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**Cherry Bomb:
Cherry Blossom (CB) Installation Guide**

**CB Server (CherryTree and VPN) Installation, Monitoring,
Troubleshooting, Failover, and Recovery**

**For CB Version 5.0
[Corresponds to CherryTree/VPN Software Version 5.0]
(U)**

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1 (U) Introduction

(S) The Cherry Blossom (CB) system provides a means of monitoring the internet activity of and performing software exploits on targets of interest. In particular, CB is focused on compromising *wireless* networking devices, such as wireless routers and access points (APs), to achieve these goals.

(U) This document discusses Installation, Troubleshooting, Failover, and Recover of CB Servers.

(U) For a more detailed description of the Cherry Blossom system, see the “Cherry Blossom User’s Manual”.

2 (U) Related Documents

(U) This document references the following documents:

- Cherry Blossom User’s Manual
- Dell Poweredge 1850 Server Manuals

3 (U) Points of Contact

(S) Here are points of contact for the Cherry Blossom system that can assist with system configuration, operation, and troubleshooting.

- XXXXX Y – sponsor – COTR
- XXXXX Y – contractor – PM
- XXXXX Y – contractor – Lead Engineer
- XXXXX Y – contractor – Software Engineer
- XXXXX Y – contractor – Software Engineer
- XXXXX Y – contractor for sponsor/network infrastructure expert

4 (U) CB Servers

(U) The CB system has a “backend” server component. This section describes the CB servers in more detail.

4.1 (U) CB Server Types

(U) The CB system has two server types:

1. **CherryTree or CB-CC Server** – handles Command and Control (CC) of the CB system. This server hosts the “CherryWeb” user interface and the “CherryTree” system management software modules. See the “Cherry Blossom User’s Manual” for details of CB system operation.
2. **CB-VPN Server** – handles the VPN actions of the CB system. See the “Cherry Blossom User’s Manual” for details of CB VPN actions.

4.2 (U) Current CB Systems

(U) Currently, there are two CB systems, each with its own set of CB-CC servers (both systems use the same CB-VPN servers):

1. **Production/Operational/Legacy** – this system is the current operational system (as of 14 October 2010).
2. **CT2010** – this system was setup on a virtual host on September 15-17, 2009 to troubleshoot network issues.

(U) The following diagram illustrates the server components of the “Production/Operational/Legacy” CB system. For a more detailed diagram, see section 5.1.

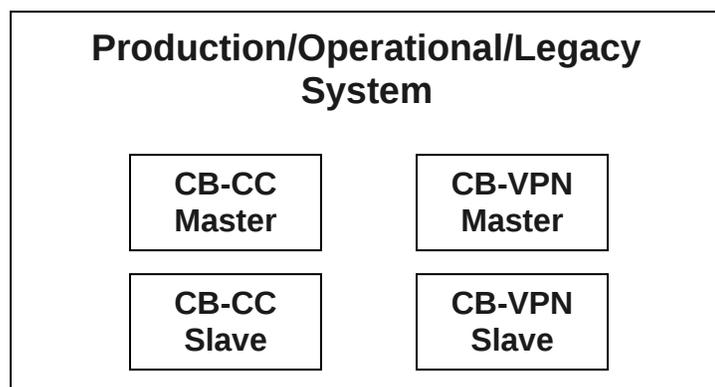


Figure 1: Production/Operational/Legacy CB System Server Components

4.3 (U) Master and Slave Architecture

(U) A CB system has a Master CB-CC server that is running all of the necessary CB-CC processes and a Master CB-VPN Server running all of the necessary CB-VPN processes. A CB system also has a hot spare CB-CC Slave server and a hot spare CB-VPN Slave server. If a Master server fails, the Master server can be taken offline for repair/diagnosis and the Slave server can be converted to the Master server. When the failed server is returned to the system, it will become the Slave. Section 7 documents that process of converting a Slave to a Master server.

4.3.1 (U) CB-CC Data Replication

(U) The CB-CC Slave server performs replication/backup duties of the CB-CC database and other relevant data. The CB-CC Server uses a mysql database to store system data, and it stores Copy Data in flat files. The mysql replication feature is used to keep an in-sync copy of the CB-CC database on the Slave server. The “rsync” utility is used to keep an in-sync copy of CB-CC Copy Data on the Slave server (nominally every 5 minutes).

