



Microsoft Sharepoint 2010 Deployment Guide

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About This Guide

This guide details the configuration of Loadbalancer.org appliances for deployment with Microsoft Sharepoint 2010.

For an introduction to setting up the appliance as well as more detailed technical information, please refer to our quick-start guide and administration manual which are available at the following link :

<http://www.loadbalancer.org/downloads.php>

(the documentation links are at the bottom of the page)

Appliances Supported

All our products can used with Sharepoint 2010. The complete list of models is shown below:

- Enterprise R16
- Enterprise
- Enterprise MAX
- Enterprise 10G
- Enterprise VA
- Enterprise VA R16

For a full specification comparison of these models please refer to : <http://www.loadbalancer.org/matrix.php>

Microsoft Sharepoint 2010 Software Versions Supported

- All Versions

Loadbalancer.org Software Versions Supported

- v6.9, v6.10, v6.11, v6.12, v6.13, v6.14, v6.15, v6.16, v6.17, v6.18
- v7.2, v7.3, v7.3.1, v7.3.2

Sharepoint Server 2010

Microsoft Sharepoint 2010 is the latest version of Microsoft's enterprise collaboration platform. Sharepoint makes it easier for people to work together. Using Sharepoint 2010, staff can set up web sites to share information with others, manage documents from start to finish, publish reports to help everyone make better decisions and search across a range of internal and external data sources to find answers and information more quickly and effectively.

Server Roles

In Sharepoint 2010 what were roles in prior versions of the product can now be viewed simply as components, so as opposed to assigning a specific role to a server, components are placed on an agnostic machine, independent of any specific role definition. For example, in the past the role of indexer or query server was assigned to a machine, now the search topology is extended by assigning one or more search components, such as Query or Crawl to a machine. Roles are a concept that do not necessarily apply in 2010, instead a machine is generic and flexible to provide a multitude of services. Components and services are shared between servers in the farm depending on server performance, topology requirements, anticipated user load etc.

Installation Options

The Sharepoint installation supports two options as described in the table below:

Option	Description
Standalone	Installs all components on a single machine including SQL Express, but servers cannot be added to a server farm, typically only used for trialing the product or for very small deployments
Complete	Installs all components (except SQL Express) and allows servers to be added to a farm - this option must always be used in a Farm environment

Farm Size & Topology

The physical architecture is typically described in two ways: by its size and by its topology. Size, which can be measured in several ways, such as the number of users or the number of documents, is used to categorize a farm as small, medium, or large. Topology uses the idea of tiers or server groups to define a logical arrangement of farm servers. Microsoft uses the following definitions for size and topology:

Farm Size :

Size	Description
Small	A small server farm typically consists of at least two Web servers and a database server
Medium	A medium server farm typically consists of two or more Web servers, two application servers, and more than one database server
Large	A large server farm can be the logical result of scaling out a medium farm to meet capacity and performance requirements or by design before a Sharepoint Server solution is implemented

Farm Topology :

Topology	Description
Single-Tier	In a single-tier deployment, Sharepoint Server and the database server are installed on one computer
Two-Tier	In a two-tier deployment, Sharepoint Server components and the database are installed on separate server
Three-Tier	In a three-tier deployment, the front-end Web servers are on the first tier, the application servers are on the second tier, which is known as the application tier, and the database server is located on the third tier

For more information please refer to : <http://technet.microsoft.com/en-us/library/ee667264.aspx>

Load Balancing Sharepoint 2010

The Basics

Load balancing is required for the Front-end Web Servers to provide performance and resilience for users connecting to the Sharepoint farm.

For the middle (application) tier, multiple application servers running the same service applications are load balanced by default and there is no external load balancing requirement.

Sharepoint 2010 is based on IIS and associated technologies at the top / middle tier and Microsoft SQL Server for back-end storage. Therefore, load balancing Sharepoint 2010 is relatively straight- forward, but to provide a resilient and robust Sharepoint system, it's important to consider Microsoft's various architectural recommendations, best practices and guidelines when designing your Sharepoint Infrastructure.

