

## Appendix A

### Developer Architectures and Application Screenshots

ISI X-Bone Software Architecture Diagram

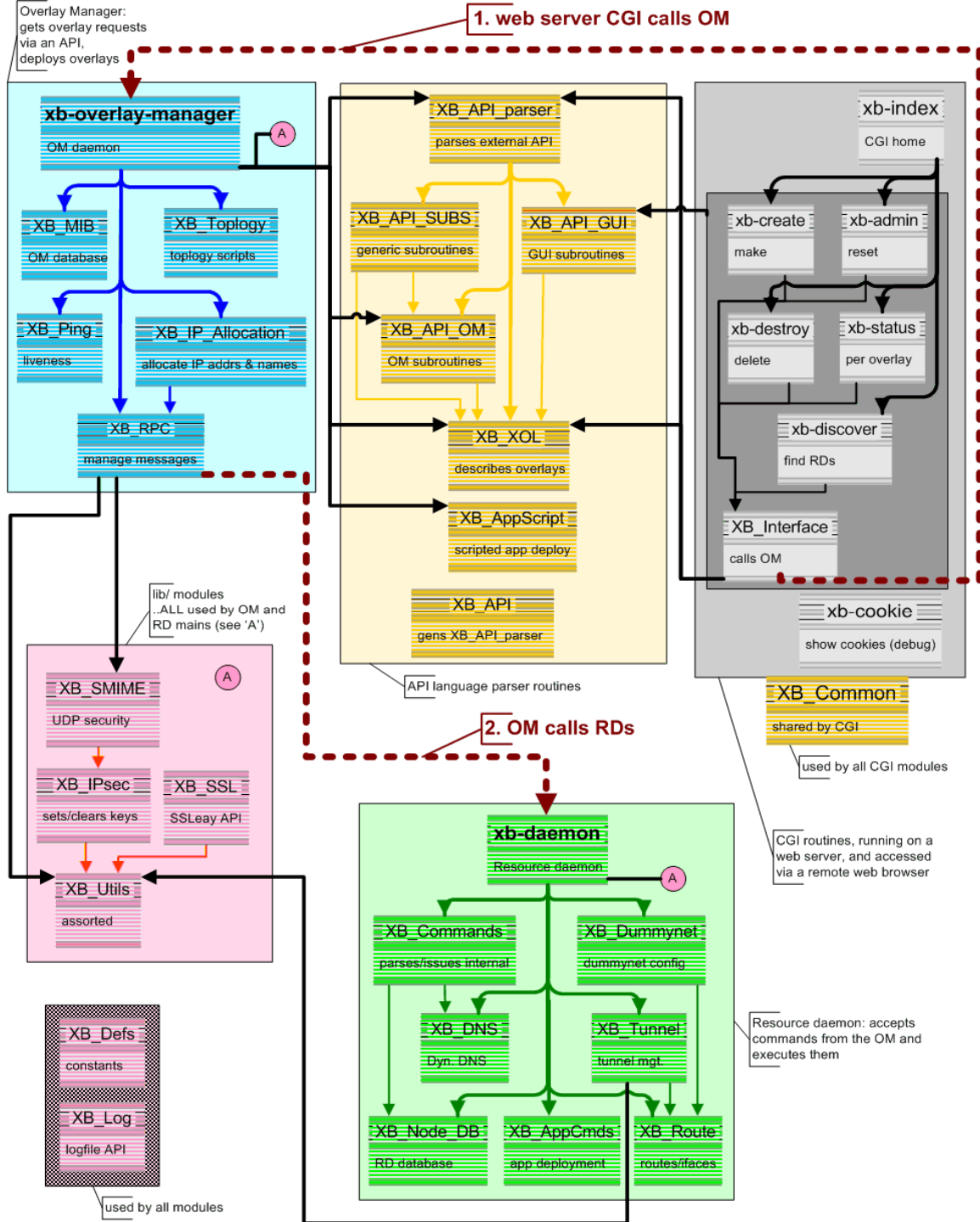


Figure 6

Appendix A con't

ISI X-Bone Communications Architecture

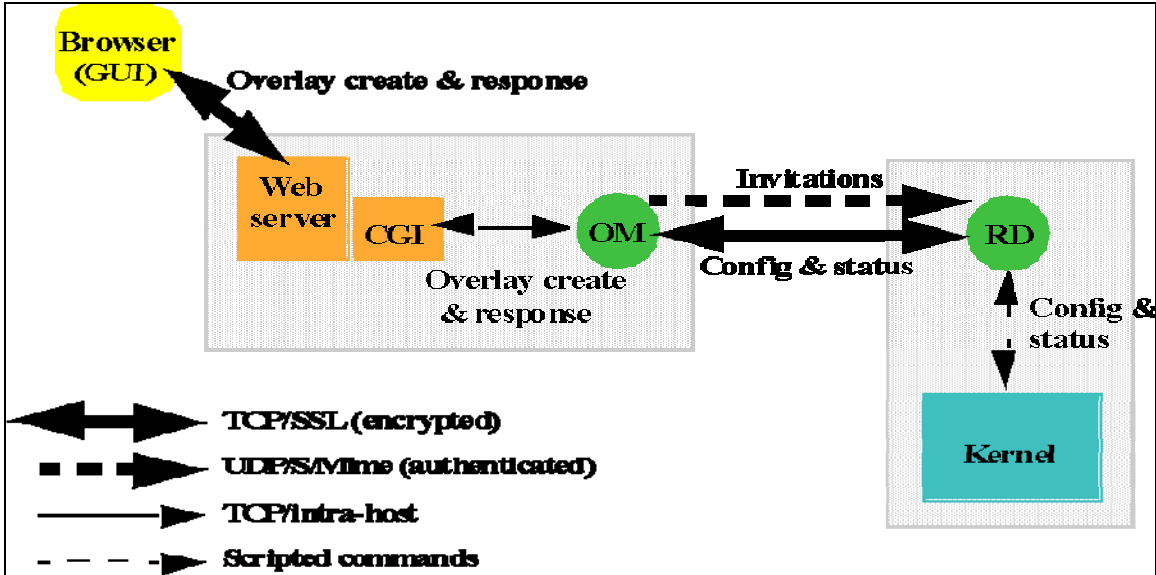


Figure 7

ISI X-Bone GUI Control Page

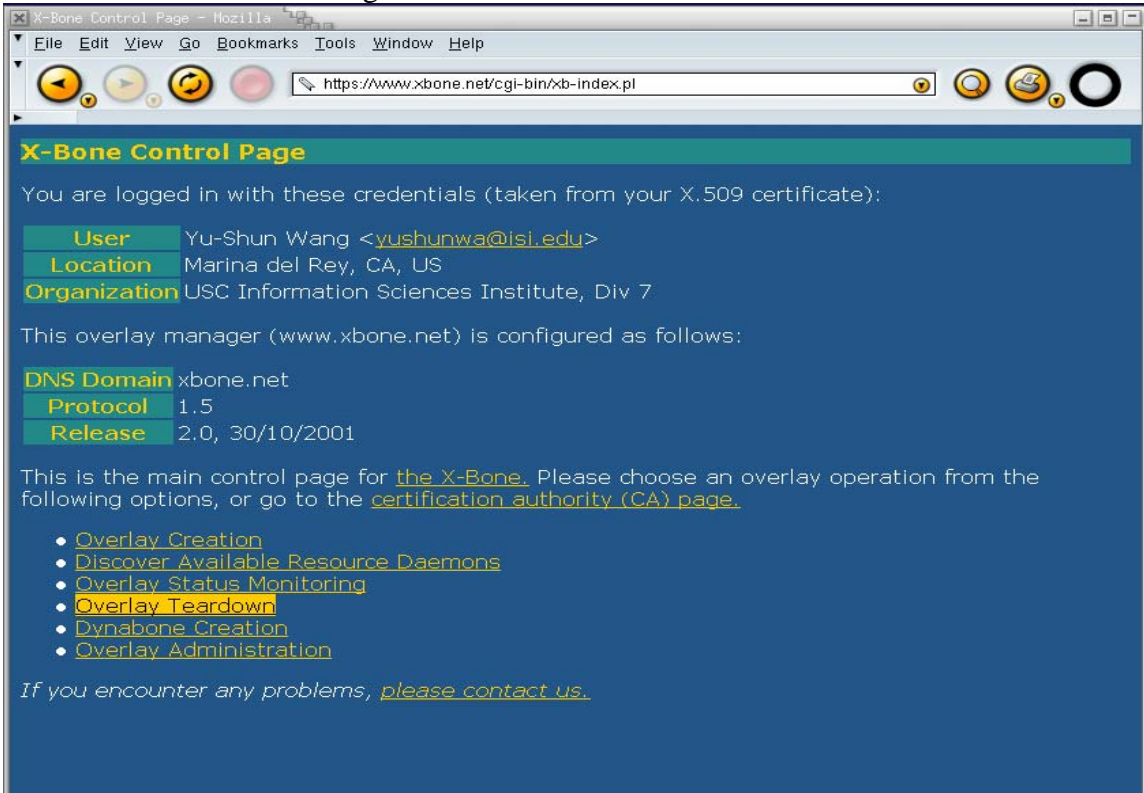


Figure 8

Appendix A con't

ISI X-Bone GUI Resource Discovery Page

The screenshot shows a Mozilla browser window displaying the X-Bone GUI Resource Discovery Page. The browser's address bar shows the URL `https://www.xbone.net/cgi-bin/xb-discover.pl`. The page content includes a header, a login status message, user credentials, and two tables of resource information.

