LOADBALANCER

DEPLOYMENT GUIDE

Load Balancing Microsoft Sharepoint 2010 / 2013

Version 1.8.0

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1. About this Guide

This guide details the steps required to configure a load balanced Microsoft Sharepoint 2010/2013 environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Microsoft Sharepoint 2010/2013 configuration changes that are required to enable load balancing.

For more information about initial appliance deployment, network configuration and using the Web User Interface (WebUI), please also refer to the Administration Manual.

2. Loadbalancer.org Appliances Supported

All our products can be used with Sharepoint. For full specifications of available models please refer to: https://www.loadbalancer.org/products/enterprise.

Some features may not be available or fully supported in all cloud platforms due to platform specific limitations. For more details, please refer to the "Main Differences to our Standard (Non-Cloud) Product" section in the appropriate cloud platform Quick Start Guide or check with Loadbalancer.org support.

3. Software Versions Supported

3.1. Loadbalancer.org Appliance

- V8.9.1 and later

> **Note** The screenshots used throughout this document aim to track the latest Loadbalancer.org software version. If you're using an older version, or the very latest, the screenshots presented here may not match your WebUI exactly.

3.2. Microsoft Sharepoint

- Microsoft Sharepoint 2010 – all versions
- Microsoft Sharepoint 2013 – all versions

4. Microsoft Sharepoint

Microsoft Sharepoint is Microsoft's enterprise collaboration platform. Sharepoint makes it easier for people to work together. Using Sharepoint, 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.

4.1. Server Roles

In Sharepoint 2010 & 2013 there are effectively three server roles – ***Web Frontend Servers***, ***Application Servers*** and ***Database Servers***. With Sharepoint 2013, there is flexibility in the architecture because certain underlying components and services can be distributed and shared between servers in the farm depending on server performance, topology requirements, anticipated user load etc.

4.2. 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 trialling 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.

4.3. 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 servers.
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 on installing and configuring Sharepoint please refer to: https://technet.microsoft.com/en-us/library/ee667264.aspx

For more information on building a 3-tier farm, please refer to the following URL: https://docs.microsoft.com/en-

5. Load Balancing Sharepoint

> **Note** It's highly recommended that you have a working Sharepoint environment first before implementing the load balancer.

5.1. Load Balancer Deployment Mode

Layer 7 SNAT mode (HAProxy) is recommended for Sharepoint and is used for the configuration presented in this guide. This mode offers high performance and is simple to configure since it requires no mode-specific configuration changes to the load balanced Sharepoint Servers.

Layer 4 DR mode, NAT mode and SNAT mode can also be used if preferred. For DR mode you'll need to solve the ARP problem on each AD FS server - for more information please refer to DR Mode Considerations. For NAT mode the default gateway of the Sharepoint servers must be the load balancer. For layer 4 SNAT mode no mode-specific server configuration changes are required.

5.2. 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 is based on IIS and associated technologies at the top/middle tier and Microsoft SQL Server for back-end storage. Therefore, load balancing Sharepoint 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.

5.3. 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 [1]	Central Admin	Custom port for Central Administration Website (HTTP)
8443 [2]	Central Admin	Custom port for Central Administration Website (HTTPS)

Table Footnotes

1. During the Sharepoint 2010/2013 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.
2. In the lab environment, the Central Administration website was extended to the Custom Zone and configured for HTTPS on port 8443. System administrators are then able to access the Central Administration website over HTTP and HTTPS.

5.4. Persistence (aka Server Affinity)

Enabling persistence ensures that clients continue to connect to the same server when connecting into the Sharepoint farm.

5.4.1. Sharepoint 2010

For Sharepoint 2010 we recommend using IP persistence for simplicity and compatibly across protocols.

5.4.2. Sharepoint 2013

Persistence is no longer required for Sharepoint 2013. This is because the Distributed Cache service maintains authentication information across all Sharepoint 2013 Web Servers and therefore a particular client no longer needs to persist to the same Server.

5.5. Load Balancer Virtual Service (VIP) Requirements

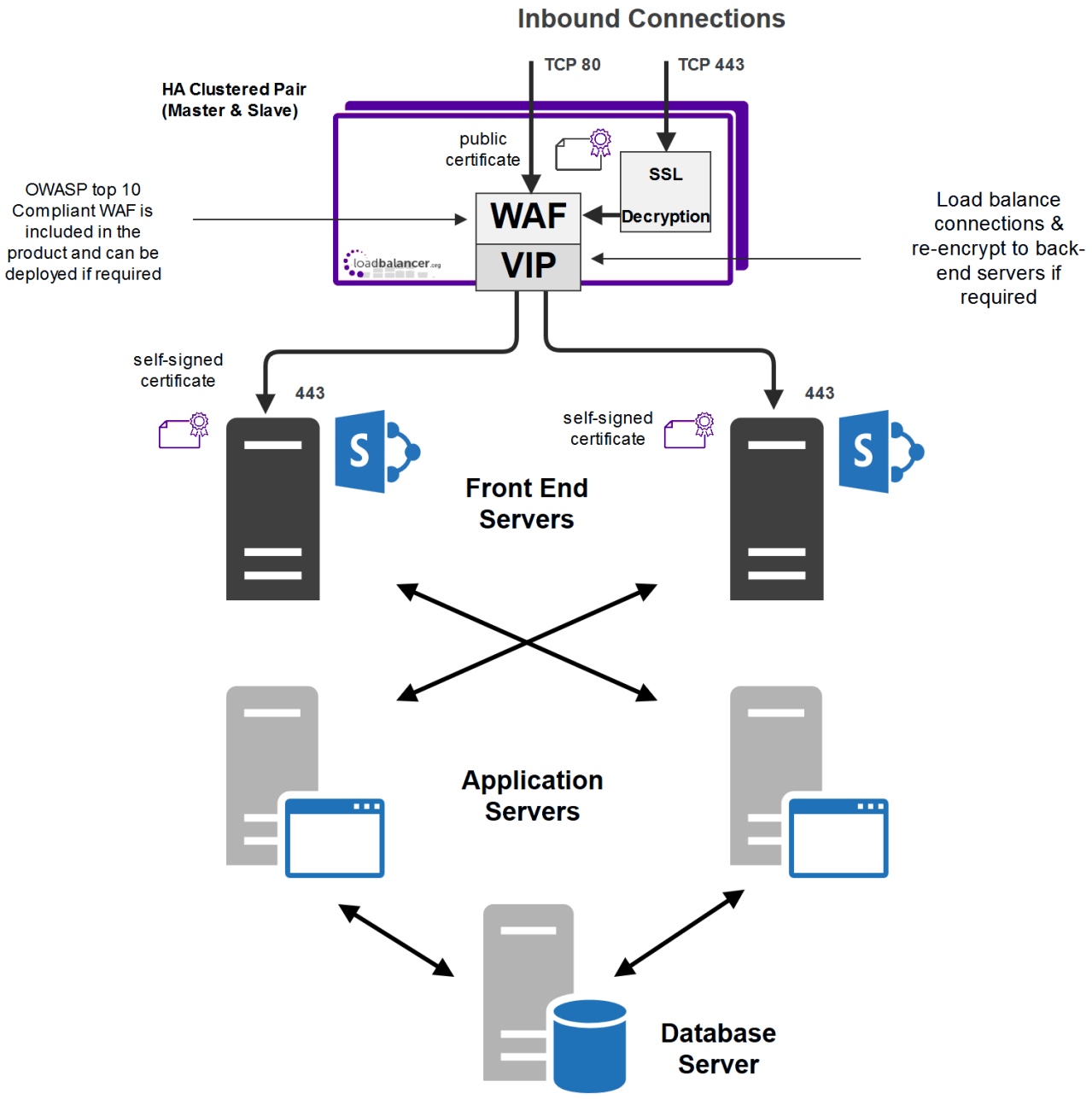
It is possible to configure a single VIP that includes all required ports as listed in the table above. However, to enable more granular control and improved health-check monitoring, multiple Virtual Services are recommended.

