LOADBALANCER

DEPLOYMENT BRIEF

Load Balancing CyberArk PSM

Version 1.0.0

Table of Contents

1. About this Brief

This brief outlines the steps required to configure a load balanced CyberArk PSM environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any CyberArk PSM 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 CyberArk PSM. 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

- V8.13.2 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. CyberArk PSM

- All versions

4. CyberArk PSM

CyberArk Privileged Session Manager (PSM) enables organizations to secure, control and monitor privileged access to network devices by using the Vault technology to manage privileged accounts and record all IT administrator privileged sessions on remote machines.

PSM acts as an additional authentication layer and proxy for RDP connections. It also includes an HTML5 gateway, which allows users to establish RDP sessions directly from a web browser.

5. Load Balancing CyberArk PSM

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

5.1. Load Balancing & HA Requirements

Installing multiple PSM servers in a load balanced configuration provides load sharing, high availability and resilience, along with better utilization of hardware resources compared to an active-passive cluster.

Both the native RDP service and the HTML5 gateway can be load balanced. For more information, please refer to the CyberArk article Install PSM in a load balancing environment.

5.2. Virtual Service (VIP) Requirements

To provide load balancing and HA for CyberArk PSM, the following VIPs are required:

Ref.	VIP Name	Mode	Port(s)	Persistence Mode	Health Check
VIP 1	CyberArk-PSM	L7 SNAT (TCP)	3389	Source IP	HTTPS (GET)
VIP 2	CyberArk-PSM-Web	L7 SNAT (TCP)	443	Source IP	HTTPS (GET)

5.3. SSL Termination

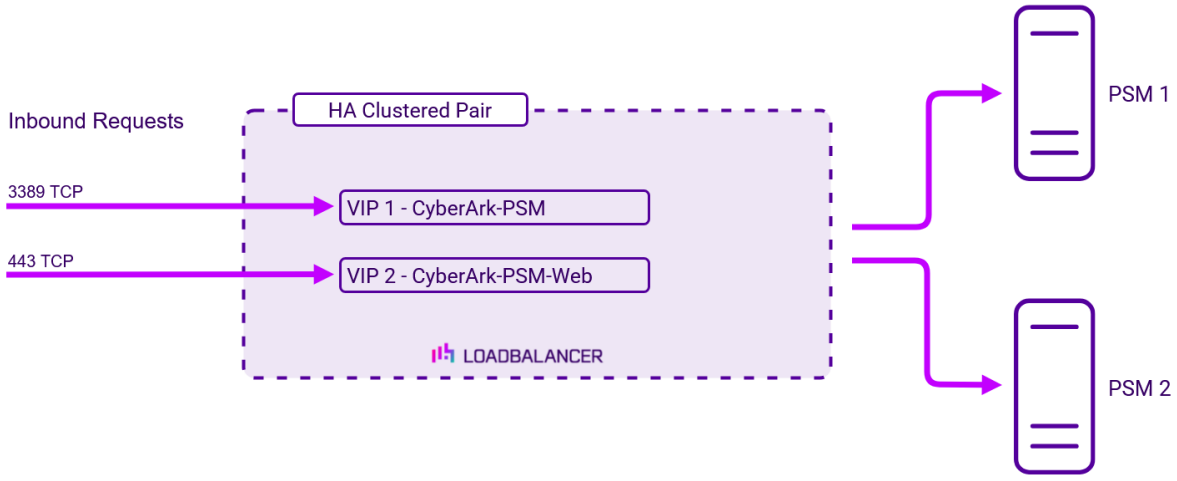
CyberArk recommends that SSL/TLS is **not** terminated on the load balancer. The Virtual Services are configured in Layer 7 TCP mode so that encrypted traffic is passed through to the PSM servers unmodified.

5.4. Health Checks

PSM provides a health check service that reports the availability (health) of the PSM service to the load balancer. The health check script must be installed manually on each PSM server — see Configuring CyberArk PSM for Load Balancing. Once installed, the load balancer queries the **/psm/api/health** endpoint over HTTPS and expects a response of **PASS** from a healthy server. For more information, please refer to the CyberArk article PSM health check.

6. Deployment Concept

Once the load balancer is deployed, clients connect to the Virtual Services (VIPs) rather than connecting directly to one of the CyberArk PSM servers. These connections are then load balanced across the CyberArk PSM 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 the section Configuring HA - Adding a Secondary Appliance in the appendix for more details on configuring a clustered pair.

