

# Load Balancing EMIS Symphony

Version 1.0.0



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## 1. About this Brief

This brief outlines the steps required to configure a load balanced EMIS Symphony environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any EMIS Symphony 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 EMIS Symphony. For full specifications of available models please refer to https://www.loadbalancer.org/products.

Some features may not be supported in all cloud platforms due to platform specific limitations, please check with Loadbalancer.org support for further details.

# 3. Software Versions Supported

## 3.1. Loadbalancer.org Appliance

V8.6.1 and later

**8** Note

The screenshots used throughout this document aim to track the latest Loadbalancer.org software version. If using an older software version, note that the screenshots presented here may not match the WebUI exactly.

## 3.2. EMIS Symphony

All versions

# 4. EMIS Symphony

Symphony from EMIS is a market-leading clinical system for urgent and emergency care. It supports patient management, patient tracking, and clinical workflow. By providing busy teams with the information needed at the point of care, Symphony enables faster, safer, and more efficient working.

# 5. Load Balancing EMIS Symphony

8 Note

It's highly recommended that you have a working EMIS Symphony environment first before implementing the load balancer.

## 5.1. Persistence (aka Server Affinity)

To correctly load balance EMIS Symphony traffic, session affinity is required at the load balancing layer. This is achieved by using source IP address-based affinity, which is enabled by default when creating a virtual service.



## 5.2. Virtual Service (VIP) Requirements

To provide load balancing and HA for EMIS Symphony, a single VIP is required:

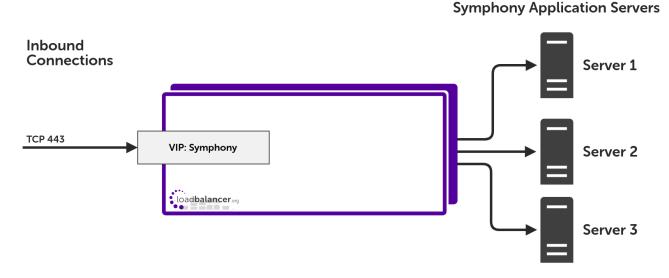
• Symphony (for HTTPS-based client access)

## 5.3. Port Requirements

The following table shows the port that is load balanced:

Port	Protocols	Use	
443	TCP/HTTPS	Client Access to Symphony Services	

# 6. Deployment Concept



VIPs = Virtual IP Addresses

8 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 the section Configuring HA - Adding a Secondary Appliance in the appendix for more details on configuring a clustered pair.

# 7. Load Balancer Deployment Methods

The load balancer can be deployed in 4 fundamental ways: Layer 4 DR mode, Layer 4 NAT mode, Layer 4 SNAT mode, and Layer 7 SNAT mode.

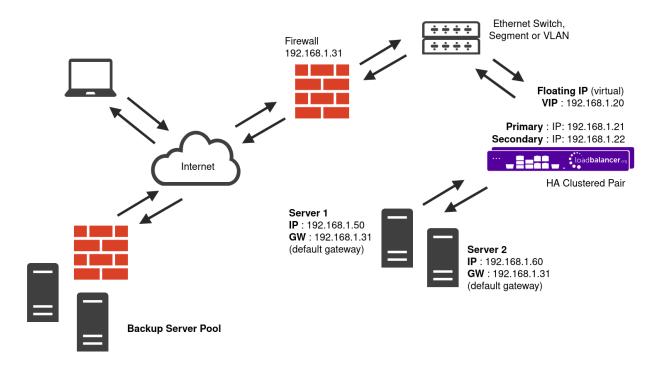
For EMIS Symphony, using layer 7 SNAT mode is recommended. This mode is described below and is used for the configurations presented in this guide. For configuring using layer 7 SNAT mode refer to Section 9, "Appliance Configuration for EMIS Symphony".

