



# (U) Hive Infrastructure Installation and Configuration Guide

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**Hive Infrastructure Configuration Guide**

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**(U) Table of Changes**

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**Hive Infrastructure Configuration Guide**

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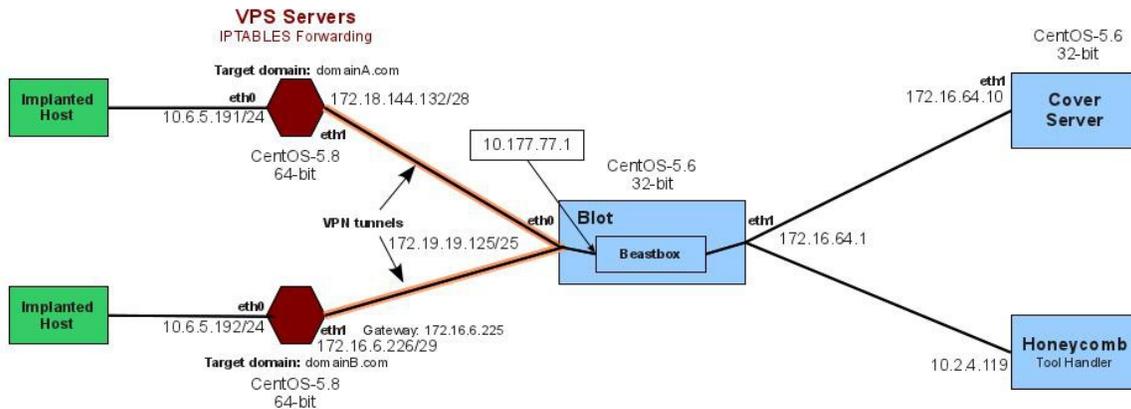
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## 1 (U) Overview

(S//NF) Pictured below is an example of the Hive operating environment.



(S//NF) Beacons from an implanted host enter a commercial VPS server that has been configured as a redirector for the given domain (domainA.com or domainB.com). Traffic for these domains is redirected into a VPN tunnel to a Blot proxy. Each VPS redirector modifies the destination port number to one that corresponds to the domain that it is servicing. So, for example, beacons and other web traffic entering the VPS redirector servicing domain A would have port 80 traffic changed to port 8001 before being sent on to the Blot proxy. The Blot proxy looks at the redirected traffic and, if it finds a valid beacon, forwards it to the tool handler (Honeycomb in this case); all other traffic is forwarded to the cover server. The cover server uses the destination port number to determine what web pages it will display, domain A or domain B.

(S//NF) Each section below covers the installation and configuration of the key components making up this infrastructure, starting with the cover server and working out to the VPS redirectors. All servers are assumed to be running a CentOS distribution of Linux.

## 2 (S//NF) Cover Server

### 2.1 (U//FOUO) Install and Configure Apache web server

- Install the Apache web server using:  

```
yum install httpd
```

- Go to the directory /etc/httpd/conf
- Edit /etc/httpd/conf/httpd.conf

Add the following line to the bottom of the file.

```
include /etc/httpd/vhosts.d/*.conf
```

- Create the directory /etc/httpd/vhosts.d
  - Create a file for each domain that is to be served using the name vhost<n>.conf using the format shown below in an example configuration for /etc/httpd/vhosts.d/vhost1.conf

```
#NameVirtualHost *:80

Listen 172.16.64.10:8001
<VirtualHost 172.16.64.10:8001>
    DocumentRoot /var/www/html/vhosts/vhost1/docroot
    ServerName vhost1.edb.devlan.net
    ServerAlias 10.6.5.191
    ErrorLog /var/log/www/vhosts/vhost1/error.log
    TransferLog /var/log/www/vhosts/vhost1/access.log
    <Directory /var/www/html/vhosts/vhost1/docroot>
        Options Indexes FollowSymLinks Multiviews
        AllowOverride None
        Order allow,deny
        allow from all
    </Directory>
</VirtualHost>
```

Virtual host address – the real (internal address) used for internal routing

ServerAlias – is the address that is seen in the **public address space**

- /etc/httpd/vhosts.d/vhost2.conf
- 

### 2.2 (U) Secure Apache Web Server

(U) [The configuration files need to be scrutinized carefully to assure that the server has adequate security.]

### **3 (S//NF) Honeycomb Tool Handler**

(S//NF) Refer to documentation on the Honeycomb Tool Handler for this task.