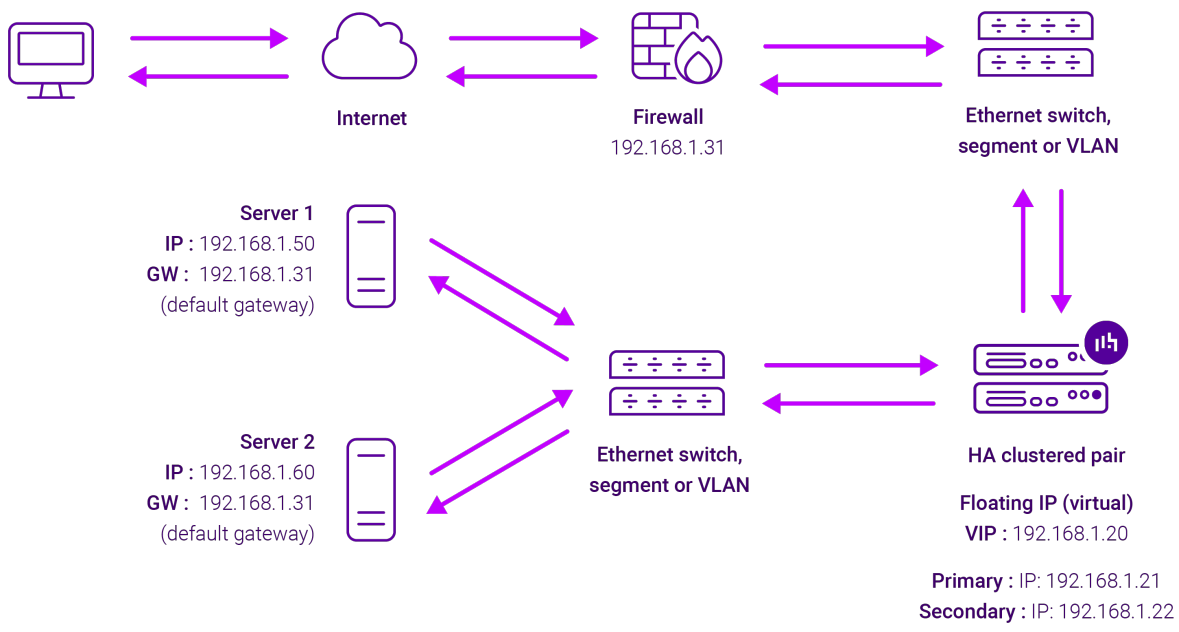
7. Load Balancer Deployment Methods

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 CyberArk PSM, layer 7 SNAT mode is recommended. This mode is described below and is used for the configuration presented in this guide.

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. The image below shows an example network diagram for this mode.



- Because layer 7 SNAT mode is a full proxy, Real Servers in the cluster can be on any accessible network 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, **eth1** is typically used for client side connections and **eth0** is used for Real Server connections, although this is not mandatory since any interface can be used for any purpose.
- 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.

> **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.

