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 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

- v8.3.8 and later

🔒 **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.

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.
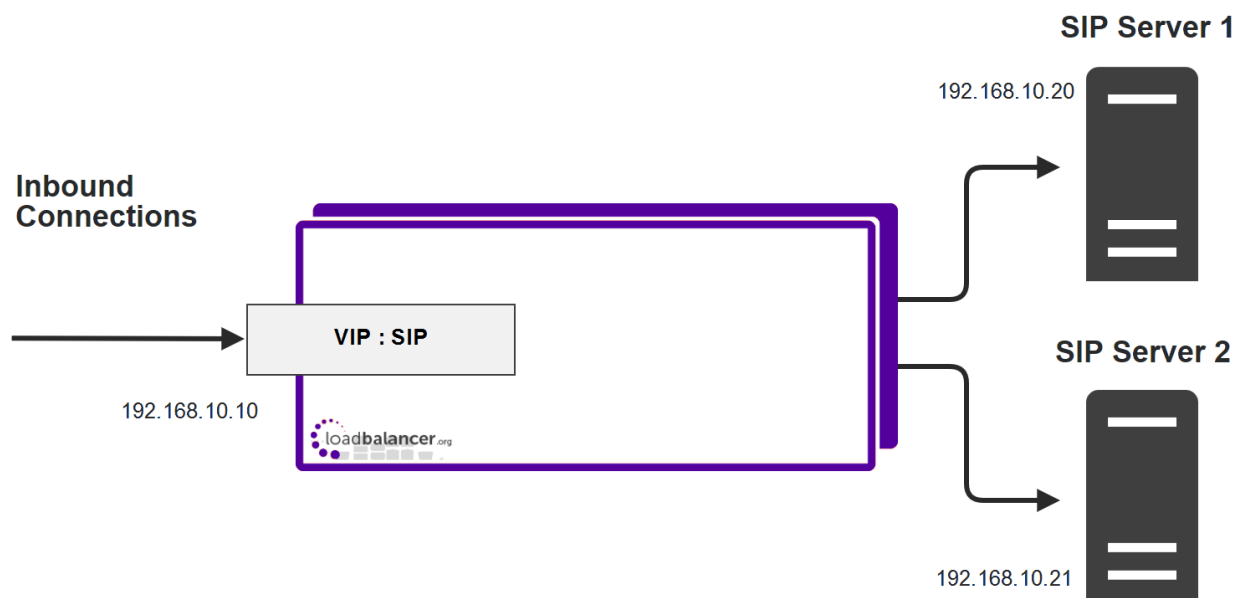
7. Deploying & Accessing the Appliance

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.

> ♚ **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/

> ♚ **Note**　You'll receive a warning about the WebUI'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:

