headquarters is located in Chicago, IL, and they have 2,000 users based in Chicago.

1. First, Contoso creates a location profile called **Chicago** that defines all phone numbers that can be dialed from Chicago. The Chicago location profile needs multiple normalization rules.
2. Next, Contoso creates multiple normalization rules to accommodate its users' dialing habits. For example:
   - **Chicago five-digit extension:** If the users in Chicago used to dial only five digits for internal extensions, this normalization rule translates the five-digit extension to the full E.164 format.

     For example, a user dials 51212; the translation would be +13125551212.
   - **Chicago Local Calls:** If the users in the Chicago office used to dial seven digits for local calls, this normalization rule translates the seven digits dialed into the full E.164 format.

     For example, a user dials 1231212; the translation would be +13121231212.
   - **Chicago National Calls:** If the users in Chicago dial a ten-digit number, this normalization rule translates the number to a full E.164 format by adding the leading + sign and a 1 to make it standard.

     For example, a user dials 415-555-1212 to call someone in San Francisco; the rule translates it to full E.164 format, +14155551212.

- **Chicago International Calls:** If a user in the Chicago office dials an international number, this normalization rule translates it to the full E.164 format.

  As shown in Figure 12-8, at the bottom, if you enter 01141785551212 in the sample dialed number box, the rule translates it to +41785551212 as shown in the translated number box.

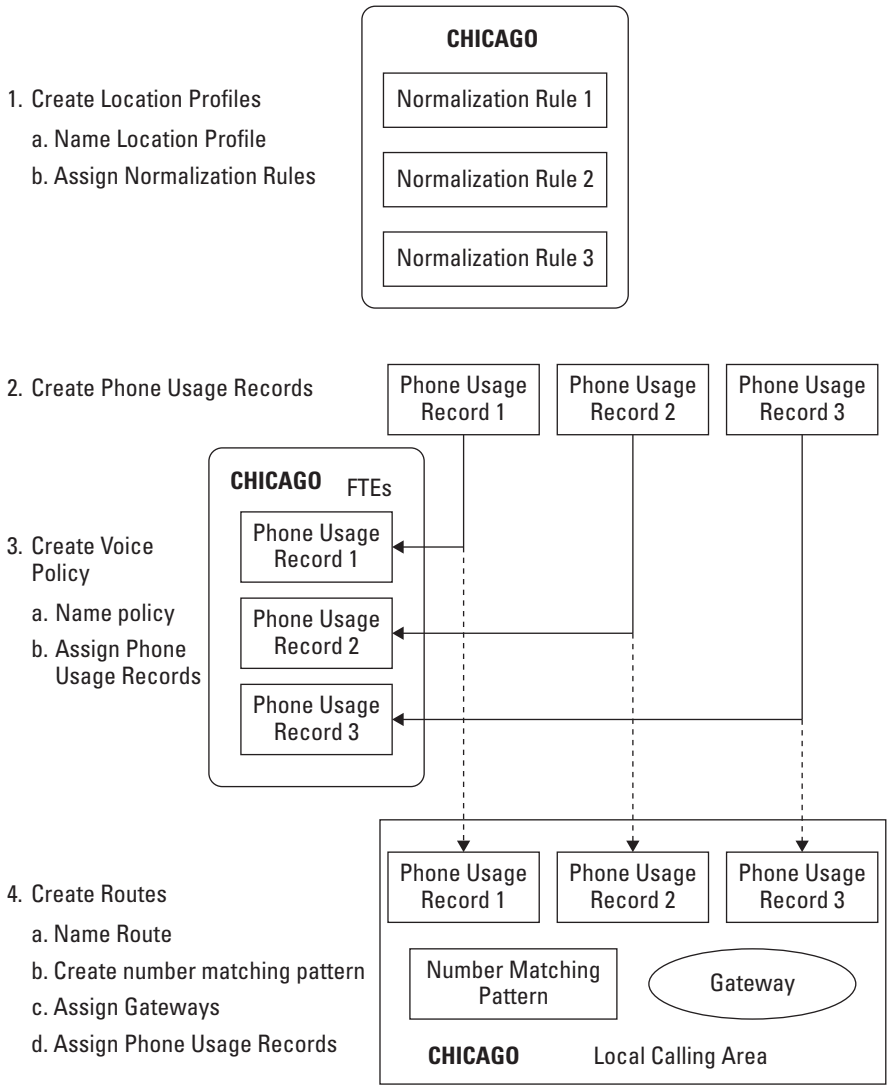


Figure 12-7: Outbound routing components.

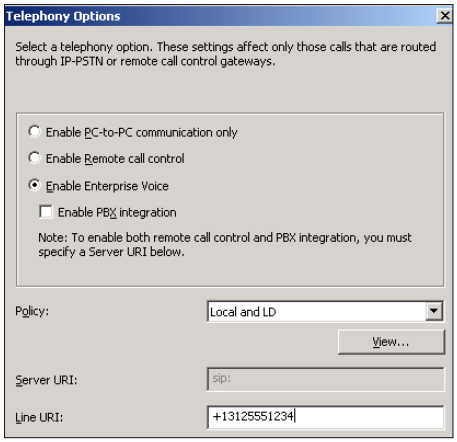


Figure 12-8: Chicago International Calls normalization rule.

3. Next, Contoso creates phone usage records to specify two classes of calls (such as local and long distance), and then assigns them to various users, or groups of users, who are authorized to make those classes of calls.

   For example:

   - ContosoUsage: No long distance calls allowed
   - ContosoExecUsage: Long distance calls allowed

4. Next, two voice policies must be created to associate the two phone-usage records defined above:

   - Local Calls Only (see Figure 12-9): Add ContosoUsage to this policy and make sure you check the box that says Allow simultaneous ringing.
   - Local and Long Distance: Add ContosoExecUsage to this policy.

5. Finally, a voice route is defined to route the destination phone numbers to a particular IP PSTN gateway and phone usage records.

   For example:

   - **All Calls:** Route all external calls to the Chicago office gateway that has the ContosoExecUsage as the Phone Usage defined (see Figure 12-10).
   - **Local Calls Only:** Allow calls to 312, 773, 331, and 630 area codes only and use ContosoUsage as the Phone Usage Record.

6. After the policies and rules have been defined, you need to assign correct voice policies to the users. So everyone at Contoso who is not an executive will be assigned the policy defined as **Local.**

As shown in Figure 12-11, John Williams, a member of the executive team, is assigned to the **Local and Long Distance** voice policy.

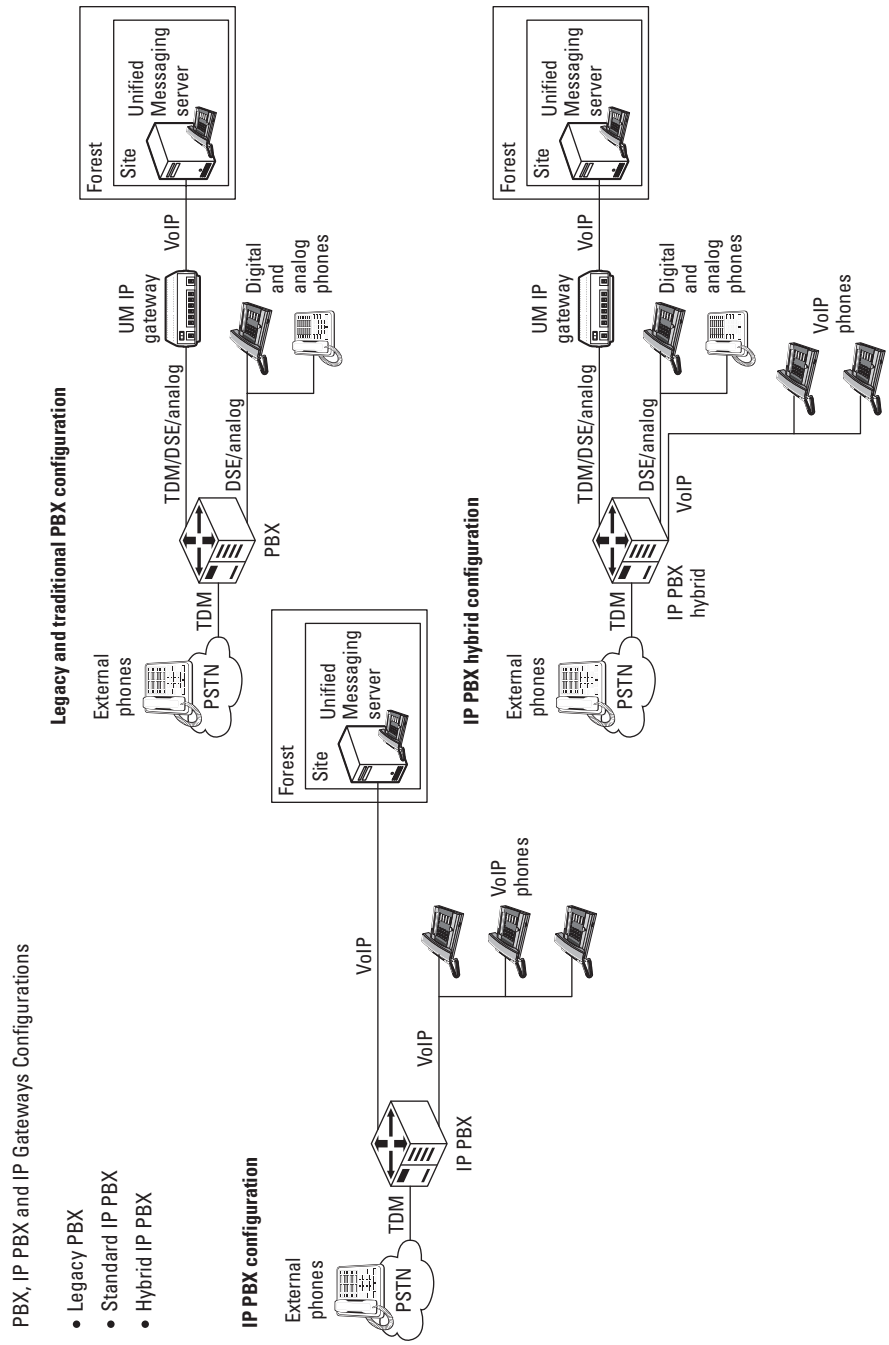


Figure 12-9: Contoso's Local Calls Only policy defined.

PBX, IP PBX and IP Gateways Configurations

- Legacy PBX
- Standard IP PBX
- Hybrid IP PBX

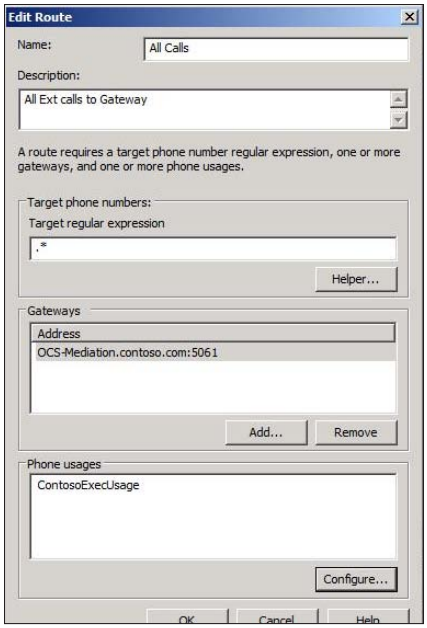


Figure 12-10: All Calls route defined.

Deployment scenarios

You basically have two deployment options:

- Keep your existing PBX and integrate it with Enterprise Voice.
- Remove your existing PBX completely from your environment.

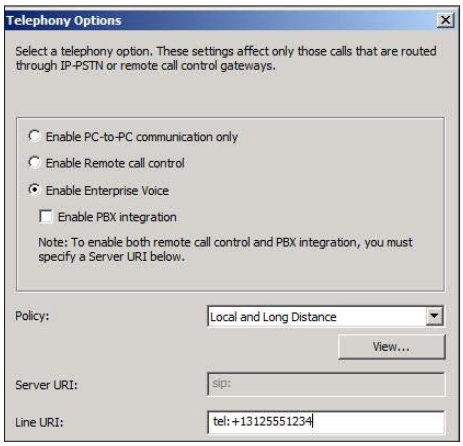


Figure 12-11: Assign Local and Long Distance voice policy to John.

The decision depends on how your employees work:

- If your users typically work from their offices and you want to leverage your investment in the existing PBX, you can implement the Enterprise Voice components described above, mediation server and media gateway (if needed), to enable co-existence:
  - If your existing PBX is a legacy TDM PBX, you need to add the certified media gateway and mediation server so that your users' desk phone and Communicator client can both be used.
  - If your existing PBX is an IP PBX that supports SIP natively, you can integrate it with Enterprise Voice and enable full co-existence. Users can use their existing desktop IP phone or unified communications client to make calls.
- If your users are very mobile and work remotely more often than from the office, you may consider removing your existing PBX completely or gradually and move over to the unified communications solution for all your voice needs. The users in this case will give up their desk phones immediately or gradually.
- You can start your deployment of the unified communications solution with Enterprise Voice by departments or teams. Those departments or teams will be completely migrated to the unified communications solution as the only telephony solution available to them. You are able to introduce Enterprise Voice slowly in your company and test out the users' experience before moving the entire company to it. If your company has widely dispersed teams that are mobile and prefer working remotely, this is an ideal solution to gain significant savings in your long-distance and cellular phone charges.
- If you are a new business that does not yet have a PBX or your company is opening new sites, you can take advantage of the unified communications solution implementation and move to Enterprise Voice. You will have significant savings from not having to implement and maintain a PBX, integrating it with unified communications, and incurring deployment and maintenance costs. In this scenario, all calls are routed over your IP network. Calls to the PSTN are routed to the appropriate media gateway. Communicator becomes your softphone client. This type of deployment is called a *Greenfield deployment.*

In addition to the network infrastructure that is required to support the unified communications system, in a Greenfield deployment, you may consider a small PBX to support fax machines and to provide emergency services if your unified communications system is down.

Configuring voice mail

Your existing PBX environment may have a separate voice mail system that delivers voice mails to your desk phones and turns the flashing red light on. It is possible that the PBX may have its own voice mail system.

With the deployment of unified communications in your company, you may decide also to implement Unified Messaging and integrate it with the instant messaging and audio, videoconferencing, and voice system.

The Exchange 2007 server provides the Unified Messaging features by adding a UM server role to its architecture. Unified Messaging combines voice mail, fax, and e-mail so that users receive all in a unified mailbox, Outlook. You can now access your mailbox from

- A desktop or laptop computer
- A mobile phone
- A standard telephone

For your users to have a seamless experience between their unified communications features of IM, presence, conferencing, and the Unified Messaging features, you need to integrate these two environments.

If you are considering Microsoft Office Communications Server 2007 for your unified communications solution, the following requirements must be met for the integration of the two components mentioned earlier:

- You must be running Exchange 2007 SP1 on all Unified Messaging servers in your organization.
- You must be running Communications Server 2007 in your organization.
- Exchange 2007 SP1 and Communications Server 2007 must be configured correctly.

The Exchange UM server interoperates with several IP gateways. When you decide to integrate Exchange UM and Office Communications Server's unified communications features, then Office Communications Server becomes the gateway for all UM traffic and manages the routing of voice mail. Dialing rules are used to route incoming calls to the appropriate gateway — in this case, the appropriate gateway is the Office Communications Server.

In Figure 12-12, different deployment scenarios are described depending upon which unified communications deployment scenario you have selected from the earlier discussions in the "Deployment Scenarios" section.

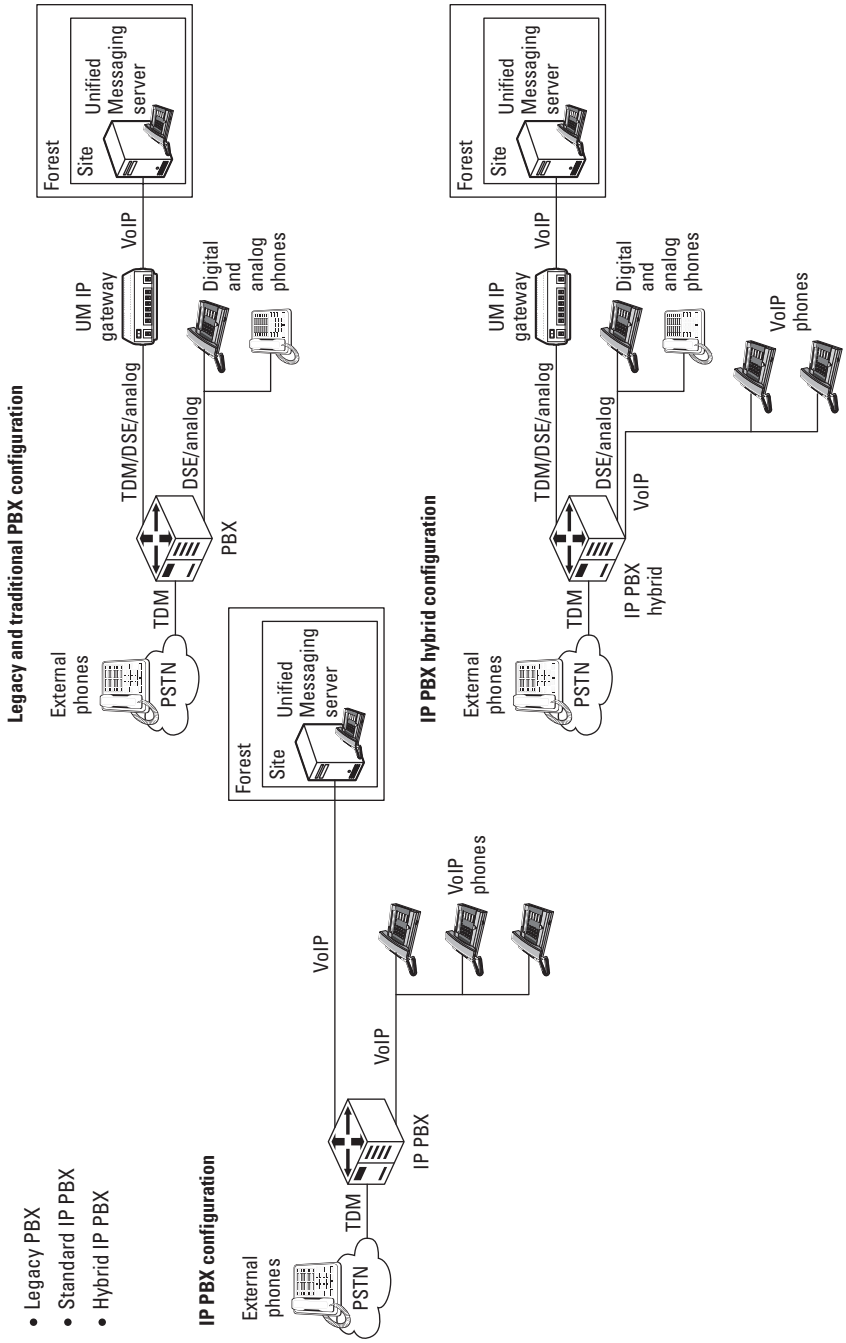


Figure 12-12: Different deployment scenarios for Exchange Unified Messaging.