4.4 (U) CB Server Hardware and Operating System

(U) The “Production/Operational/Legacy” system’s CB-CC Servers (both Master and Slave) are Dell Poweredge 1850 servers running Red Hat Fedora 9.

(U) The “CT2010” system’s CB-CC Servers (both Master and Slave) are virtual servers running Red Hat Fedora 9.

(U) Both the “Production/Operational/Legacy” and “CT2010” systems use the same CB-VPN Servers. One of the CB-VPN Servers is a Poweredge 1850 running Red Hat Fedora 9, and the other is a virtual server running Red Hat Fedora 9.

(U) All Dell Poweredge 1850 CB Servers have (at least) 2 Gigabytes of RAM, and (at least) 160 Gigabytes of RAID hard disk space.

(U) Refer to the Dell Poweredge 1850 Server Manuals for more information. Sponsor personnel (see section 3) are cognizant of the virtual server configuration.

4.5 (U) CB Server Physical Location

(S) All CB servers (CB-CC and CB-VPN Masters and Slaves) from both the “Production/Operational/Legacy” and “CT2010” are housed in a secure sponsor facility.

4.6 (U) CB Server Requirements

(U) A server slated to be a CB server (either CB-CC or CB-VPN), must meet the following requirements:

- OS: Red Hat Fedora 9
- Hard Drive: RAID with at least 160 Gigabytes
- RAM: at least 4 Gigabytes
- DRAC interface
- CPU: i386, 4 cores, 2.0 GHz or better

5 (U) CB Server Access

(U) This section details how to access the current production CB Servers.

5.1 (U) CB Server/Sponsor Network Diagram

(U) The following diagram shows the sponsor network infrastructure as it relates to CB. This diagram shows the “Production/Operational/Legacy” system. A diagram for the “CT2010” system is currently under construction.



Figure 2: Sponsor Network Infrastructure Related to Cherry Blossom

5.2 (U) CB CC Service IP

(U) Of particular importance is the “CB CC Service IP”, which is the IP address to use when accessing Cherry Web for system command and control. Currently, for the “Production/Operational/Legacy” system this IP is **172.24.5.16** (for the “CT2010” system, this IP address is 172.24.5.147). Note that the “CB CC Service IP” is assigned to a virtual interface on whichever CB Server is currently the Master.

5.3 (U) CB Server Users and Passwords

(S) The following table lists the critical users/passwords for CB servers:

Server/Service	User	Password
CB Server Linux root account	root	k3dEtE820s (although see note below)
CB Server Linux cbuser account	cbuser	cbPhoneHome
CB Server Mysql root account	root	key4CherryTree
CB Server Mysql cbuser account	cbuser	key4CherryTree
CB VPN Server Linux root account	root	k3dEtE820s (although see note below)
Cherry Web Admin User	cwadmin	k3dEtE820sFqw3
Cherry Web Admin User	sponsor	k3dEtE820sFqw3
Cherry Web Normal User	cbuser	k3dEtE820sFqw3

(S) NOTE: the sponsor maintains CB servers, and may change the Linux root account password. As such, the sponsor tracks the root password. Contact the appropriate sponsor personnel for changed root passwords.

5.4 (U) CB Server “root” Console/Terminal Access

(S) “root” console/terminal access to CB Servers is gained through the Icon (formerly Genesis) system. This section assumes the user has successfully logged on to an Icon terminal and, using the Cisco VPN Client software, connected to the “TDN-VPN-ASA01” profile.

(U) Once logged on and connected to the proper profile, start the PuTTY program. On the PuTTY GUI, enter the IP address of the CB Server of interest (IP addresses are found in the Network Diagram of section 5.1). When prompted for credentials, use:

user = root

password = the “CB Server Linux root account” password from section 5.3.

5.5 (U) CB Server “cbuser” Console/Terminal Access

(U) Some actions performed on a CB Server do not require root access. In general, if an action does not require root access, that action should be done as user “cbuser”.

(U) To gain “cbuser” console/terminal access to a CB Server, follow the instructions for opening a “root” console/terminal of section 5.4, using the following for credentials:

user = cbuser

password = the “CB Server Linux cbuser account” password from section 5.3.