**X-Bone Available Resource Daemons**

You are logged in with these credentials (taken from your X.509 certificate):

- User:** Yu-Shun Wang <yushunwa@isi.edu>
- Location:** Marina del Rey, CA, US
- Organization:** USC Information Sciences Institute, Div 7

Host	Operating System	X-Bone Release	Dynamic Routing	IPsec Algorithms	Deployed Overlays	Tunnels In Use
<a href="#">mtv.isi.edu</a> 128.9.160.79	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	4 / 1000
<a href="#">tlc.isi.edu</a> 128.9.160.31	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	4 / 1000
<a href="#">tnn.isi.edu</a> 128.9.168.57	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	4 / 1000

Router	Operating System	X-Bone Release	Dynamic Routing	IPsec Algorithms	Deployed Overlays	Tunnels In Use
<a href="#">cnn.isi.edu</a> 128.9.160.76	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	10 / 1000
<a href="#">hbo.isi.edu</a> 128.9.160.75	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	10 / 1000
<a href="#">sci.isi.edu</a> 128.9.160.93	FreeBSD/KAME	2.0	no	none, md5, sha1 none, des, 3des	2 / 1000	8 / 1000

Back to the [main X-Bone page](#).

Figure 9

Appendix A con't

ISI X-Bone GUI Overlay Creation Page

**X-Bone Overlay Creation**

You are logged in with these credentials (taken from your X.509 certificate):

**User** Yu-Shun Wang <yushunwa@isi.edu>  
**Location** Marina del Rey, CA, US  
**Organization** USC Information Sciences Institute, Div 7


This page allows you to create a new overlay. Please fill out **all remaining red fields**.

**Overlay-Wide Properties**

**Name**  Name of the new overlay. Suffix ".xbone.net" will be added automatically. If "use DNS" is checked below, the overlay name will also become part of the DNS names of your overlay nodes.

**DNS**  use DNS If you check "use DNS", the overlay manager will assign DNS names in the OM's domain to the nodes of the new overlay. If unchecked, no DNS entries are created, and you will need to use IP addresses directly to reach overlay nodes.

**Search Radius**  Multicast search radius limiting the region in which the overlay manager will look for X-Bone hosts willing to participate in setting up the new overlay.

**Topology**  These topologies are available for new overlays:  
  
 Linear Ring Star

**Dynamic Routing**  use Dynamic Routing This option will determine whether to use Static Routing or Dynamic Routing within the overlay. **Only dynamic routing with RIP running Gated are supported.**

**Application Deployment**  Deploy Application Application Deployment Script [URL]:  **Application Deployment is still Experimental!** Automatically deploy and start an application after the overlay has been set up. You need to specify the **complete URL of the deployment script, eg. http://, file://, or (anonymous) ftp://.**

**Host Properties**

**Number of Hosts**  Number of hosts in the overlay. (Hosts are overlay nodes that do not route packets.)

**Host Operating System**  FreeBSD  Linux  Solaris  NetBSD Operating system requirements for the hosts. Only hosts of the checked operating systems will be picked for the new overlay.

**Router Properties**

**Number of Routers**  Number of routers in the overlay. (Routers are overlay nodes that route packets.)

**Router Operating System**  FreeBSD  Linux  Solaris  NetBSD Operating system requirements for the routers. Only routers of the checked operating systems will be picked for the new overlay.

**Link Properties**

**Authentication**  IPsec authentication algorithm used to authenticate all overlay traffic.

**Encryption**  IPsec encryption algorithm used to encrypt all overlay traffic.

**Dummynet (FreeBSD only)**  ms Per-link transmission delay in milliseconds.  
 KBps Per-link bandwidth limit.  
 Bytes Per-hop queue length limit.  
 % Per-hop loss probability.