TCP Ports

Sharepoint uses a range of ports for internal and external farm communication. The ports that need to be load balanced are those used in communications between external users and the Front-End Web Servers as shown in the following table:

TCP Port	Use	Description
80	Web Front-End	Standard HTTP port used for Web Application / Site access
443	Web Front-End	Standard HTTPS port used for Web Application / Site access
8080*	Central Admin	Custom port for Central Administration Website (HTTP)
8443**	Central Admin	Custom port for Central Administration Website (HTTPS)

* During the Sharepoint 2010 installation the installer suggests a random HTTP port for the Central Administration website. In the lab environment used for this guide, this was set to port 8080

** In the lab environment, the Central Administration website was extended to the Extranet zone and configured for HTTPS on port 8443. System administrators are then able to access the Central Administration website over HTTP and HTTPS

For a full Sharepoint Server port list, please refer to:

<http://technet.microsoft.com/en-us/library/cc262849.aspx>

Persistence (aka Server Affinity)

Enabling persistence ensures that clients continue to connect to the same server when connecting into the Sharepoint farm. We recommend using IP persistence for simplicity and compatibility across protocols.

Load Balancer Virtual Server (VIP) Requirements

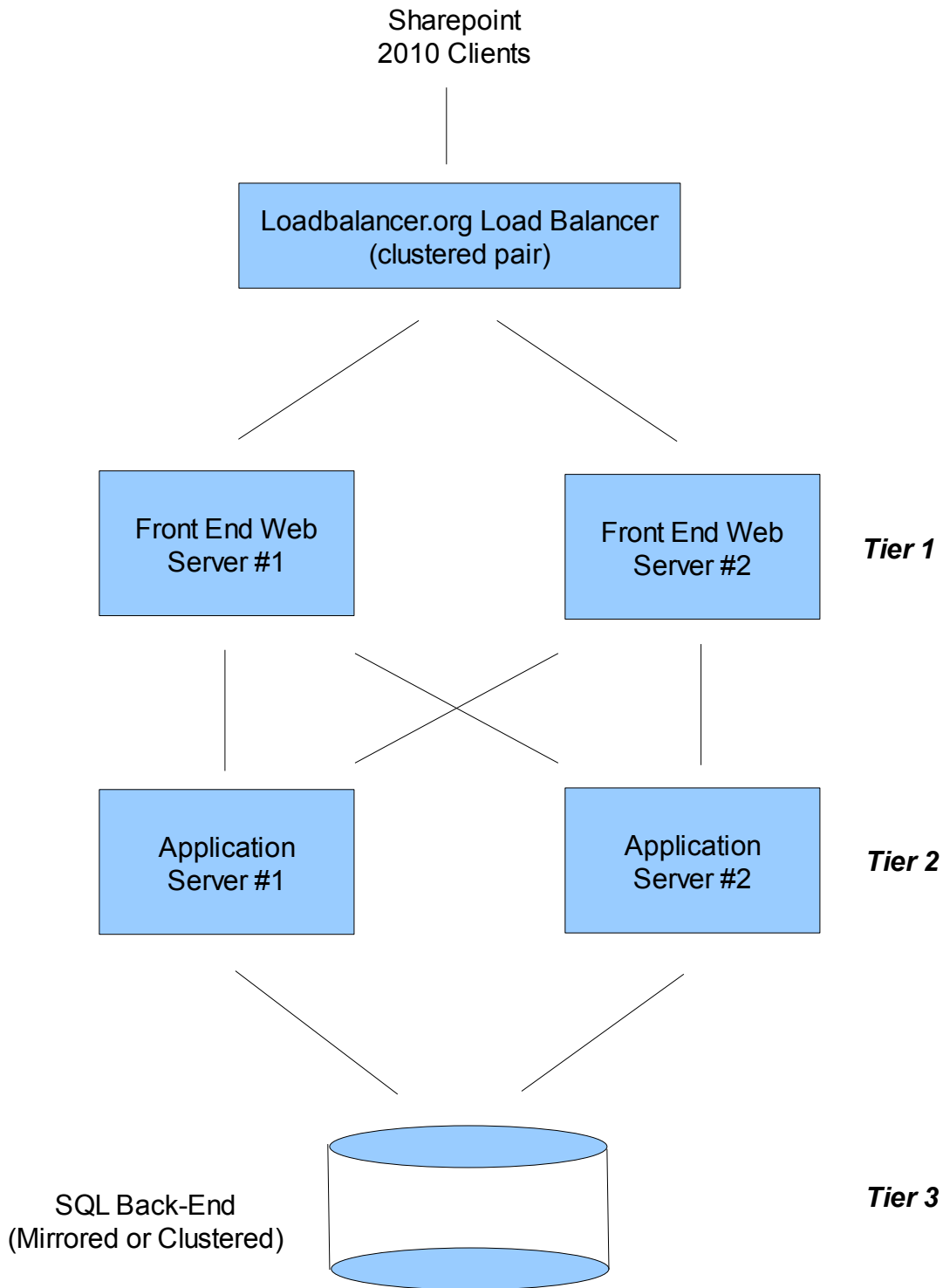
It is possible to configure a single VIP that includes all required ports as listed in the table above. However, to enable more granular control and improved health-check monitoring, multiple Virtual Servers are recommended. The list below shows the general approach used in this guide:

- VIP-1 : For the Sharepoint User Portal , typically running on the default HTTP (80) & HTTPS (443) ports
- VIP-2 : For the Load balanced Central Administration site running on the port selected (in this guide 8080 & 8443)
- VIP-3 , etc. : For any additional Sharepoint Web Applications / IIS sites created

NB. In the lab setup used for this guide, the Web Servers have a single IP address. Also all Virtual Servers configured on the load balancer use the same IP address with different ports. The Virtual Servers could also be configured using different IP addresses if needed.

Lab Deployment Architecture

There are multiple ways to deploy Sharepoint 2010 depending on a number of factors including number of end-users, physical server topology options / preferences etc. For the lab environment used in this guide, the following 3-tier redundant topology was used:



Lab Environment Architecture Notes

Planning for High Availability

The following table shows Microsoft's general guidance to achieve high availability :

Server	Preferred redundancy strategy within a farm
Front-end Web Server	Deploy multiple front-end Web servers within a farm, and use Network Load Balancing (NLB)
Application Server	Deploy multiple application servers within a farm
Database Server	Deploy database servers by using clustering or high-availability database mirroring

For more details please refer to the following Microsoft link :

<http://technet.microsoft.com/en-us/library/cc748824.aspx>

Front-End Web Servers

Two Front-end Web Servers are used to provide redundancy. These servers are load balanced by the Loadbalancer.org appliances (clustered pair for high availability). The servers also run the query related components so the index is also located on these servers. Therefore the index files should be located on a disk which has the capacity and performance required. Multiple query components can be added for fault tolerance and improved performance. For more details on the Sharepoint search / query architecture the following Microsoft link provides a useful insight:

<http://blogs.msdn.com/b/russmax/archive/2010/04/16/search-2010-architecture-and-scale-part-2-query.aspx>

Application Servers

Two application servers are used to provide redundancy. Both servers run the same service applications which enables built in load balancing. This distributes requests from the Web Servers on a round-robin basis. For more details on the built-in service application load balancer, please refer to the following Microsoft link:

<http://blogs.msdn.com/b/dtaylor/archive/2011/02/23/sharepoint-2010-service-application-load-balancer.aspx>

In the lab setup, these servers also run the crawl components. Multiple crawl components can be added for fault tolerance and improved performance. For more details on the Sharepoint Search architecture and configuring crawl the following Microsoft link provides a useful insight:

<http://blogs.msdn.com/b/russmax/archive/2010/04/16/search-2010-architecture-and-scale-part-1-crawl.aspx>

Database Server

In a live environment the SQL back-end should be mirrored, clustered or made redundant in any other appropriate way. For more details on SQL database clustering and mirroring for Sharepoint 2010 please refer to the following Microsoft links:

Planning for availability : <http://technet.microsoft.com/en-us/library/cc748824.aspx>

Clustering & Mirroring SQL Server for Sharepoint : <http://technet.microsoft.com/en-us/library/dd207313.aspx>

Sharepoint Installation & Configuration

Installation Considerations

Central Administration Website

For improved resilience and redundancy the Central Administration website can also be load balanced. This requires that the Central Administration component is installed on multiple servers – this is done during initial installation of the software by selecting the Advanced Settings, Host Central Administration Website , & checking “Use this machine to host the website”. In the lab environment used for this guide, Central Administration is installed on both Front-End Web Servers.