PBX, IP PBX and IP Gateways Configurations

- Legacy PBX
- Standard IP PBX
- Hybrid IP PBX

In addition to voice mail and faxes integrated with your e-mail and dropped into your Outlook mailbox, integration of the unified communications and UM features also will enable other features:

- **Voicemail access:** You can access your voice mails from Outlook, Outlook Web Access, Outlook Mobile, and Office Outlook Voice Access.
- **Multiple locations:** A single Exchange server can support multiple locations so you won't need to set up separate UM servers in each of your sites. Many companies have different voice mail systems with their different PBXs in each site and will now have a unique option to centralize everything to a single site.
- **Integration with Many Private Branch Exchanges (PBXs):** Exchange UM supports all standard VoIP protocols and can integrate with your TDM or IP PBX. If you have a TDM PBX, you will need a media gateway. The same media gateway that you use with your unified communications solution may work with Exchange UM and allow you to reduce your costs.
- **Outlook Voice Access:** Your users will be able to access their Exchange mailbox using a standard telephone or from their communicator client. Using touchtone commands or speech-enabled interactive menus, they can
    - Hear and act on their calendars
    - Listen to e-mail messages (translated from text to speech)
    - Listen to voice mail messages
    - Call their personal contacts
    - Call any user listed in the company
- **Active Directory Integration:** Both Exchange Unified Messaging and the Office Communications server use Active Directory for all user enablement. Administrators can now manage all of these environments from standard, integrated management consoles.
- **Play on phone:** When you are in a public place like an airport and it is not practical to play your voice mails on your computer for all to hear, you can route the voice mail to play on a mobile phone or desk phone.
- **Self-Service Options:** You can easily reset your voice mail PIN or greetings from Outlook or Outlook Web access, thus reducing the need for you to call the help desk.
- **Speech-Enabled Auto Attendant:** You may set up an automatic interactive voice response system for external calls coming to your company number. An automated operator with customizable menus (for example, "Press 1 for sales") and global address list directory lookups (for example, "Whom would you like to contact?") answers the incoming calls. Callers interact with the Automated Attendant through touch tone commands or their voices using speech recognition. This is another way to reduce costs for answering thousands of incoming calls and route them to the correct department or person.

After you have installed the required server roles in your Exchange Server 2007 organization, there is a sequence of steps that you must perform on the Exchange UM environment and in your OCS 2007 environment to correctly deploy Enterprise Voice and Exchange Server 2007 Unified Messaging. Exchange 2007 UM is used to provide call answering, Outlook Voice Access, and auto attendant services. Office Communications Server 2007 enables more advanced features that are found in Enterprise Voice services.

For integration of the two environments, you must perform the following steps:

1. **Create UM SIP Dial Plans:** All users will have an e-mail address and a phone extension now that they have been enabled for both Exchange UM and Communications Server unified communications. For the integration to work, Exchange UM dial-plan must correspond to the location profile defined earlier. For example, you may create a dial-plan called **Chicago.**

   Run ExchUcUtil.ps1: You need to run this utility using Exchange Management Shell and it will:

   - Assign the Communications server to be the UM IP gateway for Exchange UM to use
   - Create an Exchange UM hunt group for each gateway
   - Grant Communications Server security permission to read Exchange UM Active Directory objects

2. **Create an OCS 2007 location profile:** If you are integrating Exchange UM with Communications Server, then the location profile name must match.

   For example, if the name of a UM dial plan is **Chicago,** then the name of the corresponding location profile must be **Chicago.contoso.com.**

3. **On the OCS 2007 Front End servers, run the Exchange UM integration utility.** The utility creates Active Directory contact objects and validates that the location profile name matches the Exchange UM dial plan.

   When you run the Exchange UM Integration Utility, it performs the following tasks:

   - Creates contact objects for each auto-attendant and subscriber access number to be used by Enterprise Voice users
   - Verifies that the name of each Enterprise Voice location profile matches its corresponding UM dial plan phone context
   - The Exchange UM Integration tool must be run from a user account with the following characteristic: Membership in the RTC UniversalUserAdmins group
   - Enables users for Enterprise Voice from Communications Server console
   - Enables users for UM from Exchange management console

Chapter 13

Securing Unified Communications

In This Chapter

- Protocols
- Encryption
- Common attacks
- Implementing security best practices

Just once, can't there be a technology that just works and doesn't require a conscious effort to secure and protect?

Well, no. Sorry.

Often, vendors are in a rush to get into the market and the initial wave of products are big on bells and whistles and short on security. With new technologies it is common for companies to jump on the cutting-edge bandwagon and start implementing new tools without properly considering security.

Security is less expensive and more effective when built in from the beginning than when tacked on as an afterthought.

When it comes to unified communications, there are also some unique security concerns. Along with combining the best of both worlds, unified communications also introduces the worst of both worlds. Traditional voice networks are separate from data networks and have their own security issues. Migrating to VoIP, and merging voice and data communications, exposes the voice network to data network exploits and the data network to voice network exploits.

Don't Forget about Security

Many aspects of information security are approached as an afterthought. Security is not considered during the initial design of the software or hardware. Security isn't factored in to the architecture and implementation of the hardware or software when it is deployed. After the product is implemented, the options for securing it are both *limited* and *expensive.*

The right way to do security is to build it into the solution from the beginning:

- Vendors need to design their products with security in mind.
- Organizations need to consider security implications, and architect their implementations with security in mind.

Let's take a look at some of the security considerations for unified communications and what you need to do to ensure that your communications are secure.

Understanding unified communications protocols

Your system will protect these common protocols:

- **SIP:** Short for Session Initiation Protocol, it is an application-layer control protocol; a signaling protocol for Internet Telephony. SIP can establish sessions for such features as audio/videoconferencing, interactive gaming, and call forwarding to be deployed over IP networks, thus enabling service providers to integrate basic IP telephony services with Web, e-mail, and chat services.

  In addition to user authentication and redirect and registration services, SIP Server supports traditional telephony features such as personal mobility, time-of-day routing, and call forwarding based on the geographical location of the person being called.

- **H.323:** An International Telecommunications Union (ITU) standard that provides specification for computers, equipment, and services for multimedia communication over packet based networks that defines how real-time audio, video and data information is transmitted.

  H.323 is commonly used in VoIP, Internet Telephony, and IP-based videoconferencing. Users can connect with other users over the Internet and use varying products that support H.323. This standard is based on the Internet Engineering Task Force (IETF) Real-Time Protocol (RTP) and Real-Time Control Protocol (RTCP), with additional protocols for call signaling and data and audiovisual communications.

- **TLS:** Short for Transport Layer Security, a protocol that guarantees privacy and data integrity between client/server applications communicating over the Internet.

  The TLS protocol is made up of two layers:

  - **The TLS Record Protocol:** Layered on top of a reliable transport protocol, such as TCP, it ensures that the connection is private by using symmetric data encryption, and it ensures that the connection

is reliable. The TLS Record Protocol also is used for encapsulation of higher-level protocols, such as the TLS Handshake Protocol.

- **The TLS Handshake Protocol:** Allows authentication between the server and client and the negotiation of an encryption algorithm and cryptographic keys before the application protocol transmits or receives any data.

TLS is application protocol-independent. Higher-level protocols can layer on top of the TLS protocol transparently.

- **RTP:** Short for Real-Time Transport Protocol, an Internet protocol for transmitting real-time data such as audio and video. RTP itself doesn't guarantee real-time delivery of data, but it does provide mechanisms for the sending and receiving applications to support streaming data. Typically, RTP runs on top of the UDP protocol, although the specification is general enough to support other transport protocols.

  RTP has received wide industry support. Netscape intends to base its LiveMedia technology on RTP, and Microsoft claims that its NetMeeting product supports RTP.

- **SRTP:** The Secure Real-time Transport Protocol (or SRTP) defines a profile of RTP (Real-time Transport Protocol), intended to provide encryption, message authentication and integrity, and replay protection to the RTP data in both unicast and multicast applications.

Protecting your communications with encryption

There are a lot of ways to attack voice systems. These range from old-school *phreaking,* to denial of service, to run-of-the-mill eavesdropping. What's challenging about protecting these systems is that the nature of convergence means that there are many more attack vectors. For instance, you can attack an IP telephony system either

- By phone
- From the network/TCP/IP side
- Through applications, such as
  - Integrated e-mail/voicemail
  - HTTP, LDAP, and XML interfaces, which many IP phones support

The first thought that most network administrators have is that encryption would be impractical for VoIP because of the CPU-intensive overhead that comes from all that math. The fear is that delay and jitter the encryption

process might add would make the conversation quality intolerable. This is a factor to be considered, but most networks today (especially domestic ones) find that they have plenty of room in their budgets to afford encryption.

If confidential voice is a requirement in your organization, then you also need to decide which device will do the encryption. It may be that you only need to encrypt a VoIP trunk that passes through a provider's network, in which case you can use regular IPSec tunnels with "VPN accelerators" or other hardware-based encryption devices. These devices usually add fewer than 10 ms of delay, which is usually easy to accommodate.

If you need to encrypt all voice conversations from end-point to end-point, then you're probably looking at vendor-specific implementations. While some IP phones and gateways on the market support encryption (such as that provided by IPsec), many phones and gateways don't.

Office Communications Server 2007 R2 uses TLS and MTLS to encrypt instant messages. All server-to-server traffic requires MTLS, regardless of whether the traffic is confined to the internal network or crosses the internal network perimeter.

TLS is optional, but recommended, between the Mediation Server and media gateway; If TLS is configured on this link, MTLS is required. Therefore, the gateway must be configured with a certificate from a CA that is trusted by the Mediation Server.

Requirements for client-to-client traffic depend on whether that traffic crosses the internal corporate firewall. Strictly internal traffic can use either

- TLS, in which the instant message is encrypted
- TCP, in which the instant message isn't encrypted

The TURN protocol doesn't mandate the traffic to be encrypted, and the information that it is sending is protected by message integrity. Although it is open to eavesdropping, the information it is sending (IP addresses and port) can be extracted directly by simply looking at the source and destination addresses of the packets. The A/V Edge service ensures that the data is valid by checking the Message Integrity of the message using the key derived from a few items including a TURN password, which is never sent in clear text.

TLS and MTLS

TLS and MTLS protocols provide encrypted communications and endpoint authentication on the Internet. Office Communications Server uses these two protocols to create the network of trusted servers and to ensure that all

communications over that network are encrypted. All SIP communications between servers occur over MTLS. SIP communications from client to server occur over TLS.

TLS enables users, through their client software, to authenticate the Office Communications Server 2007 R2 servers to which they connect. On a TLS connection, the client requests a valid certificate from the server. There are two rules:

- The certificate must have been issued by a CA that is also trusted by the client.
- The DNS name of the server must match the DNS name on the certificate.

If the certificate is valid, the client trusts the server and opens the connection. The resulting connection is trusted; from that point, the connection isn't challenged by other trusted servers or clients. Within this context, Secure Sockets Layer (SSL) as used with Web services can be associated as TLS-based.

Server-to-server connections rely on mutual TLS (MTLS) for mutual authentication. On an MTLS connection, the server originating a message and the server receiving it exchange certificates from a mutually trusted CA. The certificates prove the identity of each server to the other. In Office Communications Server 2007 R2 deployments, certificates issued by the enterprise CA are automatically considered valid by all internal clients and servers. In federated scenarios, the issuing CA must be trusted by both federated partners. Each partner can use a different CA, if that CA is trusted by the other partner.

This trust is most easily accomplished by either

- The Edge Servers having the partner's root CA certificate in their trusted root CAs
- Use of a third-party CA that is trusted by both parties

TLS and MTLS help prevent both eavesdropping and man-in-the-middle attacks. In a man-in-the-middle attack, the attacker reroutes communications between two network entities through the attacker's computer without the knowledge of either party. TLS and secure server lists mitigate the risk of a man-in-the-middle attack partially on the application layer, but ultimately the networking infrastructure (in this case corporate DNS) must be secured according to best practices.

Office Communications Server assumes that the DNS server is trusted in the same way that domain controllers and global catalogs are trusted.

Unified communications security threats

- **Compromised-key attack:** A compromised-key attack occurs when the attacker determines the key (a secret code or number used to encrypt, decrypt, or validate secret information). This key corresponds to the certificate associated with the server. When the attacker has the key, the attacker uses the key to decrypt encrypted data without the knowledge of the sender of the data.

  There are two sensitive keys in use in public key infrastructure (PKI):

  - The private key that each certificate holder has
  - The session key that is used after a successful identification and session key exchange by the communicating partners

- **Network denial-of-service:** The denial-of-service attack occurs when the attacker prevents normal network use and function by valid users.

  By using a denial-of-service attack, the attacker can

  - Send invalid data to applications and services running in the attacked network to disrupt their normal function.
  - Send a large amount of traffic, overloading the system until it stops responding or responds slowly to legitimate requests.
  - Hide the evidence of the attacks.
  - Prevent users from accessing network resources.

- **Eavesdropping:** Eavesdropping can occur when an attacker gains access to the data path in a network and has the ability to monitor and read the traffic.

  This is also called *sniffing* or *snooping*.

  If the traffic is in plain text, the attacker can read the traffic when the attacker gains access to the path. An example is an attack performed by controlling a router on the data path.

- **Identity spoofing:** Spoofing occurs when the attacker determines and uses an IP address of a network, computer, or network component without being authorized to do so.

  A successful attack allows the attacker to operate as if the attacker is the entity normally identified by the IP address. This situation comes into play only if an administrator has both

  - Configured connections that support only Transmission Control Protocol (which isn't recommended, because TCP communications are unencrypted)
  - Marked the IP addresses of those connections as trusted hosts

    This is less of a problem for Transport Layer Security (TLS) connections, which are encrypted.

This precaution prevents an attacker from performing IP address spoofing on specific connection (for example, mutual TLS connections). But an attacker could still spoof the address of the DNS server that Office Communications Server uses.

- **Man-in-the-middle attack:** A man-in-the-middle attack occurs when an attacker reroutes communication between two users through the attacker's computer without the knowledge of the two communicating users (see Figure 13-1).

  The attacker can monitor and read the traffic before sending it to the intended recipient. Each user in the communication unknowingly sends traffic to and receives traffic from the attacker, while thinking they are communicating only with the intended user. This can happen if an attacker can either

  - Modify Active Directory Domain Services to add his or her server as a trusted server
  - Modify Domain Name System (DNS) to get clients to connect through the attacker on their way to the server.

  A man-in-the-middle attack can also occur with media traffic between two clients, except that in Office Communications Server 2007 R2 point-to-point media streams are encrypted with SRTP, using cryptographic keys that are negotiated between the peers using Session Initiation Protocol (SIP) over TLS. Servers such as Group Chat and Communicator Web Access use HTTPS to secure Web traffic.

- **RTP replay attack:** A replay attack occurs when a valid media transmission between two parties is intercepted and retransmitted for malicious purposes.

  SRTP used with a secure signaling protocol protects transmissions from replay attacks by enabling the receiver to

  - Maintain an index of already received RTP packets.
  - Compare each new packet with those already listed in the index.

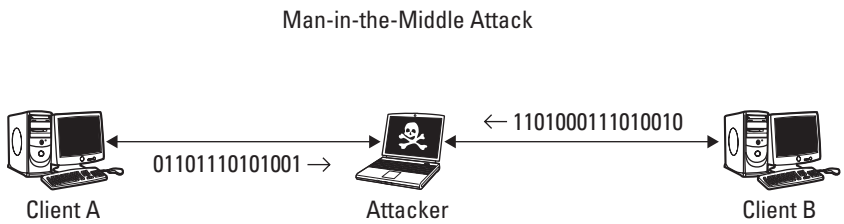


Figure 13-1: Illustration of how a man-in-the-middle attack works.

- **Call Redirection Attack:** When initiating VoIP communications with SIP, the first part of establishing a call is that the sending or initiating system sends a SIP INVITE request. The receiving or called system then sends a SIP response. The response could be that the phone is ringing, or that the call is being forwarded, or a variety of other options. One set of response codes tell the initiating SIP device that the call should be redirected.

  Here are some examples of SIP Redirection responses:

  - 301: Move Permanently
  - 302: Moved Temporarily
  - 305: Use Proxy
  - 380: Alternative Service

  If an attacker can monitor or intercept the SIP INVITE requests (by executing a MitM attack, for example), they can spoof the INVITE response and get the initiating SIP device to reroute or redirect the call. These attacks are possible from the external Internet, particularly when using SIP trunking to connect with the VoIP provider directly, but are more likely to occur successfully from attackers who already have access to the internal network.

  A Call Redirection attack could be used for

  - **Denial-of-Service:** Redirect calls to a non-existent destination.
  - **Disrupt Communications:** Redirect calls to some other random destination.
  - **Intercept Calls:** Redirect calls to a rogue device and spoof the intended call recipient.

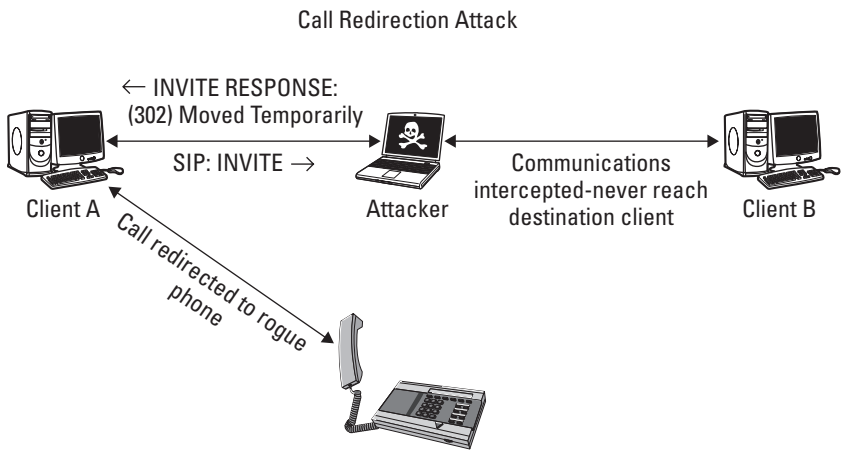


Figure 13-2: Anatomy of a call redirection attack.

- **SPIM:** Unsolicited commercial instant messages or presence subscription requests. While not by itself a compromise of the network, it is annoying, it can reduce resource availability and production, and it can possibly lead to a compromise of the network.

  An example of this is users spimming each other by sending requests. Users can block each other to prevent this, but with federation, if a coordinated spim attack is established, this can be difficult to overcome unless you disable federation for the partner.

- **SPIT:** Spam over Internet Telephony, or SPIT, is the proliferation of unwanted, automatically-dialed, pre-recorded phone calls using Voice over Internet Protocol (VoIP).

  Voice over IP systems, like e-mail and other Internet applications, are susceptible to abuse by malicious parties who initiate unsolicited and unwanted communications. Telemarketers, prank callers, and other telephone system abusers are likely to target VoIP systems, particularly if VoIP tends to supplant conventional telephony.

- **Viruses and worms:** A virus is a unit of code whose purpose is to reproduce additional, similar code units. To work, a virus needs a host, such as a file, e-mail, or program.

- A worm is a unit of code that is coded to reproduce additional, similar code units, but doesn't need a host.

  Viruses and worms primarily show up during file transfers between clients or when URLs are sent from other users.

- **Personally identifiable information:** Unified communications has the potential to disclose information over a public network that might be able to be linked to an individual.