Figure 10

Appendix A con't

ISI X-Bone GUI Overlay Status Page

**X-Bone Overlay Status**

You are logged in with these credentials (taken from your X.509 certificate):

- User:** Yu-Shun Wang <yushunwa@isi.edu>
- Location:** Marina del Rey, CA, US
- Organization:** USC Information Sciences Institute, Div 7

**Overlay Parameters**

**Name:** line-test.xbone.net

**Topology:** linear

**Overlay Properties:** Authentication: none, Encryption: 3des, Dynamic Routing: No, Dummynet: No

**Creator:** Yu-Shun Wang <yushunwa@isi.edu>

Role	Resource	Daemon	Local Tunnel End	Remote Tunnel End	Status
Router	<a href="#">cnn.isi.edu</a> 128.9.160.76 FreeBSD/KAME		172.26.1.2	172.26.1.1	up
			172.26.1.6	172.26.1.5	up
			172.26.1.13	172.26.1.14	up
Router	<a href="#">hbo.isi.edu</a> 128.9.160.75 FreeBSD/KAME		172.26.1.14	172.26.1.13	up
			172.26.1.17	172.26.1.18	up
Host	<a href="#">mtv.isi.edu</a> 128.9.160.79 FreeBSD/KAME		172.26.1.9	172.26.1.10	up
Router	<a href="#">sci.isi.edu</a> 128.9.160.93 FreeBSD/KAME		172.26.1.10	172.26.1.9	up
			172.26.1.18	172.26.1.17	up
Host	<a href="#">tlc.isi.edu</a> 128.9.160.31 FreeBSD/KAME		172.26.1.1	172.26.1.2	up
Host	<a href="#">tnn.isi.edu</a> 128.9.168.57 FreeBSD/KAME		172.26.1.5	172.26.1.6	up

Back to the [main X-Bone page](#).

Figure 11

## Appendix B

### IDART™ X-Bone Component Communications Sequence

Note: The optional DNS components are not shown in this sequence.