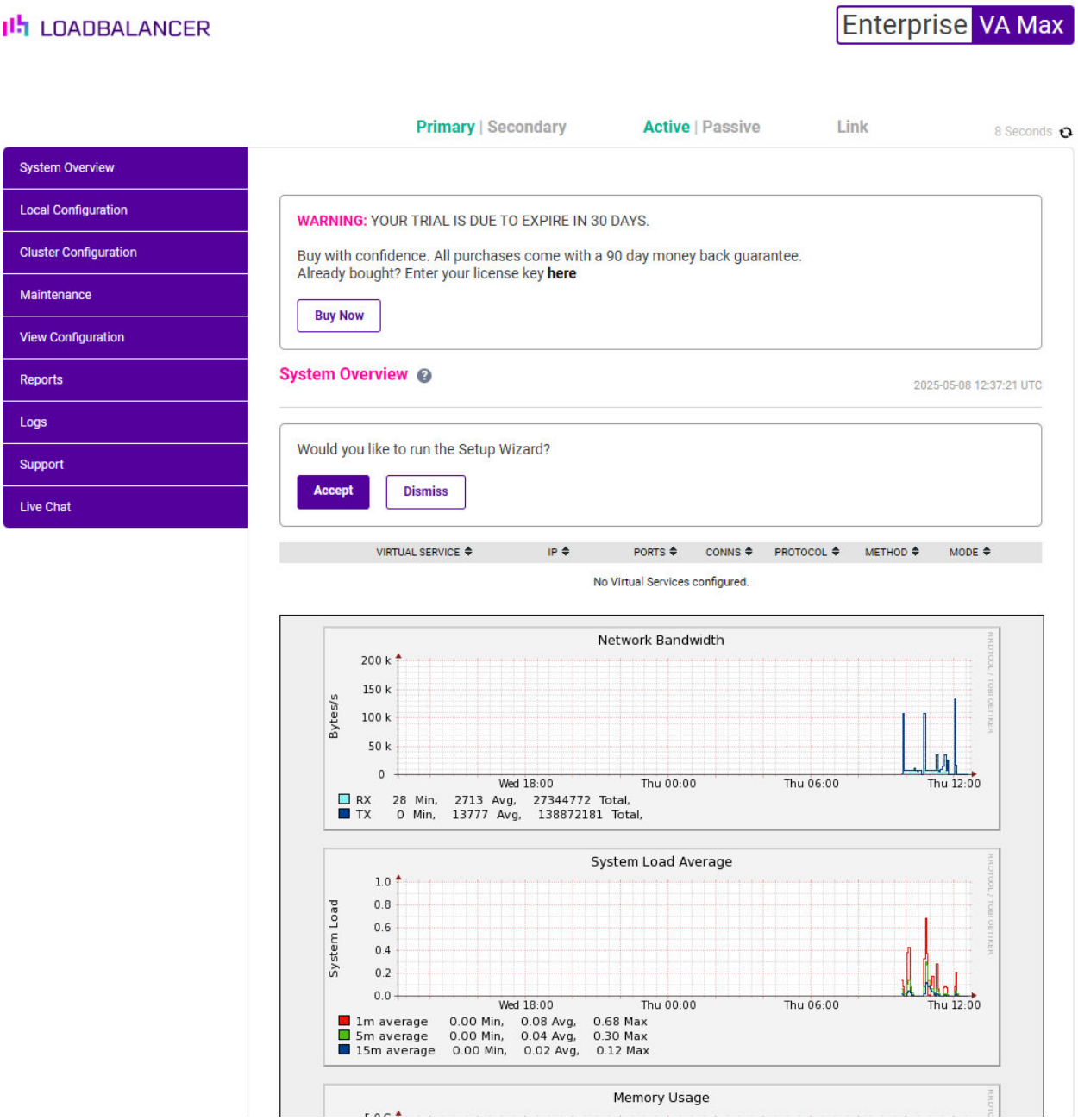
   > **Note** If you need to change the port, IP address or protocol that the WebUI listens on, please refer to Service Socket Addresses.

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

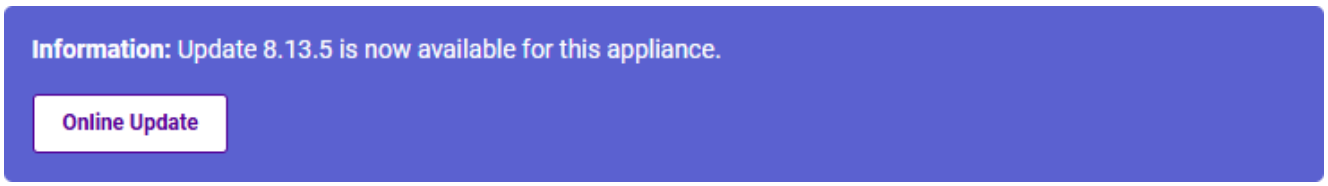
We recommend that the appliance is kept up to date to ensure that you benefit from the latest bug fixes, security updates and feature improvements. Both online and offline update are supported.

> **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

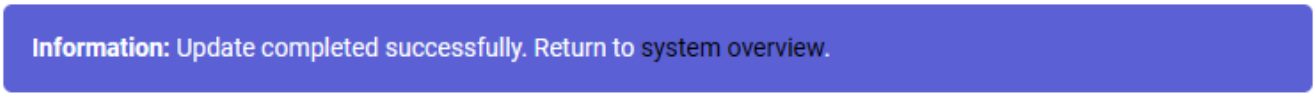
The appliance periodically contacts the Loadbalancer.org update server (**update.loadbalancer.org**) and checks for updates. This is the default behavior and can be disabled if preferred. If an update is found, a notification similar to the example below will be displayed at the top of the WebUI:



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.