## 7.1. Layer 7 SNAT Mode

Layer 7 SNAT mode uses a proxy (HAProxy) at the application layer. Inbound requests are terminated on the load



balancer and HAProxy generates a new corresponding request to the chosen Real Server. As a result, Layer 7 is typically not as fast as the Layer 4 methods. Layer 7 is typically chosen when either enhanced options such as SSL termination, cookie based persistence, URL rewriting, header insertion/deletion etc. are required, or when the network topology prohibits the use of the layer 4 methods.



- Because layer 7 SNAT mode is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN.
- Layer 7 SNAT mode is not transparent by default, i.e. the Real Servers will not see the source IP address of the client, they will see the load balancer's own IP address by default, or any other local appliance IP address if preferred (e.g. the VIP address). This can be configured per layer 7 VIP. If required, the load balancer can be configured to provide the actual client IP address to the Real Servers in 2 ways. Either by inserting a header that contains the client's source IP address, or by modifying the Source Address field of the IP packets and replacing the IP address of the load balancer with the IP address of the client. For more information on these methods please refer to Transparency at Layer 7.
- Layer 7 SNAT mode can be deployed using either a one-arm or two-arm configuration. For two-arm deployments, **eth0** is normally used for the internal network and **eth1** is used for the external network although this is not mandatory.
- Requires no mode-specific configuration changes to the load balanced Real Servers.
- Port translation is possible with Layer 7 SNAT mode, e.g. VIP:80 → RIP:8080 is supported.
- You should not use the same RIP:PORT combination for layer 7 SNAT mode VIPs and layer 4 SNAT mode VIPs because the required firewall rules conflict.

# 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.
8 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.
8 Note	The VA has 4 network adapters. For VMware only the first adapter ( <b>eth0</b> ) 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 Server and other network 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.

8 Note	There are certain differences when accessing the WebUI for the cloud appliances. For details, please refer to the relevant Quick Start / Configuration Guide.
§ Note	A number of compatibility issues have been found with various versions of Microsoft Internet Explorer and Edge. The WebUI has been tested and verified using both Chrome & Firefox.

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

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

You'll receive a warning about the WebUl's 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.

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

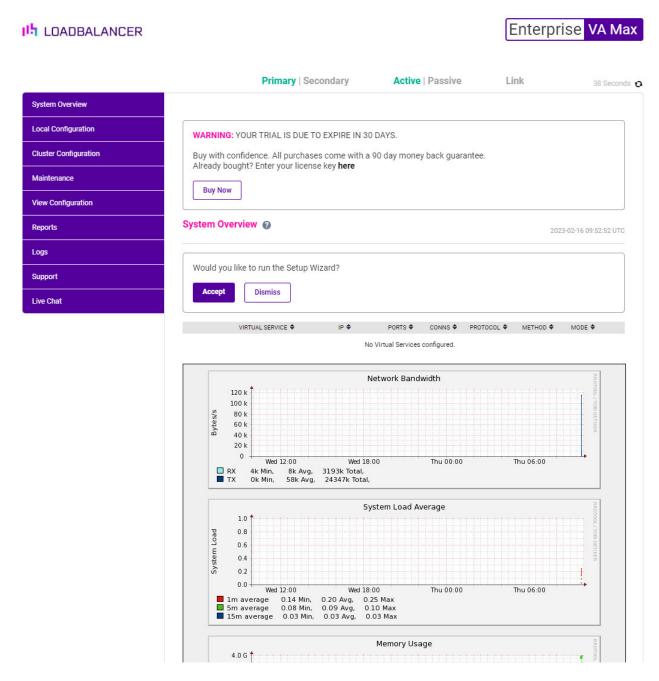
Username: loadbalancer



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.

#### 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 taking 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

To ensure that the appliance(s) are running the latest software version, we recommend a software update check is performed.

#### **Determining the Current Software Version**

The software version is displayed at the bottom of the WebUI as shown in the example below:

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#### Checking for Updates using Online Update

8 Note

By default, the appliance periodically contacts the Loadbalancer.org update server and checks for updates. An update check can also be manually triggered as detailed below.