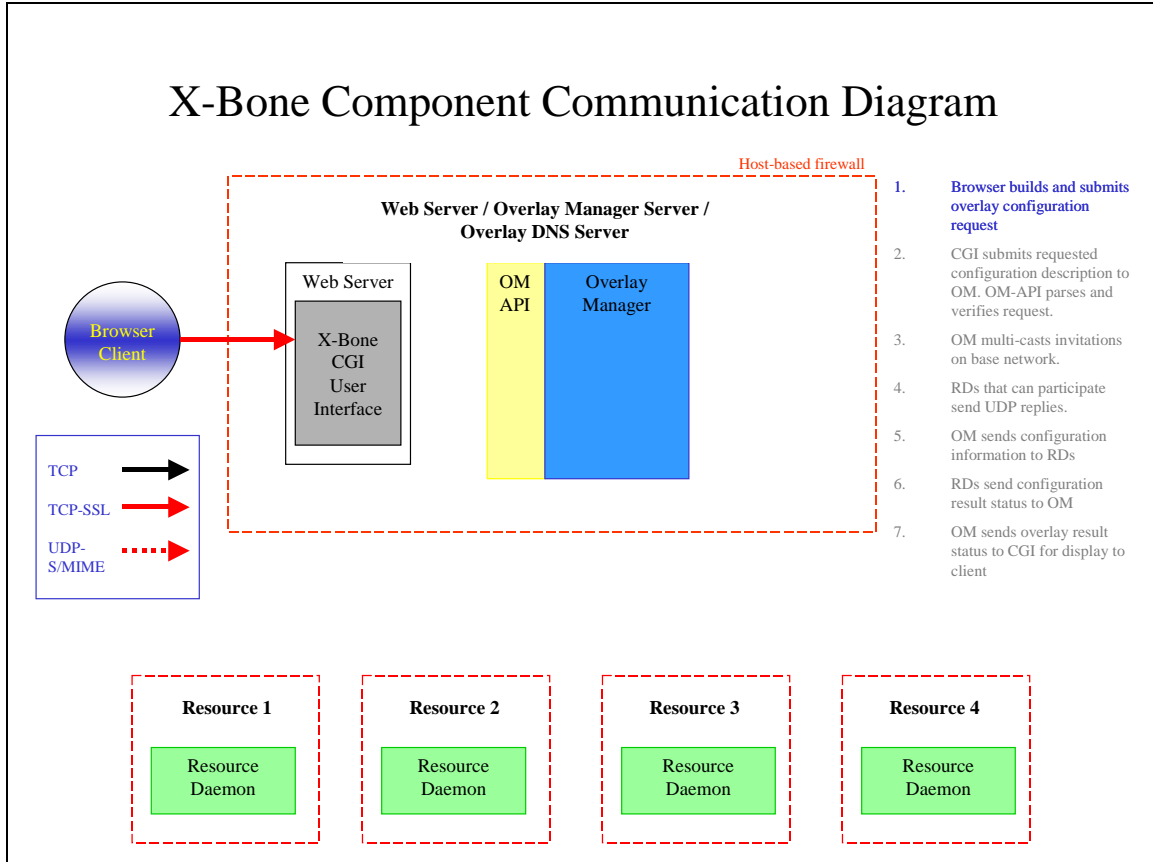


Figure 12

Appendix B con't

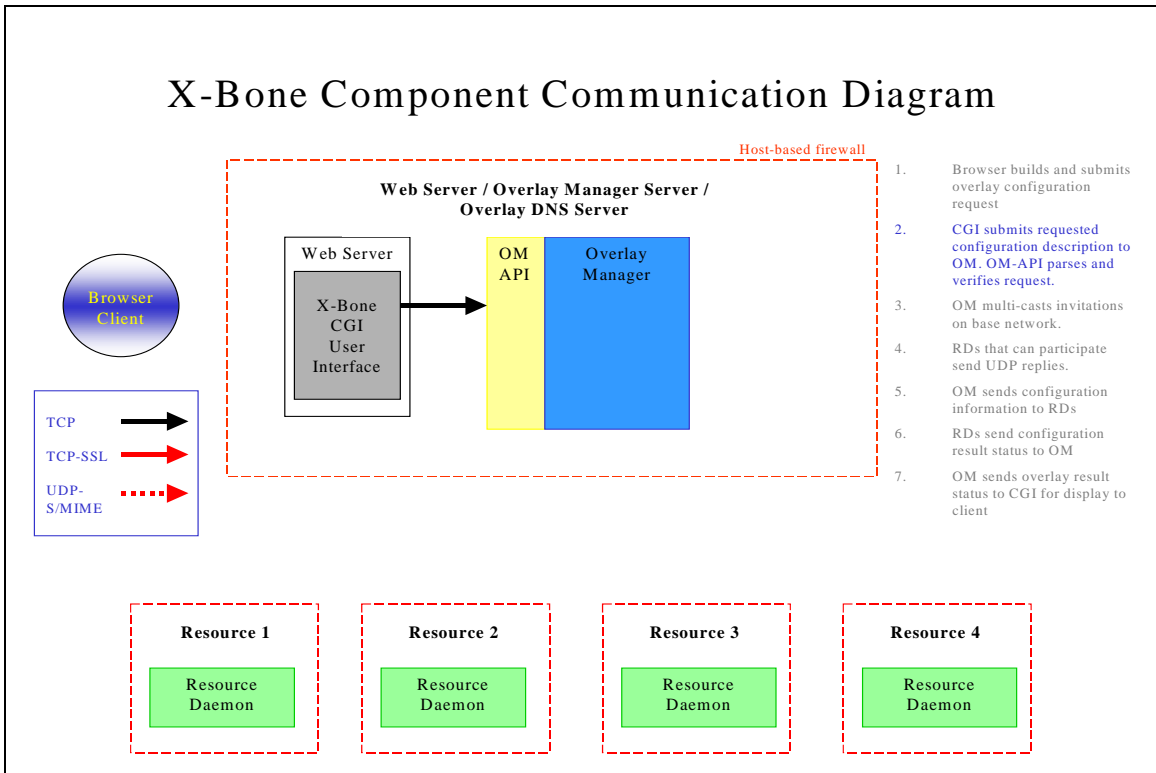