Alternate Access Mappings / Zones

Alternative Access Mappings must be setup correctly to ensure that users are able to connect consistently without receiving broken links and experiencing other issues. These are configured automatically when new Web Applications are created and extended using Central Administration. If manual changes are made later to Sharepoint or IIS , the mappings may also need to be adjusted manually.

Microsoft recommends extending a Web Application to a new IIS web site for each zone required. This provides a backing IIS Web site. Its not generally recommended to reuse the same IIS web site for multiple zones. For more information please refer to the following Microsoft link:

<http://technet.microsoft.com/en-us/library/cc261814%28office.12%29.aspx>

Authentication

Sharepoint 2010 supports various authentication methods, the method used in this guide is NTLM which is the default.

SSL Certificates

For full end-to-end SSL encryption, installing SSL certificates on the Sharepoint 2010 Web Servers is recommended. For the lab setup two test Thawte certificates were used – one for each Front-End Web Server. In both cases the Common Name was set to 'portal.justtesting.com'.

Service Applications

For a three-tier infrastructure, Service Applications should be distributed between the servers in each tier according to the topology in use. The complete installation option and the Configuration Wizard should be used to provision all service applications on each server. Central Administration can then be used to configure where each service runs.

DNS Configuration

DNS records must be configured that point to the Virtual Server on the load balancer. For the lab setup, Internal DNS entries were created for 'portal' and for external testing a DNS entry was added to the local hosts file of a non domain test client.

Lab Environment Installation

Basic Site / Zone Structure

Site	Zone	Ports	Host Header Value
Central Administration	default	8080	'portal'
Central Administration	Extranet	8443	-
Sharepoint User Portal	default	80	'portal'
Sharepoint User Portal	Extranet	443	-

Outline Installation Steps

- Install and prepare Microsoft SQL Server
- Install Sharepoint 2010 on both Web Servers. Install Central Administration on both servers. Use the Farm / Complete install option, run the Configuration Wizard and deploy all Service Applications. Later, these services can be enabled or disabled as required on the various servers depending on their purpose
- Install Sharepoint 2010 on both Application Servers. Use the complete install option, run the Configuration Wizard and deploy all Service Applications. Later, these services can be enabled or disabled as required
- Create an Web Application / site collection for the Sharepoint User Portal
- Set host header values for the Central Administration & User Portal sites
- Extend the Central Administration site to the Extranet zone on port 8443 / SSL
- Extend the User Portal site to the Extranet zone on port 443 / SSL
- Configure SSL certificates on both Web Servers for the HTTPS sites. In both cases CN=portal.justtesting.com, so the same certificate is used for both the secure portal and the secure Central Administration site
- Create an internal DNS entry for 'portal', this should point to the IP address of the Virtual Server created on the load balancer (see pages 13 & 18).
- Create an external DNS entry on the non domain test client for 'portal.justtesting.com', again this should point to the Virtual Server created on the load balancer (see pages 13 & 18).

User Access to Sharepoint

With the configuration described above, the following table shows how Sharepoint is accessed in the lab environment :

Site	Internal	External (Extranet)
Sharepoint User Portal	http://portal	https://portal.justtesting.com
Central Administration	http://portal:8080	https://portal.justtesting.com:8443

Useful Sharepoint Commandlets

There are many Sharepoint commands that can be run through the Sharepoint 2010 Management shell. A couple of useful examples are listed below:

1) Set the Central Admin Site Port:

```
set-spcentraladministration -port <port>
```

or to be able to specify SSL:

```
stsadm -o setadminport -port <port> -ssl
```

(N.B. this is a 2007 method but is also valid for 2010)

2) Create new Central Administration Site:

```
new-spcentraladministration -port <port>
```

Loadbalancer.org Appliance Configuration



It's important to have a working Sharepoint 2010 environment first before implementing the load balancer

Load Balancer Deployment Method

As with other Microsoft applications, the load balancer for Sharepoint 2010 is deployed in one-arm SNAT mode (Source Network Address Translation) at layer 7 using HAproxy. This mode is generally recommended by Microsoft and also has the advantage that it requires no changes to the Sharepoint 2010 servers.

