

Load Balancing SIP

Version 1.7.0



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1. About this Guide

This guide provides a quick reference for setting up SIP load balancing using Loadbalancer.org appliances.

2. Loadbalancer.org Appliances Supported

All our products can be used for load balancing SIP. For full specifications of available models please refer to <https://www.loadbalancer.org/products>.

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.

4. Related Documentation

For additional information, please refer to the [Administration Manual](#) and the relevant [Quick Start / Configuration Guide](#).

5. Load Balanced Ports / Services

| Port | Use | Transport Layer Protocols |
|------|-------------------|---------------------------|
| 5060 | Non-encrypted SIP | TCP & UDP |
| 5061 | Encrypted SIP | TCP & UDP |

Note

The exact port requirements depend on how the VoIP system is configured. This guide includes both TCP & UDP ports 5060 and 5061 for completeness.

6. Appliance Configuration Overview

6.1. Operation Mode

The following modes can be used to load balance SIP:

- **Layer 4 DR mode** - This mode offers the best performance and requires limited physical Real Server



changes. The load balanced application must be able to bind to the Real Server's own IP address and the VIP at the same time.

- Requires the "ARP Problem" to be solved - for more details please refer to [DR Mode Considerations](#)
- Is transparent, i.e. the Real Servers will see the source IP address of the client
- **Layer 4 NAT mode** - This mode is also a high performance solution but not as fast as DR mode.
 - Requires the default gateway of each Real Server to be the load balancer
 - Is transparent, i.e. the Real Servers will see the source IP address of the client
- **Layer 4 SNAT mode** - This mode is also a high performance solution but not as fast as the other layer 4 modes.
 - Does not require any changes to the load balanced SIP servers
 - Is non-transparent, i.e. the Real Servers will see the source IP address of the load balancer not the client

Note

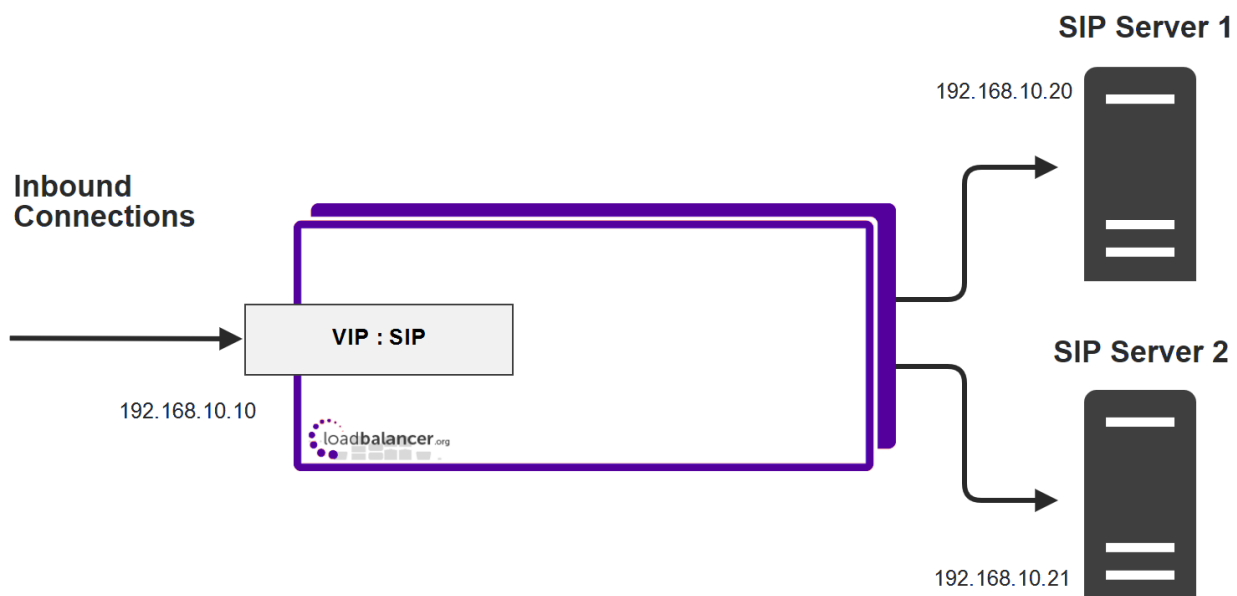
For full details of all modes, please refer to [Topologies & Load Balancing Methods](#).

6.2. SIP Server Health-check

A connect to port health-check is used to verify that each SIP Server is available.

6.3. Deployment Concept

Once the load balancer is deployed, clients connect to the Virtual Service (VIP) on the load balancer rather than directly to one of the SIP servers.