  The information types can be broken down to two specific categories:

  - **Enhanced presence data:** Information that a user can choose to share, or not share, over a link to a federated partner or with contacts within an organization. This data isn't shared with users on a public IM network. Group policy and client configuration may give some control to the system administrator.
  - **Mandatory data:** Data that is required for the proper operation of the server or the client and isn't under the control of the client or system administration. This information is necessary at a server or network level for the purposes of routing, state maintenance, and signaling.

Best Practices

VoIP merges the communications network with the data network, making voice communications subject to the same sorts of threats and compromises that used to affect only data networks. Most of VoIP and unified communications security rests in sound practices for network security.

Start by following these essential rules for security:

- **Keep security patches up to date:** Inadequate patching exposes the VoIP and data network to risks that could easily be avoided. Many attacks target software vulnerabilities and flaws in the implementation to achieve very specific and potentially damaging aims.

  A very systematic approach to monitoring and installing patches from the vendor must be formed and religiously followed to protect your assets.

- **Install and maintain a good anti-virus system:** Ensure all laptops, servers and other devices have a sophisticated anti-virus system installed and updated regularly to prevent viruses, worms, and other malware from affecting both the data and VoIP network.

  While existing anti-virus solutions don't adequately protect against VoIP attacks because it doesn't recognize them, you should ensure that a virus or worm doesn't impact either the VoIP/unified communications network or applications from the data side as the infrastructures converge.

- **Enforce strong authentication and encryption wherever possible:** It's imperative that all signaling be encrypted, but it's just as important that all media be encrypted to ensure privacy and confidentiality of the conversation. At the same time, all end-points should be verified using either

  - Digest
  - Certificates
  - Two-factor authentication techniques

  Inbound calls should only be accepted from trusted or verifiable sources.

- **Secure WiFi access points:** Anyone implementing a WiFi network knows that you need to secure it, and you need to be sure that only authorized endpoints have access and that the traffic is encrypted.

  With WiFi/dual-mode phones being deployed in the enterprise, similar precautions need to be taken to ensure no rogue devices gain access to the network for either VoIP or data communications.

- **Use VLANs to keep voice and data traffic separate:** By segmenting voice and data traffic using virtual LANs, VoIP traffic is prioritized, resulting in lower latency and better quality. VLAN separation also helps to prevent data attacks from affecting the VoIP network.

  If you're rolling out soft clients, enabling Microsoft OCS, or incorporating other collaboration applications, then this separation will be far less effective. You need to allow voice traffic on the data VLAN, and vice-versa, so you need to police the interconnection point.

The ideal comprehensive VoIP/unified communications security solution incorporates three core pieces:

- Unified communications threat prevention to ensure unique VoIP/unified communications attacks are proactively recognized, detected, and eliminated
- Unified communications policy compliance to enforce granular polices to all unified communications traffic based on user, device, network, and time of day
- Secure unified communications access to
  - Guarantee the privacy and authentication of all unified communications traffic to the enterprise
  - Limit the number of ports open on existing firewalls

The rest of this chapter lists necessary features for comprehensively securing unified communications.

VoIP/unified communications threat prevention

- **Floods and fuzzing prevention:** Protection from volume based denial of service attacks and malformed message fuzzing attacks.

  Customized scrubbing rules detect and remove malformed messages that may crash, make vulnerable, or slow down the VoIP systems (servers and end points).
- **Media anomaly prevention:** Selectively enables the media traffic and enforces rules on the type of traffic carried, based on the negotiated signaling and other configured policies (such as preventing video and modem/fax messages).

This also prevents bandwidth abuse.

- **Spoofing prevention:** Various validation techniques are applied to detect and prevent device and caller ID spoofing, including the use of fingerprints for different protocol fields/messages that trigger further validations and verifications.
- **Stealth attack prevention:** Based on behavior learning, the product can detect nuisance/annoying calls to individual users and selectively block these calls.

  Stealth attacks are typically undetectable by traditional data security devices and SBCs that rely on rate limiting.

- **Reconnaissance prevention:** It must monitor source behavior to detect application layer scans and block the attackers.
- **Spam protection:** Unlike e-mail spam, where the e-mail content is available to perform text analysis, VoIP spam must be prevented by blocking a call even before the actual message is delivered.

  Compute and maintain network-wide caller trust scores and apply various policies to detect and protect against spammers, including VoIP Turing tests to identify machine generated calls.
- **Signature updates:** New signatures for detecting new known and potential attacks must be
  - Easily added to a central attack signatures database
  - Automatically distributed to all appliances in the network

VoIP/unified communications policy compliance

- **Whitelist/Blacklist:** Used to allow and block specific endpoints based on either
  - Caller identity
  - SIP URI
  - IP Address
  - Device name

  Entire domains can be blocked.
- **Signaling Firewall:** Signaling rules allow you to define the action to be taken (allow or deny) for each type of signaling request and response message.

  Signaling rules allow finegrained control over protocol headers, methods, and requests.

- **Media Firewall:** Media rules allow you to enforce RTP media packet parameters such as
  - Codec types (both audio and video)
  - Codec matching priority
  - Firewall rules
  - NAT considerations
- **Application Control:** Application rules allow you to enforce which types of and how many unified communication sessions are allowed for such applications as voice, video, and IM.
- **Call Routing Policies:** Routing rules allow fine-grained control over
  - Inbound packet transport settings
  - Name server addresses and resolution methods
  - Next hop routing information
  - Outbound packet transport types

Secure VoIP/unified communications access

- **Message integrity:** Message integrity means that the recipient is assured that what they receive is exactly what the sender transmitted.

  This is achieved by standard HMAC techniques used in TLS and SRTP
- **Privacy:** Privacy prevents unauthorized network users from eavesdropping on data sent to and from the network by encrypting it, thereby assuring confidentiality to authorized users.

  This is achieved by standard encryption algorithms used by TLS and SRTP.
- **Authentication:** Authentication identifies the parties exchanging information and ensures that each party can be sure of whom they are communicating with.

  This is achieved by using two-factor authentication, such as RSA SecurID, exchanging digital certificates, and/or encrypted password based digest authentication techniques.
- **Replay protection:** Replay protection ensures that transmitted data cannot be captured and replayed at another time.

  This is achieved by integrity protection of sequence numbers or random nonces.

- **Firewall/NAT traversal:** Media uses ephemeral UDP ports that need to be open during the call.

  Enforce signaling/media integrity by allowing media traffic to use only the negotiated port numbers while blocking all non-negotiated ports to prevent media attacks. And for remote users behind NAT, the VoIP Firewall must keep the port mapping on the remote NAT refreshed to be able to successfully connect new calls.

- **Secure Firewall Channel:** Tunnel VoIP/unified communications traffic to the IP PBX to ensure that

  - Only one port is open in the internal firewall.
  - There is no access to other data services.

  This functionality is crucial to simplifying firewall rules and ensuring the security of the system making it a key advantage over traditional firewalls.

- **Call Admission Control:** Set limit on maximum number of simultaneous calls, bandwidth usage, and call rate for each network, domain, and user group.

Chapter 14

Archiving and Compliance

In This Chapter

- Compliance requirements
- Archiving instant messages
- Archiving meeting history
- Archiving voicemail
- Archiving e-mail

This chapter discusses the current compliance requirements that exist and summarizes those requirements for electronic communications, specifically. It also covers the available options you have to comply with those requirements — including archiving of IM; audio-, video-, and Web-conferencing; e-mail; and calling history.

Compliance Requirements

Are you in a business that is regulated by the federal, state, or local government?

Are you in health, insurance, financial, or any industry that typically is regulated and has a higher degree of compliance requirements than other businesses?

Have you heard about the HIPAA, Sarbanes-Oxley, FDIC, and other regulations that affect e-mail, instant messaging, and how they are managed and archived to meet the regulations?

Have you heard about the e-discovery law that was passed in December 2006?

If your answer is yes to any of these questions, chances are that your company is already archiving and retaining the e-mail messages. If your answer is no or your company is not archiving and retaining the electronic communications

between your employees and customers and partners, you may need to start looking for ways to archive them. It may include all your electronic communications:

- Instant messages
- Audio-, video, and Web-conferencing
- Voice calls
- E-mail

You may be required to archive these communications in specific ways so that you are in compliance with the federal, state, or local requirements.

HIPAA

If your business participates in any type of health care of patients, you may be familiar with the implementation and provisions of the HIPAA regulation. For everyone's clarification purposes, the following sections discuss the rules, the people covered, and the compliance requirements.

The U.S. Department of Health and Human Services (HHS) released the Privacy rule in April 2003 to implement the requirements identified in the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

This privacy rule addresses the use and disclosure of an individual's health information known as "protected health information" by organizations that are subject to the privacy rule known as "covered entities."

A major goal of the privacy rule is to assure that individuals' health information is secured and protected appropriately while allowing the flow of health information needed to provide and promote high-quality health care and to protect the public's health and well-being.

The privacy rule applies to health plans, health care clearinghouses, and to any health-care provider who transmits health information in electronic form in connection with transactions for which the Secretary of HHS has adopted standards under HIPAA.

To determine whether you are a "covered entity," use the decision tool at:

```
http://www.cms.hhs.gov/HIPAAGenInfo/06_AreYouaCoveredEntity.asp
```

Basically any business that deals with a person's health and electronically transmits that person's health information needs to meet specific compliance requirements.

HIPAA documentation and record retention

A covered entity must maintain, until six years after the later of the date of their creation or last effective date, its privacy policies and procedures, its privacy practices notices, disposition of complaints, and other actions, activities, and designations that the privacy rule requires to be documented.

In addition to HIPAA, many other regulations need to be considered by businesses to determine their archiving and compliance requirements. Major amongst them are:

- **Sarbanes-Oxley Act of 2002 (SOX):** This is one of the most widely known regulatory acts that requires the preservation records by certain exchange members, brokers, and dealers. Many corporate scandals, including Enron's, caused the decline of public trust in corporate accounting and brought about the passing of this act.
- **Security Exchange Commission Rule 17a-4 (SEC Rule 17 A-4):** A U.S. Security and Exchange Rule that provides rules regarding the retention of electronic correspondence and records.
- **National Association of Securities Dealers 3010 & 3110 (NASD 3010 & 3110):** The NASD details requirements for member firms that include the supervision of registered representatives, including transactions and correspondence with the public. These regulations affect primarily broker-dealers, registered representatives, and individuals who trade securities or act as brokers for traders who are subject to the regulations.
- **Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (Patriot Act):** It is known as the Patriot Act and expands the authority of U.S. law enforcement for the stated purpose of fighting terrorist acts in the United States and abroad.

Now that everyone is either using or considering using some of the unified communications tools like instant messaging, audio, video, and Web-conferencing, e-mail, and VoIP-based calls, it becomes a corporate responsibility to manage these communications both for security and protection of corporate information.

Many businesses have recognized the corporate, regulatory, and e-discovery requirements to retain and archive corporate e-mail communications and have implemented rules and procedures to do so. Most businesses retain their corporate e-mail communications for three to seven years, depending on the type of business they are in as well as the federal, state, and local requirements.

Those businesses need to focus on the real-time communications applications in their workplace and assess the risks associated with employees using instant messaging with their colleagues, customers, and partners. Obviously, management should be concerned that employees are not sending the company's confidential information *(intellectual property)* to customers or partners.

E-discovery law

Federal Rules of Civil Procedure enacted new laws for e-discovery that went into effect in December 2006, requiring organizations to keep track of any electronic communications and be prepared to produce it as evidence in most federal court cases — especially for electronically stored information (ESI). ESI covers any and all information that can be stored electronically — including e-mail, instant messaging threads, and other forms of electronic communication. Government agencies have been known to request ESI more often in recent times and impose strict penalties for failure to produce it. Unfortunately, many companies are unaware of these compliance requirements.

Even if you are in a non-regulated industry, you should consider corporate compliance as the best practice to protect your electronic communications from any sort of unauthorized use and prepare yourself for the e-discovery laws. It is in the company's best interest to archive and retain electronic communications like e-mail and IM.

Look at the following types of communications:

- E-mail
- Instant messages
- File-transfers via IM
- Information sharing
- Sharing or restricting access to sensitive data
- Audit trail

Table 14-1, courtesy of `www.facetimesecurity.com`, summarizes regulatory requirements. Check out the myriad state and federal regulations imposed by the SEC, NASD, NYSE, FDIC, FCC, FERC, HIPAA, MiFID, and others.

Table 14-1 Regulations by various agencies, by industry

Industry	*Regulator/ Regulation*	*Impact*
All	US Federal Courts - Federal Civil Rules of Procedure #26-35	Effective December 1, 2006, this legislation requires organizations to keep track of these and other electronic records and be able to produce "electronically stored information" as part of the process.
Financial Services (Investment Banks, Broker/Dealers, Mutual Funds, Investment Advisors)	Sarbanes Oxley (SOX) NASD 2210, 3010/3110 SEC 17-a/34 SEC 204-2 NYSE 342, 372, 440	IM defined as electronic communication "book and record," required to be logged, audited and archived.
Banking	Sarbanes Oxley (SOX) NASD 2210, 3010/3110 SB1386 in CA Gramm Leach Bliley Act (GLB) USA Patriot Act (USPA) FDIC	IM defined as electronic communication "book and record". GLB requires security of customer information. USPA requires record retention of suspicious communications associated with money transfer and laundering.
Federal Government	Department of Defense (DOD)	DOD Directive 5015.2 sets standards for records retention, including IM.
Life Sciences/ Healthcare	Health Insurance Portability and Accountability Act (HIPAA)	HIPAA requires retention of patient records during clinical trials by med/pharma companies and privacy of patient records, including patient information shared over IM.

(continued)

Table 14-1 ***(continued)***

Industry	*Regulator/ Regulation*	*Impact*
Energy	Federal Energy Regulatory Commission (FERC)	IM defined as electronic communication "book and record". FERC requires the logging and auditing of transaction-related information.
Telecom	Federal Communications Commission (FCC)	Extensive record keeping and storage requirements. Supervision and index of books and records required.
Investment Services (Europe)	Financial Services Authority (FSA)	Markets in Financial Instruments Directive (MiFID): IM is required to be recorded when orders are received over this electronic communication medium. Data must be stored for a three year period in a format readily accessible by the FSA, and it must not be possible to alter or manipulate the records.

New recent guidance also came from the FDIC to CEOs of financial institutions about the record-keeping and archiving requirements for instant messaging.

```
http://www.fdic.gov/news/news/financial/2004/fil8404.html
```

Archiving Instant Messages

There are many regulatory requirements to archive and retain electronically stored information, which includes instant messages.

Fortunately for the businesses that are planning to deploy instant messaging in their organization, most unified communications vendors include some form of archiving solution as part of their unified communications solution, albeit as an optional component. If you are still evaluating unified communications solutions from different vendors and your company is one of the covered entities described earlier, then you should look at unified communications vendors' solutions that include archiving and compliance out of the box. It is always better to have the option of installing the archiving component when you

need it. Make sure that you also look at the archiving solution options — for example, can you define retention policies by department or individuals? That would be a big plus.

After researching the compliance requirements that apply to your particular business, you need to evaluate the archiving component included in the unified communications solution that you have deployed or are planning to deploy. If an out-of-the-box archiving component doesn't offer all of the features you need based on the requirements, you need to look at third-party solutions that will provide the appropriate coverage. Your unified communications vendor also may have recommendations for third-party partner solutions that integrate well with its unified communications solution.

In most cases, instant messaging happens between two or more people who work for the same organization. In some cases, your company may extend your IM infrastructure to *federate* with your customers and partners.

Federation is possible between two organizations if both have deployed the same type of unified communications solution, and then trust each other by exchanging digital certificates and each other's external FQDN for the edge servers. The IP address of the Edge server has to be publicly routable.

If your IM system is internal only, the archiving server component will allow for archiving the text of the IM conversation.

If your IM system includes federation with customers and partners, then the archiving server component may allow you to archive the text of all IM conversations, including those of external participants. This is something you need to pay attention to if it applies to your company, and then figure out the best solution that covers all your requirements.

Archiving server component

Here's an example to illustrate the process of deploying and implementing an archiving solution: Say a medium-sized organization is deploying Microsoft Office Communications Server 2007, which includes an optional archiving server component out of the box. Most vendors' unified communications solutions will fit this example, with a little variation of features included or reports that are available out of the box. Figure 14-1 shows the typical scenario for a medium-sized organization deploying Microsoft Office Communications Server 2007 that includes the optional archiving server component for the purpose of archiving all the content of IM conversations.

The archiving server component shown uses a SQL database server to store all the content being archived. It is possible to co-locate the database server and archiving server on the same computer. It is recommended to use a separate server for the database if you have more than 500 users with a lot of IM activity.

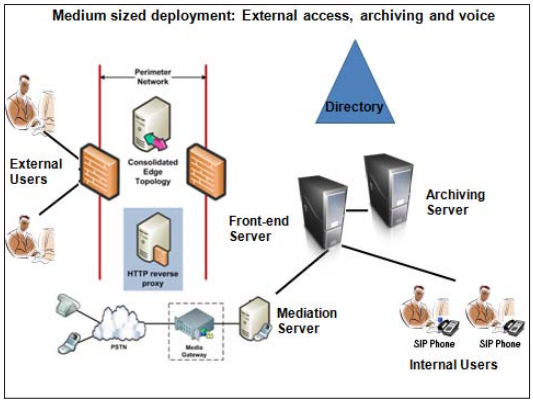


Figure 14-1: Medium-sized organization's deployment of unified communications with archiving.

If your company has fewer than 100 users, you can co-locate the archiving server with the front-end server. You will have to watch out for the performance impact on your users and decide if the archiving activity is impacting users' productivity when they are using IM.

TECHNICAL STUFF

You may use a single SQL server for the archiving database. But if your company wants high availability and redundancy for the SQL database, so that no IM conversations can be missed, you may consider using a virtual SQL server instance running in a cluster. Clustering the SQL server database means you have two instances of SQL server — one active and one passive node — that ensures that if the active node fails the passive node will take over, providing extra assurance or redundancy.

When you deploy the archiving server and associate it with your front-end server, you can choose to archive IM conversations of all users located on the front-end server or pool or archive only the users that you specify. You can see these options in Figure 14-2. You also have an option to select archiving the federated conversations if your company has enabled federation.

When you set up the archiving server, you have an option to choose to run the archiving server in critical mode if the archiving server is temporarily unable to send a message to the database queue or insert a message into the database — where the front-end server shuts down.

To illustrate, look at a scenario of how the IM conversations are archived after you have installed the archiving server component and chosen to archive all users' IM conversations.

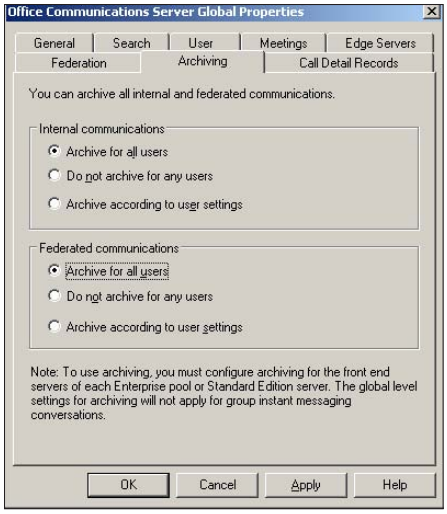


Figure 14-2: Archiving options.

1. **Start an IM conversation.**

   In Figure 14-3, Peter starts an IM conversation with Holly.