## 4 (S//NF) Blot Proxy

(S//NF) Three components must be configured: 1) Network interfaces, 2) the Beastbox proxy, and 3) the VPN connections.

### 4.1 (U) Network Interfaces

(S//NF) Two network interfaces are required: one for the back-end and one for the front-side that faces the public Internet.

### 4.2 (S//NF) Blot Proxy

Beastbox is the proxy router used in the Blot system. Beastbox receives packets from the outside network and presents them to an Implant Traffic Detector (ITD) that is associated with the corresponding transport protocol. The transport protocol and the name of the corresponding ITD are as follows:

Transport Protocol	Blot Tool Handler Protocol (bthp)	ITD
HTTPS	1	Swindle
HTTP	12	Vortex
DNS	3	Brawl

#### 4.2.1 (U) Software Installation

(S//NF) Install Blot-4.3 sinnertwin-blot-beastbox-1.3-1.

### 4.2.2 (U) Configuration

(S//NF) Configuring Blot requires the configuration of Beastbox and the associated ITDs. At the time of this writing, Hive uses only the HTTPS transport. Consequently two files need to be modified: /etc/blot/beastbox.cfg and /etc/blot/itds/swindle/swindle.cfg. Use the following sample configuration to configure the Beastbox.

```
<beastbox>
  <version>4.3</version>
  <server-pending-timer>5000</server-pending-timer>
  <th-pending-timer>120000</th-pending-timer>
  <external-ip>10.177.77.1</external-ip>

  <th name="honeycomb">
    <ip>10.2.4.119</ip>
    <port>4098</port>
  </th>
```

```

<server name="vhost1-https" in_port="44301">
  <ip>172.16.64.11</ip>
  <port>443</port>
  <protocol>tcp</protocol>
</server>

<server name="vhost1-https" in_port="44302">
  <ip>172.16.64.11</ip>
  <port>443</port>
  <protocol>tcp</protocol>
</server>

<server name="vhost1" in_port="8001">
  <ip>172.16.64.11</ip>
  <port>8001</port>
  <protocol>tcp</protocol>
</server>

<server name="vhost2" in_port="8002">
  <ip>172.16.64.10</ip>
  <port>8002</port>
  <protocol>tcp</protocol>
</server>

<server name="Bind" in_port="5301">
  <ip>172.16.64.10</ip>
  <port>5301</port>
  <protocol>udp</protocol>
</server>

<itd path="/etc/blot/itds/swindle/swindle_itd.so" name="Swindle ITD"
config="/etc/blot/itds/swindle/swindle.cfg" enabled="true">
  <tid num="0x65ae82c7" th="honeycomb" />
  <bthp>1</bthp>
</itd>

<itd path="/etc/blot/itds/brawl/brawl_itd.so" name="Brawl ITD"
config="/etc/blot/itds/brawl/brawl.cfg" enabled="false">
  <bthp>3</bthp>
</itd>

<itd path="/etc/blot/itds/vortex/VortexITD.so" name="Vortex ITD"
config="/etc/blot/itds/vortex/vortex.cfg" enabled="false">
  <bthp>12</bthp>
</itd>

<log>
  <path>/var/log/blot</path>
  <encryption>
    <session-algorithm>NONE</session-algorithm>
    <entry-algorithm>NONE</entry-algorithm>
  </encryption>
</log>

<key>xV8JjUEooa0H9RxdSki8CcYcIywFbU3C3BHyx0rncwaVs8H8/hnSjIwseIoF+eHJUfZJ9Wrqieebi9Br/
pIpNAXq39MrreH1RJ4onxn+2d1V0tF8TZrWhhUg8A0jEEucCi4zqEqoLLX0uKPjAYQFcimsJsYfHd2klt4R3i
pdQJ70Kv72j7WILT2fcynwEqbBGT5iqhwhSAOq+BIKqQRMNuN9D1Es8eQmPBjh0qzjMPSDH9xRks3EDszNVbn9
h40mYPiWj9gtRbnbJE8ED85Gb5uFwkVbD6Lh6hdgJam+r8F3lLqsQBBbcilQdnDwfQkCyN0ml1RTBv+45uoKrn
4kQ==</key>
</encryption>
</log>

</beastbox>

```

- **External IP:** There can be only one external IP address on which the proxy will listen.
- **Tool handler name (th):** There must be a tool handler configured for each ITD defined below and the tool-handler names must match.
- **Server names** – must be unique
- **ITD number:** The ITD number used in the itd declaration must match the code that is baked-into the implant.