7. Deploying & Accessing the Appliance

7.1. Deployment

Deploy the Loadbalancer.org appliance as described in the relevant [Quick Start / Configuration Guide](#).



7.2. 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:

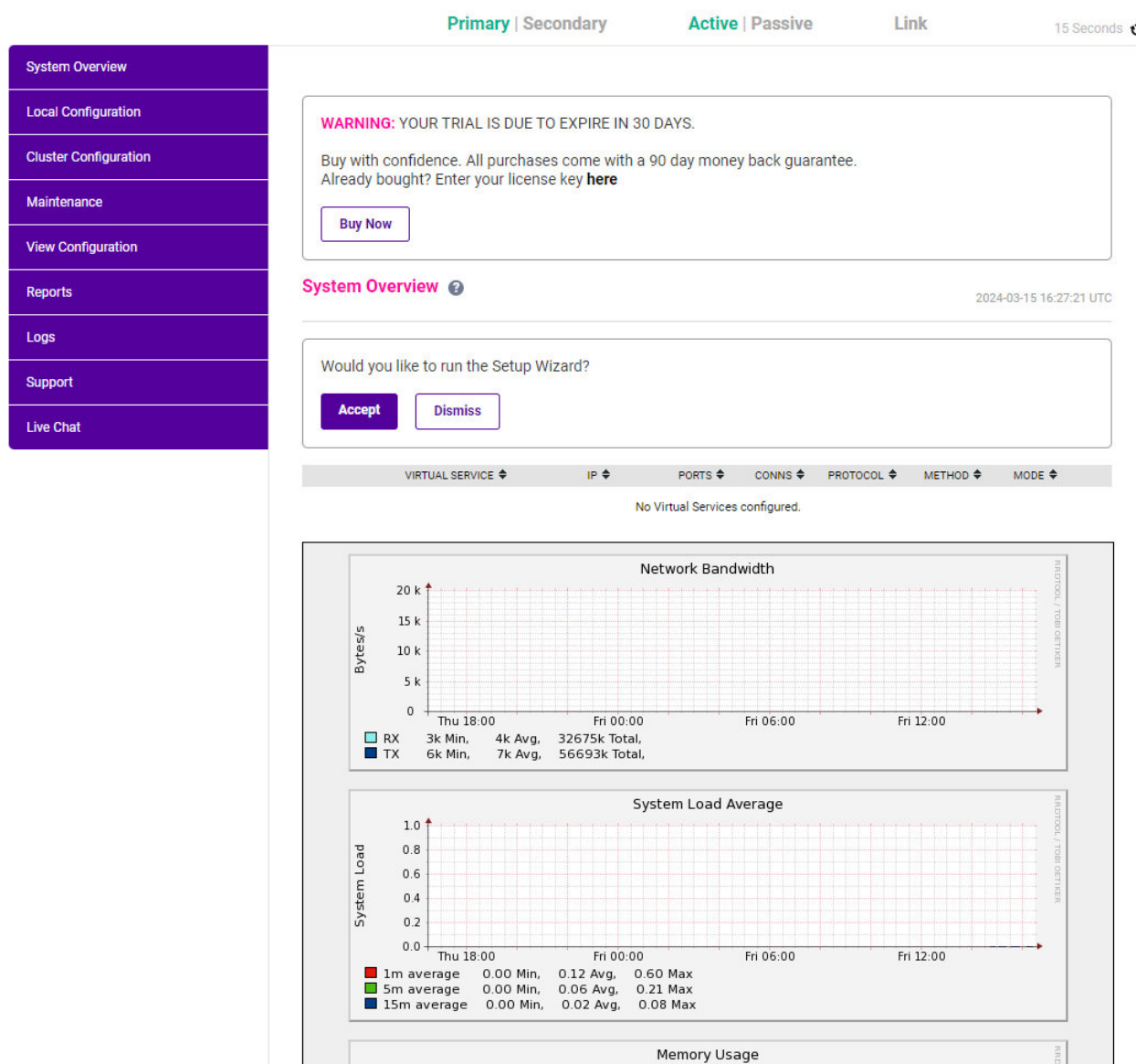
Username: loadbalancer

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 which can be used to configure layer 7 services. Click **Dismiss** if you're following a guide or want to configure the appliance manually or click **Accept** to start the wizard.