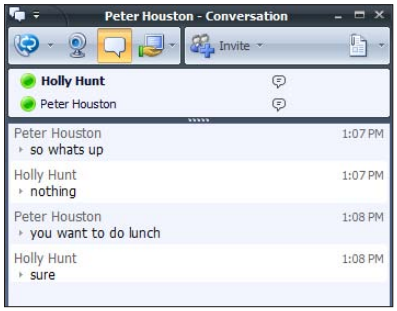


Figure 14-3: IM conversation between Peter and Holly.

2. **Open SQL Server Management Studio Express on the SQL server, which is installed along with the archiving server component.**

   As an administrator, you have access to SQL Server Management Studio Express.

3. **Connect to the instance of the SQL server created in Step 2.**

4. **Click New Query, type the following query (case-sensitive), and then click Execute:**

```
USE LcsLog
GO
SELECT * FROM Messages
```

The query returns the results that show all the IM messages, including date/time stamp and other pertinent information.

5. **Scroll all the way to the right, under the Body column, to see the details of a specific conversation.**

For other reports and information captured by the archiving server component, Microsoft Office Communications Server 2007 includes a Resource Kit. The Resource Kit includes an Archiving Reporter tool that provides the number of reports and access to other pertinent data. You need to install the Resource Kit on the archiving server computer.

6. **Install the OCS R2 Resource Kit ocsreskit.msi from the OCS 2007 server DVD.**

   The Resource Kit installs ArchivingCdrReporter.

7. **Run the Reporter from Start and find it under Microsoft Office Communications Server 2007.**

8. **Click the Archiving tab; then, in Instance, type the name of the SQL server instance that was created earlier.**

9. **In the Database name field, type** LcsLog and **click OK. Then, from the Database drop-down list, choose Archiving.**

   As you can see in Figure 14-4, ArchivingCdrReporter enables you to look at different numbers that have been captured for peer to peer IM conversations, conferencing data, total number of users, and actual users whose data has been captured.

   If you want to figure out which users are actually using the unified communications system you have deployed, you can search the archived data and find those users, as shown in Figure 14-5.

Figure 14-4: Archiving-Cdr-Reporter.

Figure 14-5: Users who have used the unified communications system between specific dates.

ArchivingCdrReporter allows you to filter the information by dates or by specific users' activities. In Figure 14-6, I filtered the archived data between May 1, 2009, and June 19, 2009, for the users Peter and Holly. The total number of instant messages between them is 20.

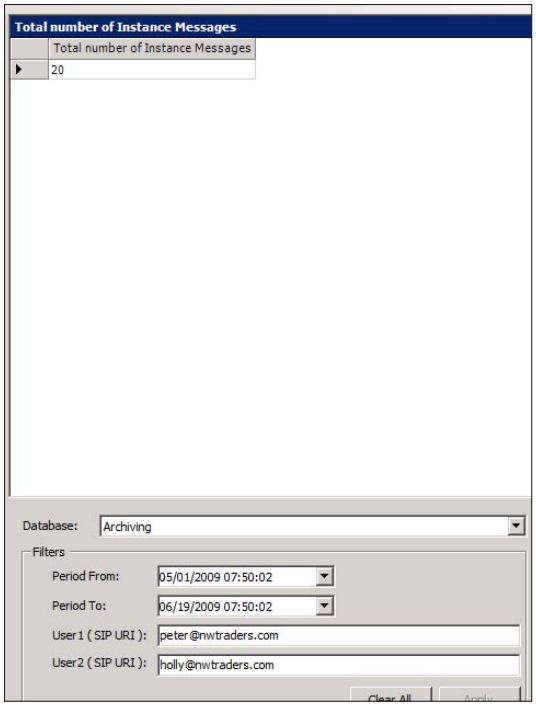


Figure 14-6: Peter and Holly's IM conversations between two dates.

Based on your requirements, the filter provides options such as searching for all IM conversations for a particular person between specific dates (enter only the one user's SIP URI — the e-mail address), all IM conversations that occurred between two specific users (enter both users' SIP URI), or all IM conversations among all users between specific dates (enter only the dates and leave the SIP URI blank).

If all the preceding features and options shown for the example still don't meet your archiving and compliance requirements for IM messages, you need to look at other vendors that specialize in archiving and compliance solutions. Most of these vendors create customized archiving solutions that integrate well with the core unified communications vendor's solutions.

Archiving Conferencing and VoIP Data

If you are deploying a unified communciations solution in your company, you probably will enable your users for

- Audio-, video-, and Web-conferencing
- Voice over Internet Protocol (VoIP) calls
- Meetings
- Application sharing
- File transfers

Any type of conferencing and voice communications data is commonly known as Call Detail Record (CDR) and comprises many data elements that are typically required for both compliance and monitoring, including

- Date/time stamp
- Initiator
- Participants
- Duration

In the earlier example, the archiving server component of Microsoft Office Communications Server 2007 was implemented. If your company also needs to capture the call detail records to meet compliance requirements, then you will need to deploy the monitoring server component.

Using the earlier example of a medium-sized organization, and as shown in Figure 14-7, I install the monitoring server component in addition to the archiving server component installed earlier.

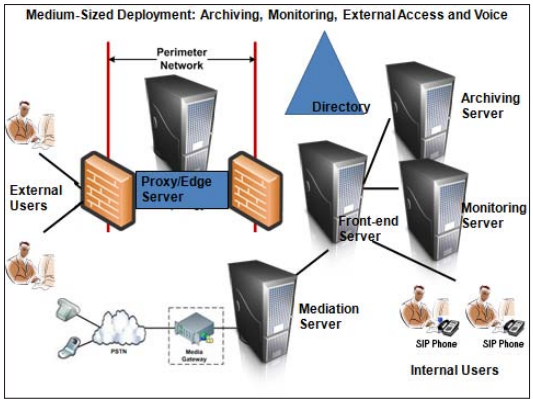


Figure 14-7: Monitoring server component added to medium-sized deployment.

Obviously, each unified communications vendor offers different ways to collect this data. If your organization is required to capture data for compliance, make sure that the unified communications vendor you are looking at provides a way for you to do so. Microsoft Office Communications Server 2007 delivers enhanced out-of-the-box monitoring and reporting capabilities for conferencing, voice, and video conversations.

Monitoring server component

It's possible to install the monitoring server component on the same server as the archiving server component if your organization has fewer than 100 users and your requirements are simple. It does require a full installation of Microsoft SQL server database. You may use a single SQL server for the monitoring database. But if your company wants high availability and redundancy for the database so that no CDR can be missed, consider using a virtual SQL server instance running in a cluster.

When you deploy the monitoring server and associate it with your front-end server (see Figure 14-8), you can select to monitor all peer-to-peer call details, conferencing call details, and voice call details.

After you install the monitoring server, you need to enable call detail recording on the front-end server or pool to actually start the data capture. You also need to restart the front-end server service so the call detail records get captured when any activities take place between the users.

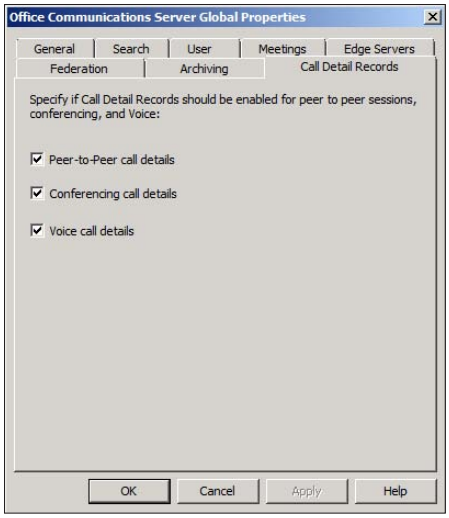


Figure 14-8: Monitoring options.

The following steps show how the call detail record data is captured and how you can look at some available reports:

1. **Start a video conversation.**

   In this example, Peter starts a video conversation with Holly (see Figure 14-9).

Figure 14-9: Video conversation between Peter and Holly.

2. **Look at the right side of the Conversation screen to see how long the audio conversation has been in progress.**

   In the audio conversation between Peter and Holly, you can see that the conversation has been going on for 2 minutes, 44 seconds.

3. **To access the CDR data (as an administrator), open the Archiving CDR Reporter on the archiving server and view the new CDR data elements that have been captured by the Monitoring server component. Click the CDR tab; in the Instance, type the name of the SQL server instance created for the Monitoring component.**

4. **In the Database name field, type** LcsCDR **and click OK. In the Database drop-down list, choose CDR.**

   As shown in Figure 14-10, ArchivingCdrReporter enables you to look at many different data elements, including

   - Peer to Peer Usage Reports
   - Conferencing Usage Reports
   - VoIP Usage Reports
   - Response Group Usage Reports

   In Figure 14-10 you can see the selected dates between 5/1/09 and 6/19/09, and Peter and Holly as the users. You can see all the statistics of usage between these users for the dates specified. For example, they spent a total of 30 minutes in conferencing during that time period.

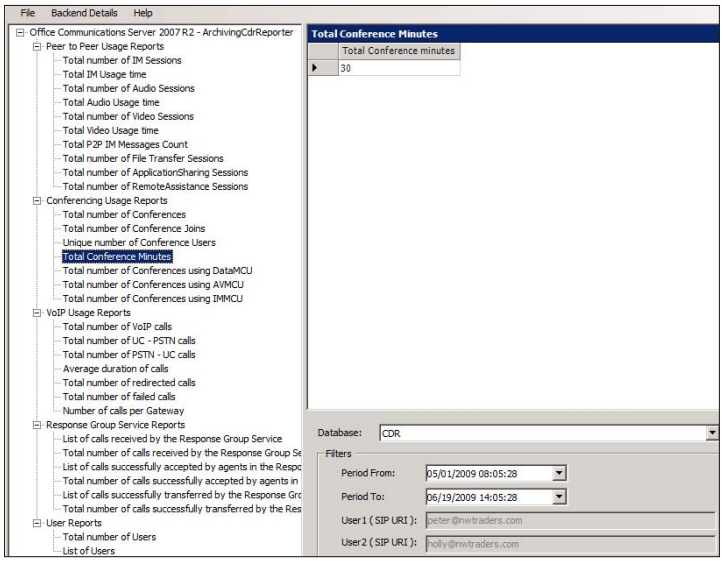


Figure 14-10: Archiving-Cdr-Reporter shows total conference minutes.

5. **To enable the Monitoring Server Report Pack, which you can add during installation, you must be running SQL server reporting service on that computer.**

   The reports are accessible from the Web site you define during the installation of the report pack. By default, your Web URL is `https://reports.domain.com/reportserver/`. After you access the report server Web URL, you get a list of reports that you can run for either

   - Specific dates and specific users
   - All dates and all users

   Figure 14-11 shows a selection of all the reports that are available for query.

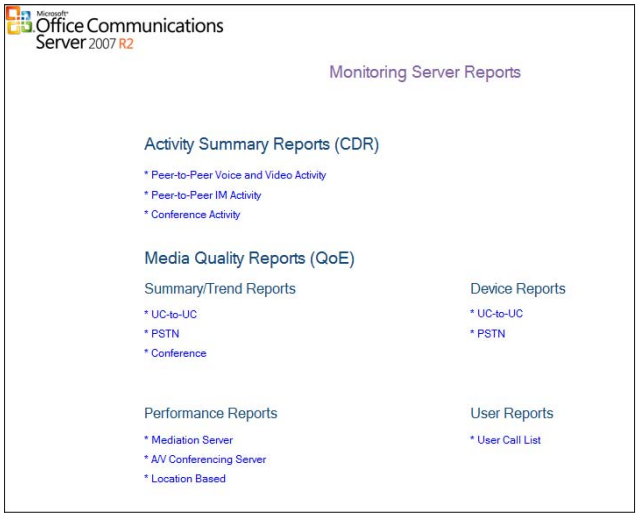


Figure 14-11: Monitoring Server Reports pack.

Archiving Voicemail and E-mail

Microsoft Exchange 2007 Server provides Unified Messaging that includes convergence of your e-mail, voicemail, and fax transmissions all coming into your single mailbox. Now that all communications media is delivered into a single Outlook inbox, you need to consider the archiving and compliance requirements for the e-mail and voicemail delivered as e-mail.

Even if your organization has not deployed Exchange Unified Messaging, your voicemail system may be delivering them in your Outlook e-mail mailbox. As long as they are delivered to your mailbox, you may have compliance requirements to archive them.

Most businesses that have implemented some sort of e-mail messaging system in their organizations may already have made provisions to retain and archive the e-mail messages for the 3- to 7-year period required by regulations.

For an example scenario, say a medium-sized organization is using Microsoft Exchange Server 2007 as its e-mail system. Exchange uses two concepts that I need to explain: archiving and journaling.

Archiving

All your e-mail and perhaps voicemail is automatically deposited in your mailbox and stored on the Exchange server. In fact, Exchange calls it the mailbox server role. As e-mail is received by your e-mail system — Exchange server in most cases — it gets sent immediately to the mailbox server role. The client, in this case Microsoft Outlook, will be able to access the e-mail, and perhaps the voicemail, from the mailbox server when needed. If you are required to archive these e-mails, you need to back up and store the data somewhere and remove it from its native storage. This way, even if users delete the e-mail from their active inbox, the backup will still be available for compliance purposes. This activity is called *archiving*.

The question is whose e-mail and voicemail gets archived? Earlier, in the discussion of instant messaging, I mentioned that the administrator has the capability to determine whether the IMs of all or only selected users get archived. With Microsoft Exchange Server 2007, you also have the capability to define which users' e-mail and voicemails get archived. This activity is called *journaling*.

Journaling allows the administrator to specify that all communications be recorded, including e-mail communications, so that the organization can meet its compliance requirements. Many organizations may have implemented e-mail retention or archival strategy as a company policy to meet other obligations, such as e-discovery laws.

To illustrate, consider an example of a financial services company based in New York. SEC and NASDAQ regulations require the corporate officers to take the responsibility for any claims their employees make to their clients. These claims may be made by brokers or financial analysts to the clients via instant messages, e-mail, and so forth. The company officers need to ensure that claims made are accurate and that the company can stand behind them. One way to do this is to occasionally and randomly review employee communications both instant messaging (if enabled) and e-mail.

This financial services company needs to journal all e-mail communications of those employees who directly communicate with clients. Even fax transmissions and telephone conversations of these employees to their customers must be recorded.

If your company has implemented Exchange Unified Messaging, all voice mails and faxes are delivered to their e-mail mailboxes along with e-mail, making it easier to journal all communications coming into the e-mail mailbox of those employees who deal with customers.

With Microsoft Exchange Server 2007, administrators need to define a *Journaling agent* to capture all e-mail communications for those employees just mentioned. Administrators have two options:

- **Standard journaling.** In this option, each user is located on a specific mailbox database on the computer that hosts the mailbox server role. You may have divided your user base among multiple mailbox databases as a performance or storage requirement. If you have five mailbox databases defined in your Exchange organization, you need to configure journaling for each mailbox manually. It may be wise as a retention and archival strategy to group all users who need to be recorded into a mailbox database and only journal that database.
- **Premium journaling:** In this option, individual users or users in a distribution list can be marked for journaling regardless of which mailbox database they are located in. Premium Journaling requires Exchange Enterprise Client Access License (CAL).

Microsoft Exchange Server 2007 allows administrators to define the scope of the journaling rule:

- **Internal:** Only messages sent or received by internal mailboxes are journaled.
- **External:** Messages sent or received from external recipients are journaled.
- **Global:** All messages that pass through the hub transport server in an Exchange organization are journaled.

Based on the regulations that apply to your company, select internal, external, or global scope to process the messages.

External and Global scopes will increase the number of messages that are processed and retained in your archived storage, requiring you to provide for additional storage capacity as well as plan for the performance hit on your infrastructure.

If your organization falls under any special regulations for retention of e-mail communications from or to specific recipients, or if they are involved in any legal proceedings, you may consider using the Premium Journaling option available.

Exchange Unified Messaging–enabled journal recipients

If your organization has deployed Exchange Unified Messaging, your users will get their faxes, voicemails, and e-mails all in the same inbox. The volume of this combination of messages for each user can be significant for an organization. You need to determine if the regulation requires you to retain and archive all communications, including missed-call notifications and voicemail, or just the e-mail messages.

If you can skip retaining the missed-call notifications and voicemail messages generated by the UM server, that will substantially reduce the need for extra storage space on your archiving hardware and reduce the performance hit on your network.

The journaling agent allows you to skip processing of the missed-call notifications and voicemail messages.

Unified Messaging service delivers faxes to your Inbox as mail messages. These messages will always be journaled even if you skip the missed-call notifications and voicemail messages.

Journaling mailboxes

When you define journaling in Microsoft Exchange Server 2007, you also have to configure a journaling mailbox that is used to collect all journal reports.

Journal reports contain the most sensitive information that you need to secure and protect at all costs. If needed, you will be required to submit the contents of the journaling mailbox as is without any tampering.

Messages that are journaled are wrapped in journaling envelopes that contain information about whom the message was sent to, who sent it, its subject, and other useful information. You may either

- Create one journaling mailbox to collect messages for all the journal rules.
- Create journaling mailboxes for each journal rule.

The journaling mailbox can be a valid SMTP address, meaning that you can store journaled messages in either

- Microsoft Exchange
- A SharePoint services site
- A hosted message archival solution

Create strict policies for who can access the journaling mailbox and speak with your legal counsel to verify that your retention and archiving policies will meet the regulatory requirements for your organization.

Considering Exchange Hosted Services

Perhaps your organization is not ready to take on the additional requirements of hardware, software, and administration of archiving and compliance. In that case, you may consider external services provided by third-party providers that enable archiving as a hosted service. Microsoft provides Exchange Hosted Services:

- Hosted Filtering protects from e-mail–borne malware.
- Hosted Archiving provides e-mail retention.
- Hosted Encryption encrypts data to preserve confidentiality.
- Hosted Continuity provides access to e-mail during and after emergency situations.

Exchange Hosted Services can be integrated with on-premise Exchange servers that your IT staff is managing, as well as with Hosted Exchange e-mail services offered through service providers.

Chapter 15

Management and Troubleshooting

In This Chapter

- Monitoring systems
- Diagnosing problems

Even after you have successfully deployed all of your unified communications components, you are really not done. If you are in the IT department of your company, you now have the responsibility of managing this new infrastructure. You must make sure that it works as advertised, and that your users are achieving higher productivity and are satisfied.

You have assembled so many components together — hardware, software, network, PBX integration with gateways (if enabled), and of course, the users — that something somewhere could fail. Managing and monitoring the unified communications infrastructure that you have planned and implemented so carefully is a mission critical task.

If you are part of the IT team that is responsible for the planning and implementation of your company's unified communications solution, then the contents of this chapter are for you. It starts with exploring details about monitoring the server component (see Chapter 14), and then dives into detailed troubleshooting strategies and how your unified communications solution can help you do just that. This chapter also explores the diagnostics tools that you should be familiar with and describes the major ones available.

Monitoring Unified Communications

Any technology solution that you implement requires constant monitoring to keep it running smoothly and make sure that the users are productive when they use the solution so the company's investment in the technology is getting paid back.

As IT administrators for the unified communications solution, you should constantly monitor the unified communications system and its usage. Constant monitoring ensures that you will be able to detect problems and issues before they become company-wide problems and everything shuts down.