The following shows the ITD configuration file for Swindle (HTTPS). Here the port numbers must reflect the ports that the ITD will listen to for an implant beacon. The Vortex (HTTP) and Brawl (DNS) ITD configurations will be similar.

```
<itd version="1.2">
  <ports>
    <port protocol="tcp">44301</port>
    <port protocol="tcp">44302</port>
  </ports>
  <certFilePath>/etc/blot/itds/swindle/swindle.crt</certFilePath>
</itd>
```

(S//NF) **NOTE:** Beastbox is very sensitive to the configuration file. A syntax error, the use of the wrong version number and other such anomalies will cause the Beastbox proxy to die silently without any output to the console or log file. Here are key items to note.

### 4.3 (S//NF) OpenVPN

(S//NF) OpenVPN is used to tunnel the connections between the VPS redirectors and the Blot proxy.

#### 4.3.1 (U) Software Installation

(S//NF) The following software packages are required:

- openvpn version 2.2.2 or later

(S//NF) To install these, install epel-release-5-4.noarch.rpm. If this is not available in the Yum repository, get it by using:

```
wget http://download.fedoraproject.org/pub/epel/5/i386/epel-release-5-4.noarch.rpm
```

and then install it using:

```
rpm -ivh epel-release-5-4.noarch.rpm
```

(S//NF) Then install OpenVPN using:

```
yum install openvpn
```

(S//NF) This should install the *lzo* compression software as a dependency.

(S//NF) Setup OpenVPN so that it will start after booting by using chkconfig.

```
chkconfig --add openvpn
```

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```
chkconfig --levels 2345 openvpn on
```

(S//NF) Then verify that it will be on in runlevels 2, 3, 4, and 5.

```
chkconfig --list openvpn
```

**4.3.2 (S//NF) Key Generation**

(S//NF) Generate the master Certificate Authority (CA) certificate and key on a secure host apart from the Blot and VPS proxies. This is done using the source code directory tree. After installing the source code, go to the *easy-rsa/2.0* directory and edit the *vars* file. This file contains a number of variables that will need to be changed before generating the CA certificates and keys. After editing this file, execute the following commands:

```
$ . ./vars
$ ./clean-all
$ ./build-ca
$ ./build-key-server server
$ ./build-key client1
$ ./build-key client2
.
.
$ ./build-dh
```

(S//NF) The following files are generated:

Filename	Needed By	Purpose	Secret?
ca.crt	Blot + all VPS clients	Root CA certificate	No
ca.key	Key signing host only	Root CA key	Yes
dh{n}.pem	Blot only	Diffie Hellman parameters	No
Server.crt	Blot only	Server Certificate	No
Server.key	Blot only	Server Key	Yes
Client1.crt	VPS1 only	Client1 Certificate	No
Client1.key	VPS1 only	Client 1 Key	Yes
.	.	.	.
Clientn.crt	VPSn only	Clientn Certificate	No
Clientn.key	VPSn only	Clientn Key	Yes

(S//NF) Distribute the keys to the */etc/openvpn* directory on the appropriate hosts.

**4.3.3 (S//NF) Blot-Side Configuration**

(S//NF) Edit the *server.conf* file in */etc/openvpn*. Keep the defaults, but check the following parameters and make changes if necessary.

```
port 1194
proto tcp
/dev/tun
```

```
dh /etc/openvpn/dh2048.pem (for 2048-bit keys)
server <IP address> <bitmask>
keep-alive 10 120
comp-lzo
log-append /var/log/openvpn.log
```

(S//NF) The server's IP address should be a non-routable address such as 10.177.77.1. When configuration is complete, start openvpn.

```
service openvpn start
```

## 5 (S//NF) VPS Redirector

### 5.1 (S//NF) IPv6 Security

(S//NF) If IPv6 is functional (verified by noting the presence of inet6 addresses on the network interface configurations after using *ifconfig*), then add the following IPv6 firewall rules using *iptables*:

```
iptables -F INPUT
iptables -F OUTPUT
iptables -F FORWARDING
iptables -P INPUT DROP
iptables -P OUTPUT DROP
iptables -P FORWARD DROP
```

(S//NF) Use *iptables-save* to save these into */etc/sysconfig/iptables* and then review the settings in the *iptables-config* file.

### 5.2 (S//NF) Install and Configure Redirection Script

(S//NF) Copy the *redirection* script to */etc/init.d/redirection*.

(S//NF) Copy the redirection configuration file, *redirect.conf* to the */etc/openvpn* directory and edit it to conform to the desired configuration. It looks similar to this:

```
outside_interface=eth0
inside_interface=eth1
tunnel_interface=tun0

VPN_PORT=1194           # VPN tunnel port
ADMIN_PORT=3600        # SSH port used by administrator

PUBLIC_IP=10.6.5.191   # Public-facing IP
PRIVATE_IP=10.177.77.1 # IP of next hop

VDNS_PORT=5301         # Virtual DNS port
VHTTP_PORT=8001        # Virtual HTTP port
VHTTPS_PORT=44301      # Virtual HTTPS port
```

(S//NF) Use *chkconfig* to set redirection to start and stop on system startup and shutdown.

```
chkconfig --add redirection
```

(S//NF) Set the system configuration to perform IP forwarding by editing */etc/sysctl.conf* as follows.

```
net.ipv4.ip_forward = 1
```

(S//NF) To start redirection after first installing the script use:

```
service redirection start
```

(S//NF) To stop redirection, but maintain the tunnel and administrative access through *ssh*, use:

```
service redirection stop
```

(S//NF) To view the iptables rules currently in effect use:

```
service redirection status
```

### 5.3 (S//NF) OpenVPN Configuration

(S//NF) Edit the client.conf file in /etc/openvpn. Keep the defaults, but check the following parameters and make changes if necessary.

```
/dev/tun
proto tcp
remote <IP address> <port>
user nobody
group nobody
comp-lzo
cipher BF-CBC
log-append /var/log/openvpn.log
```

(S//NF) Use the IP address of the server from section 4.3.3 above as the remote IP address.

### 5.4 (S//NF) Add Redirection and Logging (Optional)

(S//NF) To facilitate monitoring and troubleshooting of redirection, the log entries can be sent to a separate log file by modifying /etc/rsyslog.conf. Add the following line

```
kern.warn      /var/log/iptables
```

(S//NF) To control the size and number of these log files, add a logrotate configuration for iptables under /etc/logrotate.d with the following contents:

```
/var/log/iptables {
    missingok
    notifempty
    size 5M
    compress
    rotate 5
    create 0600 root root
}
```

### 5.5 (U) Configure Routing

(S//NF) Add a line to /etc/rc.local that will create a route for OpenVPN to connect with the Blot proxy.

```
ip route add <Blot Proxy Address> via <gateway on interface facing Blot proxy>
```

**example:**

```
ip route add 172.16.63.101 via 172.16.60.1
```

## 6 (U) Test and Troubleshooting

(S//NF) After completing the previous sections, redirection should be established through the Blot proxy to the cover server and tool handler. Attempting to access the public IP website with a web browser should produce a valid web page from the cover server. Verifying this implies that any HTTP-based beacon should reach the tool handler, barring any misconfiguration of the Blot proxy.

### 6.1 Unresponsive Cover Server

(S//NF) If a cover web page does not appear in this testing, here are some things to check.

- (S//NF) Use `ifconfig` on the VPS redirector and the Blot proxy to verify that a tunnel interface (e.g. `tun0`) is present. If not, then `openvpn` is not operational. Recheck the configuration and restart `openvpn` using the command: `service openvpn restart`. Look for problems in the `openvpn` log file `/var/log/openvpn.log`.
- (S//NF) On the VPS redirector, verify that the `iptables` redirection script was executed by issuing the command:

```
service redirection status
or
watch service redirection status
```

(S//NF) This will display the current firewall rules. By reissuing this command and comparing the packet/byte counts displayed (or using the `watch` command to see it updated continually), it is possible to get an idea of the packet flows when a web page is requested. The `PREROUTING` chain in the `nat` table should increase for each web page requested, along with the related rules in the `FORWARD` chain of the `filter` table.

- (S//NF) If there seems to be problems in establishing the tunnel between the VPS redirector and the Blot proxy, verify the communications between them. Check the routing. While the default route will likely be to the public-facing gateway, there must also be a route to get to the Blot proxy.

### 6.2 Lost Beacons

(S//NF) If an implant beacon fails to arrive at the tool-handler, first follow the steps above in section 6.1 to verify that the path to the Blot proxy is functional. If it is, then the problem is most likely the Blot proxy configuration. Verify the parameters in `/etc/blot/beastbox.cfg` and the ITD configuration file(s) in `/etc/blot/itds`. The port number(s) in the `itd` file files must match those configured in the `beastbox.cfg` file.