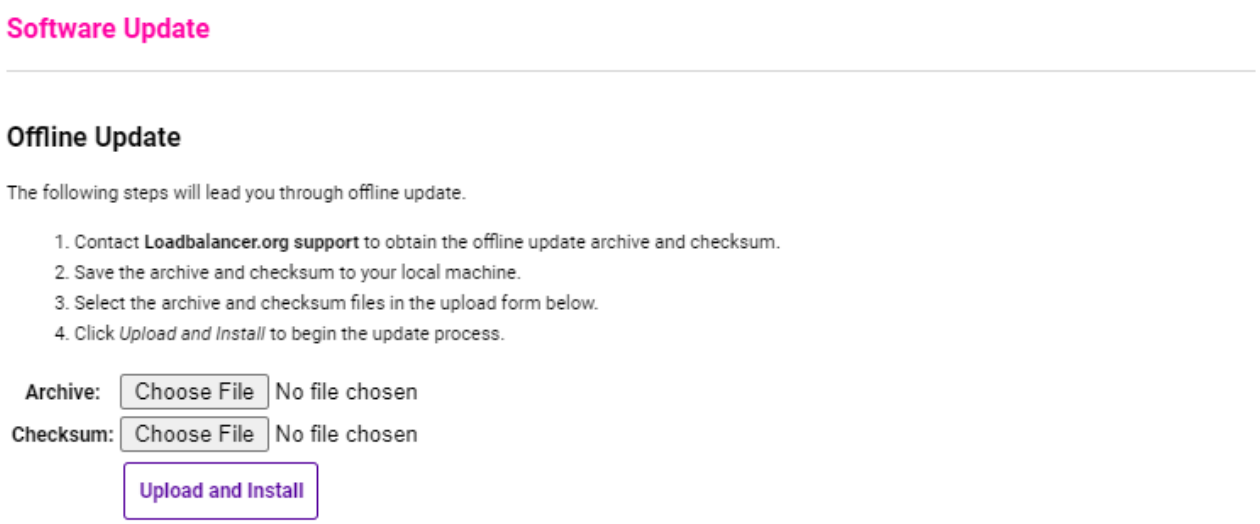
8.4.2. Offline Update

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	GSLB
TCP & UDP	123	NTP
TCP & UDP	161	SNMP
UDP	6694	Heartbeat between Primary & Secondary appliances in HA mode
TCP	7778	HAProxy persistence table replication
TCP	9000	Gateway service for ADC Portal comms
TCP	9080	WebUI - HTTP (disabled by default)
TCP	9081	Nginx fallback server
TCP	9443	WebUI - HTTPS
TCP	25565	Shuttle service for ADC Portal comms

> **Note** All ports listed above except port 123 (NTP) can be changed if required.

- To change the port used for heartbeat, refer to Configuring High Availability
- To change the port used for HAProxy replication, refer to Layer 7 - Advanced Configuration
- To change other ports, 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 the section Configuring HA - Adding a Secondary Appliance of the appendix.

9. Configuring CyberArk PSM for Load Balancing

A number of changes must be made to the PSM environment before it can be load balanced:

1. **Configure PSM for a load balancing environment**
   Each PSM server must be configured to operate behind a load balancer. The required settings are described in the section "Set up PSM in a load balancing environment" of the CyberArk article Install PSM in a load balancing environment.
2. **Install the health check script**
   The PSM health check script must be installed manually on each PSM (Real) server so that the load balancer can determine server health. Please refer to the CyberArk article PSM health check.
3. **Configure the HTML5 gateway (if used)**
   If the HTML5 gateway is being load balanced (VIP 2), additional configuration steps are required on each gateway. Please refer to the CyberArk article Configure the PSM HTML5 gateway.