- 1. Using the WebUI, navigate to: Maintenance > Software Update.
- 2. Select Online Update.
- 3. If the latest version is already installed, a message similar to the following will be displayed:

Information: Version v8.9.0 is the current release. No updates are available

- 4. If an update is available, you'll be presented with a list of new features, improvements, bug fixes and security related updates.
- 5. Click **Online Update** to start the update process.
  - Note Do not navigate away whilst the update is ongoing, this may cause the update to fail.
- 6. Once complete (the update can take several minutes depending on download speed and upgrade version) the following message will be displayed:

Information: Update completed successfully.

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

#### **Using Offline Update**

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

8 Note

Please contact support@loadbalancer.org to check if an update is available and obtain the latest offline update files.

#### 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:

#### **Software Update**

#### Offline Update

The following steps will lead you through offline update.

- 1. Contact Loadbalancer.org support to obtain the offline update archive and checksum.
- 2. Save the archive and checksum to your local machine.
- 3. Select the archive and checksum files in the upload form below.
- 4. Click Upload and Install to begin the update process.

Archive: Choose File No file chosen
Checksum: Choose File No file chosen
Upload and Install

- 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
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	9080	WebUI - HTTP (disabled by default)
TCP	9081	Nginx fallback page
TCP	9443	WebUI - HTTPS

## 8.6. HA Clustered Pair Configuration

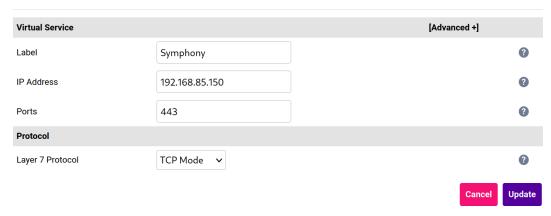
Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary unit is covered in the section Configuring HA - Adding a Secondary Appliance of the appendix.

# 9. Appliance Configuration for EMIS Symphony

# 9.1. Configuring the Virtual Service (VIP)

- 1. Using the web user interface, navigate to *Cluster Configuration > Layer 7 Virtual Services* and click on **Add** a new Virtual Service.
- 2. Define the *Label* for the virtual service as required, e.g. **Symphony**.
- 3. Set the Virtual Service IP Address field to the required IP address, e.g. 192.168.85.150.
- 4. Set the Ports field to 443.
- 5. Set the Layer 7 Protocol to TCP Mode.
- 6. Click **Update** to create the virtual service.

Layer 7 - Add a new Virtual Service



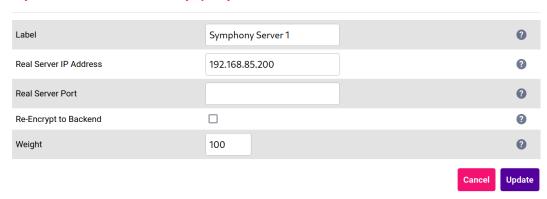
## 9.2. Defining the Real Servers (RIPs)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.



- 2. Define the *Label* for the real server as required, e.g. **Symphony Server 1**.
- 3. Set the Real Server IP Address field to the required IP address, e.g. 192.168.85.200.
- 4. Click Update.
- 5. Repeat these steps to add the remaining Symphony servers.

Layer 7 Add a new Real Server - Symphony



## 9.3. 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.

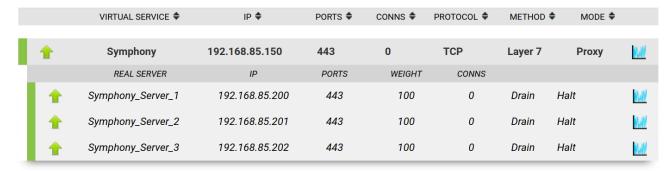
# 10. Testing & Verification

1 Note

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

## 10.1. Using System Overview

The System Overview can be viewed in the WebUI. It shows a graphical view of all VIPs & RIPs (i.e. the EMIS Symphony servers) and shows the state/health of each server as well as the state of the cluster as a whole. The example below shows a standard deployment where all EMIS Symphony servers are healthy and available to accept connections:



# 11. Technical Support

For more details about configuring the appliance and assistance with designing your deployment please don't hesitate to contact the support team using the following email address: 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 configured first and then the Secondary should be added. Once the Primary and Secondary are paired, all load balanced services configured on the Primary are automatically replicated to the Secondary over the network using SSH/SCP.