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. Configuration Steps - DR Mode

8.1. Appliance Configuration

Create the Virtual Service (VIP)

Follow the steps below to create a new VIP – this is the IP address that clients will connect to.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:

| Virtual Service | | |
|-------------------|---|---|
| Label | <input type="text" value="SIP"/> |  |
| IP Address | <input type="text" value="192.168.10.10"/> |  |
| Ports | <input type="text" value="5060,5061"/> |  |
| Protocol | | |
| Protocol | <input type="text" value="TCP/UDP"/> |  |
| Forwarding | | |
| Forwarding Method | <input type="text" value="Direct Routing"/> |  |
| | | <input type="button" value="Cancel"/> <input type="button" value="Update"/> |

3. Specify an appropriate *Label* (name) for the Virtual Service, e.g. **SIP**.
4. Set the *Virtual Service IP Address* to the required IP address, e.g. **192.168.10.10**.
5. Set the *Ports* field as required, e.g. **5060,5061** for all SIP ports.



Note

If you only require a single port, e.g. 5060, then just specify **5060** rather than **5060,5061** in the *Ports* field.

6. Set the *Protocol* to **TCP/UDP**.
7. Set the *Forwarding Method* to **Direct Routing**.
8. Click **Update** to create the Virtual Service.

Define The Real Servers (RIPs)

The Real Servers (i.e. the SIP servers) must now be associated with the VIP.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Real Servers* and click **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:



| | | |
|------------------------|--|-------------------|
| Label | <input type="text" value="SP1"/> | ? |
| Real Server IP Address | <input type="text" value="192.168.10.20"/> | ? |
| Weight | <input type="text" value="100"/> | ? |
| Minimum Connections | <input type="text" value="0"/> | ? |
| Maximum Connections | <input type="text" value="0"/> | ? |

3. Enter an appropriate label for the RIP. e.g. **SIP1**.
4. Change the *Real Server IP Address* field to the required address, e.g. **192.168.10.20**.
5. Click **Update**.
6. Repeat the above steps to add your other SIP server(s).

8.2. SIP Server Configuration

Resolve the "ARP Problem" on each SIP server. The exact steps required depend on the particular OS being used. The Administration Manual contains steps for a number of operating systems - for more details, please refer to [DR Mode Considerations](#).

9. Configuration Steps - NAT Mode

9.1. Appliance Configuration

Create the Virtual Service (VIP)

Follow the steps below to create a new VIP – this is the IP address that clients will connect to.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:

| Virtual Service | | |
|-------------------|--|---|
| Label | <input type="text" value="SIP"/> | |
| IP Address | <input type="text" value="192.168.10.10"/> | |
| Ports | <input type="text" value="5060,5061"/> | |
| Protocol | | |
| Protocol | <input type="text" value="TCP/UDP"/> | |
| Forwarding | | |
| Forwarding Method | <input type="text" value="NAT"/> | |
| | | <input type="button" value="Cancel"/> <input type="button" value="Update"/> |

3. Specify an appropriate *Label* (name) for the Virtual Service, e.g. **SIP**.
4. Set the *Virtual Service IP Address* to the required IP address, e.g. **192.168.10.10**.
5. Set the *Ports* field as required, e.g. **5060,5061** for all SIP ports.



Note

If you only require a single port, e.g. 5060, then just specify **5060** rather than **5060,5061** in the *Ports* field.

6. Set the *Protocol* to **TCP/UDP**.
7. Set the *Forwarding Method* to **NAT**.
8. Click **Update** to create the Virtual Service.

Define The Real Servers (RIPs)

The Real Servers (i.e. the SIP servers) must now be associated with the VIP.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Real Servers* and click **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

| | | |
|------------------------|--|---|
| Label | <input type="text" value="SIP1"/> | ? |
| Real Server IP Address | <input type="text" value="192.168.10.20"/> | ? |
| Real Server Port | <input type="text"/> | ? |
| Weight | <input type="text" value="100"/> | ? |
| Minimum Connections | <input type="text" value="0"/> | ? |
| Maximum Connections | <input type="text" value="0"/> | ? |

3. Enter an appropriate label for the RIP. e.g. **SIP1**.
4. Change the *Real Server IP Address* field to the required address, e.g. **192.168.10.20**.
5. Leave the *Real Server Port* field blank.
6. Click **Update**.
7. Repeat the above steps to add your other SIP server(s).

9.2. SIP Server Configuration

Ensure that the default gateway for each SIP Server is set to be the load balancer. For a clustered pair, add a floating IP address and use this as the gateway. This will ensure that the gateway is available irrespective of which load balancer in the cluster is active.

10. Configuration steps - SNAT Mode

10.1. Appliance Configuration

Create the Virtual Service (VIP)

Follow the steps below to create a new VIP – this is the IP address that clients will connect to.