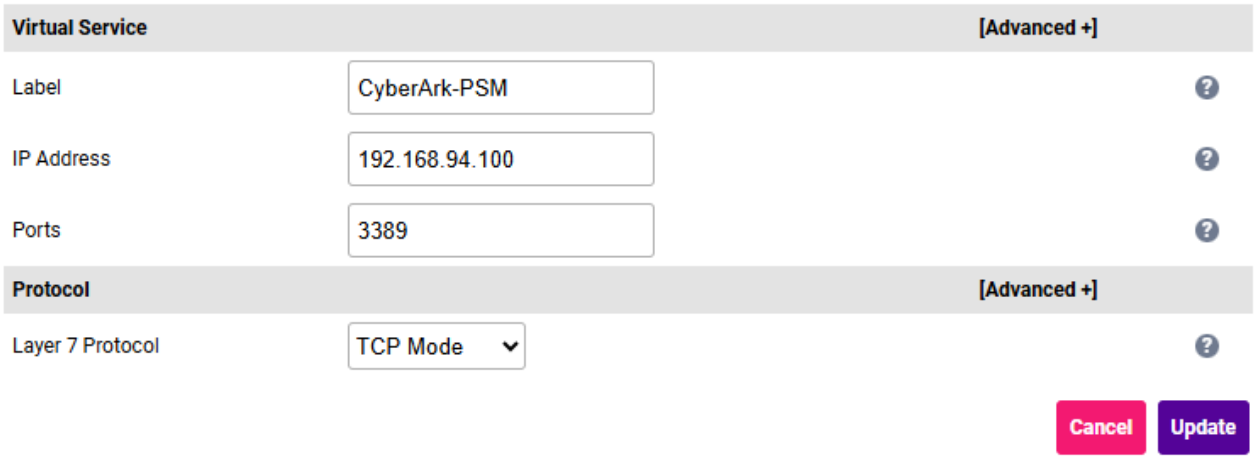
10. Appliance Configuration for CyberArk PSM

10.1. VIP 1 - CyberArk-PSM

This Virtual Service load balances the native PSM RDP service.

10.1.1. Virtual Service (VIP) Configuration

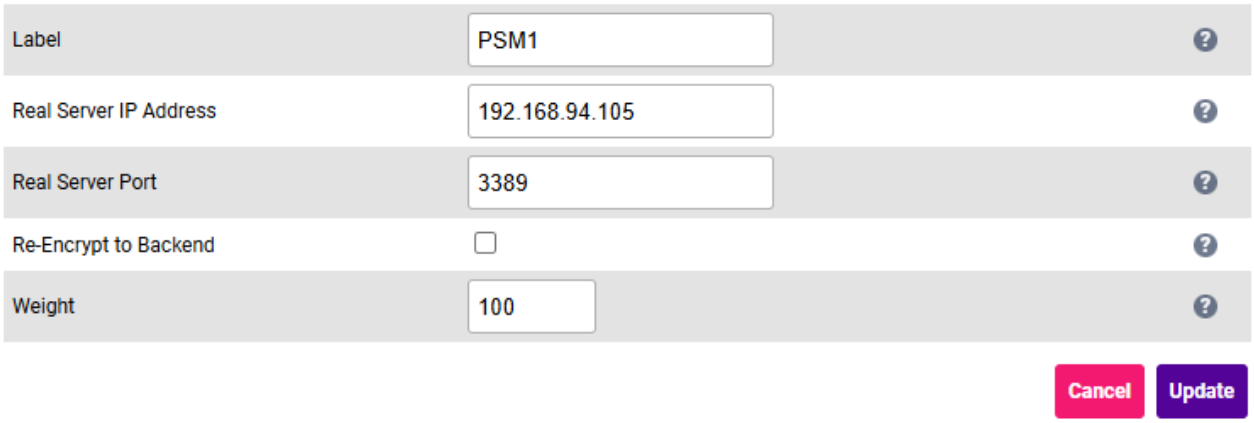
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click **Add a new Virtual Service**.



2. Enter an appropriate *Label* (name) for the Virtual Service, e.g. **CyberArk-PSM**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.94.100**.
4. Set *Ports* to **3389**.
5. Set the *Layer 7 Protocol* to **TCP Mode**.
6. Click **Update**.
7. Now click **Modify** next to the newly created VIP.
8. Ensure *Persistence Mode* is set to **Source IP**.
9. Scroll down to the *Health Checks* section.
    - Set *Health Checks* to **Negotiate HTTPS (GET)**.
    - Set *Check Port* to **443** (the RDP service does not respond to HTTP/HTTPS, so the health check must target the PSM health check service on port 443).
    - Set *Request to Send* to **/psm/api/health**.
    - Set *Response Expected* to **PASS**.
10. Leave all other settings at their default value.
11. Click **Update**.