The list below shows the general approach used in this guide:

- **VIP-1**: For the Load balanced Sharepoint Central Administration site running on the selected port. In this guide, HTTP port 8080 & HTTPS port 8443.
- **VIP-2**: For the load balanced Sharepoint User Portal, typically running on the default ports: HTTP (80) & HTTPS (443).
- **VIP-3** etc.: Used for additional Sharepoint Web Applications/IIS sites that require a different IP address to be used.

6. Lab Deployment Architecture

There are multiple ways to deploy Sharepoint 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. Once configured, clients then connect to the Virtual Services (VIPs) on the load balancer rather than connecting directly to one of the Sharepoint servers. These connections are then load balanced across the Sharepoint servers to distribute the load according to the load balancing algorithm selected.



> **Note** The load balancer can be deployed as a single unit, although Loadbalancer.org recommends a clustered pair for resilience & high availability. Please refer to Configuring HA - Adding a Secondary Appliance for more details on configuring a clustered pair.

6.1. Lab Environment Notes

6.1.1. 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 Load Balancing
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 on HA architecture please refer to the following Microsoft link: https://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.

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.

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 configuring crawl please refer to the following Microsoft article: https://technet.microsoft.com/en-us/library/dd335962(v=office.14).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 HA please refer to the following URL: https://technet.microsoft.com/en-us/library/cc748824.aspx

7. Sharepoint Installation & Configuration

7.1. Installation Considerations

7.1.1. 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 Application Servers.

7.1.2. 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 URL: https://technet.microsoft.com/en-us/library/cc261814(v=office.15).aspx

7.1.3. Authentication

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

7.1.4. SSL Certificates

For performance scalability, installing SSL certificates on the Sharepoint Servers is recommended rather than terminating SSL on the load balancer. For the lab setup a trial Thawte certificate was used. The Common Name was set to **sharepoint.robstest.com**.

7.1.5. 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.

7.1.6. DNS Configuration

DNS records must be configured that point to the Virtual Services on the load balancer. For the lab setup, Internal DNS entries were created for 'sharepoint.robstest.com' on the domains DNS server and external DNS entries were created on the local hosts file of a non domain member test PC.

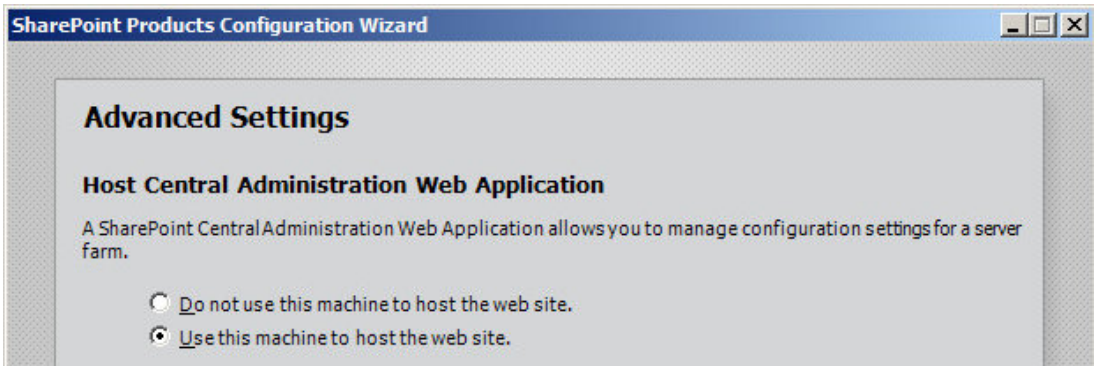
7.2. Lab Environment Installation

7.2.1. Site & Zone Structure

Site	Zone	Protocol	Ports	Notes	Host Header Value	Certificate CN
Central Administration	Default	HTTP	8080	-	-	-
Central Administration	Custom	HTTPS	8443	Extended site	-	sharepoint.robstest.com
Sharepoint User Portal	Default	HTTP	80	-	sharepoint.robstest.com	-
Sharepoint User Portal	Custom	HTTPS	443	Extended site	-	sharepoint.robstest.com

7.2.2. Installation Steps

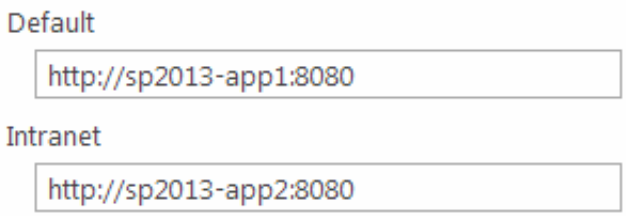
1. Install the Software:
    a. Install & prepare Microsoft SQL Server.
    b. Install Sharepoint on both Application Servers. Install Central Administration on both servers setting the port to 8080. Use the 'Complete' install option, run the Configuration Wizard and deploy all Service Applications. Later, these services can be enabled or disabled as required.
    c. Use the Advanced Settings option to install Central Admin:



d. Install Sharepoint on the Front End Web 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.

2. Configure the Central Administration site for load balancing:

a. Edit the Public URLs to ensure that both Application Servers are listed as shown below:

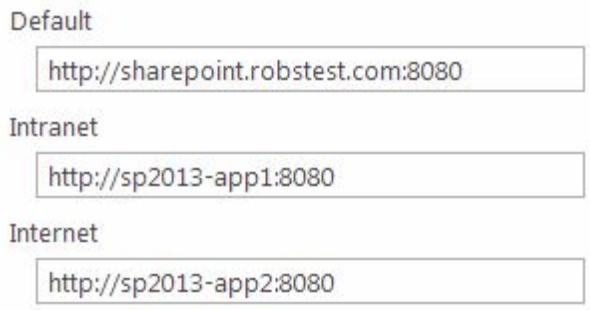


Once configured the AAMs are set as follows:

Internal URL	Zone	Public URL for Zone
http://sp2013-app1:8080	Default	http://sp2013-app1:8080
http://sp2013-app2:8080	Intranet	http://sp2013-app2:8080

(see http://www.harbar.net/articles/spca.aspx for more details)

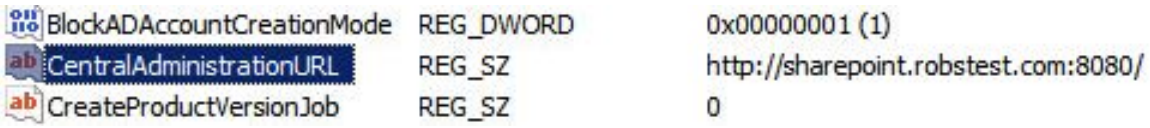
b. Edit the public URLs again and add **http://sharepoint.robstest.com:8080**. Also ensure that this URL is set as the Default Zone as shown below:



3. Confirm that the AAMs are set as follows:

Internal URL	Zone	Public URL for Zone
http://sharepoint.robstest.com:8080	Default	http://sharepoint.robstest.com:8080
http://sp2013-app1:8080	Intranet	http://sp2013-app1:8080
http://sp2013-app2:8080	Internet	http://sp2013-app2:8080

> **Note** These settings ensure that the **CentralAdministrationURL** registry key is set correctly as shown below:



a. Extend the Central Administration Web Application to the Custom Zone on port 8443, using SSL. Once done a corresponding AAM is automatically configured as shown below:

Internal URL	Zone	Public URL for Zone
http://sharepoint.robstest.com:8080	Default	http://sharepoint.robstest.com:8080
http://sp2013-app1:8080	Intranet	http://sp2013-app1:8080
http://sp2013-app2:8080	Internet	http://sp2013-app2:8080
https://sharepoint.robstest.com:8443	Custom	https://sharepoint.robstest.com:8443

b. On one of the application servers create a CSR for CN=**sharepoint.robstest.com**, then complete the request once a signed certificate is obtained.

c. Export the certificate & private key and import to the other Application Server.

d. Using IIS Manager on both Application Servers ensure that the HTTPS bindings correctly refer to the **sharepoint.robstest.com** certificate.