5.6 (U) MTU Size Issue

(S) During the testing of the “CT2010” system, an issue relating to the interface Maximum Transmission Unit (MTU) size was discovered and corrected. The installer now sets (and persists) the interfaces for the CB-CC Servers and CB-VPN Servers at 1200 bytes. A CB-VPN tunnel creation script (run each time a new VPN tunnel is created) was also modified to set the tunnel MTU at 1140 bytes.

6 (U) CB Server Installation, Verification, and Configuration

(U) This section details how to install/upgrade, verify, and configure CB Server software.

6.1 (U) Installation

(U) This section discusses installation/configuration of CB Servers and installation/upgrade of CB Server software. To install or upgrade the Cherry Tree/VPN software on a CB server:

1. Open a “root” console to the CB Server (see 5.4)
2. From the root console, mount the CB Server (CherryTree/VPN) Software DVD iso in the “tmp” directory (mount <iso_file> /tmp).
3. Follow the instructions in the /tmp/README_INSTALL file (it may be helpful to print this document).
4. Verify the installation by following the steps in section 6.2.
5. Perform any appropriate server configuration as described in section 6.3.
6. Perform the test procedures of section 6.4.

6.2 (U) Verification

(U) To verify that the installation/upgrade is successful:

1. From the Icon terminal, open a browser and navigate to:
https://<CB CC Service IP>/CherryWeb
(see section 5.2 for the <CB CC Service IP>)
2. Enter the “Cherry Web Normal User” User and Password from section 5.3.
3. Verify that the CherryWeb Overview page displays properly.
4. From a “root” console/terminal to the Slave server (see section 5.3), run:

```
/usr/local/bin/check_cherrytree.sh
```

5. This script causes the Slave server to emulate a Flytrap beacon. In this case, the Flytrap will display on Cherry Web View -> Flytraps as “77:77:77:77:77:77”. Verify that the beacon was received at the proper time (On Cherry Web left menu pane, click View -> Flytraps, then click on the 77:77:77:77:77:77 Flytrap link, then scroll down to the Status table – each entry in this table is a Beacon and includes the time the Beacon was received).
6. See section 6.4 for comprehensive test procedures performed at each server installation/upgrade event.

(U) If the verification does not pass, refer to section 8 for troubleshooting, or contact relevant staff from section 3.

6.3 (U) Configuration

(U) This section discusses configuration of CB Servers after an installation/upgrade event.

6.3.1 (U) Configuring Catapult

(U) This configuration step is generally only necessary in the case of a new installation (i.e., not an upgrade). The forwarding of Alert information to Catapult can be configured through the Cherry Web interface. A test email can be sent to Catapult through Cherry Web as well. See Section “Configuring Forwarding of Alerts to Sponsor Alert System (Catapult)” (or similar) in the “Cherry Blossom User’s Manual”.

6.3.2 (S) Configuring the Windex Connection

(S) This configuration step is generally only necessary in the case of a new installation (i.e., not an upgrade). The connection to the Windex system is configured using Cherry Web, and requires the following:

- A certificate generated/provided by the Windex team
- A URL to the Windex server provided by the Windex team

(S) From an Icon (formerly Genesis) terminal, copy the certificate (use WinSCP or similar) onto the (Master) CB-CC Server. On CherryWeb, navigate to the Administer -> Windex Connection page. Enter the Windex Connection URL. Import the certificate. Test the connection using the Test button – success will be indicated by a “Success” message displaying the Windex server time.

6.3.3 (U) Configuring the Default Mission

(U) This configuration step is generally only necessary in the case of a new installation (i.e., not an upgrade). After a successful installation, it may be desirable to create a new Mission and set it as the default Mission. See section “Setting the Default Mission” in the “Cherry Blossom User’s Manual”. Consult appropriate sponsor personnel (see section 3 for COTR information) before creating a new default Mission.