10.1.2. Configure the Associated Real Servers (RIPs)

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



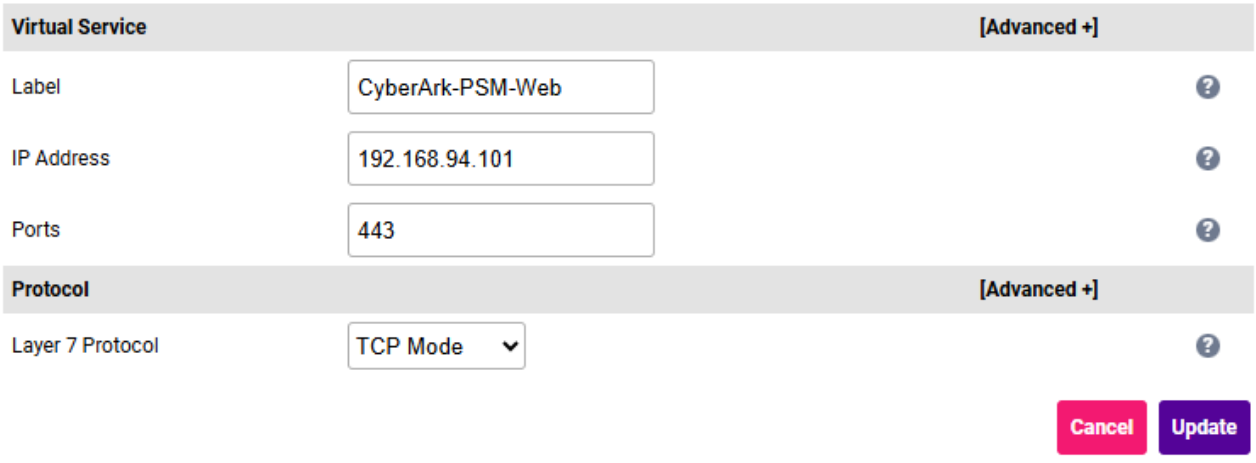
2. Enter an appropriate *Label* (name) for the Real Server, e.g. **PSM1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.94.105**.
4. Set the *Real Server Port* field to **3389**.
5. Leave all other settings at their default value.
6. Click **Update**.
7. Repeat these steps to add additional Real Server(s).

10.2. VIP 2 - CyberArk-PSM-Web

This Virtual Service load balances the PSM HTML5 gateway, which allows users to establish RDP sessions through a web browser.

10.2.1. Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click **Add a new Virtual Service**.

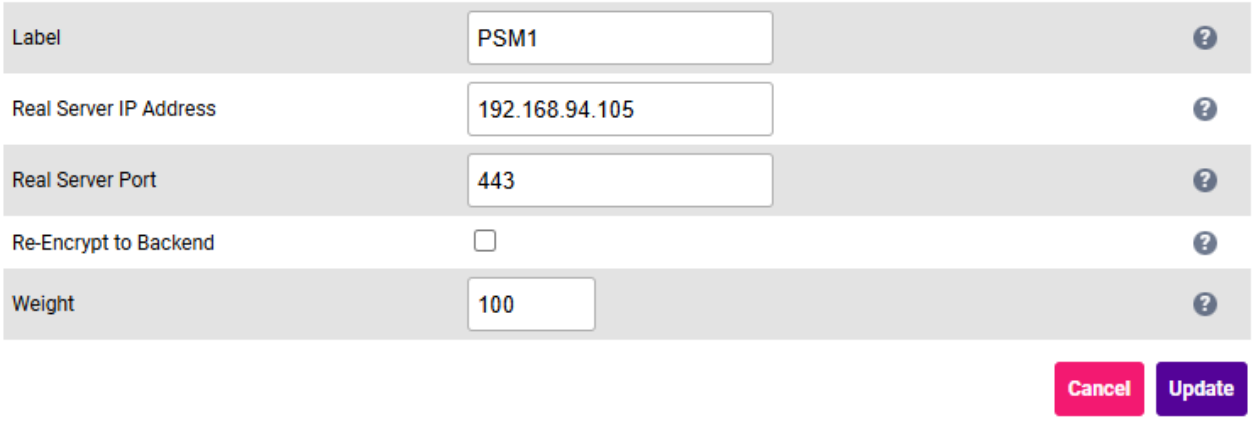


2. Enter an appropriate *Label* (name) for the Virtual Service, e.g. **CyberArk-PSM-Web**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.94.101**.
4. Set *Ports* to **443**.

5. Set the *Layer 7 Protocol* to **TCP Mode**.
6. Click **Update**.
7. Now click **Modify** next to the newly created VIP.
8. Ensure *Persistence Mode* is set to **Source IP**.
9. Scroll down to the *Health Checks* section.
    - Set *Health Checks* to **Negotiate HTTPS (GET)**.
    - Set *Request to Send* to **/psm/api/health**.
    - Set *Response Expected* to **PASS**.
10. Leave all other settings at their default value.
11. Click **Update**.