Figure 13

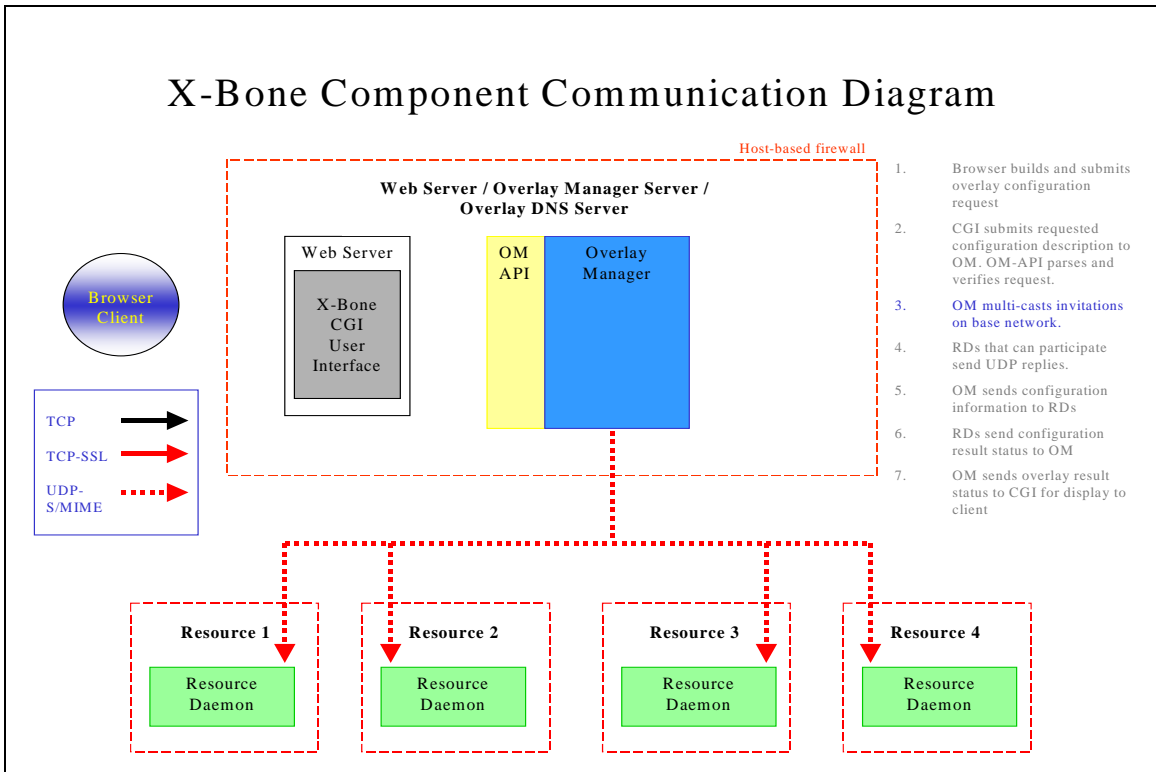


Figure 14

Appendix B con't