NB. The wizard should not be used since this will configure a Layer 4 Virtual Server which is not required in this case.

Accessing the WUI

(All configuration is completed via the Web User Interface)

The WUI can be accessed from a browser at: ***http://192.168.2.21:9080/lbadmin***
(replace 192.168.2.21 with the IP address of your load balancer)

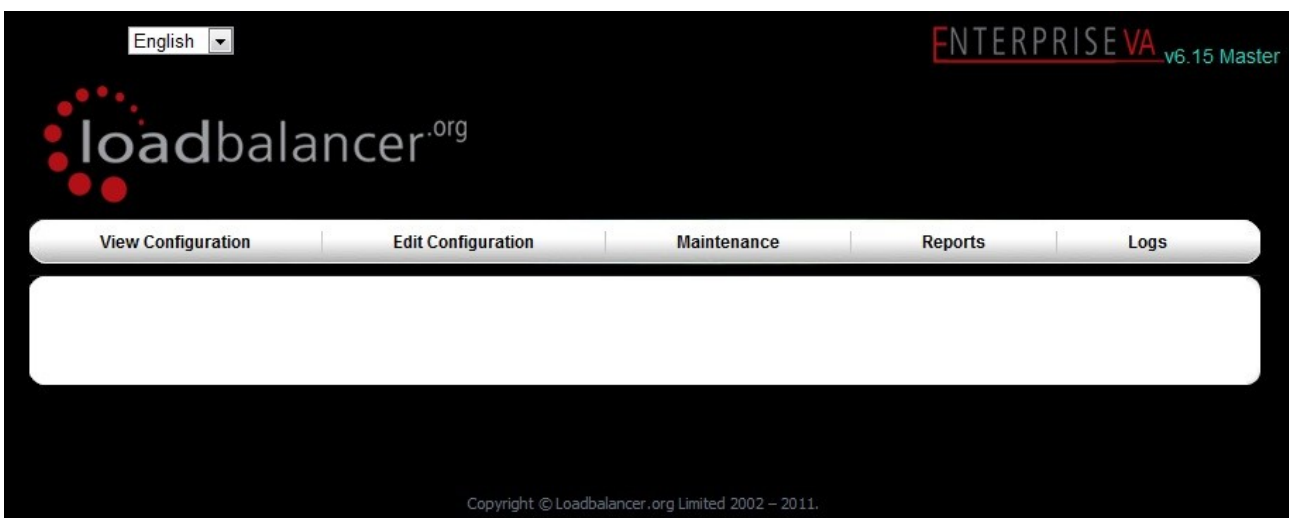
Username: loadbalancer

Password: loadbalancer

Once you have entered the logon credentials the Loadbalancer.org Web User Interface will be displayed.