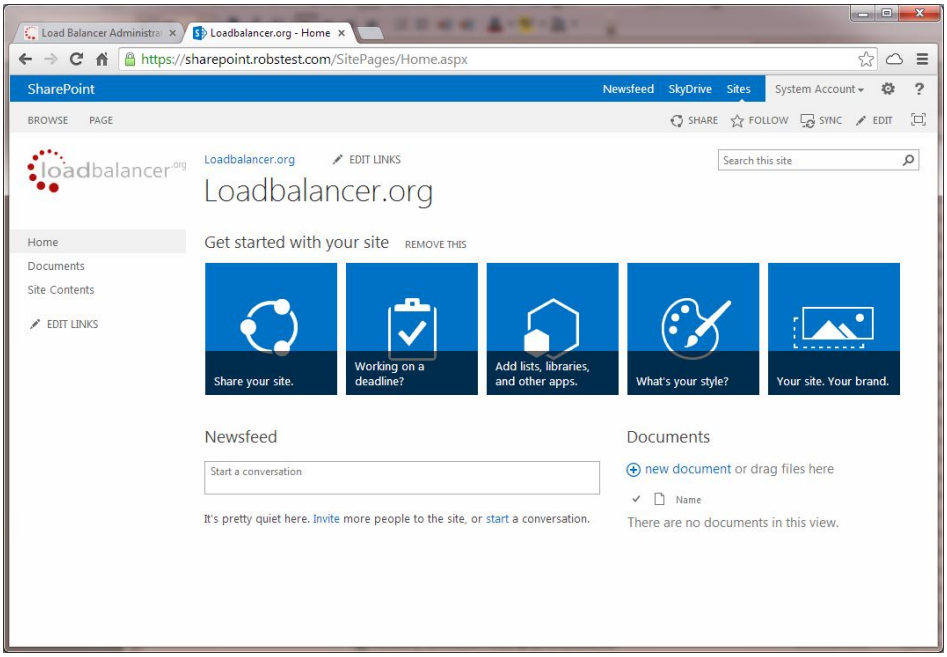
4. Configure the User Portal Web Application & Top Level Default Site:

   a. Create a new Web Application for the Sharepoint User Portal on Port 80.

   b. Create a new top level Site Collection under the User Portal Web Application.

   Navigating to: **http://sharepoint.robstest.com/**

   opens: **https://sharepoint.robstest.com/_layouts/15/start.aspx#/**



> **Note** The lab setup has a HTTP to HTTPS redirect for the User Portal (see Configuring an HTTP to HTTPS Redirect for the User Portal).

c. Extend the User Portal Web Application to the Custom Zone on port 443, using SSL. Once done a corresponding AAM is automatically configured as shown below:

Internal URL	Zone	Public URL for Zone
http://sharepoint.robstest.com	Default	http://sharepoint.robstest.com
https://sharepoint.robstest.com	Custom	https://sharepoint.robstest.com

d. Using IIS Manager on both Front End Web Servers import the **sharepoint.robstest.com** certificate and ensure that the HTTPS bindings correctly refer to this certificate.

5. Configure DNS:

a. Create internal & external DNS entries for **sharepoint.robstest.com**. This should point to the IP address of the Virtual Service that's created on the load balancer (see STEP 3 – Configure the Load Balanced User Portal Site).

7.2.3. Accessing Sharepoint

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

Site	HTTP	HTTPS
Sharepoint User Portal	http://sharepoint.robstest.com	https://sharepoint.robstest.com
Central Administration	http://sharepoint.robstest.com:8080	https://sharepoint.robstest.com:8443

8. Loadbalancer.org Appliance – the Basics

8.1. Virtual Appliance

A fully featured, fully supported 30 day trial is available if you are conducting a PoC (Proof of Concept) deployment. The VA is currently available for VMware, Virtual Box, Hyper-V, KVM, XEN and Nutanix AHV and has been optimized for each Hypervisor. By default, the VA is allocated 2 vCPUs, 4GB of RAM and has a 20GB virtual disk. The Virtual Appliance can be downloaded here.

Note	The same download is used for the licensed product, the only difference is that a license key file (supplied by our sales team when the product is purchased) must be applied using the appliance's WebUI.

Note	Please refer to Virtual Appliance Installation and the ReadMe.txt text file included in the VA download for additional information on deploying the VA using the various Hypervisors.

Note	The VA has 4 network adapters. For VMware only the first adapter (**eth0**) is connected by default. For HyperV, KVM, XEN and Nutanix AHV all adapters are disconnected by default. Use the network configuration screen within the Hypervisor to connect the required adapters.

8.2. Initial Network Configuration

After boot up, follow the instructions on the appliance console to configure the management IP address, subnet mask, default gateway, DNS servers and other network and administrative settings.

Important	Be sure to set a secure password for the load balancer, when prompted during the setup routine.

8.3. Accessing the Appliance WebUI

The WebUI is accessed using a web browser. By default, users are authenticated using Apache authentication. Users can also be authenticated against LDAP, LDAPS, Active Directory or Radius - for more information, please refer to External Authentication.

Note	There are certain differences when accessing the WebUI for the cloud appliances. For details, please refer to the relevant Quick Start / Configuration Guide.

1. Using a browser, navigate to the following URL:

   https://<IP-address-configured-during-the-network-setup-wizard>:9443/lbadmin/

Note	You'll receive a warning about the WebUI's SSL certificate. This is due to the default self signed certificate that is used. If preferred, you can upload your own certificate - for more information, please refer to Appliance Security Features.

Note	If you need to change the port, IP address or protocol that the WebUI listens on, please