6.3.4 (U) Point of Presence (PoP/Snowball) Configuration

(S) This configuration step is generally only necessary in the case of a new installation (i.e., not an upgrade) or if a new PoP is to be used by the system. CB communications from the outside world (i.e., from Flytraps) are forwarded to the CB Servers through Points of Presence (PoPs/Snowballs). PoPs are configured and maintained by the sponsor’s network group (see section 3 for network group contact). A CB Server must be configured properly for the PoPs that it will be using. On a CB Server, PoP configurations are stored in:

```
/etc/cb-PoP-X.conf
```

where X is an integer number.

(U) To configure a PoP, first disable the server:

```
~/cbuser/bin/disable-server.sh
```

Next, edit the self-documenting “/etc/cb-PoP-X.conf” file appropriately. Finally, enable the server:

```
~/cbuser/bin/enable-server.sh
```

6.4 (U) Server Installation/Upgrade Test Procedures

(U) After all CB servers have been installed/upgraded, CB staff in concert with sponsor IV&V staff perform a test of backend system components and interfaces to other sponsor systems (e.g., SNMP monitoring, Catapult). The relevant documents are:

1. CherryBomb_CherryBlossom_CherryTreeUpgrade_TestProcedures_CDRL-14b.doc
2. CherryBomb_CherryBlossom_CherryTreeUpgrade_VAndVReport_CDRL-15b.xls

(U) The first document details the test procedures. The second document records the results of the test procedures.

7 (U) CB Server Monitoring with SNMP

(U) The sponsor maintains an SNMP Monitoring system to monitor the health and status of servers. The CB Server supports this health and status monitoring via SNMP. Each CB server runs an appropriately configured snmpd daemon (configuration file is /etc/snmp/snmpd.conf). An SNMP agent (e.g., the net-snmp package) running on a remote but properly networked/firewalled host can query the server for relevant health monitoring information. It is expected that the sponsor will maintain a server with an snmp agent (a.k.a. the SNMP Monitoring Server) that periodically polls the CB server for health monitoring information. It is also expected that the sponsor will properly network the SNMP Monitoring Server to give appropriate SNMP access (port 161) through the relevant firewall(s). What follows is a list of useful commands that can be issued from the SNMP Monitoring Server to check on the health of the CB Server.

(U) Note the CB system has two servers, a Master and a Slave (a hot spare) – SNMP health monitoring can and should be performed on both servers.

7.1 (U) Verbose Dump of All SNMP Health Monitoring Information

(U) A verbose dump of all relevant health monitoring information can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .1.3.6.1.4.1.2021
```

7.2 (U) Available Memory in Kilobytes

(U) The available memory (in kilobytes) of the CB Server can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .
1.3.6.1.4.1.2021.4.memAvailReal
```

(U) The suggested “WARN” and “CRITICAL” levels are:

WARN if < 500000 (i.e., 500 Megabytes)

CRITICAL if < 100000 (i.e., 100 Megabytes)

(U) The rationale for these values is as follows: 500 Megabytes is roughly 1/8th of the available 4 Gigabytes of memory. 100 Megabytes is roughly 1/40th of the available memory. 100 Megabytes is still more than adequate to run diagnostic utilities while still allowing the system to function normally, both with Cherry Web Users performing typical functions, and with Flytraps beaconing regularly.

(U) This value is the same “MemFree” value reported in the /proc/meminfo file.

7.3 (U) CPU Usage

(U) The percentage of CPU usage devoted to user mode processes averaged over 1 minute can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.11.ssCpuUser
```

(U) The suggested “WARN” and “CRITICAL” levels are:

WARN if ≥ 80 (i.e., 80%)

CRITICAL if ≥ 90 (i.e., 90 %)

(U) The rationale for these values is as follows: 90% CPU usage is still more than adequate to run diagnostic utilities while still allowing the system to function normally, both with Cherry Web Users performing typical functions, and with Flytraps beaconing regularly.

(U) This value is the same “Cpu x.x%us” value reported by the “top” program.

7.4 (U) Hard Disk Usage

(U) The percentage of hard disk usage can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.9.1.dskPercent.1
```

(U) The suggested “WARN” and “CRITICAL” levels are:

WARN if ≥ 80 (i.e., 80%)

CRITICAL if ≥ 90 (i.e., 90 %)

(U) The rationale for these values is as follows: at 90% hard disk usage (i.e., 30 Gigabytes of total 300 Gigabytes), the system could still handle 1000 Flytraps harvesting 4 kilobytes/hour for over 300 days, and is still more than adequate to run diagnostic utilities while still allowing the system to function normally, both with Cherry Web Users performing typical functions, and with Flytraps beaconing regularly.