Most unified communications solutions include tools for the administrator to manage the infrastructure proactively and be on the lookout for potential problems. Amongst the tools that are commonly available are:

- Event logs
- Performance monitor
- Archiving Server and Monitoring Server

Administrators can use a combination of these tools to monitor the health of the unified communications system, track the usage, and make sure that users are taking full advantage of the components.

Event logs

Any software solution that you implement is tracked through recording of events in the Windows event log. After implemented and operational, your unified communications system starts logging milestones, successes, failures, and warnings in the event logs.

In the example scenario of deploying the Microsoft Office Communications Server 2007 R2, it saves all the event information in an event log named Office Communications Server. If the archiving server cannot connect to the SQL server database, an event will be recorded as shown below:

> *Failed to connect to the back-end database. Office Communications Server Archiving Service will continuously attempt to reconnect to the back-end. While this condition persists, incoming messages will not be archived and will remain in the queue.*

Windows Event viewer is a standard tool included with any server or client software that you install in your environment. It records and logs thousands of events that are not as important or critical for you to monitor. The events that you need to monitor are the warnings and actual failures that occur. To better monitor these important events, there are other tools that look at the Event logs for you and only deliver the important events that you specify for your view.

Microsoft Office Communications Server 2007 R2 has included a Microsoft Management Console (MMC) snap-in called Administrative Tool that presents a better view for the administrators focused on OCS. The Administrative tool is recommended because it includes filtering mechanisms that administrators can use to select only events that show critical errors or select specific categories, dates, and so forth.

The Administrative tool by default shows you the latest ten events regardless of the event source or category for that server. It also makes it possible to look at events for any server by simply clicking on the server that you are interested in. All the OCS server roles that you have deployed in your organization show up in the Administrative tool, and you can select event logs for any of them.

Look at an example. You deployed the Archiving Server component. You are the IT administrator and you have been asked to monitor the Archiving server. You will open the Administrative tool and click the Archiving server node. Each server's events are grouped by categories in the event log to allow for quick views. The Administrative tool displays the event categories for the Archiving server:

- Archiving Server
- Management
- Deployment

Administrative tool

The Administrative tool will show only the events that are relevant to the archiving server role, and so you have to monitor and track only those events. After all the events for the archiving server role have been collected, the administrative tool allows you to scroll through the list and see the actual reason for the event.

Follow these steps:

1. **On one of the OCS 2007 servers, archiving or monitoring, go to Start, select Run, and type MMC. That will open the Microsoft Management Console. Select File, and then click Add/Remove Snap-In. As shown in Figure 15-1, from the Available Snap-Ins window, select Office Communications Server, and then click Add. Click OK.**

   Save this MMC console by giving it a name for ease of use in the future.

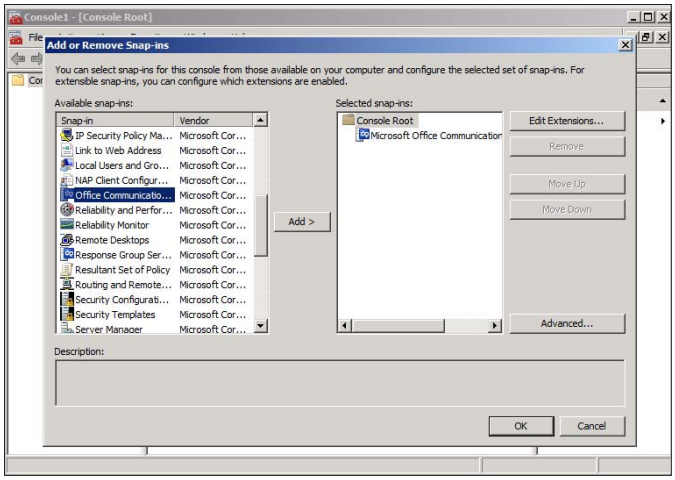


Figure 15-1: MMC snap-ins for Administrative Tool.

2. **After the Administrative tool opens, select the Forest and expand the nodes.**

   For example, if you are interested in looking at the Monitoring server, click on that node and select the server. In the right-window pane, you can select the Status tab to look at the status of the services for the Monitoring server. The next tab shows the Event Log, as shown in Figure 15-2; you can see all the events that include information, warnings, and error events.

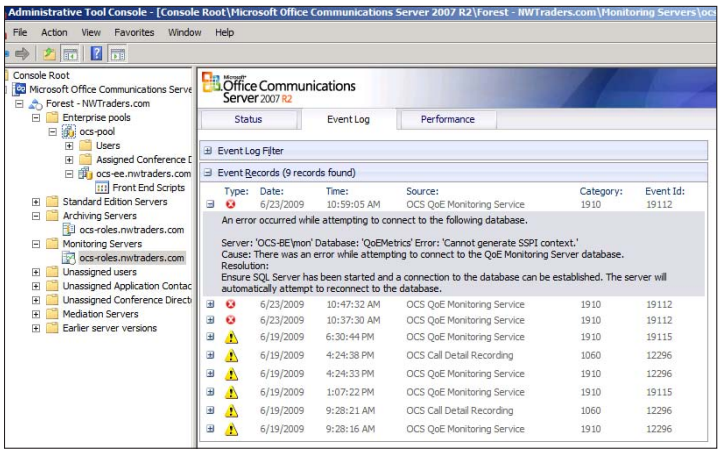


Figure 15-2: Administrative tool event log for Monitoring server.

3. **If you don't want to see all the events but only the critical errors, you can open the Event Log Filter and choose to display records by**
    - Category
    - Type of event (information, warning, or error)
    - Dates
    - Maximum number of records

    As shown in Figure 15-3, all errors that occurred after June 1, 2009, in All Categories were selected. This strips the list from the Figure 15-2 (nine records) down to only error events (three records).

    As an administrator, sometimes you only want to focus on critical errors that you need to fix right away, and those are exactly what you will be viewing, as shown in Figure 15-3.

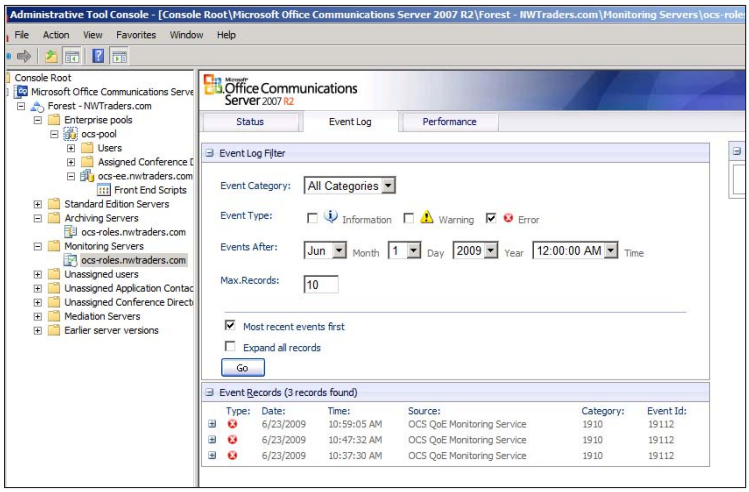


Figure 15-3: Administrative tool event log filter.

Performance monitoring

As an administrator, you should always be proactive in monitoring the unified communications environment for signs of trouble before it actually happens. The Event log provides you with adequate information about the events that have happened already. Problems recorded in the Event logs provide you with information that you can use and respond to in order to prevent the same events from happening again.

Administrators for the unified communications system need to look for monitoring information somewhere else — and that is the Performance monitor. It involves real-time monitoring of the entire unified communications system as well as the individual components that have been deployed in your environment, such as archiving or remote access.

Any Windows server or client component is best monitored using the Performance monitor. Most vendors create many data elements in their systems that can be monitored through what's called *performance counters.* Performance counters enable you to monitor how many users are connected to the system at any given time or how the CPU is performing under the load of that many users.

Continuing with the example of Microsoft Office Communications Server 2007, it has a myriad of counters that allow an administrator to monitor the health of the overall system as well as manage and monitor individual server components, like the Archiving server.

The Administrative tool used in the earlier example to view the Event logs was specifically designed to focus on the OCS 2007 server only. In the same way, the Administrative tool has been embedded with instances of the Performance monitor that are pre-populated with the counters relevant to the OCS 2007 server and its components.

For example, if you want to look at the performance counters available for the Monitoring Server component, here is what you need to do:

1. **Open the Administrative tool console.**
2. **Click on the Monitoring node, and then highlight the server.**
3. **In the right-window pane, select the Performance tab.**

   You will see an instance of Performance monitor already running that shows different Call Detail Records (CDR) counters displayed in the graphical way. This default instance of the performance counter is shown in Figure 15-4.

   You can change the style of the graph, add other counters, remove existing counters, and more.

   For example, if you want to see how the processor is doing, you can add the Processor Time counter by simply clicking on the + sign, and then selecting the appropriate counter. Now you can see the results of the Processor time counter in the graph, as shown in Figure 15-5. You can see the yellow line between the 0 and 10 percent lines.

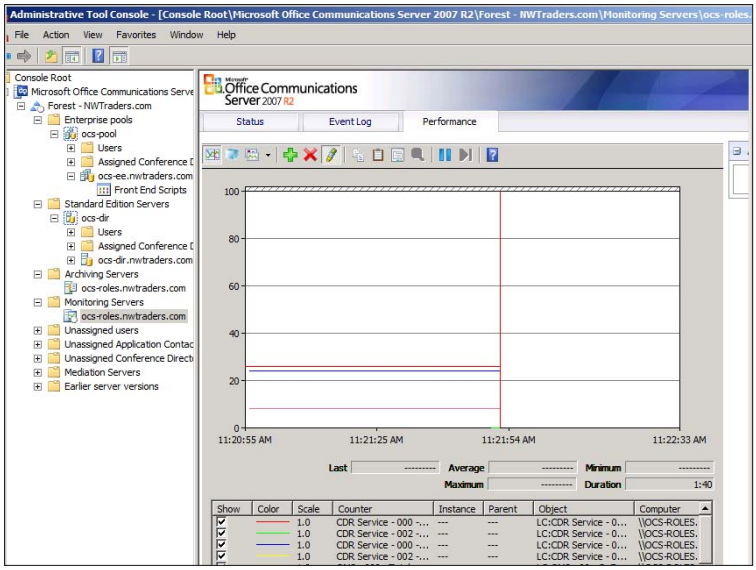


Figure 15-4: Performance monitor for Monitoring Server.

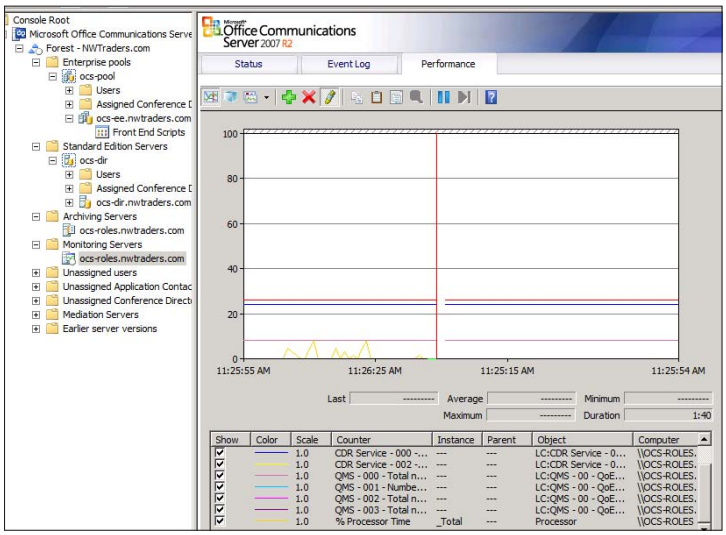


Figure 15-5: Performance monitor with processor time counter.

Administrative tools have a default set of performance instances pre-defined for each server component in the OCS 2007 server environment. It's possible that you don't like the default counters selected in a specific instance of the Performance monitor for a server component. Just like the processor time counter was added in the example above, you may want to add or delete counters that are shown in an instance, and then save that modification for future use.

The only way to modify the default set of performance counters for a server component is by modifying a file called ServerPerfMon.xml, and then saving it.

You can find the ServerPerfMon.xml file in `C:\program files\common files\Microsoft office communications server 2007 r2\`. Back up this file first before modifying it. Simply add new counters that you want to be displayed and remove those that you don't want to be displayed.

Archiving server and Monitoring server

In Microsoft Office Communications Server 2007, the Archiving server role recorded the contents of all IM conversations that occurred in your unified communications environment as well as captured the usage information, called Call Detail Records (CDR). CDRs include the usage information like

- File transfers
- Audio, video and Web-conferencing usage
- Application sharing
- Desktop sharing

As an administrator, you install the Archiving server role to collect all of this usage information and to meet compliance requirements.

With the release of Microsoft Office Communications Server 2007 R2, the CDR capture capabilities were moved to the Monitoring server role along with other new monitoring features. For monitoring and tracking usage information related to conferences, file transfers, or VoIP calls, you now also need to install the Monitoring server role.

Archiving server stores the actual content of the IM conversations in the SQL server database. Monitoring server does not actually record or store the phone calls or conferences content, but does record and store such information as

- Time and date
- Who called whom
- Call length
- Which devices were used

In this chapter, we look at Archiving server and Monitoring server roles in detail from a monitoring and trouble-shooting perspective.

Say that your thousands of users have been using the unified communications system for a while and your management decides to evaluate how the users would rate the system:

- You may create an evaluation survey for the system, and then ask the users to fill out the survey.

  If you don't want to ask all the thousands of users, you may use the Archiving server and Monitoring server data to identify the top 100 users of IM; audio, video, or Web-conferencing; or VoIP calls, and then survey them.
- You may also seek evaluation ratings from the bottom 100 users, and ask them why their usage is low.

TIP

One of the major questions that you may ask is about the voice quality of the VoIP call or an A/V conference. You may have users rate the quality from 1 to 5 (5 being the highest). If you asked your users an open-ended question such as "How was the voice quality," you may see answers like:

- I couldn't hear clearly.
- I heard an echo.
- My speakers sounded funny.

Does that help you in monitoring or tracking the voice quality of your unified communications system? These highly subjective answers are hard to evaluate and make it difficult to take any type of action. Each user is giving a subjective answer that is clearly related to something very specific in the unique environment — speakers or headsets, background noise, or something else.

There is a better way to measure voice quality called *absolute categorization scale (ACS).* Users are asked a set of questions about their listening experience and rate their quality of experience from 1 to 5 (highest). These answers are then averaged and a mean opinion score (MOS) is calculated. The MOS then allows you to compare between groups, like the top 100 users and bottom 100 users in your company, and see what the MOSs are. If the top group gets an average of 3.5 and the bottom group gets an average MOS of 2.1, you can summarize that the bottom group's listening experience was not as good as the top group's experience. You then can start looking for areas where you need to make adjustments or add capacity.

Monitoring server role has been populated with a series of algorithms to predict how users would rate the quality of experience based on a lot of research and analysis of data. Monitoring server categorizes MOSs based on these algorithms in the following categories:

- **Listening MOS:** Prediction of the wideband quality of an audio stream that a user is listening to. It takes into account the audio fidelity, distortion, speech, and noise levels.

- **Sending MOS:** Prediction of the wideband quality of an audio stream sent from a user and looking at the audio fidelity, distortion, speech, and noise levels.
- **Network MOS:** Prediction of the wideband quality of an audio stream played to a user while looking at network factors only, including audio codec used, packet loss, packet errors, and jitter (variation in the delay time of packets arriving at their destination).
- **Conversational MOS:** Prediction of the narrowband quality of the audio stream played to a user. In this case, the mathematical algorithms look at how a large group of users would rate the quality of the connection for holding a conversation.

Narrowband refers to the audio codecs that use an 8 kHz sample rate. Wideband refers to the audio codecs that use a 16 kHz sample rate. Typically, telephone conversations are rated as narrowband.

The Monitoring server component is installed at the highest level of the organization, the Forest level. You should also install the Monitoring server report pack so you can take advantage of the built-in reports. Built-in reports retrieve and aggregate the CDR data collected in the SQL server database. This is the fastest and simplest way to get started with viewing and analyzing the data collected by the Monitoring server.

Monitoring server report pack

Out of the 12 pre-defined reports, 9 reports focused on the media quality and 3 CDR Activity Summary reports. Each report allows you additional filtering capability to narrow down the scope to specific dates, users, type of media, and so forth. Figure 15-6 shows a list of the available reports from the Monitoring server.

For example, if you selected the Media Quality report known as UC-to-UC in Summary Trend Reports, you can filter the data by:

- **Location:**
  - Select all subnets
  - Select 1 or 2 specific subnets
- **Media connection:**
  - Direct
  - Relay
  - HTTP proxy

- **Client used:**
  - Communicator
  - IP phone
  - Web
- **Granularity:**
  - Hourly
  - Daily
  - Weekly
  - Monthly
- **From/To:**
  - Start date
  - End date

Report pack can be accessed from `https://reports.domain.com/reportserver`.

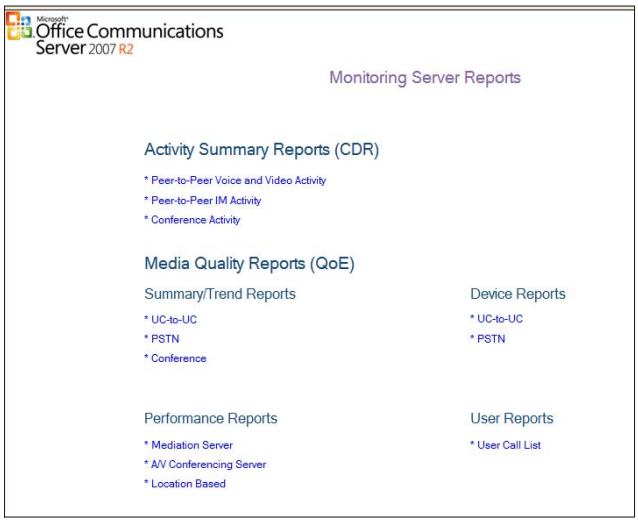


Figure 15-6: Monitoring Server Reports.

When you are interested in usage statistics for your organization's unified communications system, the Monitoring Server Reports should be the first place you look. But if the data you are looking for is collected by the Archiving server or you just want to extract certain CDR data collected by the Monitoring server not included in the above reports, then look at the ArchivingCDrReporter.

Chapter 14 covers the ArchivingCDrReporter in detail, so please look at that chapter if you are interested in this tool.

Troubleshooting Unified Communications

No matter how much proactive monitoring and management you implement, some component of your unified communications environment may still fail.

Microsoft Management Console has a snap-in for the administration of Office Communications Server 2007 or R2 and has comprehensively integrated all of the components deployed in your unified communications environment under one roof. You can access all of the global settings that you have configured at the Forest level as well as all of the settings for each individual role, such as front-end server, archiving server, and monitoring server.

The rest of this chapter covers useful troubleshooting tools.

Administrative tool or Event logs

Microsoft Office Communications Server provides the Administrative tool that shows you the ten latest events regardless of the event source or category for a server role. The Administrative tool also makes it possible to look at events for any other server role by simply clicking the server that you are interested in. All the OCS server roles that you have deployed in your organization show up in the Administrative tool, and you can select event logs for any one of them.

You can even use the Event Log filter to narrow the scope of the events. For example, you can filter on either

- Errors only
- Errors and warnings only

While troubleshooting a specific server or service that is not working, it is best to filter the events for errors only, and then focus on those events.