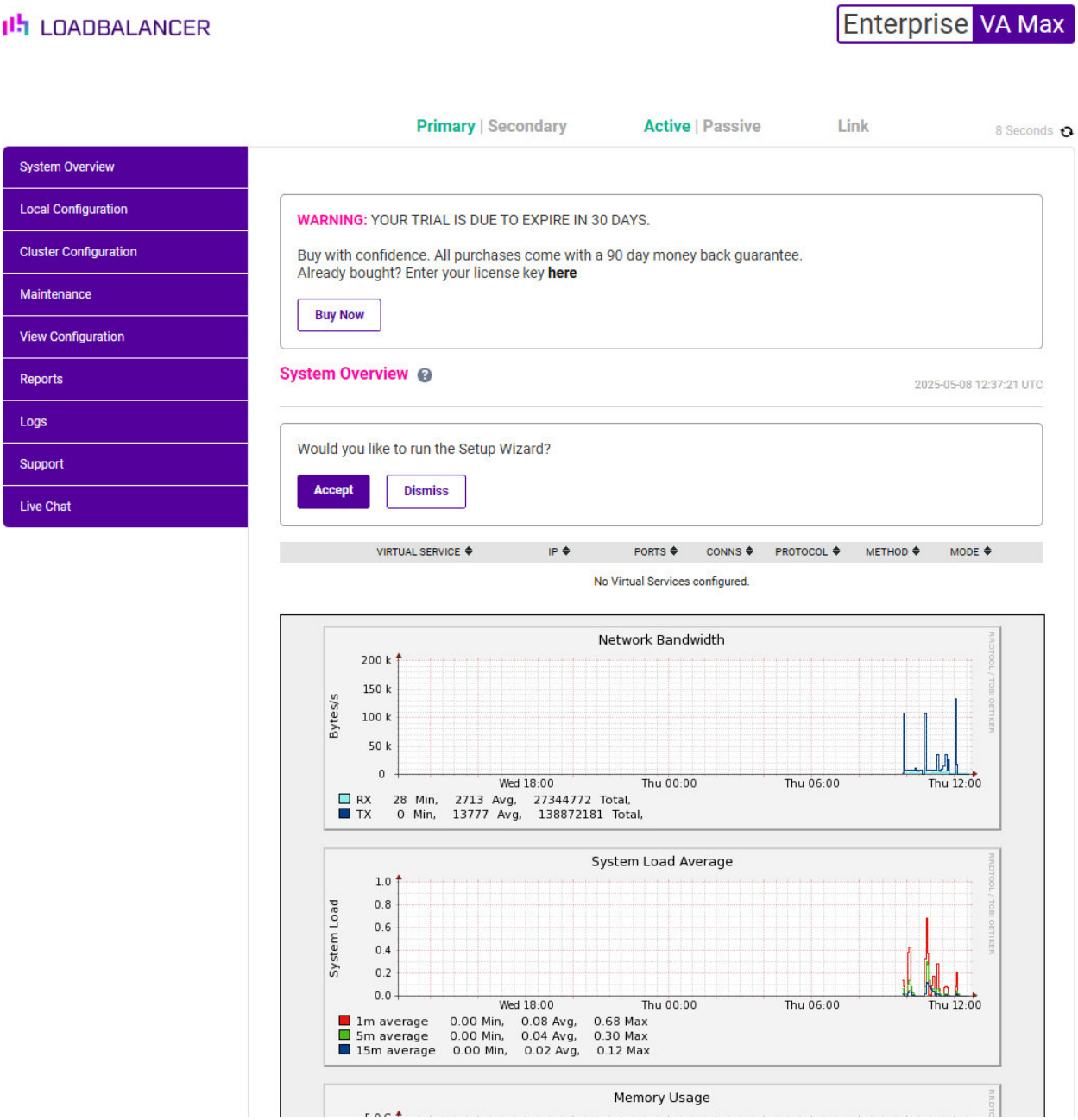
refer to Service Socket Addresses.

2. Log in to the WebUI using the following credentials:

Username: loadbalancer
Password: <configured-during-network-setup-wizard>

> **Note** To change the password, use the WebUI menu option: *Maintenance > Passwords*.

Once logged in, the WebUI will be displayed as shown below:



3. You'll be asked if you want to run the Setup Wizard. Click **Dismiss** if you're following a guide or want to configure the appliance manually. Click **Accept** to start the Setup Wizard.

> **Note** The Setup Wizard can only be used to configure Layer 7 services.

8.3.1. Main Menu Options

System Overview - Displays a graphical summary of all VIPs, RIPs and key appliance statistics
Local Configuration - Configure local host settings such as IP address, DNS, system time etc.
Cluster Configuration - Configure load balanced services such as VIPs & RIPs
Maintenance - Perform maintenance tasks such as service restarts and creating backups
View Configuration - Display the saved appliance configuration settings
Reports - View various appliance reports & graphs
Logs - View various appliance logs
Support - Create a support download, contact the support team & access useful links
Live Chat - Start a live chat session with one of our Support Engineers

8.4. Appliance Software Update

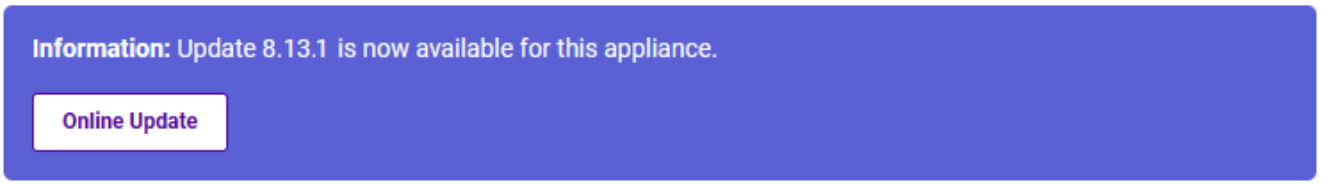
We recommend that the appliance is kept up to date to ensure that you benefit from the latest bug fixes, security updates and feature improvements. Both online and offline update are supported.

> **Note** For full details, please refer to Appliance Software Update in the Administration Manual.

> **Note** Services may need to be restarted/reloaded after the update process completes or in some cases a full appliance restart may be required. We therefore recommend performing the update during a maintenance window.

8.4.1. Online Update

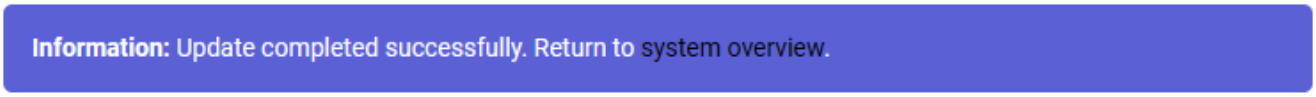
The appliance periodically contacts the Loadbalancer.org update server (**update.loadbalancer.org**) and checks for updates. This is the default behavior and can be disabled if preferred. If an update is found, a notification similar to the example below will be displayed at the top of the WebUI:



Click **Online Update**. A summary of all new features, improvements, bug fixes and security updates included in the update will be displayed. Click **Update** at the bottom of the page to start the update process.

> **Important** Do not navigate away whilst the update is ongoing, this may cause the update to fail.

The update can take several minutes depending on download speed and upgrade version. Once complete, the following message will be displayed:



If services need to be reloaded/restarted or the appliance needs a full restart, you'll be prompted accordingly.

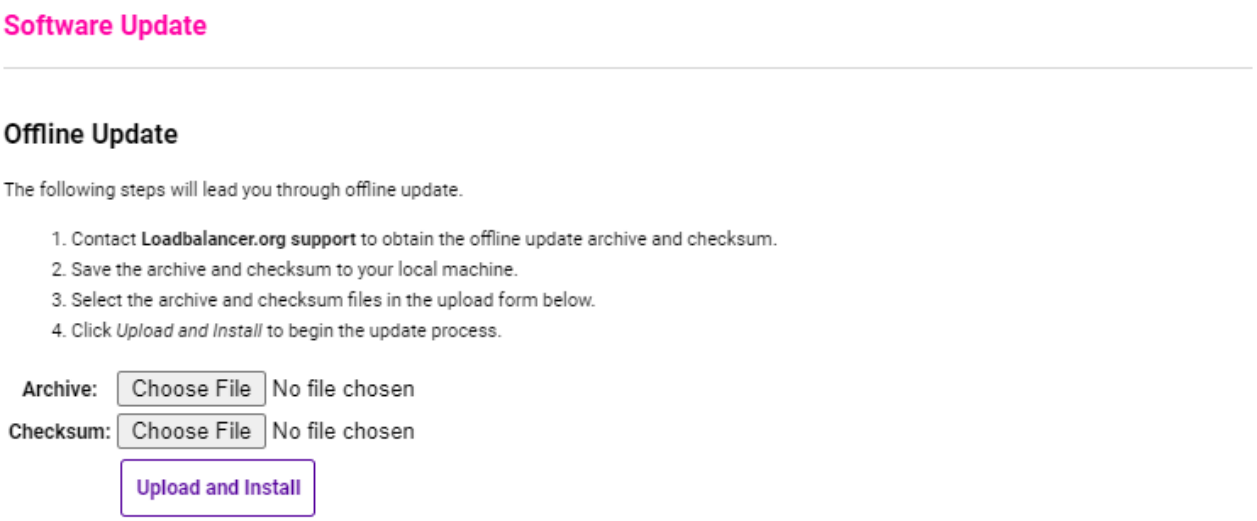
8.4.2. Offline Update

If the appliance does not have access to the Internet, offline update can be used.