10.2.2. Configure the Associated Real Servers (RIPs)

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



2. Enter an appropriate *Label* (name) for the Real Server, e.g. **PSM1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.94.105**.
4. Set the *Real Server Port* field to **443**.
5. Leave all other settings at their default value.
6. Click **Update**.
7. Repeat these steps to add additional Real Server(s).

10.3. 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*.

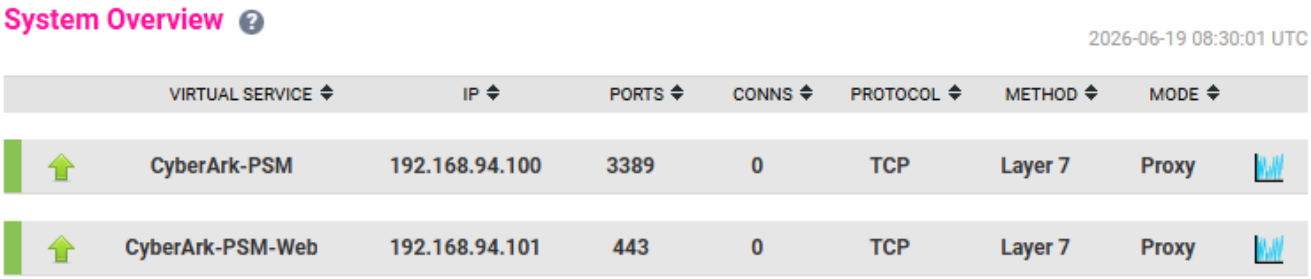
2. Click **Reload HAProxy**.

11. Testing & Verification

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

11.1. Using System Overview

The System Overview can be viewed in the WebUI. It shows a graphical view of all Virtual Services & the associated Real Servers (i.e. the CyberArk PSM servers) and shows the state/health of each server as well as the overall state of each cluster. The example below shows that all servers are healthy (green) and available to accept connections:



11.2. Accessing CyberArk PSM via the Load Balancer

Verify that you're able to successfully access CyberArk PSM via the Virtual Services on the load balancer, both for native RDP sessions (VIP 1) and for HTML5 gateway sessions through a web browser (VIP 2).

> **Note** Make sure that DNS is updated so that any FQDNs used point to the VIPs rather than individual servers.

12. 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.

13. Further Documentation

For additional information, please refer to the Administration Manual.

14. Appendix

14.1. 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.

14.1.1. 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	Firewall Script	Firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings

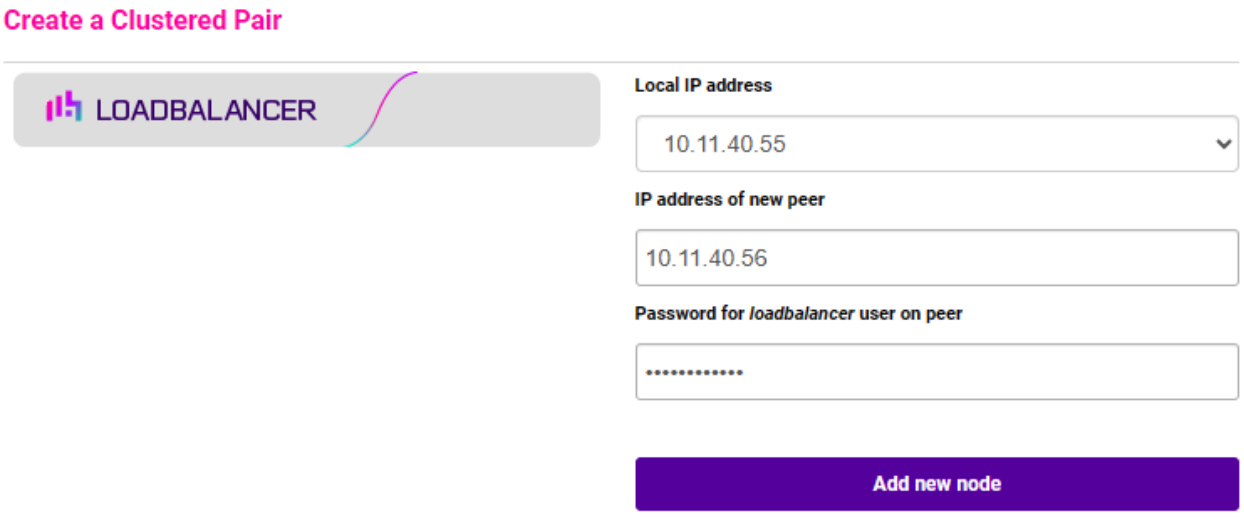
> **Important** Make sure that where any of the above have been configured on the Primary appliance, they're also configured on the Secondary.