8 Note

For Enterprise Azure, the HA pair should be configured first. In Azure, when creating a VIP using an HA pair, 2 private IPs must be specified – one for the VIP when it's active on the Primary and one for the VIP when it's active on the Secondary. Configuring the HA pair first, enables both IPs to be specified when the VIP is created.

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.

#### 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:

WebUl Main Menu Option	Sub Menu Option	Description
Local Configuration	Hostname & DNS	Hostname and DNS settings
Local Configuration	Network Interface Configuration	All network settings including IP address(es), bonding configuration and VLANs
Local Configuration	Routing	Routing configuration including default gateways and static routes
Local Configuration	System Date & time	All time and date related settings
Local Configuration	Physical – Advanced Configuration	Various settings including Internet Proxy, Management Gateway, Firewall connection tracking table size, NIC offloading, SMTP relay, logging and Syslog Server
Local Configuration	Security	Appliance security settings
Local Configuration	SNMP Configuration	Appliance SNMP settings
Local Configuration	Graphing	Appliance graphing settings
Local Configuration	License Key	Appliance licensing
Maintenance	Software Updates	Appliance software update management
Maintenance	Firewall Script	Appliance firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings

(!) Important

Make sure that if these settings/updates have been configured on the Primary appliance, they're also configured on the Secondary appliance.

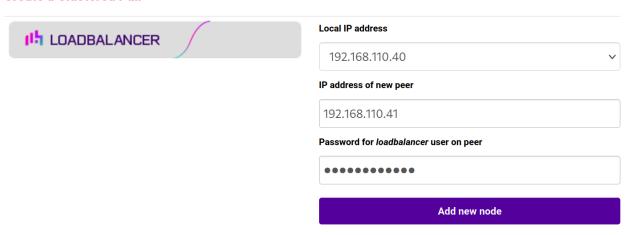
#### Adding a Secondary Appliance - Create an HA Clustered Pair

8 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.

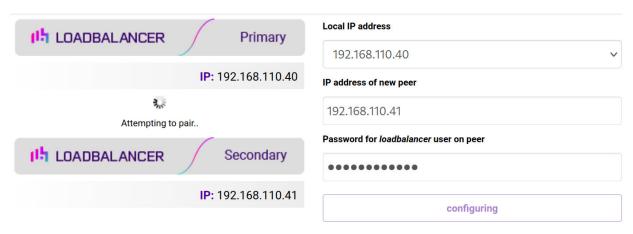
- 1. Deploy a second appliance that will be the Secondary and configure initial network settings.
- 2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.

#### **Create a Clustered Pair**



- 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:

#### **Create a Clustered Pair**

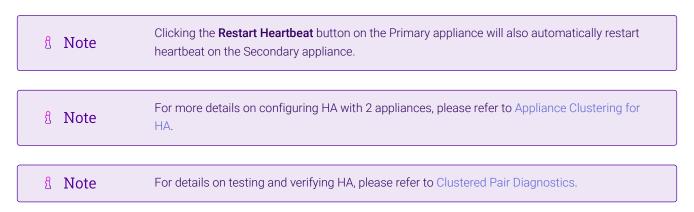


6. Once complete, the following will be displayed on the Primary appliance:

#### **High Availability Configuration - primary**



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.



# 14. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.0.0	24 August 2023	Initial version		MT, AH



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