To check for the latest version, please refer to our product roadmap page available here. To obtain the latest offline update files contact support@loadbalancer.org.

To perform an offline update:

1. Using the WebUI, navigate to: *Maintenance > Software Update*.
2. Select **Offline Update**.
3. The following screen will be displayed:



4. Select the *Archive* and *Checksum* files.
5. Click **Upload and Install**.
6. If services need to be reloaded/restarted or the appliance needs a full restart, you'll be prompted accordingly.

8.5. Ports Used by the Appliance

By default, the appliance uses the following TCP & UDP ports:

Protocol	Port	Purpose
TCP	22 *	SSH
TCP & UDP	53 *	DNS / GSLB
TCP & UDP	123	NTP

Protocol	Port	Purpose
TCP & UDP	161 *	SNMP
UDP	6694	Heartbeat between Primary & Secondary appliances in HA mode
TCP	7778	HAProxy persistence table replication
TCP	9000 *	Gateway service (Centralized/Portal Management)
TCP	9080 *	WebUI - HTTP (disabled by default)
TCP	9081 *	Nginx fallback page
TCP	9443 *	WebUI - HTTPS
TCP	25565 *	Shuttle service (Centralized/Portal Management)

> **Note** The ports used for SSH, GSLB, SNMP, the WebUI, the fallback page, the gateway service and the shuttle service can be changed if required. For more information, please refer to Service Socket Addresses.

8.6. HA Clustered Pair Configuration

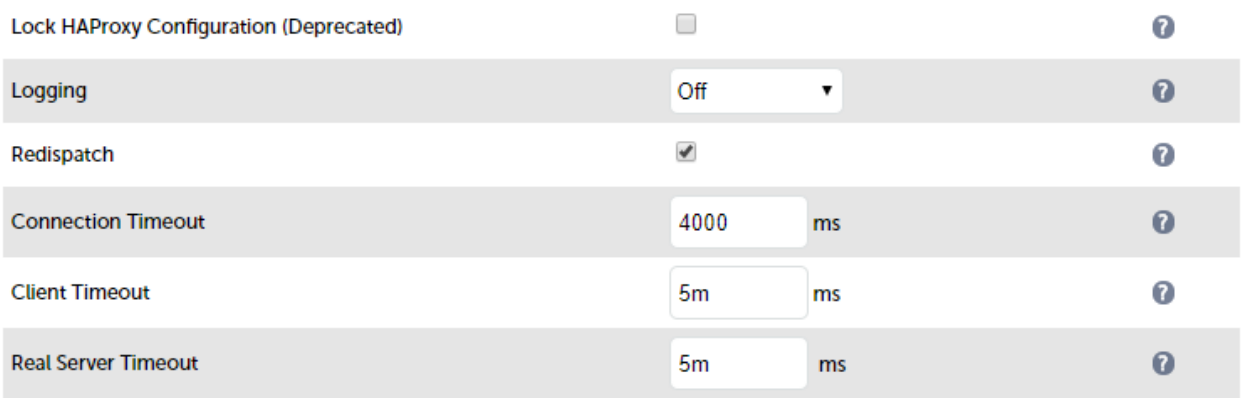
Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary unit is covered in Configuring HA - Adding a Secondary Appliance.

9. Appliance Configuration for Sharepoint

9.1. STEP 1 – Configure Layer 7 Global Settings

To ensure that client connections remain open during periods of inactivity, the Client and Real Server Timeout values must be changed from their default values of 43 seconds and 45 seconds respectively to 5 minutes. To do this follow the steps below:

1. Using the WebUI, navigate to: ***Cluster Configuration > Layer 7 – Advanced Configuration***:



2. Change ***Client Timeout*** to **5m** (i.e. 5 minutes) as shown above.

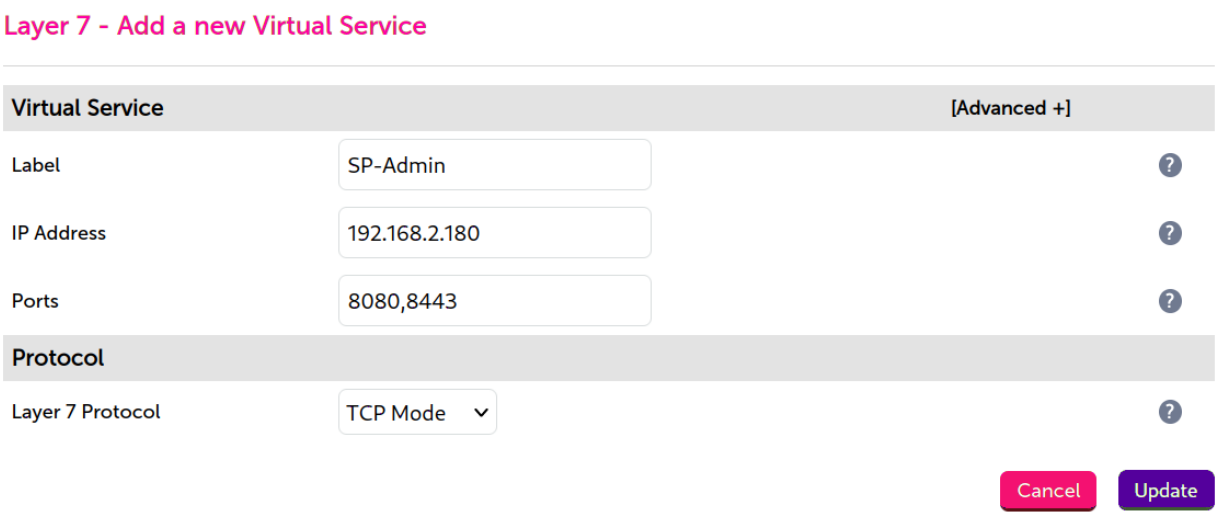
3. Change *Real Server Timeout* to **5m** (i.e. 5 minutes) as shown above.
4. Click the **Update** button to save the settings.

9.2. STEP 2 – Configure the Load Balanced Central Admin Site

9.2.1. Create the Virtual Service (VIP)

This VIP is used to provide access to the Central Administration website on ports 8080 & 8443.