14.1.2. Configuring the HA Clustered Pair

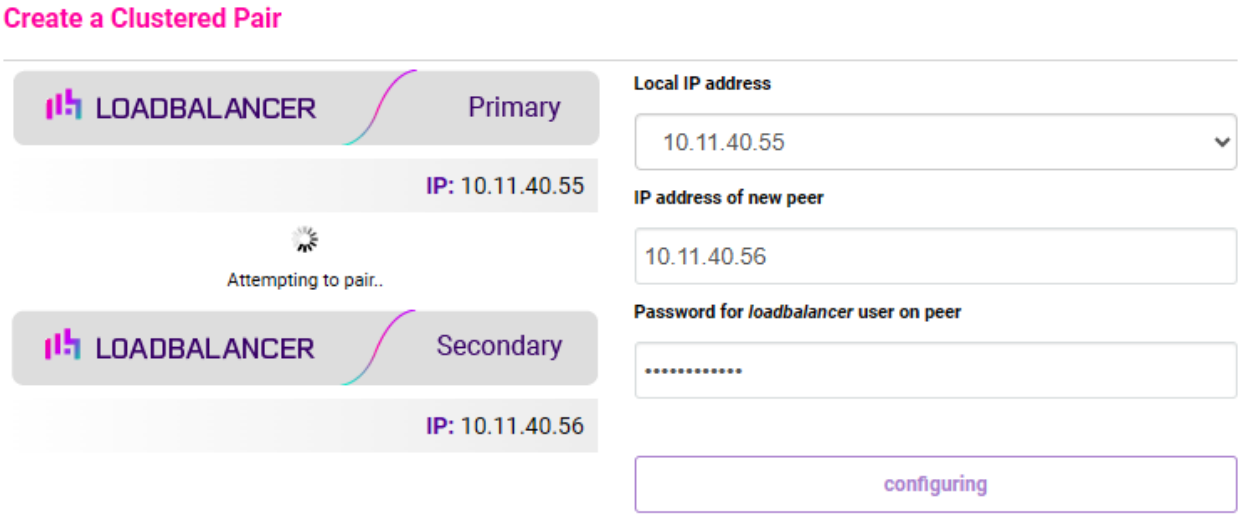
> **Important** During HA pairing, all WebUI users and passwords are synchronized from the Primary to the Secondary. After clustering completes (you will be logged out of the Secondary when this occurs), the Primary's credentials should be used to login to both nodes.

> **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.

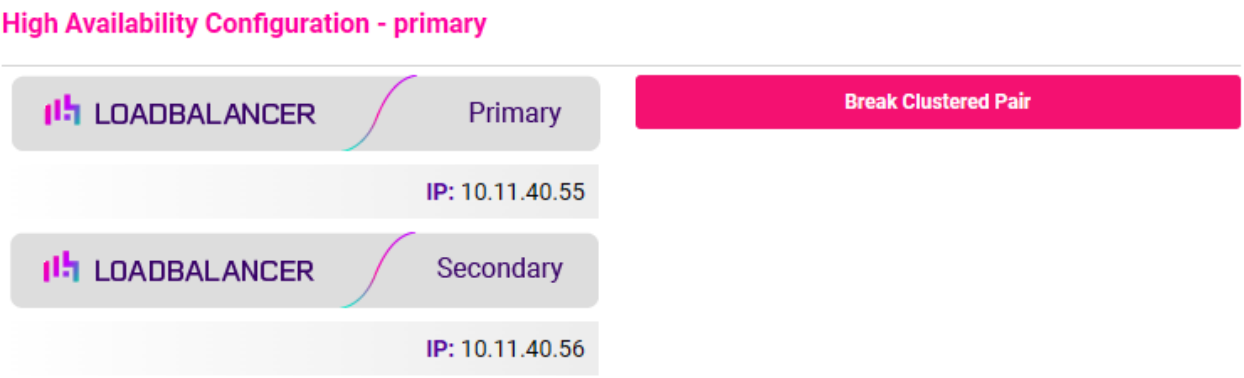
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: ***Cluster Configuration > High-Availability Configuration***.



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 Configuring High Availability.

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

15. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.0.0	24 June 2026	Initial version		MH/RJC

LOADBALANCER

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About Loadbalancer.org

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