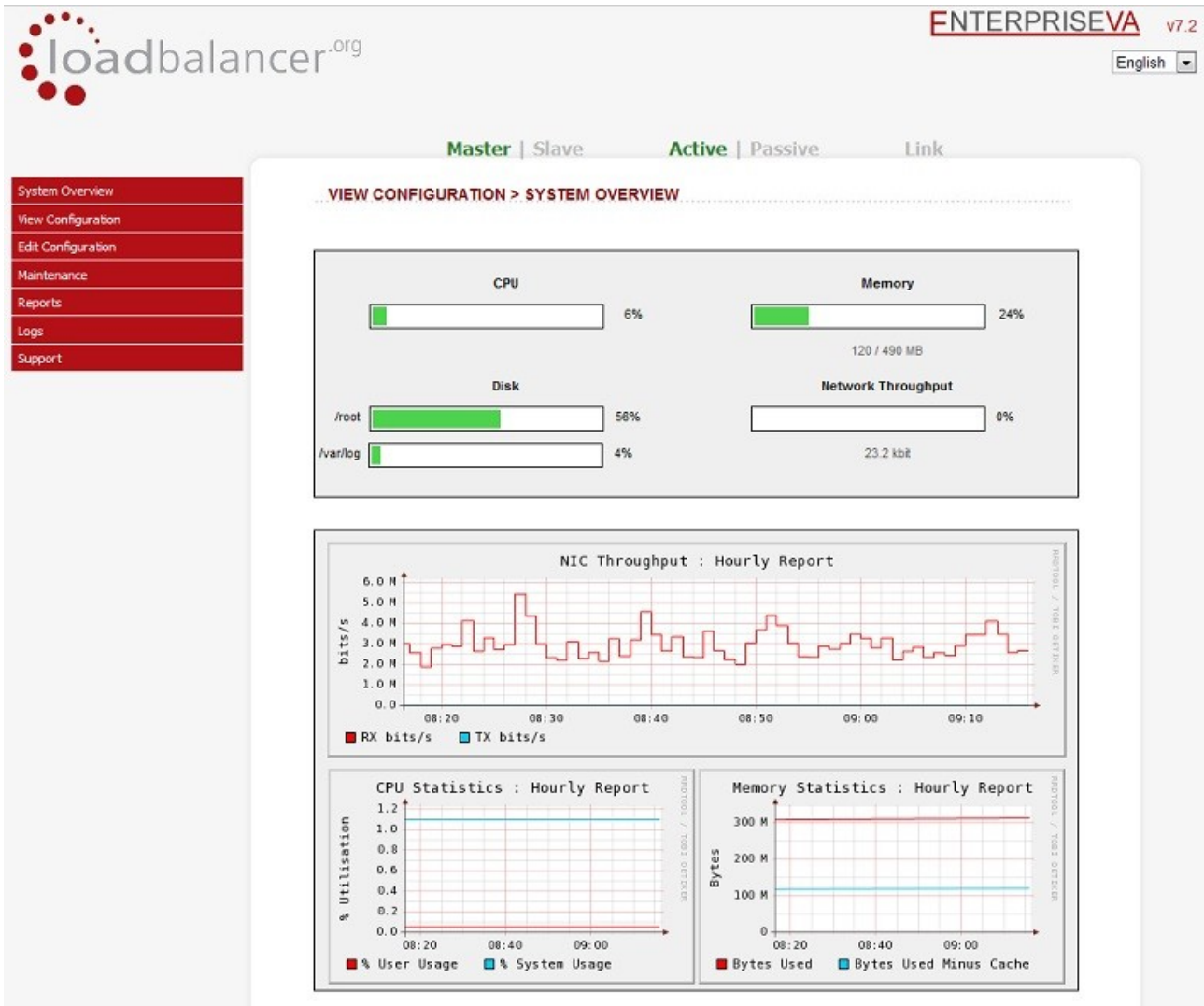
V6

The figure below shows the V6.15 Web User Interface once logged in.



V7

The figure below shows the V7.2 Web User Interface once logged in.



NOTE: The setup instructions in the following sections cover both versions 6 and 7 of the Appliance. If there are any differences in the configuration steps between the versions, these are highlighted accordingly.

Configuring the Virtual & Real Servers

Central Administration - Virtual Server (VIP)

This VIP is used to provide access to the Central Administration website on ports 8080 & 8443. Once configured, the Front-End Web Servers can then be associated with this VIP as described on page 15.

- **V6** - Go to *Edit Configuration > Virtual Servers (HAProxy)*
- **V7** - Go to *Edit Configuration > Layer 7 - Virtual Servers*
- Click [**Add a new Virtual Server**]
- Type an appropriate label (name) for the Virtual Server, e.g. 'Portal-Admin'
- **V6** - Enter an IP address for the VIP followed by :8080 (e.g. 192.168.30.120:8080), the other port will be specified later
- **V7** - (*N.B. V7 uses a separate port field*) - Enter an IP address for the VIP (e.g. 192.168.30.120) and enter '8080,8443' in the Virtual Server Ports field
- Change the Persistence Mode to 'Source IP'
- Click the Update button
- Now click [**Modify**] next to the newly created Virtual Server
- Change Layer 7 Protocol to 'Other TCP'
- **V6** - In the Extra Ports field enter the additional port : 8443
- Set the Balance Mode according to your needs (recommended : Least Connections)
- Click the Update button to save/apply the settings

V6 - The completed Portal-Admin Virtual Server

Label	<input type="text" value="Portal-Admin"/>	?
Virtual Server (ipaddress:port)	<input type="text" value="192.168.30.120:8080"/>	?
Extra Ports	<input type="text" value="8443"/>	?
Layer 7 Protocol	<input type="text" value="Other TCP"/>	?
Persistence mode	<input type="text" value="Source IP"/>	?
Balance mode	<input type="text" value="Least Connections"/>	?
Failure method	<input type="text" value="Halt"/>	?
Timeout	<input type="text" value="30"/>	?