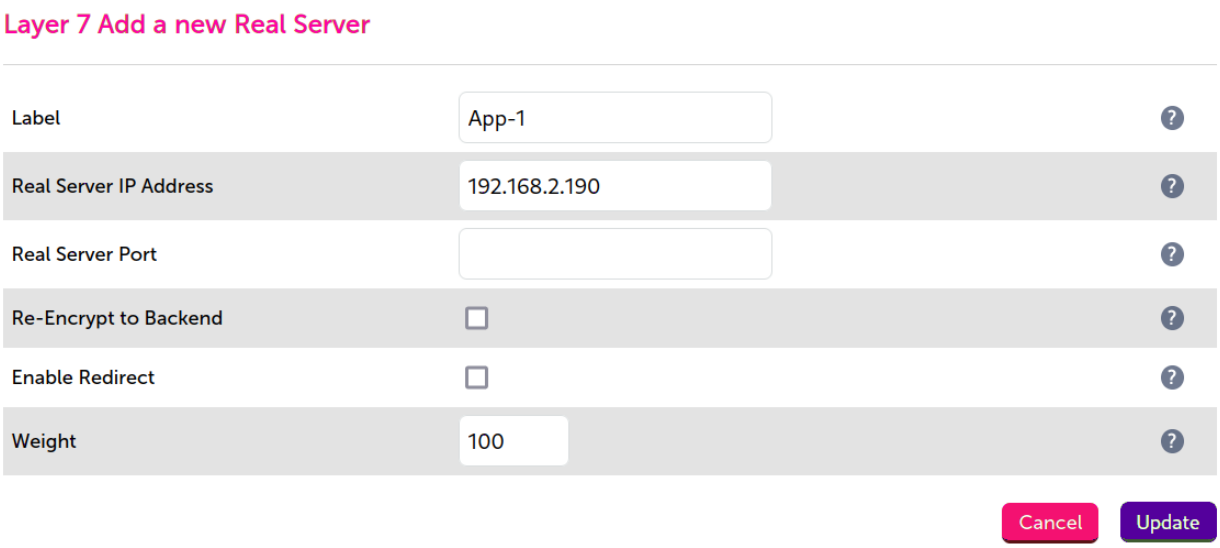
1. Using the WebUI, navigate to: *Cluster Configuration > Layer 7 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:



3. Enter an appropriate label for the VIP, e.g. **SP-Admin**.
4. Set the *Virtual Service IP address* field to the required IP address, e.g. **192.168.2.180**.
5. Set the *Virtual Service Ports* field to **8080,8443**.
6. Change *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update**.
8. Click **Modify** next to the newly created VIP.
9. Set *Balance Mode* as required – **Weighted Least Connections** is recommended.
10. **For Sharepoint 2010** – Ensure that *Persistence Mode* is set to **Source IP**.
11. **For Sharepoint 2013** – Ensure that *Persistence Mode* is set to **None**.
12. Click **Update**.

9.2.2. Define the Real Servers (RIPs)

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 7 – Real Servers* and click **Add a New Real Server** next to the newly created Virtual Service.
2. Enter the following details:



3. Enter an appropriate label for the RIP, e.g. **App-1**.
4. Change the *Real Server IP Address* field to the required IP address, e.g. **192.168.2.190**.
5. Leave the *Real Server Port* field blank.
6. Click **Update**.
7. Repeat the above steps to add your other Application Servers.

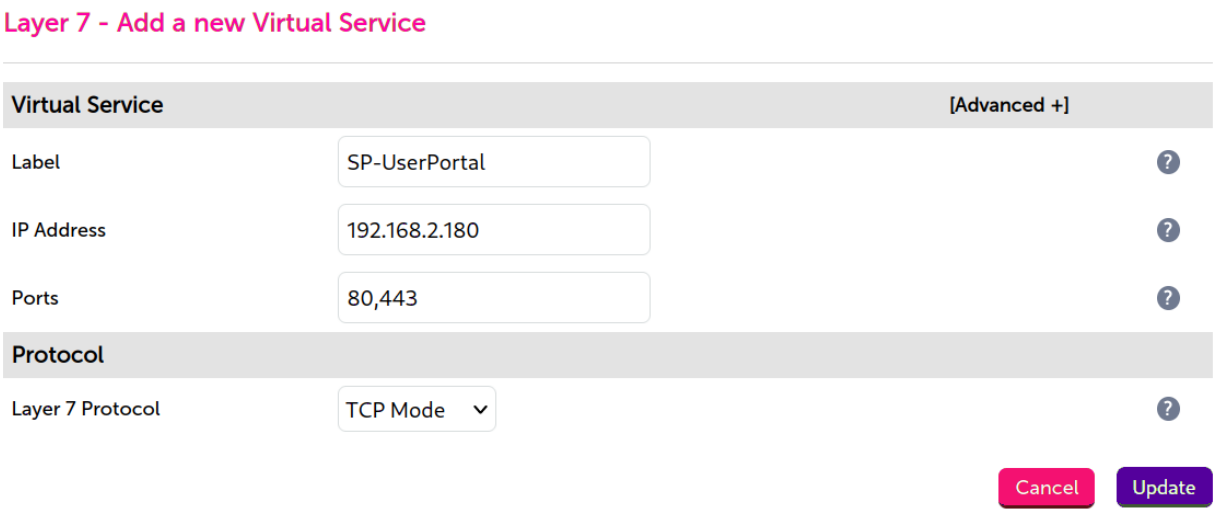
> **Note** Because SNAT is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN.

9.3. STEP 3 – Configure the Load Balanced User Portal Site

9.3.1. Create the Virtual Service (VIP)

This VIP is used to provide access to the User Portal website on ports 80 & 443.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 7 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:

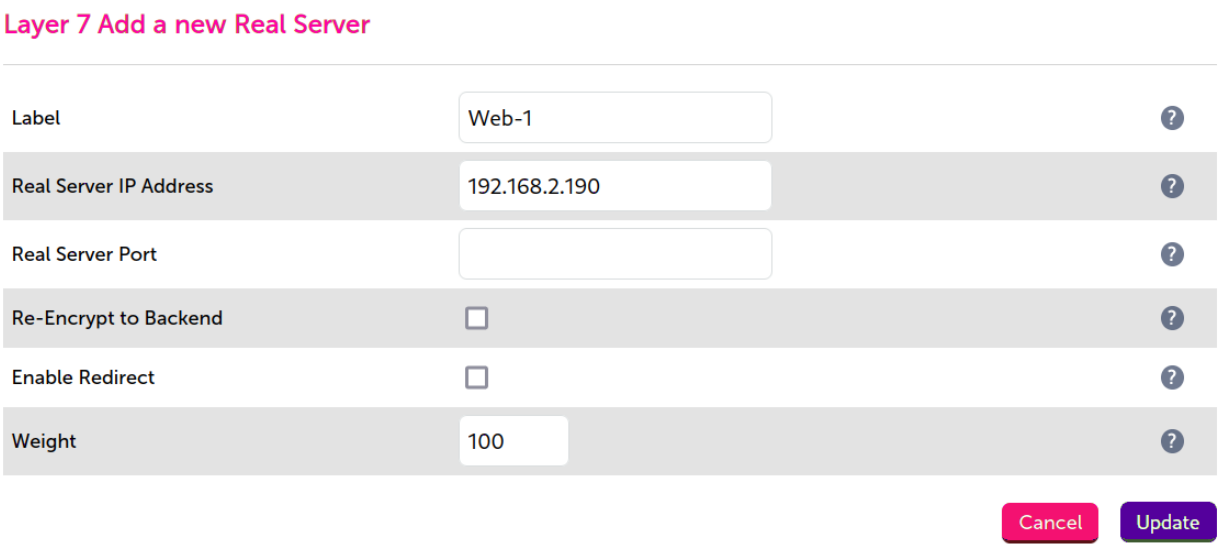


3. Enter an appropriate label for the VIP, e.g. **SP-UserPortal**.
4. Set the *Virtual Service IP address* field to the required IP address, e.g. **192.168.2.180**.
5. Set the *Virtual Service Ports* field to **80,443**.
6. Change *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update**.
8. Click **Modify** next to the newly created VIP.
9. Set *Balance Mode* as required – **Weighted Least Connections** is recommended.
10. **For Sharepoint 2010** – Ensure that *Persistence Mode* is set to **Source IP**.
11. **For Sharepoint 2013** – Ensure that *Persistence Mode* is set to **None**.
12. Click **Update**.