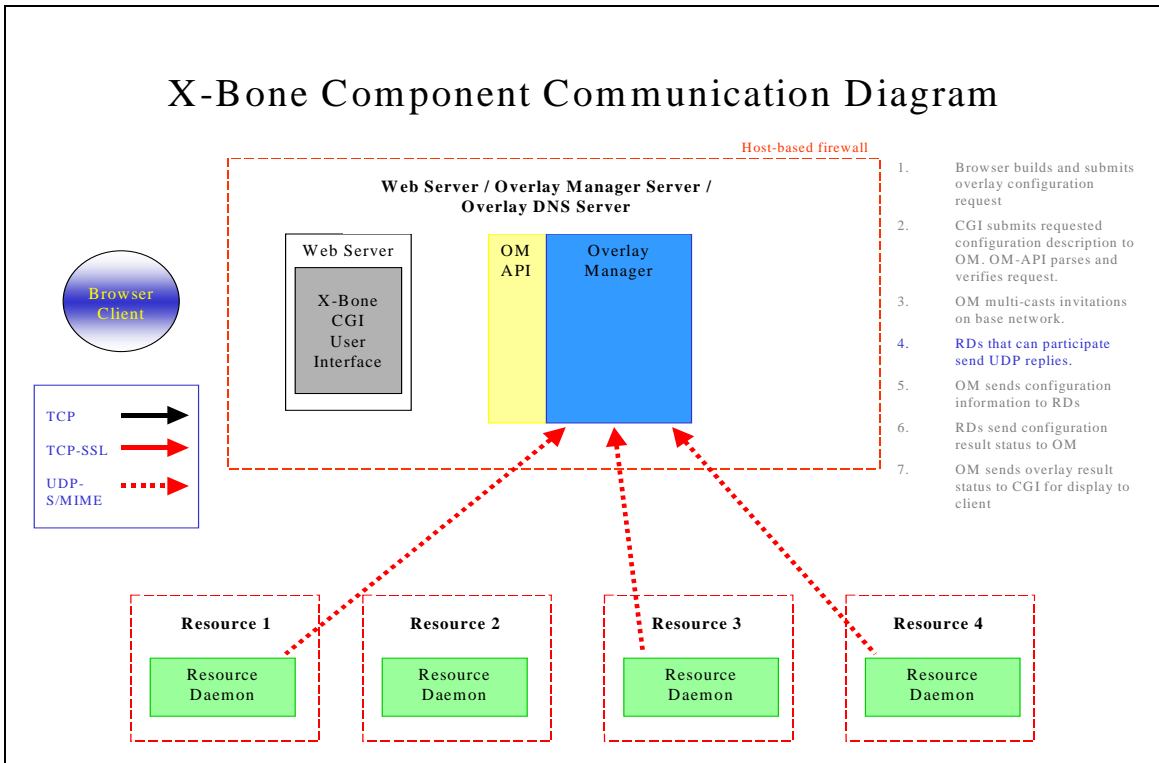


Figure 15

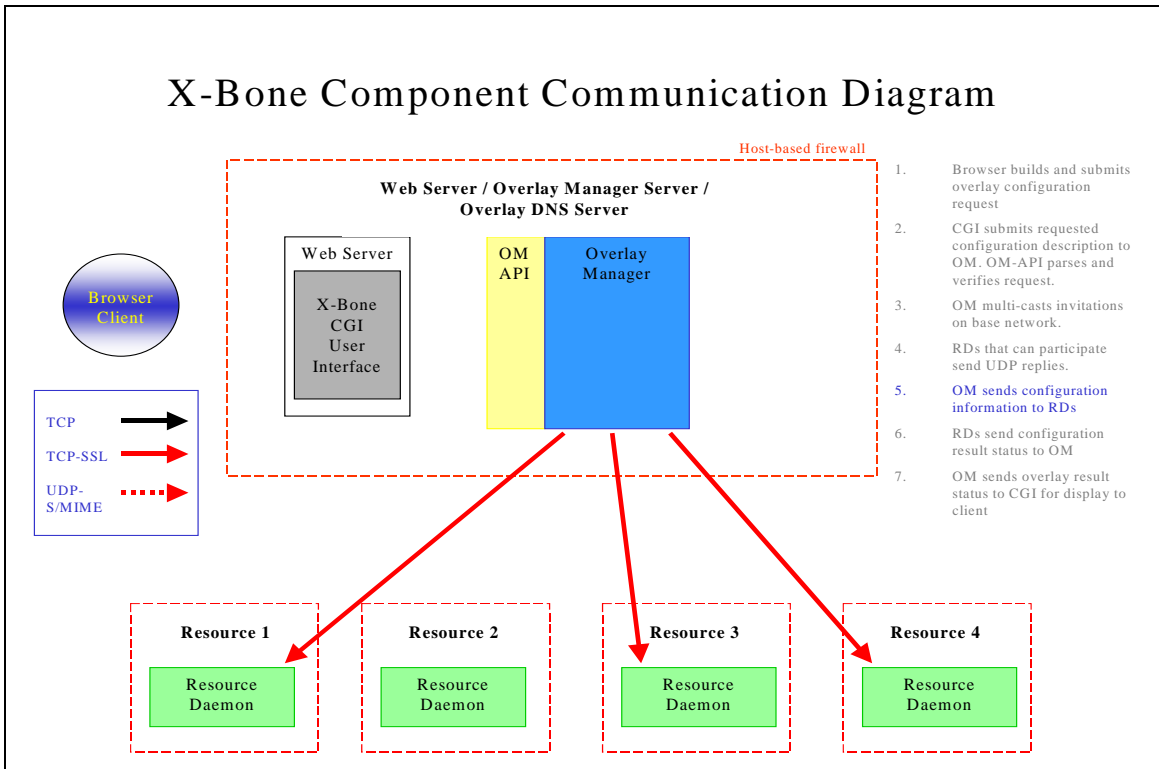


Figure 16

Appendix B con't