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:

| Virtual Service | | |
|-------------------|--|-------------------|
| Label | <input type="text" value="SIP"/> | ? |
| IP Address | <input type="text" value="192.168.10.10"/> | ? |
| Ports | <input type="text" value="5060,5061"/> | ? |
| Protocol | | |
| Protocol | <input type="text" value="TCP/UDP"/> | ? |
| Forwarding | | |
| Forwarding Method | <input type="text" value="SNAT"/> | ? |

- Specify an appropriate *Label* (name) for the Virtual Service, e.g. **SIP**.
- Set the *Virtual Service IP Address* to the required IP address, e.g. **192.168.10.10**.
- Set the *Ports* field as required, e.g. **5060,5061** for all SIP ports.



Note

If you only require a single port, e.g. 5060, then just specify **5060** rather than **5060,5061** in the *Ports* field.

- Set the *Protocol* to **TCP/UDP**.
- Set the *Forwarding Method* to **Direct Routing**.
- Click **Update** to create the Virtual Service.

Define The Real Servers (RIPs)

The Real Servers (i.e. the SIP servers) must now be associated with the VIP.

- Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Real Servers* and click **Add a new Real Server** next to the newly created VIP.
- Enter the following details:

| | | |
|------------------------|--|---|
| Label | <input type="text" value="SIP1"/> | ? |
| Real Server IP Address | <input type="text" value="192.168.10.20"/> | ? |
| Real Server Port | <input type="text"/> | ? |
| Weight | <input type="text" value="100"/> | ? |
| Minimum Connections | <input type="text" value="0"/> | ? |
| Maximum Connections | <input type="text" value="0"/> | ? |

Cancel
Update

- Enter an appropriate label for the RIP. e.g. **SIP1**.
- Change the *Real Server IP Address* field to the required address, e.g. **192.168.10.20**.
- Leave the *Real Server Port* field blank.
- Click **Update**.
- Repeat the above steps to add your other SIP server(s).

10.2. SIP Server Configuration

No mode specific configuration changes are required to the SIP servers.

11. Testing & Verification

11.1. Check Server State

Using the System Overview in the WebUI, verify that the VIP and associated RIPs are up (green) as shown in the example below:

System Overview ? 2022-07-08 08:30:26 UTC

| | VIRTUAL SERVICE | IP | PORTS | CONNS | PROTOCOL | METHOD | MODE | |
|---|-----------------|---------------|-----------|--------|----------|---------|------|--|
| ↑ | SIP | 192.168.10.10 | 5060,5061 | 0 | TCPUDP | Layer 4 | DR | |
| | REAL SERVER | IP | PORTS | WEIGHT | CONNS | | | |
| ↑ | SIP1 | 192.168.10.20 | 5060,5061 | 100 | 0 | Drain | Halt | |
| ↑ | SIP2 | 192.168.10.21 | 5060,5061 | 100 | 0 | Drain | Halt | |

11.2. Check Connectivity

Verify that clients can connect to the VIP address (192.168.10.10 in this example configuration) and access the load balanced SIP servers rather than connecting directly.

12. Loadbalancer.org 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.



13. Document Revision History

| Version | Date | Change | Reason for Change | Changed By |
|---------|------------------|---|---|------------|
| 1.5.0 | 5 November 2019 | Styling and layout | General styling updates | AH |
| 1.5.1 | 3 June 2020 | New title page Updated Canadian contact details Updated 'Quick Start Guide' hyperlink URL | Branding update Change to Canadian contact details Quick Start Guides have been amalgamated at a new location | AH |
| 1.5.2 | 8 July 2022 | Changed the VIP configuration to use TCP/UDP rather than defining a Firewall Mark. | Simpler configuration steps utilizing updated appliance features. | RJC |
| 1.6.0 | 1 September 2022 | Converted the document to AsciiDoc Updated links and instructions where necessary | Move to new documentation system Required updates | AH |
| 1.6.1 | 5 January 2023 | Added one level of section numbering | Housekeeping across all documentation | AH |
| 1.6.2 | 2 February 2023 | Updated screenshots | Branding update | AH |
| 1.6.3 | 16 March 2023 | Improved document structure Added layer 4 NAT mode & 4 SNAT mode configuration steps | Document standardization Improved deployment flexibility | RJC |
| 1.7.0 | 24 March 2023 | New document theme Modified diagram colours | Branding update | AH |



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About Loadbalancer.org

Loadbalancer.org's mission is to ensure that its clients' businesses are never interrupted. The load balancer experts ask the right questions to get to the heart of what matters, bringing a depth of understanding to each deployment. Experience enables Loadbalancer.org engineers to design less complex, unbreakable solutions - and to provide exceptional personalized support.