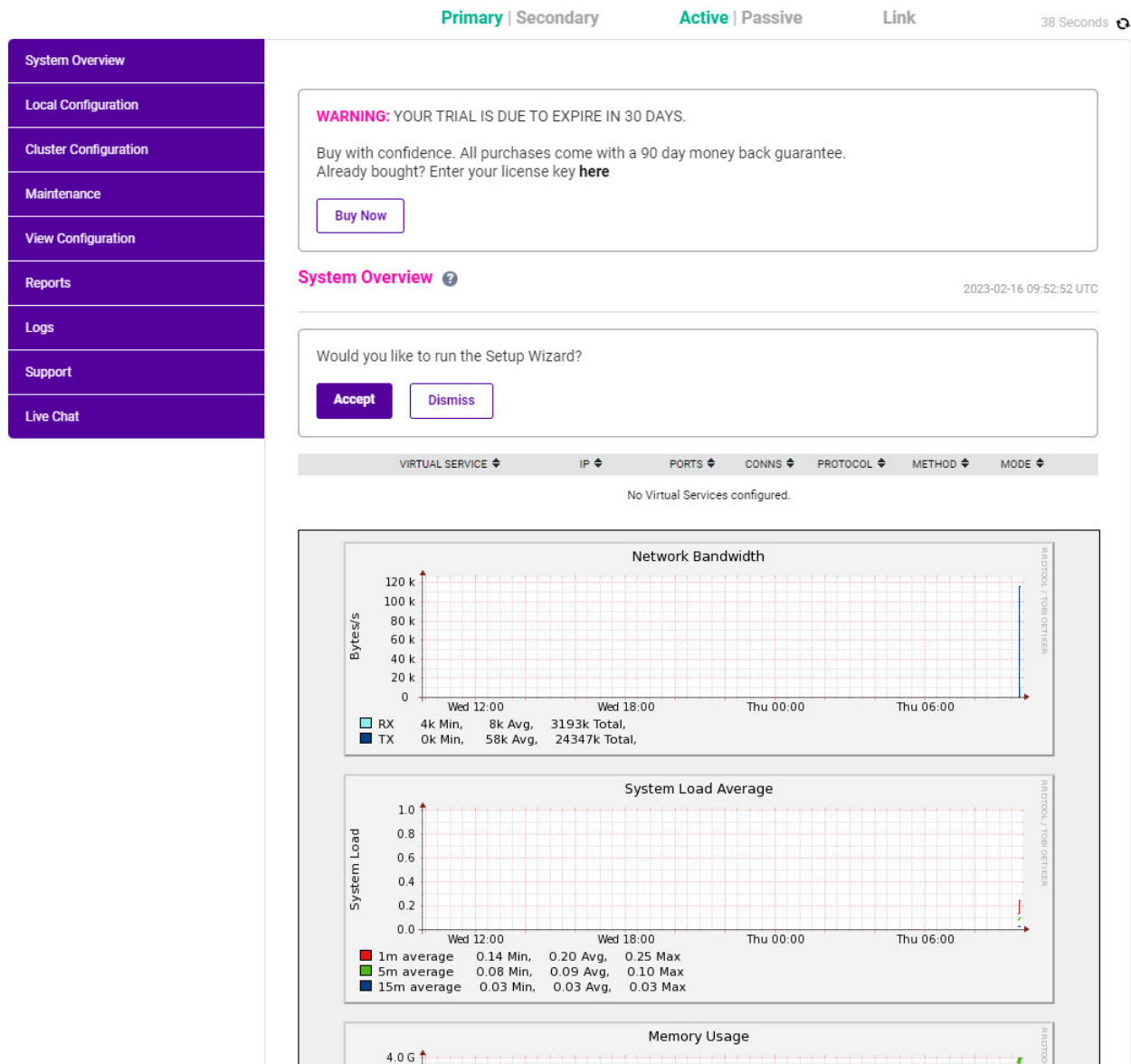   **Username**: loadbalancer
   Password: <configured-during-network-setup-wizard>

> ♚ **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. 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	SIP	❓
IP Address	192.168.10.10	❓
Ports	5060,5061	❓
Protocol		
Protocol	TCP/UDP ⌄	❓
Forwarding		
Forwarding Method	Direct Routing ⌄	❓

<p align="right">Cancel   Update</p>

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	SP1	❓
Real Server IP Address	192.168.10.20	❓
Weight	100	❓
Minimum Connections	0	❓
Maximum Connections	0	❓

Cancel Update

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	SIP	❓
IP Address	192.168.10.10	❓
Ports	5060,5061	❓
Protocol		
Protocol	TCP/UDP ⌄	❓
Forwarding		
Forwarding Method	NAT ⌄	❓

<div align="right">Cancel   Update</div>

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	SIP1	❓
Real Server IP Address	192.168.10.20	❓
Real Server Port		❓
Weight	100	❓
Minimum Connections	0	❓
Maximum Connections	0	❓

<div align="right">Cancel   **Update**</div>

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	SIP	❓
IP Address	192.168.10.10	❓
Ports	5060,5061	❓

Protocol

Protocol	TCP/UDP ⌄	❓

Forwarding

Forwarding Method	SNAT ⌄	❓

Cancel **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	SIP1	❓
Real Server IP Address	192.168.10.20	❓
Real Server Port		❓
Weight	100	❓
Minimum Connections	0	❓
Maximum Connections	0	❓

Cancel   Update

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).

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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