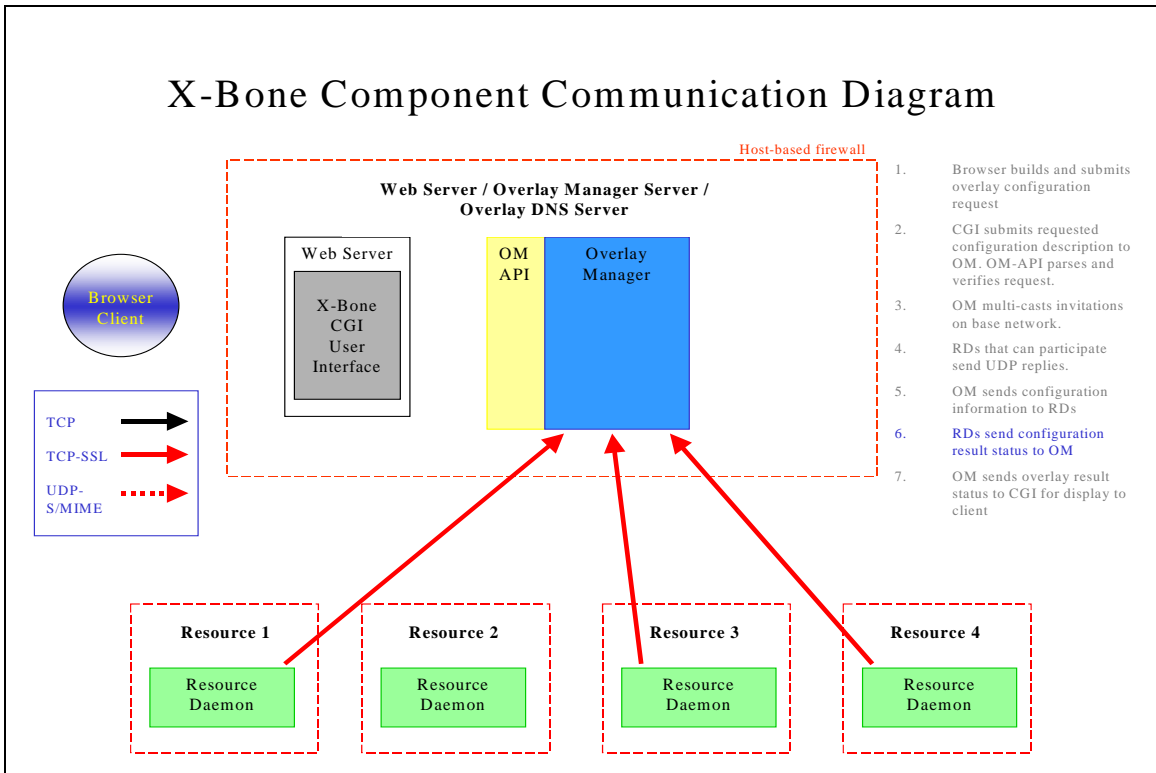


Figure 17

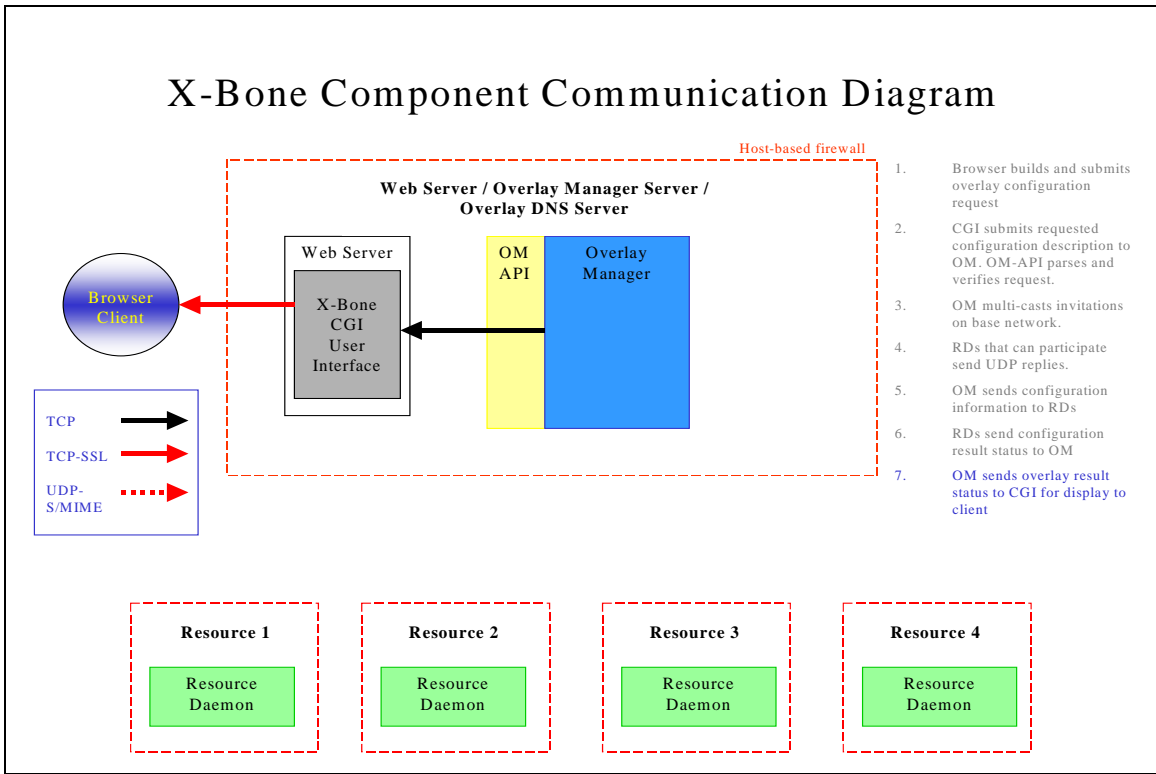


Figure 18