> **Note** Please refer to Configuring an HTTP to HTTPS Redirect for the User Portal for details on configuring a HTTP to HTTPS redirect for the User Portal.

9.3.2. Define the Real Servers (RIPs)

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 7 – Real Servers* and click **Add a New Real Server next** to the newly created Virtual Service.
2. Enter the following details:



3. Enter an appropriate label for the RIP, e.g. **Web-1**.
4. Change the *Real Server IP Address* field to the required IP address, e.g. **192.168.2.190**.
5. Leave the *Real Server Port* field blank.
6. Click **Update**.
7. Repeat the above steps to add your other Web Front End Servers.

> **Note** Because SNAT is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN.

9.4. STEP 4 – Finalizing the Configuration

To apply the new settings, HAProxy must be reloaded. This can be done using the button in the "Commit changes" box at the top of the screen or by using the *Restart Services* menu option:

1. Using the WebUI, navigate to: *Maintenance > Restart Services*.
2. Click **Reload HAProxy**.

10. Testing & Verification

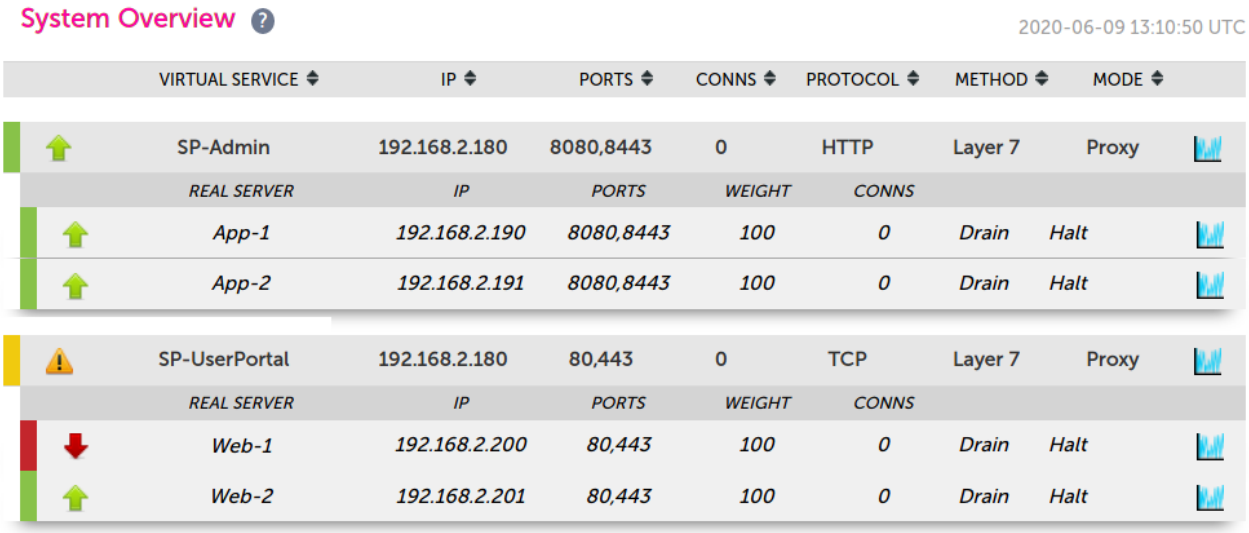
> **Note** For additional guidance on diagnosing and resolving any issues you may have, please also refer to Diagnostics & Troubleshooting.

It's 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.

The System Overview in the WebUI can then be used to check that the server has been marked down (colored red). Also, when the cable is plugged back 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 IIS User

Portal site on Web-1 will cause the system overview to mark **SP-UserPortal/Web-1** as down (red) as shown below:



SP-UserPortal/Web-2 is still healthy (green), so all requests will now be routed here.

The System Overview also enables the servers to be taken offline using the Drain and Halt options. The enables servers to be removed from the cluster to perform maintenance tasks etc. Once again, requests will then only be sent to the remaining operational server.

11. Technical Support

If you have any questions regarding the appliance or would like assistance designing your deployment, please don't hesitate to contact our support team: support@loadbalancer.org.

12. Further Documentation

For additional information, please refer to the Administration Manual.

13. Appendix

13.1. Configuring HA - Adding a Secondary Appliance

Our recommended configuration is to use a clustered HA pair of load balancers to provide a highly available and resilient load balancing solution. We recommend that the Primary appliance is fully configured first, then the Secondary appliance can be added to create an HA pair. Once the HA pair is configured, load balanced services must be configured and modified on the Primary appliance. The Secondary appliance will be automatically kept in sync.

> **Note** For Enterprise Azure, the HA pair should be configured first. For more information, please refer to the Azure Quick Start/Configuration Guide available in the documentation library

The clustered HA pair uses Heartbeat to determine the state of the other appliance. Should the active device (normally the Primary) suffer a failure, the passive device (normally the Secondary) will take over.

13.1.1. Non-Replicated Settings

A number of settings are not replicated as part of the Primary/Secondary pairing process and therefore must be manually configured on the Secondary appliance. These are listed by WebUI menu option in the table below:

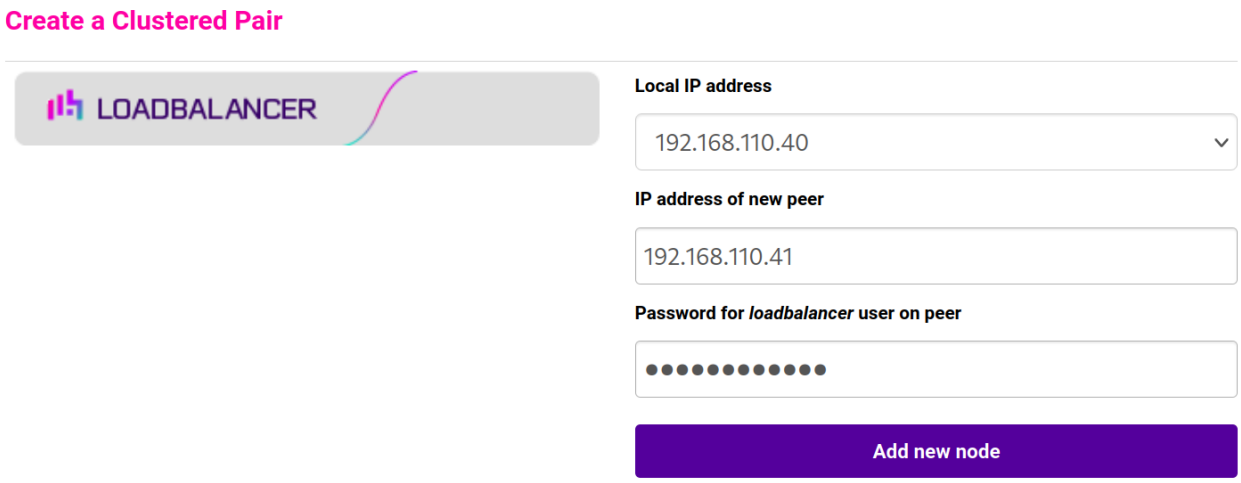
WebUI Main Menu Option	Sub Menu Option	Description
Local Configuration	Hostname & DNS	Hostname and DNS settings
Local Configuration	Network Interface Configuration	Interface IP addresses, bonding configuration and VLANs
Local Configuration	Routing	Default gateways and static routes
Local Configuration	System Date & time	Time and date related settings
Local Configuration	Physical – Advanced Configuration	Various appliance settings
Local Configuration	Portal Management	Portal management settings
Local Configuration	Security	Security settings
Local Configuration	SNMP Configuration	SNMP settings
Local Configuration	Graphing	Graphing settings
Local Configuration	License Key	Appliance licensing
Maintenance	Backup & Restore	Local XML backups
Maintenance	Software Updates	Appliance software updates
Maintenance	Fallback Page	Fallback page configuration
Maintenance	Firewall Script	Firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings

> **Important** Make sure that where any of the above have been configured on the Primary appliance, they're also configured on the Secondary.