Validation wizard

During the installation of the Office Communications Server 2007, you had an option to run the Validation wizard, which analyzes and validates current configuration and connectivity to detect errors. It validates basic end-to-end scenarios and provides configuration recommendations to fix errors.

If you want to use the Validation wizard after installation, you can do so from the Office Communications Server 2007 or R2's management console, as shown in Figure 15-7. Highlight the OCS in the left pane, and then scroll over to the right-window pane to see the available tasks. As you can see, you have many different choices to use the Validation wizard.

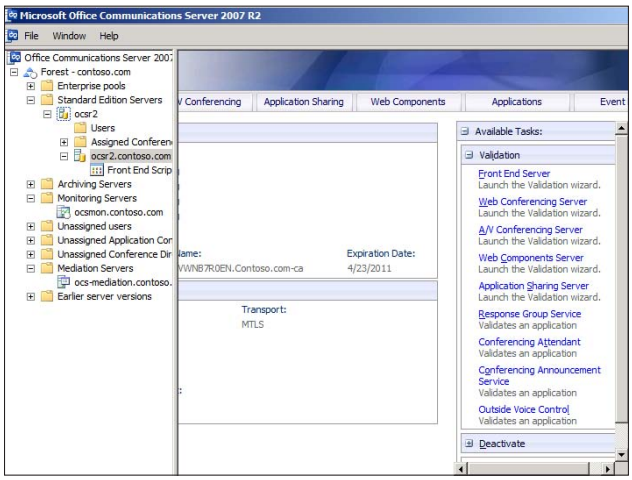


Figure 15-7: Validation wizard from OCS management console.

For example, if you want to check out end-to-end audio/videoconferencing functionality, you can select the A/V Conferencing Server from the right-window pane. (I did that for illustration purposes.) The Validation wizard checked all the connectivity components for assessing the validity of A/V services and created a report that provides a significant amount of details and shows success or failure of each internal component. As seen in Figure 15-8, the report for the lab installation shows success throughout.

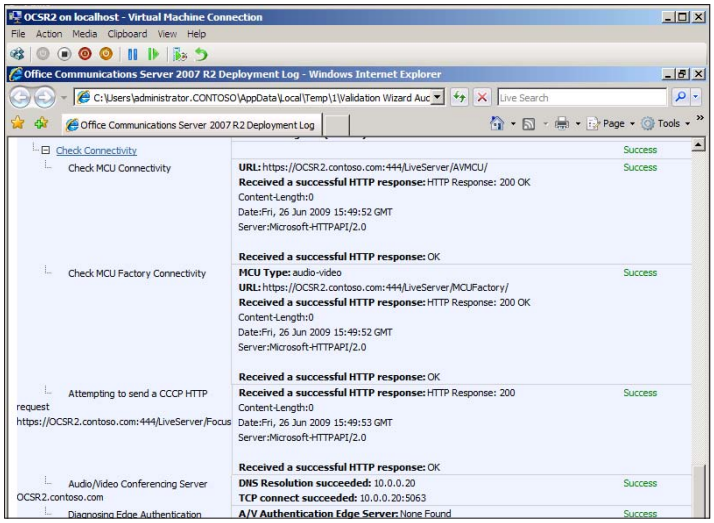


Figure 15-8: Validation wizard report.

If you run into any errors that look like connectivity issues between components or between the client and server, you can run the Validation wizard on that server component to discover the possible underlying problem.

Office Communications Server Logging tool

This tool can be accessed from the OCS management console and allows the administrators to start and stop server logging activity, and then filter and view the logs to identify errors and what is recommended as a fix.

As shown in Figure 15-9, the Logging tool can be easily accessed from the management console by right-clicking on any server component, and then selecting Logging Tool. You can start a new debug session or restart an existing session.

Snooper

Snooper is a graphical user interface (GUI) tool that allows administrators to summarize, search, and view client and server protocol and trace logs. Figure 15-10 shows an example of the Snooper tool. Snooper can be used to view logs from the client or server components, and it will summarize protocol messages, identify diagnostic and connection-level events, and then display the full content.

Snooper can also be used to create reports from queries against the archiving or monitoring server SQL database. Snooper's Reports menu offers this capability. The records can be filtered by user or specific attributes of the error message so the administrator can analyze the problems that a user is having. These types of overview information for all errors or specific types of errors can lead to proactively identifying problems before they can impact many users.

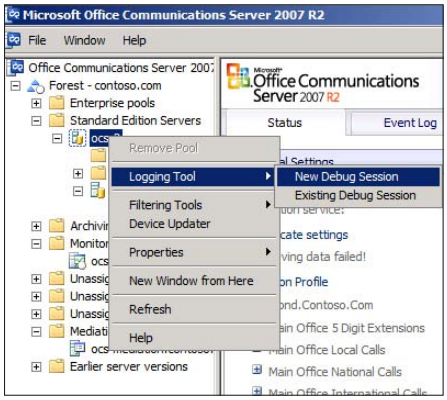


Figure 15-9: Logging Tool accessed from the management console.

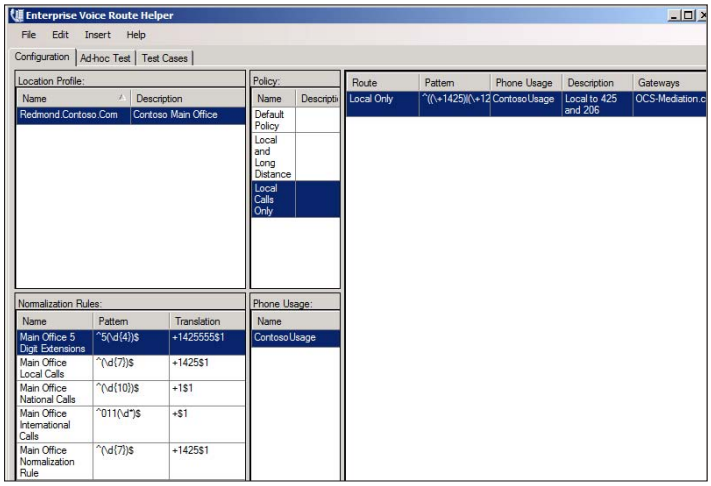


Figure 15-10: Snooper tool.

OCS Best Practices Analyzer

Administrators who want to determine the overall health of their unified communications system can use this tool proactively. Many administrators may be familiar with BPA for Microsoft Exchange server or SQL server. They all use the same framework and assist in identifying the readiness of the current infrastructure for Office Communications Server.

Here's what a BPA does:

- Checks the readiness of your environment for installation of OCS
- Checks for compliance with Microsoft's recommended best practices
- Highlights missing updates for components and how to obtain them

This BPA can be downloaded from

```
http://go.microsoft.com/fwlink/?linkid=133748
```

Deployment Validation Tool

What if you can test the connectivity for your VoIP calls between each one of your sites as well as assess the quality of the connections between those sites? It's the same concept as your cell phone company testing connectivity everywhere it provides the service and insuring that the quality is excellent.

Well, recently released OCS 2007 R2 has added just the Deployment Validation tool (DVT) so you can do the same, proactively, and then assure your users regardless of where they are located that the voice quality will be excellent. (Think cell phone company ads that bombard us.)

DVT simulates a call between any two end-points (locations) that you specify, and you can rest assured that it will verify that a connection can be made between them. DVT also tests and reports the quality of that connection.

As a proactive administrator, you should plan to use this tool all the time so that you can assure your users that connectivity and quality of their voice calls will be excellent.

DVT uses an answering agent that the administrator needs to install. After the answering agent has been installed, anyone in the organization can just call it as if calling a colleague and test the voice quality. Say that you are on a business trip to China, and you will need to participate in a critical conference call that will use your company's unified communications system. You

need to make sure that when you dial into the conference your connection and quality will be adequate. You may call the answering agent a few minutes before the actual conference. The answering agent responds like an answering machine and prompts the user to record a message. The answering agent plays the recorded message back so the user can judge the voice quality.

As an administrator, you can use the answering agent to occasionally test the connectivity and voice quality between locations. If you can't connect, then review the event logs.

Enterprise Voice Route Helper

Enterprise Voice Route Helper can be easily installed by installing the OCS 2007 or R2 resource kit. Route Helper is a terrific graphical tool that allows administrators to test the configuration of the Enterprise Voice location profile, normalization rules, voice policies, usage, and routes by actually testing the various user scenarios that they plan to support.

First, when you open Route Helper, it shows the configuration that you have implemented so far (see Figure 15-11). This is a great way to validate the different scenarios for Enterprise Voice that you plan to support and make sure that you have configured all the normalization rules and policies that you will need and have attached them to the appropriate usage records.

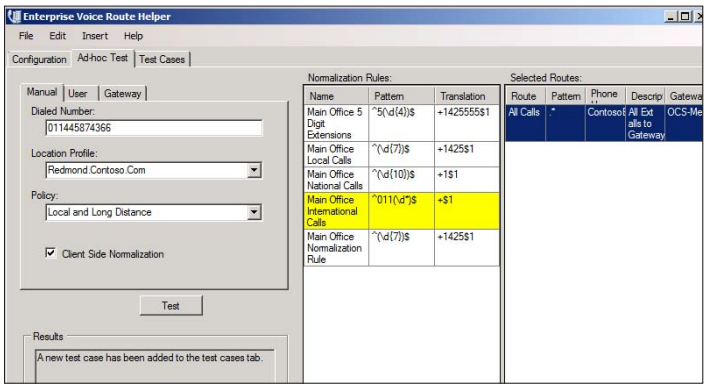


Figure 15-11: Enterprise Voice Route Helper shows the current configuration.

Route Helper also enables you to test each call scenario by clicking the Ad hoc Test tab and typing the different ways your users will make calls. For example, they may dial a 5-digit local extension and expect it to go to a colleague. If you typed a valid 5-digit extension, you not only will see that it works, but Route Helper will also identify the actual user's SIP address that the number belongs to so you can verify it.

For example, the test lab has a normalization rule called "Main Office International Calls" that will be used when someone from the U.S. dials a number starting with 011. To test out this scenario, I typed in 011445874366 in the Ad hoc Test window for the dialed number. As Figure 15-12 shows, Route Helper checked all the normalization rules that were configured and highlighted which rule would be applied, which route will be used that shows the associated gateway, and what normalized number will be dialed as +445874366.

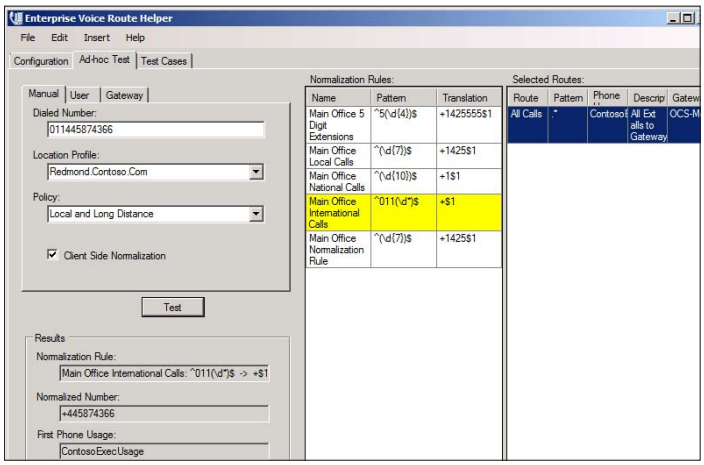


Figure 15-12: Route Helper Ad hoc Test for international number.

To be sure that all the different test cases will work appropriately, you can enter all your different scenarios and test out your configuration. I did that for illustration purposes to show the various potential combination of numbers that users may dial and ran them using Route Helper. Figure 15-13 shows each different combination of numbers tested and identifies the normalization rule, usage, policy, route, and gateway that will be used to dial the number. Finally, it tells you whether the dialed number passed through the configuration.

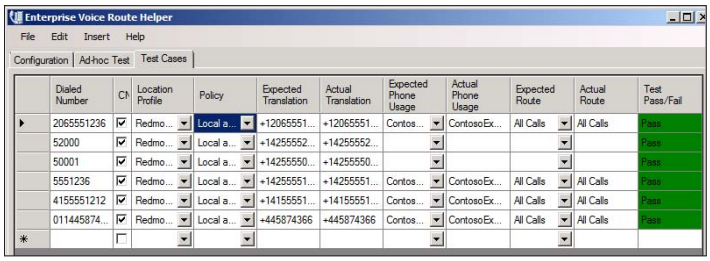


Figure 15-13: Route Helper test cases scenario.

If a user calls your help desk and says, "I dialed this number," and gives you the exact combination of what was actually dialed, you can run a test through Route Helper and identify where the exact problem is occurring, such as whether it is with a normalization rule, policy, or usage.

Escalate to vendor product support

As a last resort, when everything else fails and you have been unable to figure out what is causing the server or service down situation, contact the unified communications vendor's product support. Depending on your specific licensing, you may receive vendor support for a limited time or your company may have signed a specific and longer support agreement with the vendor.

Most unified communications vendors that support professionals have extensive databases (knowledgebases) that document issues faced by other customers, and those vendors could easily search and make recommendations. Many unified communications vendors are available 24/7 and stay on the line while you apply their recommendations.

Another great advantage of unified communications vendors is that they use their own software solutions to enable remote desktop sharing; that means they can take over your server, if you permit them, and can actually look at the server configuration firsthand and apply diagnostic tools or be able to try different solutions.

Chapter 16

Customizing Unified Communications

In This Chapter

- Creating custom client-side solutions
- Developing server-side customizations
- Demonstrating capabilities of customization

One of the biggest benefits of unified communications and software-powered VoIP is the ability to integrate the features into other applications and extend the functionality of unified communications in ways that can't be achieved with traditional communications. Rather than defining your business processes based on what the communications system is capable of, you can modify the communications system to meet the needs of your business processes.

The major unified communications platforms include the capability to develop custom solutions that either

- Use the unified communications features
- Extend the functionality

Microsoft and IBM, in particular, being software-based solutions, provide exceptional platforms for custom unified communications solutions. Cisco, Avaya, and other unified communications systems also have software components and provide the Software Development Kits and Application Programming Interface so the software developers can customize them.

This chapter looks at the tools used to create unified communications customization, and examines a few custom unified communications applications as examples of what is possible.

Creating Custom Client-Side Solutions

You can use the SDK and API tools from unified communications vendors to

- Develop custom presence states.
- Add tabs to the unified communications client application that integrates with other data or applications.
- Create new features.

To see what is possible, take a look at the tools available from Microsoft to develop custom solutions on the client side.

Microsoft has a variety of SDKs available for working with OCS 2007 and OCS 2007 R2. Which one you end up using depends on what your goal is. You begin by answering some key questions that will help you choose the appropriate tools.

- **Invoke Communicator from other applications.** You can use the Communicator Automation APIs to leverage the Microsoft Office Communicator application and invoke Communicator functionality from within other programs.

  This approach requires less code because you are simply interfacing with the existing tools.

  With these APIs, you can:

  - Sign into or log out of Communicator
  - Display a list of contacts, including current presence status
  - Show profile information
  - Manage contacts and groups
  - Initiate instant messaging, voice, or video sessions
  - Transmit text to an instant messaging session
  - Manipulate the size and position of the Communicator interface window

- **Embed unified communications features in applications.** If you need to integrate Office Communications Server features into other applications and want to include a rich feature set, you can use the Unified Communications Client API (UCCA).

  Using UCCA you can add things like presence state and instant messaging functionality directly into applications.

  UCCA essentially enables the same features and functions as the Communicator Automation APIs, but builds the functionality directly into a custom application rather than invoking the Communicator client externally.

- **Customize presence states in Communicator.** Communicator displays presence with such states as
  - Available
  - Busy
  - Do Not Disturb

  But you may prefer to show your presence state with other conditions, such as
  - Working from Home
  - Meeting with Customer
  - Presenting

  Using a customized XML configuration file, you can do it. Check it out at `http://technet.microsoft.com/en-us/library/dd819946(office.13).aspx`.

- **Develop custom tabs for Communicator.** With Communicator Extensions, you can create custom tabs that appear within the Microsoft Office Communicator software. The custom tabs extend functionality and add features not already present in Communicator. Check it out at `http://technet.microsoft.com/en-us/library/dd425110(office.13).aspx`.

  Communicator Extensions leverage an Internet Explorer control and transmit the SIP URI of the signed-in user and/or other designated contacts. With the SIP URI details, the tabs can be used to customize the information displayed for the specific user(s). In Figure 16-2 (later in this chapter), on the bottom, you can Assign, White-List and Reload each using tab customizations. Each one of these tabs is linked to other actions which could be a hyperlink.

  Custom tabs can also be created by
  - Using Registry modifications
  - Developing custom XML config files for the Communicator client

- **Create Web-based customization.** You can leverage Communicator Web Access (CWA). CWA is a Web-based version of the Communicator software built on AJAX. Because it is Web-based and built on AJAX, it allows you to manipulate or build on the Web-based functionality.

  With the Unified Communications AJAX API, you can embed the following unified communications functionality into Web pages:
  - Contacts and contact management
  - Initiation or acceptance of instant messaging and audio/videoconference sessions
  - Display and modification of presence status

To use the Unified Communications AJAX API, you must have CWA enabled.

Developing Server-Side Customizations

It is also possible to manipulate the way that Office Communications Server routes communications or responds to events. Again, Microsoft provides a variety of tools to accomplish this, and which one you ultimately use depends on what you are trying to achieve. Decide whether you want to

- **Create custom routing and logging of messages.** If you want to modify message routing or develop custom logging and archiving solutions, you can develop custom plug-ins for OCS 2007 using the OCS Server APIs. The OCS Server API uses Microsoft SIP Processing Language (MSSPL) to enable you to alter message routing and control.
- **Develop an auto-responder bot.** You can create a bot, an automated response system that can respond to specific events or messages, by using the Unified Communications Managed API (UCMA). Using this functionality, you can automate the response to frequently asked questions or gather standard information from a user or customer. For example, you may have seen an online chat tool on many Web sites that allows you to chat online with a customer service person, such as on Dell.com. Before you get to a live person, the automated bot may ask you general questions about your name, e-mail, phone number, and the issue you want to discuss. If you describe your issue appropriately, the automated bot can find the expert who can answer your questions after checking the expert's presence to make sure that he or she is online and available (see Figure 16-1).

  There is a significant difference between UCMA 1.0 and the UCMA 2.0 Core functionality available in OCS 2007 R2.
- **Customize tools with speech recognition.** Using the Speech Server Core API (SSCA), you can develop custom solutions that include speech recognition and interactive voice response (IVR) capabilities.

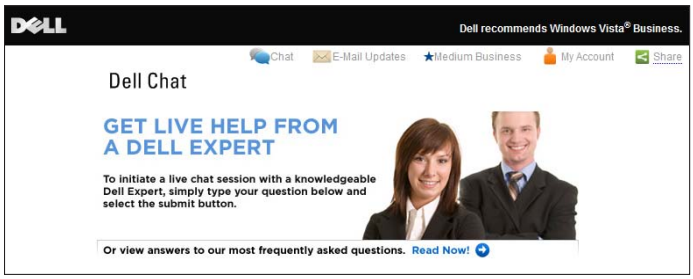


Figure 16-1: Expert chat on Dell.com.

You must have a Microsoft Speech Server installed in order to make use of the speech recognition or IVR functionality.