(U) This value is the same value reported by the “df” program.

7.5 (U) Master/Slave Roles

(U) The proper Master/Slave Role for both CB servers can be checked by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.50.100.1
```

(U) The command returns 0 if OK, or non-zero if there is a problem.

(U) A more descriptive Master/Slave Role string can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.50.101.1
```

7.6 (U) Check CherryTree Process

(U) The health of the CherryTree (i.e., the main CB server process) can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -r 0 -t 5 -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.51.100.1
```

(U) The command returns 0 if OK, 1 if WARN, or 2 if CRITICAL.

(U) A more descriptive CherryTree health string can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -r 0 -t 5 -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.51.101.1
```

(U) Note that if the “IP_address_of_CB_Server” is the IP address of the Slave server, then the health of the CherryTree process will be checked remotely from the Slave (i.e., only the Master runs an instance of the CherryTree process).

7.7 (U) Check mysql and Database Replication

(U) The health of the mysql process and database replication status (mysql database is replicated from master to slave server using the mysql replication functionality, and Copy Data is replicated from master to slave server using rsync) can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.52.100.1
```

(U) The command returns 0 if OK, 1 if WARN, or 2 if CRITICAL.

(U) A more descriptive mysql health/database replication string can be retrieved by issuing the following command from the SNMP Monitoring Server:

```
snmpwalk -v 1 IP_address_of_CB_Server -c public .  
1.3.6.1.4.1.2021.52.101.1
```

8 (U) CB Server Troubleshooting

(U) This section describes some basic troubleshooting related to the CB servers.

(U) Please contact appropriate CB staff before making permanent (i.e., persistent through a reboot) changes to any CB server. Note that appropriate Points of Contact are listed in section 3.

8.1 (U) CB Server Log Files

(U) The CherryTree and CherryWeb server applications write diagnostic log information to log files.

(U) CherryTree writes log files in the /var/log/cherrytree/ directory. CherryTree.log is the main informational log. CherryTree_error.log is the error log. Authentication.log logs CherryTree authentication failures.

(U) CherryWeb, writes log files in the /var/log/cherryweb/ directory. CherryWeb.log is the main informational log.

8.2 (U) Troubleshooting CB Server (Backend) Issues

(U) The health and status of the CB servers are monitored by the sponsor-maintained SNMP Monitoring system (see section 7 for more details). The first step to troubleshooting the CB servers is to check CB server status using the SNMP Monitoring system (seek assistance from the appropriate sponsor staff if necessary). The most critical server to the CB system is the CB Master server (also referred to as the CB-CC Master in the network diagram of section 7). This is the CB server that currently holds the “CB CC Service IP” (see section 5.2). This is the CB server that runs the Cherry Tree and Cherry Web services, accepts beacons and other communications from Flytraps, and manages the CB database. If the SNMP Monitoring system is reporting that the CB Master server is down, then the first troubleshooting step is to determine whether the issue is related to either:

1. The CB server, or
2. The network infrastructure, including firewalls, switches, routers, and gateways.

(S) For most or all of the troubleshooting steps, you will need an Icon (formerly Genesis) terminal and a “root” console terminal to the CB Server (see 5.4). The network diagram of section 7 is also extremely helpful for troubleshooting.

8.2.1 (U) Network Connectivity/Ping Diagnostic

(U) From “root” console (see 5.4), attempt to ping the CB Master Server (i.e., ping the CB Service IP of 5.2). If you can ping the Master server, then at least the Master server’s ethernet interface is up, and the server’s OS is functional – go to section 8.2.2. If you cannot ping the Master server’s CB Service IP, then ping the Master server’s “Persistent” IP address (see the network diagram of 5.1). If you cannot ping the Master server’s Persistent IP, then the most likely problems are:

- Master Server's ethernet interface is down (or more severe server issue)
- Network Infrastructure is misconfigured/down

(U) Try pinging the Slave server's "Persistent" IP address (see the network diagram of 5.1). If you cannot ping the Slave server IP, then it is more likely that the issue is related to the network infrastructure (i.e., it is less likely that both Master and Slave server have failed closely together in time) – contact an appropriate sponsor network engineer for assistance. If you can ping the Slave, it is more likely that the issue is related to the CB Master server – continue to section 8.2.2.

8.2.2 (U) Master Server Service Diagnostic

(U) Assuming you can ping the Master server, the next step is to determine if the CB services are functioning properly. Open a "root" console (see 5.4) to the CB Master server. If you cannot establish a "root" console to the CB Master server, then establish a DRAC connection (a sponsor network engineer must be consulted for this step). Select "console" from the DRAC menu, and from this DRAC console, verify that sshd is running (ps -efal | grep sshd). If sshd is running, then the issue is likely either a Master server iptables/firewall issue, or a network infrastructure issue. IMPORTANT: CB servers use a special iptables configuration process – do NOT manually restart iptables – contact an appropriate CB staff member. At this point, the best course of action is to soft reboot (i.e., not a power-cycle / hard reset as described in section 8.4) the Master server through the DRAC. When the server reboots, it should have the same iptables settings that would have been comprehensively tested at the last server install/upgrade. If, once the server reboots, you still cannot open a "root" console to the Master server, then the problem is likely related to the network infrastructure – contact an appropriate sponsor network engineer for assistance. If the network checks out, then it is possible that the server has had a more severe (hardware) failure and must be taken off line – contact an appropriate CB staff member.

8.2.3 (U) Master Server Post-Reboot Diagnostic

Once the CB Master server has been rebooted, it should be back to a state that had been comprehensively tested during the previous server install/upgrade, so CB services should be running. Through the DRAC console, verify that the CB services "CherryTree" and "CherryWeb" are running. These processes will show as "java" processes – a "ps" should show you two java processes using "CherryTree.jar" in the classpath. If this is not the case, then there is a problem with the Master server boot/initialization/startup script – contact an appropriate CB staff member. If you do see these processes, then reattempt whatever initial action was causing problems. If you're still having problems, at this point it is best to contact a sponsor network engineer.

8.2.4 (U) Managed Switch Connecting CB Master & Slave Server

(U) Previously, a problem arose with the Managed Switch to which both the CB Master and Slave are connected. The problem can be detected as follows. Open a "root" console (see section 5.4) to the CB Slave server. From this console, ping the Master server and ssh into the Master server (using PuTTY). If the ping is successful and the ssh is unsuccessful, then there is likely a problem with the managed switch connecting the CB

Master and Slave server. As of writing, a solution to this problem has not been definitively documented, but is likely a managed switch firewall issue – contact a sponsor network engineer. Note that this problem will likely result in a Flytrap not being able to beacon through a PoP to the CB Master server (because PoPs have one network interface connected to the same managed switch).