V7 - The completed Portal-Admin Virtual Server

Label	<input type="text" value="Portal-Admin"/>	?
Virtual Server IP address	<input type="text" value="192.168.30.120"/>	?
Virtual Server Ports	<input type="text" value="8080,8443"/>	?
Layer 7 Protocol	<input type="text" value="Other TCP"/>	?
Persistence mode	<input type="text" value="Source IP"/>	?
Balance mode	<input type="text" value="Weighted Least Connections"/>	?
Timeout	<input type="text" value="30"/>	?

Central Administration - Real Servers (RIPs)

- **V6** - Go to *Edit Configuration > Real Servers (HAProxy)*
- **V7** - Go to *Edit Configuration > Layer 7 - Real Servers*
- Click **[Add a new Real Server]** next to the Portal-Admin Virtual Server
- Type an appropriate label (name) for the server, e.g. Web-1
- **V6** - Enter the IP address without specifying a port (e.g. 192.168.30.151)
- **V7** (N.B. V7 uses a separate port field) - Enter an IP address for the VIP (e.g. 192.168.30.151) and leave the port field blank
- Click the Update button to save/apply the settings
- Now repeat for your other real server(s)

Once configured, your Portal-Admin RIPs will be listed as shown below:

V6

<i>Portal-Admin</i>	(192.168.30.120:8080)	[Add a new Real Server]		
<i>Web-1</i>	192.168.30.151	1	[Modify]	[Delete]
<i>Web-2</i>	192.168.30.152	1	[Modify]	[Delete]

V7

<i>Portal-Admin</i>	192.168.30.120	Ports 8080,8443	[Add a new Real Server]	
<i>Web-1</i>	192.168.30.151	Ports 8080,8443	Weight 1	[Modify] [Delete]
<i>Web-2</i>	192.168.30.152	Ports 8080,8443	Weight 1	[Modify] [Delete]



NOTE: Because SNAT is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN

Sharepoint User Portal - Virtual Server (VIP)

This VIP is used to provide access to the user Portal website on ports 80 & 443. Once configured, the Front-End Web Servers can then be associated with this VIP as described on page 18.

- **V6** - Go to *Edit Configuration > Virtual Servers (HAProxy)*
- **V7** - Go to *Edit Configuration > Layer 7 - Virtual Servers*
- Click [**Add a new Virtual Server**]
- Type an appropriate label (name) for the Virtual Server, e.g. 'Portal'
- **V6** - Enter an IP address for the VIP followed by :80 (e.g. 192.168.30.120:80), the other port will be specified later
- **V7** - (*N.B. V7 uses a separate port field*) - Enter an IP address for the VIP (e.g. 192.168.30.120) and enter '80,443' in the Virtual Server Ports field
- Change the Persistence Mode to 'Source IP'
- Click the Update button to save/apply the settings
- Now click [**Modify**] next to the newly created Virtual Server
- Change Layer 7 Protocol to 'Other TCP'
- **V6** - In the Extra Ports field enter the additional port : 443
- Set the Balance Mode according to your needs (recommended : Least Connections)
- Click the Update button to save/apply the settings

V6 - The completed Portal Virtual Server

Label	<input type="text" value="Portal"/>	?
Virtual Server (ipaddress:port)	<input type="text" value="192.168.30.120:80"/>	?
Extra Ports	<input type="text" value="443"/>	?
Layer 7 Protocol	<input type="text" value="Other TCP"/>	?
Persistence mode	<input type="text" value="Source IP"/>	?
Balance mode	<input type="text" value="Least Connections"/>	?
Failure method	<input type="text" value="Halt"/>	?
Timeout	<input type="text" value="30"/>	?