Microsoft has a variety of APIs that work with different platforms and servers and provide varying levels of functionality for developing custom unified communications solutions. Table 16-1 details the APIs that are available and which OCS 2007 version(s) they are compatible with.

Table 16-1 Microsoft Office Communications Server APIs

API	*OCS 2007*	*OCS 2007 R2*
Office Communicator Automation API	X	X
Unified Communications Client API	X	X
Unified Communications AJAX API	X	X
Communicator Custom Tabs	X	X
Unified Communications Managed API 1.0	X	
Unified Communications Managed API 2.0 Core		X
Unified Communications Managed API 2.0 Workflow		X
Unified Communications Managed API 2.0 Speech		X
Office Communications Server Application API	X	
Office Communications Server Application R2 API		X
Office Communications Server Management API	X	X

Demonstrating Capabilities of Customization

You have virtually endless possibilities to develop custom modifications to the unified communications functionality to create business processes and scenarios that enhance productivity and help users operate more efficiently.

The unified communications platform can be exploited and extended by third-party vendors. That means that a variety of applications are available to enable you to expand the functionality of your unified communications platform without having to develop the solutions yourself.

Let's take a look at some examples of third-party unified communications applications.

ETC Time Tracker for OCS

ETC Time Tracker for OCS is an add-on application from Enabling Technologies that integrates with Office Communicator to automatically track the time a user spends on it using any mode of communication: IM/VoIP Call, video call, and so forth.

Attorneys and executives in the Professional Services business can use ETC Time Tracker for OCS to track their time. Incoming and outgoing calls/IM and video are all tracked automatically. This eliminates the lag time between employees turning in their paperwork and Cash Flow for the Firm. In rough financial times, many organizations are asking for increased accuracy in their bills. OCS Time Tracker enables the company to provide precise and timely accounting to its clients. Figure 16-2 shows the client's Communicator screen on which it can identify the client and matter/project that the call should be billed to.

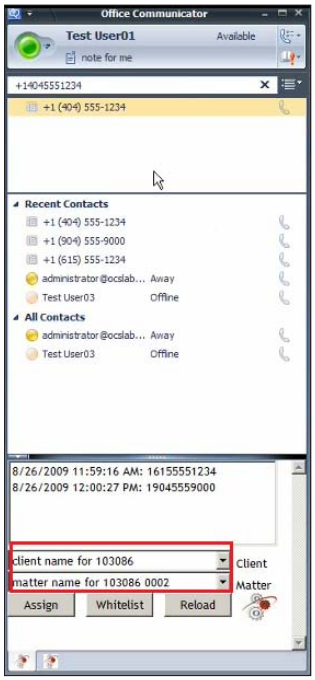


Figure 16-2: Users identify clients and matters/projects to be billed for the call.

ETC Time Tracker for OCS includes the following features:

- For In-coming communications:
  - Data lookup
  - OCS/Outlook contact lookup

- MS CRM/Sharepoint lookup
- Third-party client project database
- Match recent client projects
- Create/use existing client projects

- For Out-going communications:
  - Click to dial a contact from Outlook/OCS
  - Click to dial from context menus in Outlook
  - Click to dial from third-party directory

ics Office

ComputerTalk has integrated its ice contact center with Microsoft Office Communications Server 2007 R2 to add new unified communications features and enhancements to the 18 different modules that include such features as

- A comprehensive multichannel contact center
- Speech interactive voice response (IVR)
- Call recording
- Automated dialing

The ice contact center provides computer telephony integration and multi-channel contacts by phone, fax, e-mail, instant messaging (IM), and Web chat. Available as SaaS or CPE, it also supports both standard telephony and VoIP using standards-compliant session initiation protocol (SIP) for multimedia communication sessions. Embedded predictive dialing allows for effective outbound campaigns. ice also integrates with third-party applications such as Workforce Management and CRM software, giving contact-center agents an in-depth view of customers' purchases and service histories.

By integrating ice with Office Communications Server 2007 R2, ComputerTalk clients gain presence awareness — the capability to see when and how other users of the communications system are available for communication — and several other capabilities, including call management. The integration with Microsoft Office Communicator gives users the capability to

- Place, hold, and transfer calls
- Consult with others
- Conference
- Manage multiple simultaneous calls

Calls can be placed directly from the Microsoft Office Outlook communication and collaboration client. IM sessions can also be placed into queues and routed to the correct experts within the enterprise. Check it out at `www.computer-talk.com`.

Message Waiting Indicator

I spoke about Exchange Unified Messaging in Chapter 4. Exchange 2007 Unified Messaging added voicemail and in-bound fax transmissions to the types of messages that users receive in their Outlook Inbox. This voicemail functionality created by the Exchange 2007 Unified Messaging role provides a useful and rich experience, including such features as Outlook Voice Access and speech-enabled auto attendants. However, the Exchange voicemail system doesn't light up your PBX desk phone's message-waiting light.

Enabling Technologies created etcMWI. For some organizations, particularly those organizations in which some users are assigned phones but not computers, a fully functional Message Waiting Indicator is mission critical. ETCDevCorp's etcMWI version 3.1 is designed to solve this problem by using technologies native to Exchange 2007 and utilizing the existing VoIP infrastructure required by an Exchange 2007 Unified Messaging implementation.

In addition to MWI, the etcMWI 3.1 platform provides additional functionality to an Exchange 2007 Unified Messaging installation. These features provide text or voice notification to end users when the user receives a new voicemail. Figure 16-3 depicts the message flow.

Check out the solutions at `www.enablingtechcorp.com/DNN490/CEBPAddOnApplications/tabid/58/Default.aspx`.

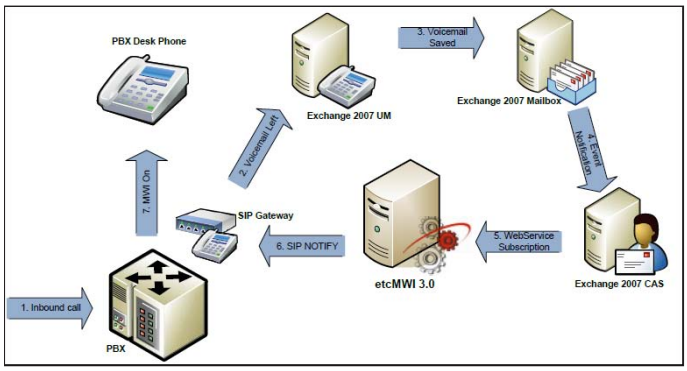


Figure 16-3: Message flow in etcMWI 3.1 UC solution from Enabling.

OCS for Blackboard Learn Platform

OCS for the Blackboard Learn Platform (OCS for BB) is a communications suite that brings together the strengths of two products:

- **Blackboard Learn Platform (BB)** is a sophisticated Web application that enables students, teachers, and administrators to communicate and share information.
- **Microsoft Office Communications Server (OCS)** is a communications tool that focuses on unified communications and makes it easier for people to connect and share information.

The **OCS for Blackboard Learn Platform** solution from Enabling Technologies brings these two applications together to enable students, teachers, and administrators to dynamically connect, share, and communicate. Suppose that a student needs to contact a professor or administrator at the school or vice versa. OCS for Blackboard enables presence awareness and automatically populates the student's client with contacts organized by classes or administrators tabs, as shown in Figure 16-4.

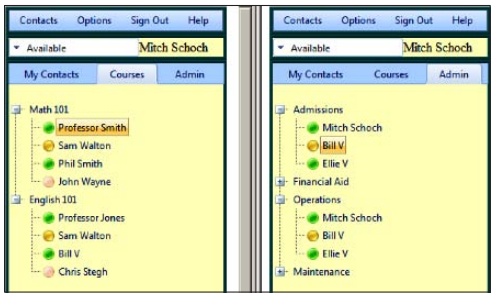


Figure 16-4: OCS for Blackboard Learn showing a student's contacts by courses and administrators.

Password Reset

Gold Systems' Password Reset solution offers a convenient anywhere, anytime user interface, a secure caller authentication, and back-end reset functionality. Users simply call in to reset their passwords as they normally would. But now, the entire process is driven by self-service voice technology.

For additional security, the option of Speaker Verification (voice biometric) can be added — for the entire organization or just for specific groups that require a stricter authentication policy. The Gold Systems Password Reset

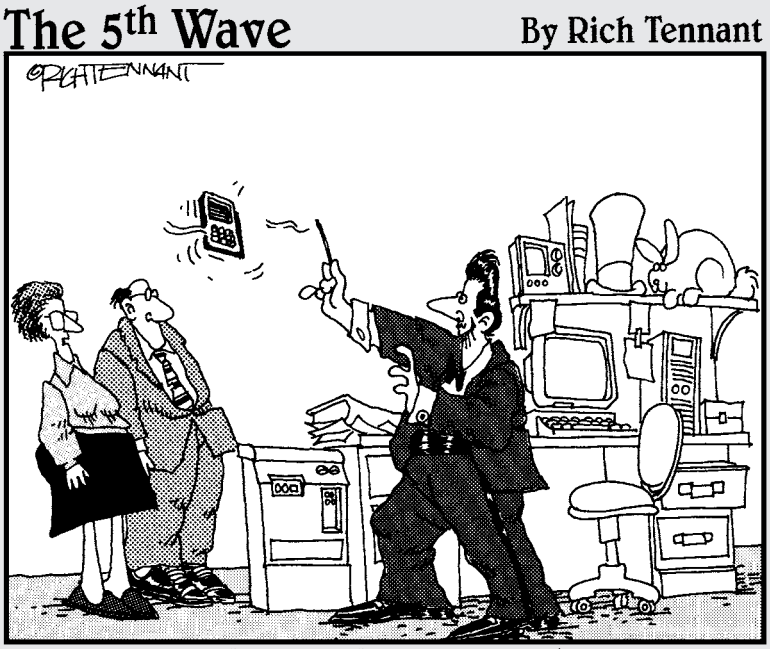
solution also provides a Web-based alternative, allowing users to automatically reset their passwords using a secure network interface. Gold Systems even supports multiple languages in both the voice and Web interfaces.

- **Quick Enrollment:** Password Reset users first enroll over the Web by answering a few challenge questions. For the speaker verification option, a voiceprint is created over the phone.
- **Secure Authentication:** When a user forgets or misplaces a system password, he or she calls into the application and is identified by providing the correct responses to a random sampling of challenge questions asked during enrollment.
- **Easy Administration:** Web-based administration is easy to set up. You can choose the number of enrollment questions, configure your challenge questions, set the temporary password activation time period, change temporary password attributes, provide access information for Active Directory settings, and monitor the performance of the application.

Gold Systems has versions of the Password Reset application available for both the Microsoft Office Communications Server platform and the Cisco Unified Communications platform.

Part IV

The Part of Tens



"His name is D'Marco D'Magician. He's helping us tap into some unregulated wavelengths for our PDAs."

In this part . . .

If you keep this book in the bathroom, the chapters in this section are the ones that you'll read the most. Each chapter consists of ten (more or less) things that are worth knowing about various aspects of unified communications.

Chapter 17

Ten Advantages of Unified Communications

In This Chapter

- Understanding the benefits
- Taking advantage of unified communications features
- Maximizing value of unified communication

Communication is nothing new. Consumers and enterprises alike have been communicating just fine using phones, fax machines, e-mail, instant messaging, and other methods for decades. The content of the communications may not always be of the best quality, but people understand how to use the technology.

What's the big deal with unified communications, then? What is it about unified communications that changes the playing field? This chapter addresses the advantages and benefits of unified communications that

- Set it apart from traditional communication methods
- Provide value for organizations that embrace this new era of communications.

Presence

Presence is the magic glue that binds unified communications. It's one of the things that separates unified communications from traditional communications and helps users to communicate more effectively and more efficiently.

REMEMBER

Presence is essentially the user's status or availability.

The method varies by vendor or platform, but presence provides a visual notification that identifies whether a given user is currently available for communication, as shown in Figure 17-1.

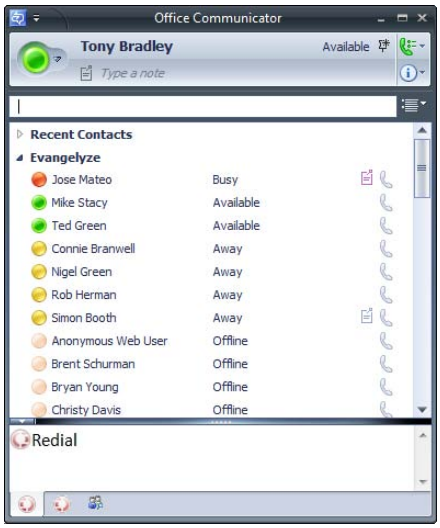


Figure 17-1: Microsoft Office Communicator uses colored circles to display presence information.

With traditional communication methods that don't integrate with each other, and don't provide or update presence information, interruptions can come from anywhere. You might be on the phone, receiving e-mail, with your mobile phone ringing, while carrying on two separate instant messaging conversations. Presence can't eliminate these distractions by itself, but if a user knows that you are already on a call and not currently available, he or she will (hopefully) find a more appropriate method or time to communicate with you.

Increase Efficiency

Unified communications enables you to communicate more efficiently. It isn't efficient or effective to send an e-mail, place multiple phone calls, leave a voicemail, send an instant message, and attempt to send a text message in order to track down a user. Unified communications helps by

- Providing presence information to notify you of the person's status or availability
- Unifying the various methods of communication

No matter how you choose to communicate with someone, they can receive and respond to that communication with a single device or application.

Some communications are simply more urgent than others while some can wait. Unified communications helps to harness all of the various communications methods and ensure that you can communicate with users anytime and anywhere. If you need to reach someone, and you know they are in a meeting or they are already on a phone call, then you can send an instant message or make a call straight to voicemail so they receive the message without being interrupted.

Improve Productivity

It's a common business situation: You're reading a document, and you have a question. With traditional communication, contacting that person can be distracting and time-wasting. For example, you may have to go to the company intranet site to search for the individual's phone number, and then dial the number and hope the person is there to answer the phone.

Unified communications improves productivity by integrating with applications, and providing a seamless communications experience. For example, a document can display presence information for the user who created it. When you have a question about the document, you can determine whether the person is available with a glance. Whether or not they are available, you can initiate a phone call, an e-mail, or an instant message with a click or two, rather than using a separate directory in another application to find the contact information, then using the contact information in yet another application.

Team Collaboration

Most organizations already use voice conferencing to conduct meetings. Many have also embraced online desktop-sharing or white-boarding tools for conducting meetings. Some companies use videoconferencing. Setting up these sessions is often a cumbersome and tedious process though that requires opening or logging into separate applications.

With unified communications, these synergistic collaborations can occur on the fly with a click of the mouse. You can select multiple contacts, then start a group chat session or desktop-sharing session to discuss ideas and collaborate on effective solutions.

Some unified communications platforms allow you to select contacts to invite to an audio or videoconference; the unified communications software then places calls to each user, to connect them with the conference.

One Number, One Client

One of the most cumbersome issues of traditional communications is how many available options there are.

It isn't uncommon for an individual to have separate accounts and devices for

- Work phone
- Home phone
- Mobile phone
- Work instant messaging
- Personal instant messaging
- Work e-mail
- Personal e-mail

That means that an average individual might need to check seven different communications tools to stay on top of the communications coming in.

Unified communications seeks to converge those various technologies to a single device or a single interface. It isn't perfect yet, and it varies from vendor to vendor, but with unified communications you can redirect your phone calls from several numbers so that they all arrive at one phone. Your voicemail, e-mail, and instant messaging communications can all be stored in a single repository.

It's also a boon when you want to *reach* someone. Unified communications provides you with the technology to do that from a single tool. Most unified communications platforms offer a client application that provides the instant messaging interface, but also enables you to send an e-mail, place a phone call, or start a videoconference with a click or two.

Communicate Anywhere

Interactive voice response systems, like the one provided by Microsoft Exchange with Unified Messaging, enable users to access their e-mail, calendar, contacts, and other Exchange services from any phone, anywhere in the

world, at any time. The system will read your e-mail messages to you, and you can dictate e-mails or changes to your calendar; the system will send out on your behalf.

As cool as that is, it's better if you can simply use the unified communications functions *directly* from your mobile phone. Many of the unified communications platforms include some sort of client application that works with a mobile phone. You can view presence information for your contacts, communicate via instant messaging, send e-mails, make and receive calls, and more. Mobile client applications like this allow you to stay connected while you're on the go, and ensure that you receive all of your communications wherever you are.

Extend Functionality

Unified communications and software-powered voice platforms open up a whole new world of potential for applications that extend the functionality of unified communications. Organizations aren't limited by what the product can do out of the box. Using software APIs, third-party vendors and in-house developers can create tools and utilities that leverage the capabilities of the unified communications platform.

For example:

- Gold Systems has created a tool that leverages Microsoft Unified Communications and Microsoft Speech Server to provide an automated voice response system to enable users to reset their own passwords.
- Evangelyze Communications has an entire suite of products, including
  - SmartChat, which extends presence data and instant messaging capabilities to an organization's web site
  - SmartSIP, which allows Microsoft Office Communications Server 2007 R2 to be connected with any SIP device or SIP phone and any SIP trunk provider

These are just a few examples of what's possible when building on the core functionality of the unified communications platform. Rather than figuring out how to develop business processes that work with the communications technology, you can develop communications technology that supports and enhances your business processes.

Single Infrastructure

From an architecture standpoint, unified communications means converging voice and data communications to a single infrastructure. That represents a cost savings for organizations that only need to run cabling for the IP network to each desktop, rather than having separate voice and data cabling and jacks for each user.

The converged network also allows for more efficient monitoring, and enables the IT department to maintain the voice network more efficiently. Troubleshooting and repair are limited to one network, too.

Retention and Compliance

There are a number of regulatory and industry compliance mandates that organizations might be required to abide by.

- Publicly traded companies are covered by Sarbanes-Oxley (SOX).
- Organizations that deal with medical data and health insurance must comply with HIPAA (Health Insurance Portability and Accountability Act).
- Companies that accept, process, transmit, or store credit card transaction data must comply with PCI DSS (Payment Card Industry Data Security Standard).

These are just three compliance standards. There are many more.

With traditional enterprise communications that could mean having to monitor and retain communications from two or three different networks or applications. Unified communications, and unified messaging, simplify regulatory compliance and data retention by storing all communications in one repository to begin with.

Minimize Travel Expenses

One of the largest expenses for many companies is travel:

- Executives travel to branch offices for strategy meetings.
- Salespeople travel to meet with customers.
- Employees travel to partner, supplier, and customer locations for a variety of reasons.

But travel is expensive. Companies have to cover airfare, rental cars, hotel lodging, meals, and other miscellaneous travel expenses. Those costs add up quickly, and don't include other intangible costs: The employee is less productive during the hours they spend

- In an airport
- On an airplane
- Driving from site to site

The synergy of collaborating and working together is important, though. With unified communications, organizations can conduct virtual meetings that allow individuals from anywhere in the world to work together. With videoconferencing virtual meetings can even retain the face-to-face factor that can enhance communications and collaboration.

Chapter 18

Ten Events You Shouldn't Miss

In This Chapter

- Understanding the benefits
- Searching for unified communications events

In this chapter, I review the major events that cover unified communications that you may find useful in your evaluation or if you have already implemented unified communications, keeping yourself updated on latest upgrades on both software and hardware fronts. I discuss two types of events, trade-show and conferences, as well as training events that you may find interesting.