8.3 (U) Troubleshooting CB Flytrap Beacon Issues

(S) Operational Flytraps Beacon through one of the PoPs assigned to the CB system (see section network diagram of 5.1). This section describes how to troubleshoot problems related to Flytraps beaconing through PoPs to the CB Master server. Problems typically resolve to one of four cases:

1. The Flytrap is configured with an errant PoP IP address or URL. Double check the IP address/URL of the PoP to which the Flytrap has been configured to beacon – e.g., connect a (true) hub to the WAN of the Flytrap, and connect a network sniffing client to the hub. Analyze the sniffed traffic for the beacon and verify the IP is correct.
2. The CB Master server and related sponsor network infrastructure is down/misconfigured – see sections 8.2.4 and 8.1.
3. The PoP or sponsor network is misconfigured and is not properly forwarding beacon traffic to the CB Master server. Consult with a sponsor network engineer.
4. The Beacon is being rejected/alterred by a firewall/IDS/proxy/etc somewhere in the network path, and as such, doesn't authenticate properly at the CB Master server, or doesn't decrypt properly at the Flytrap. This is a complex problem. As of svn revision 6200, Flytrap software successfully beacons through squid proxy servers that have been configured in a fairly default/standard manner. Cherry Web will log the situation where a Flytrap can Beacon to the CB Master server, but does not fully receive its tasking (Mission) as a response to the beacon (i.e., the socket closes before the Mission is fully received). To show this, go to the Cherry Web View -> Flytraps page, and click on the link for the Flytrap of interest. Then click on the "Diagnostics" View link. If there is a relevant error message, then the Flytrap can Beacon, but the CB Master server cannot fully send the Mission – e.g., some process in the middle is mucking with the network traffic in a way that the Flytrap does not like or understand; or, the process in the middle does not like something in the (encrypted) Mission data, and is simply closing the connection on both ends. At this point, gather as much tcpdump/ethereal/wireshark pcap data as possible at both the Flytrap (i.e., connect a (true) hub to the WAN of the Flytrap, and connect a network sniffing client to the hub) and on the CB Master server (run tcpdump) and send to the appropriate CB staff. It is likely software modifications will be needed to fix the problem.

8.4 (U) A Note on CB Server Rebooting

(U) It should never be a problem to “soft reboot” a CB server. Soft reboot means to reboot the machine following an approved OS shutdown mechanism. The CB servers use mysql databases which could be corrupted by a hard reset/power-cycle. The CB servers have two preferred methods of soft reboot:

1. Open a “root” console (see section 5.4) to the CB Server and run “/sbin/reboot”

OR

2. Login to the CB Server’s DRAC (consult with sponsor network engineer) and select the “Reboot” server action (not the “Power-cycle” or “Hard-reset” action).

(U) If the server is truly hung (i.e., neither option above works), then as a last resort, use the DRAC to power-cycle the machine.

9 (U) CB Master Server Failover Procedures

(U) This section contains the instructions for CB Server Failover in the case of a CB Master Server failure. If you have followed the troubleshooting directions of Section 8, and are convinced that a CB Master Server has had a severe hardware failure and is in need of repair, then follow the instructions in this section to failover – i.e., to make the hot spare CB Slave server become the CB Master server. To bring the failed server back into service, follow the instructions in Section 9.2.

(U) IMPORTANT: The failover procedure requires that only one CB Master Server be in service (i.e., receiving Beacons, Alerts, Copy Data, etc.) at any given time. Do not flip-flop between two CB Master Servers -- i.e., once a CB Slave is promoted to Master, the previous Master MUST be enabled/activated by following Server Recovery Procedures in Section 9.2. Otherwise the system will diverge into two separate databases that are not easily merged.

9.1 (U) Server Failover Procedure

(U) Run all commands as root unless `cbuser` is specified.

1. Open a “root” console (see section 5.4) or DRAC console into both Master and Slave servers (see network diagram of section 5.1 for Master and Slave server Persistent IP addresses).
2. Have the Master relinquish its CB CC Service IP (see 5.2). If the Master is not responding, it must be powered down (see section 8.4) OR the network interface assigned as the Master’s CB CC Service IP must be shut down. The preferred option is to disable the service interfaces while the Master server is online, by running “`~cbuser/bin/disable-server.sh`”
3. Convert the Slave to the Master. On the Slave, run the following:

```
cd ~cbuser/bin && ./make-cb-master.sh
```

- o Note: the `make-cb-master.sh` script will generate an error message if it discovers that another host is using the virtual IP. In this scenario, the server is in the Disabled Master state and can be activated.

(U) If you encounter difficulties or errors in the process, contact an appropriate CB staff member (see section 3).

9.2 (U) Server Recovery Procedure

(U) If a CB Master server has failed, and has been repaired, follow these instructions to bring it back online.

(U) Run all commands as root unless cbuser is specified.

1. **BEFORE** connecting the Old Master back to the Thunderdome network, obtain a “root” console (see section 5.4) to the server and run the following:

```
~cbuser/bin/disable-server.sh
```

2. Connect the server to the Thunderdome network.
3. Any copydata, proxydata, or MissionFiles not transferred from the old master to the new master should be synchronized. As 'cbuser' on the Old Master, run:

```
~cbuser/bin/sync-<New Master IP>.sh
```

Note: this script should run automatically once the Old Master has been up for 5 minutes.

4. Make the Old Master server a Slave. From a “root” console (see section 5.4), obtain a terminal (ssh or DRAC) to the Current Master, and run:

```
cd ~cbuser/bin && ./add-cb-slave.sh
```