V7 - The completed Portal Virtual Server

Label	<input type="text" value="Portal"/>	?
Virtual Server IP address	<input type="text" value="192.168.30.120"/>	?
Virtual Server Ports	<input type="text" value="80,443"/>	?
Layer 7 Protocol	<input type="text" value="Other TCP"/>	?
Persistence mode	<input type="text" value="Source IP"/>	?
Balance mode	<input type="text" value="Weighted Least Connections"/>	?
Timeout	<input type="text" value="30"/>	?

Sharepoint User Portal - Real Servers (RIPs)

- **V6** - Go to *Edit Configuration > Real Servers (HAProxy)*
- **V7** - Go to *Edit Configuration > Layer 7 - Real Servers*
- Click **[Add a new Real Server]** next to the Portal Virtual Server
- Type an appropriate label (name) for the server, e.g. Web-1
- **V6** - Enter the IP address without specifying a port (e.g. 192.168.30.151)
- **V7** (N.B. V7 uses a separate port field) - Enter an IP address for the VIP (e.g. 192.168.30.151) and leave the port field blank
- Click the Update button to save/apply the settings
- Now repeat for your other real server(s)

Once configured, your Portal RIPs will be listed as shown below:

V6

<i>Portal</i>	(192.168.30.120:80)	[Add a new Real Server]		
<i>Web-1</i>	192.168.30.151	<i>1</i>	[Modify]	[Delete]
<i>Web-2</i>	192.168.30.152	<i>1</i>	[Modify]	[Delete]

V7

<i>Portal</i>	192.168.30.120	Ports 80,443	[Add a new Real Server]		
<i>Web-1</i>	192.168.30.151	Ports 80,443	Weight 1	[Modify]	[Delete]
<i>Web-2</i>	192.168.30.151	Ports 80,443	Weight 1	[Modify]	[Delete]



NOTE: Because SNAT is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN

Configure Layer 7 Global Settings

Change the clitimeout and srvtimeout values from 43000 to 3600000 (i.e. 1 hour) as follows:

- **V6** - Go to *Edit Configuration > Global Settings*
- **V7** - Go to *Edit Configuration > Layer 7 – Advanced Configuration*
- Change **clitimeout** to 3600000
 - *Note*: from v7.3.2 onwards this setting is named *Client Timeout*
- Change **srvtimeout** to 3600000
 - *Note*: from v7.3.2 onwards this setting is named *Server Timeout*
- Click the Update button to save the settings

Layer 7 (HAProxy):		
Logging	off ▼	?
Redispatch	on ▼	?
Connection Timeout	4000	?
Client Timeout	3600000	?
Srvtimeout	3600000	?
Maximum Connections	40000	?

This sets the maximum client & server inactivity (idle) timeouts.

Finalizing the Configuration

To apply the new settings, HAProxy must be restarted as follows:

- **V6** - Go to *Maintenance > Restart HAProxy*
- **V7** - Go to *Maintenance > Restart Services > Restart HAProxy*.

Testing & Validation

Its very important to verify that the load balancer is working as expected. Network cables on the Front-End Web Servers can be removed to simulate a sever failure. System Overview in the WUI can then be used to check that the server has been marked down (colored red). Also, when the cable is plugged in , the server should return to normal status (colored green). Alternatively, IIS can be used to stop a website on one of the web servers. For example, stopping the Central Administration site on Web-1 will cause system overview to mark Portal-Admin / Web-1 as down as shown below (shows V6) :

Key cluster healthy cluster may need attention cluster is down real server deliberately offline

Portal-Admin - 192.168.30.120:8080 total connections:0					
Label	IP	Method	Weight	Active conns	
Web-2	192.168.30.152	Layer 7	1	0	take offline
Web-1	192.168.30.151	Layer 7	1	0	take offline

Portal - 192.168.30.120:80 total connections:0					
Label	IP	Method	Weight	Active conns	
Web-2	192.168.30.152	Layer 7	1	0	take offline
Web-1	192.168.30.151	Layer 7	1	0	take offline

Portal-Admin / Web-2 is still healthy, so all requests will now be routed here.

System Overview can also be used to take servers offline (typically used for performing maintenance tasks). Once again, requests will then only be sent to the remaining operational server.

Technical Support

For more details or assistance with your deployment please don't hesitate to contact the support team :

support@loadbalancer.org

Conclusion

Loadbalancer.org appliances provide a very cost effective solution for highly available load balanced Sharepoint 2010 environments.