I recommend that you carefully evaluate these events as well as search for local/regional events. You may visit any of the vendors' web sites, and then search on events — search for training provided through the vendors as well as your local training centers. Many vendors provide free technical training.

Understanding the Benefits

After reading about all the magic that unified communications can spread, it may look like the golden rainbow — someone's dream or fantasy. But it isn't a dream, it is real. Yes, you can get rid of that clunky old phone from your desk once and for all. Yes, the playing field has changed now and we are moving into a whole new era of technology that will revolutionize your communications and collaboration paradigm.

How do I learn more, you ask? How do I see it all in action? Well, you can invite the vendors that I cover in Chapter 19 and have them give you all the sales and marketing hype, show you demos of their products, and tell you why their products are the best. You can read a lot of books, articles, and industry pundits' analysis of the unified communications solutions, and then make up your mind.

Or, you can visit a few major events that cover unified communications and explore the unified communications solutions with your own eyes and ears at your own pace, and then decide which ones would make your short-list. This way, you will have narrowed down the field of vendors that can meet your company's business and technical requirements.

TechEd

Microsoft hosts this premier event annually throughout the world: in North America, India, Africa, Japan, Australia, New Zealand, Europe, and China. TechEd provides you an opportunity to participate in technical and business oriented sessions for all major Microsoft server and client products. Just to get a flavor of what it is all about, you may check out the 2009 event that was held in Orlando, Florida, at http://microsoft.com/events/teched2009.

Cisco Live

Cisco hosts its premier event annually; the 2009 event concluded in San Francisco. It was a very well attended event and covered all major Cisco products, including unified communications. You can get free access to some of the information that was shared at the event at the Cisco Live virtual web site: http://www.cisco-live.com/attendees/virtual. You can get access to all the sessions and more virtually for a small subscription.

VoiceCon

VoiceCon will help you learn the roadmap for migrating to the next generation of IP telephony and unified communications while maximizing your investment in enterprise communications. You will find all the major vendors that I have highlighted in Chapter 19 at VoiceCon. VoiceCon is hosted twice a year in the U.S.: Orlando in March and San Francisco in November (Avaya, Siemens, and Polycom have already announced their sponsorship). They will start VoiceCon Europe in 2010. Typical topics discussed are:

- Unified Communications
- IP-PBX Systems and Architectures
- IP Telephony/Converged Network ROI

- Software-Based Communications Architectures
- SIP Trunking
- Communications-Enabled Business Processes
- Voice/Communications Mashups
- Organizational Impacts of Convergence
- Interoperability for IM and Presence
- Wireless/Mobile Communications
- Preparing Data Networks for Voice and Video
- Quality of Service/Quality of Experience
- Video Options — Telepresence, Room- and PC-based

InterOp

InterOp is a comprehensive conference for IT people to learn about many different IT technologies and solutions. InterOp is hosted in Las Vegas, Tokyo, Mumbai, and New York. It provides you an excellent opportunity to learn through full-day workshops on various emerging technologies. For example, InterOp New York in November 2009 offered workshops on Understanding VoIP (presented by Cisco) and Creating an Enterprise UC Plan. These key topics were covered:

- Cloud Computing
- Governance, Risk & Compliance
- Virtualization
- VoIP and Unified Communications
- Wireless Technology
- Information Security
- Videoconferencing
- Mobile Platforms, Devices & Applications
- Wireless Management

Microsoft Exchange Connections/ Windows Connections

If you are an IT professional focused on messaging and e-mail technologies, then you may want to consider attending this event that now combines with Windows Connections, SharePoint Connections, ASP Connections, Visual Studio Connections, and SQL Server Connections. Here is your opportunity to learn and network with not only the vendors but also the industry experts, authors, and your colleagues from other companies. The Expo hall provides an opportunity to see and hear from vendors that deliver new add-ons to your unified communications solutions as well as the latest upgrades from major vendors. One of the highlights of the last Connections conference I attended was the Q&A session that allowed me to get my tough questions answered.

Cisco Networkers

Cisco's annual user community conference is called "Cisco Networkers" and is held in various cities around the world. It's a great way to meet and learn from your local communities of users how they are implementing Cisco technologies as well as to get trained and learn about the latest products and updates from Cisco.

Cisco engineers and developers are available at these events to deliver intensive technical training and discuss the latest updates to the products.

Cisco IP Communications Training

Cisco has been a pioneer in delivering IP communications, and thus you may want to check out the opportunities to get technical training in Cisco's IP-based communications products.

Cisco delivers these training offerings through its authorized Cisco Learning partners worldwide and also enables you to get Cisco certifications in various technologies. If you were looking at Cisco IP telephony, Cisco's unified messaging solution — Unity or their unified communications solution — I recommend you check out training available at Cisco's web site or look for local authorized Cisco learning centers.

Microsoft Unified Communications Training

Microsoft delivers its unified communications training offerings through its Certified Partner Learning Solution (CPLS) centers worldwide and also enables you to get Microsoft certifications in unified communications and Voice specialization. Microsoft has two server products that make up its unified communications solution in the marketplace today:

- Office Communications Server 2007
- Exchange Server 2007

When you are looking at training from Microsoft, you have two options to look at: training provided through MS directly or through the CPLS channel. Check out the Microsoft corporate training through your local/regional office web sites and get on the newsletter subscription list.

Look for the following types of training solutions directly from Microsoft or authorized partners:

- Voice Ignite Training
- OCS R2 Ignite Training
- MS Learning courses on OCS 2007, OCS 2007 R2, and Exchange Server 2007

To get started to learn more about Microsoft's latest release — Office Communications Server 2007 R2 — check out these free online 2-hour segments that will give you introductory information about the enhancements with new features and strategies for implementation:

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https://www.microsoftelearning.com/eLearning/offerDetail.aspx?offerPriceId=242563
https://www.microsoftelearning.com/eLearning/courseDetail.aspx?courseId=112782
https://www.microsoftelearning.com/eLearning/courseDetail.aspx?courseId=113927
```

IBM Unified Communications Training

IBM's unified communications offerings include the Lotus Notes e-mail system as well as the instant messaging and audio, videoconferencing solution called Sametime. Many organizations may have Lotus Notes as their

e-mail system and either they already have Lotus Sametime in use or are looking to deploy it so I felt that I should share some resources for you to get additional training or ways to evaluate the solutions.

If you are interested in IBM's unified communications products, here is a web site page that lists available training for Lotus Sametime that you may evaluate:

```
http://www.ibm.com/search/?en=utf&v=14&lang=en&cc=us&q=training%2Bsametime&lv=w&
                x=9&y=7
```

Chapter 19

Ten Tools You Should Have

In This Chapter

- Understanding the benefits
- Selecting great unified communications tools

In this section, I review the hardware devices that provide the best quality experience when using audio-, video-, and Web-conferencing or making VoIP-based calls. I selected tools that vendors have certified and approved to best work with their software solutions so the combination will provide you the best quality.

Understanding the Benefits

Throughout the book, you read about what unified communications is and how it enables convergence of all your communications modes into a single seamless interface. Most vendors call this interface *Communicator,* and you install it on your desktop or laptop so you can

- Send an instant message.
- Check presence.
- Engage in audio-, video-, or Web-conferencing.
- Use the existing network for Voice over Internet Protocol (VoIP) calls.

If you are using a standard desktop phone, you will expect a certain standard of voice quality when you switch over to VoIP for all your audio-, video-, Web-conferencing, and calling needs. If you currently use some form of hosted Web-conferencing, then you are familiar with using a Webcam or a headset. Obviously when you start using the new unified communications platform, you expect to start with tools that provide you the same or better quality than you previously had.

I already highlighted many benefits of a unified communications platform. It is critical to understand that you can't reap the unified communications benefits without the right equipment.

For example, you should start using the new unified communications platform to conduct audio- and videoconferences and reduce or eliminate your third-party audio-bridge and videoconferencing costs. To do that, you need high-quality audio headsets or Webcams or speakerphones in conference rooms that integrate with your unified communications software platform. Investing in the appropriate hardware tools will quickly reduce or eliminate external third-party costs.

Unified Communications Tools

As you may recognize, I focus on hardware devices — tools that allow you to reap the benefits of your unified communications implementation and provide you with the same or better audio and video quality that you had before unified communications.

USB phones

Now that you have a unified communications solution available, you may be ready to replace your old desk phone with a USB phone device that directly plugs in to your desktop or laptop. These phones are specially designed and optimized to work with Microsoft Office Communicator 2007 and are manufactured by LG-Nortel (IP8501) and Polycom (CX-200).

If you are used to having a device that looks and works like a phone, then USB phones may fit the bill. If you need a dial pad, then check out the IP phones described later. Because you are integrating USB phones with your Communicator client, I recommend that you use the Communicator for dialing. The majority of the time, you will select someone from your contact list whom you want to call, so you won't even need to dial a number. I like the voicemail indicator that tells me I have voicemail waiting, just like my old phone, and I often use the speakerphone for long meetings.

These aren't good travel phones. If you travel a lot and want to carry a portable phone, Polycom's CX-100 is easy to tote in a jacket pocket, a purse, a laptop bag, and so forth.

Price: $115–$145

IP phones

Even though you have a unified communications solution, you may prefer the look and feel of a traditional phone, including the dial pad. Such phones are known as IP phones; they take advantage of your data network and plug into a network port.

IP phones are full-function phones with full-size handsets, standard phone bases, and dial pads — not meant to travel with.

Cisco IP phones

Cisco is an IP-phone pioneer, delivering its IP-PBX known as Cisco Unified Call Manager that integrates with Cisco Unified Presence Server. Cisco IP phones are designed and optimized for the Cisco Personal Communicator. Cisco also provides video-phones.

You can look up details about them on the website at

```
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps379/ps9900/
              data_sheet_c78-504890.html
```

Microsoft IP phones

IP phones described below have been specially designed and optimized to work with Microsoft Office Communicator 2007. The specifications for these phones were defined by Microsoft, and LG-Nortel (IP8540) and Polycom (CX-700) manufactured them.

Both of these models give you a full-function phone with the added benefit of a 5.7-inch LCD color touch screen that displays all your contacts. Touch a contact's entry, and your call is made!

These phones are meant to be used in your office. A big plus is that they connect to the network, not your PC, so they can be stand-alone phones on your desk and still get you connected with your colleagues via a single touch.

Price: $466–$549

Speakerphones

Some unified communications-enabled users prefer a full-function phone on their desk, and others may prefer a high-quality speakerphone with a built-in microphone to make and receive VoIP calls using their Communicator client. Both options are available; it's a matter of individual preference whether you like a headset or a speakerphone on your desk.

Many people in sales or marketing positions prefer headsets to a phone.

Once again, Microsoft defined the specifications for the vendors to manufacture these speakerphones designed and optimized for either small groups or large groups in a conference room. Some of the speakerphones described below can easily connect to a user's desktop or laptop with USB for individual use.

ClearOne Chat170

The design of this speakerphone works great for a small group of users in a conference room or even for individual use.

Price: $329

Plantronics MCD 100-M

Microphone pickup is great from across a room with this speakerphone, and the people on the other end of the call experience great audio clarity.

Price: $119–$148

Polycom CX100

CX-100 easily fits in a jacket pocket or laptop bag. Pickup range is great even when I walk around in my home office or hotel room while in a conference call. I recommend this for the road-warrior.

Price: $119

Polycom CX5000

One of the best designs for group audio/videoconferencing, this model should be used with Microsoft Office Live Meeting 2007. Your remote participants will get a panoramic view of the entire conference room. It's meant for large conference rooms with a table in the center. It doesn't work well if the room is set up like a classroom or an auditorium.

Price: $3,300–$4,299

Handsets

Some people absolutely need a dial pad and the flexibility of movement so manufacturers have designed handsets that integrate the power of the unified communications with corded handsets.

Jabra Dial 520 USB Handset

Because some users absolutely have to have a dial pad, this handset fulfills that need. It offers a cell-phone style handset with an easy-to-use dial pad that connects to a laptop or desktop with a USB cord.

Price: $45

Corded headsets

Depending on your users' preferences, you can select one of these unified communications tools to ensure that they get the best quality experience when they use their computers to make calls. Even though various users in your company may prefer a USB phone, a corded headset, or a Bluetooth headset, your one-time investment for each user will pay off in the long run; it may even allow you to get rid of the traditional phones on every desk.

If you are in sales or marketing and on the phone a lot with customers, or if you like to get up and stretch while you are on a phone call, you may prefer something like the Jabra GN2000 NC — especially with its reasonable price point. It ranges from $67 to $120. You can even answer or end a call while you are standing or stretching by using the in-line hook-switch on the cord.

Bluetooth headsets

Bluetooth headsets are among the most practical devices because they provide complete freedom for you to multi-task. You can walk around freely while speaking and use your hands to check something on the computer, in a book, or among papers. As an added bonus, you get the best of both worlds — a headset for your mobile phone and Communicator.

Jabra M5390 USB

When I tested the Jabra headset, I was able to easily connect it with my smartphone and Communicator and switch between them. Jabra offers the farthest range from the base without loss of quality.

Price: $179

LG-Nortel IP 8502

IP 8502 differentiates itself by providing a presence indicator. But the range isn't as good as the Jabra M5390.

Price: $175

Wireless headsets

Jabra GN9350 OC

If you are on the phone all day at your office, you will need a long battery life or talk time. Jabra GN9350 may be for you if you are office-bound and want a larger coverage area so that you can walk around while speaking.

Portable Webcams

When you start using a unified communications solution for all your communications and collaboration needs, one of the biggest benefits is the reduction or elimination of travel for your employees. To really make that work, you need to invest in good-quality Webcams or purchase laptops with built-in Webcams.

Both Cisco and Microsoft have announced support for VGA and high-definition with their unified communications solutions; it would be worthwhile to check out those Web cameras for top execs or to place portable Webcams in exec conference rooms.

Logitech QuickCam 3000 for Business

I like the VGA video (640 x 480 pixels) quality at a price point around $25, but with one caution for travelers: This one doesn't pack well in a laptop bag.

Price: $25

Microsoft LifeCam Show

I was impressed with the crisp quality of the picture I saw when my colleague at Microsoft told me he was using the LifeCam Show. So I checked out the specs and realized that it has a 2.0 megapixel camera, and that explained the picture quality. He also said it was easy to travel with.

Price: $79

Microsoft LifeCam VX-5500

If you are a traveler like I am, this one is for you. It didn't really make a difference to me that it comes with three interchangeable faceplates (white, blue, and red). The best part of the design is that it folds flat and I can easily pack it in my laptop bag. It works well in either scenario — at my home office, where I have a window facing me and streaming sunlight during the day, or when I am on the road.

Price: $49

Conference room cameras

Polycom CX5000

Please refer to the CX5000 described earlier, in the “Speakerphones” section.

High-definition cameras

TANDBERG’s PrecisionHD USB camera features 720p or 1080p high-definition video quality with 30 frames per second. This one is specially designed for Microsoft Office Communications Server 2007 R2.

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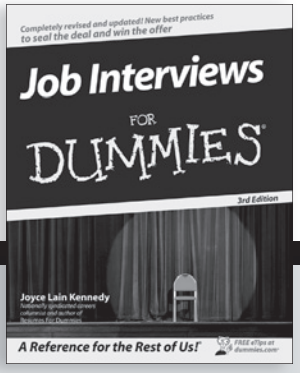

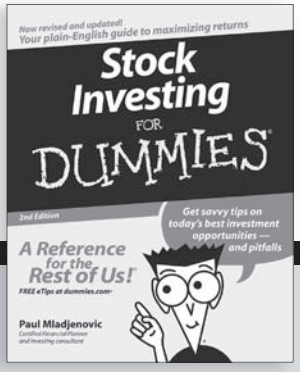

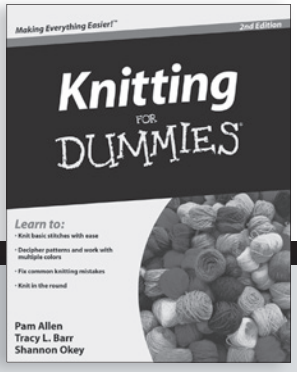

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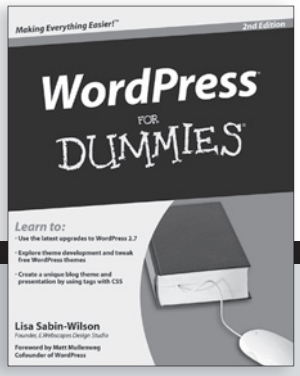

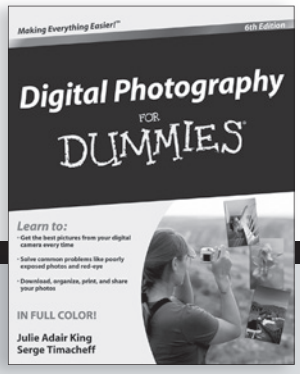

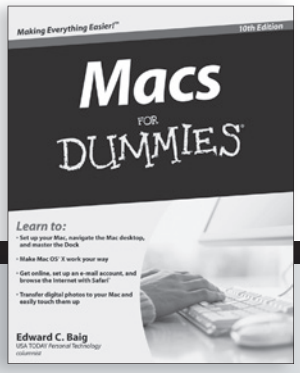

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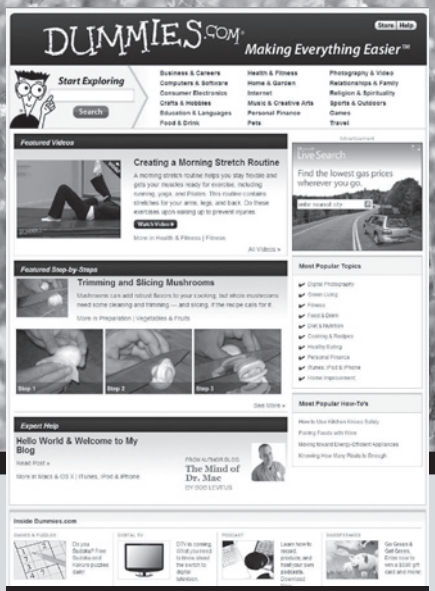

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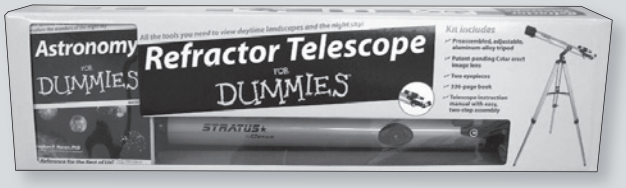

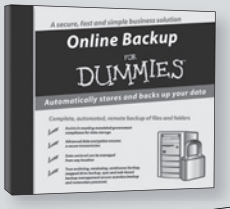

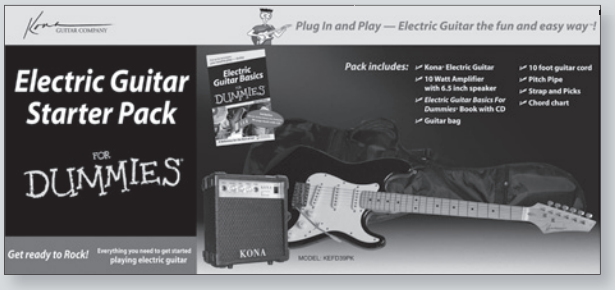

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