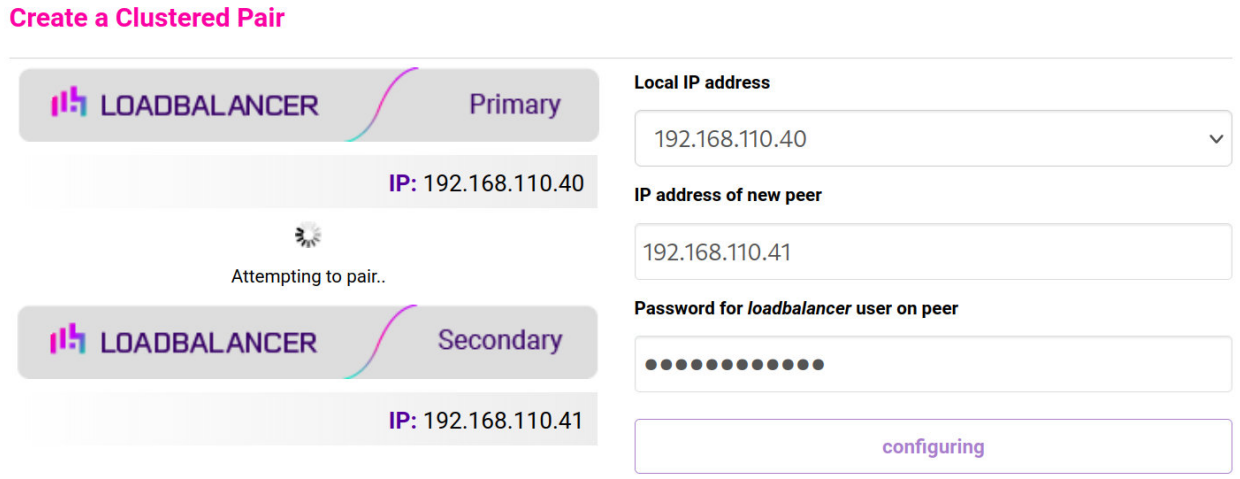
13.1.2. Configuring the HA Clustered Pair

> **Note** If you have already run the firewall lockdown wizard on either appliance, you'll need to ensure that it is temporarily disabled on both appliances whilst performing the pairing process.

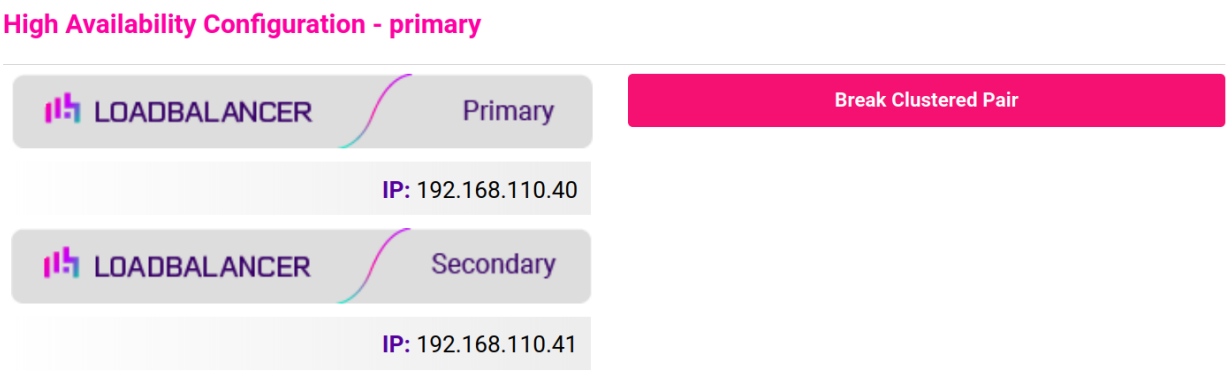
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.



3. Specify the IP address and the *loadbalancer* user's password for the Secondary (peer) appliance as shown in the example above.
4. Click **Add new node**.
5. The pairing process now commences as shown below:



6. Once complete, the following will be displayed on the Primary appliance:



7. To finalize the configuration, restart heartbeat and any other services as prompted in the "Commit changes" message box at the top of the screen.

> **Note** Clicking the **Restart Heartbeat** button on the Primary appliance will also automatically restart heartbeat on the Secondary appliance.

> **Note** For more details on configuring HA with 2 appliances, please refer to Appliance Clustering for HA.

> **Note** For details on testing and verifying HA, please refer to Clustered Pair Diagnostics.

13.2. Configuring an HTTP to HTTPS Redirect for the User Portal

An additional later 7 VIP is required that listens on HTTP port 80 on the same IP address. The VIP is then configured to redirect connections to HTTPS port 443.

e.g. **http://sharepoint.robstest.com/**

should be auto-redirected to:

https://sharepoint.robstest.com/

The steps:

1. Create another Layer 7 VIP with the following settings:
   - Label: **SP-UserPortalRedirect**
   - Virtual Service IP Address: **<same as the VIP that's listening on port 443>**
   - Virtual Service Ports: **80**
   - Layer 7 Protocol: **HTTP Mode**
   - Persistence Mode: **None**
   - Force to HTTPS: **Yes**

> **Note** This additional VIP will be shown purple/green to indicate that it's being used for HTTP to HTTPS redirection.

2. Remove port 80 from the user portal VIP – otherwise a configuration error message will be displayed since there would be a conflict.
3. Apply the new settings – to apply the new settings, reload HAProxy as using the reload button in the "Commit changes" box at the top of the screen.

14. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.6.0	17 October 2019	Styling and layout	General styling updates	RJC
1.6.1	9 June 2020	New title page Updated Canadian contact details New screenshots for creating VIPs and of the System Overview in 'Testing & Verification'	Branding update Change to Canadian contact details Changes to the appliance WebUI	AH
1.6.2	17 August 2021	Removed links to various Microsoft articles Various minor updates	No longer available on the Microsoft website Consistency across documentation library	RJC
1.7.0	1 January 2022	Converted the document to AsciiDoc	Move to new documentation system	AH, RJC, ZAC
1.7.1	28 September 2022	Updated layer 7 VIP and RIP creation screenshots	Reflect changes in the web user interface	AH
1.7.2	5 January 2023	Combined software version information into one section Added one level of section numbering Added software update instructions Added table of ports used by the appliance Reworded 'Further Documentation' section Removed references to the colour of certain UI elements	Housekeeping across all documentation	AH
1.7.3	2 February 2023	Updated screenshots	Branding update	AH
1.7.4	7 March 2023	Removed conclusion section	Updates across all documentation	AH

Version	Date	Change	Reason for Change	Changed By
1.8.0	24 March 2023	New document theme Modified diagram colours	Branding update	AH

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