Load Balancing Fiserv DNA SAF Server
Version 2.1.0
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1. About this Guide

This guide details the steps required to configure a load balanced Fiserv DNA SAF Server environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Fiserv DNA SAF Server 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 Fiserv DNA SAF Server. 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

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. Fiserv DNA SAF Server

- All versions

4. Fiserv DNA SAF Server

Fiserv is a provider of financial services and technologies. Fiserv’s DNA SAF server is one part of their product offering. In order to make the service highly available and to ensure uptime, it is recommended to deploy multiple SAF servers and place a highly available pair of load balancers in front of them.

5. Load Balancing Fiserv DNA SAF Server

Note: It’s highly recommended that you have a working Fiserv DNA SAF Server environment first before implementing the load balancer.

5.1. Persistence (aka Server Affinity)

Source IP affinity is required for a load balanced Fiserv DNA SAF Server deployment to function correctly. This is enabled by default when creating the virtual service as described in this document.
5.2. Virtual Service (VIP) Requirements
To provide load balancing and HA for Fiserv DNA SAF Server, only a single VIP is required:

- SAF

5.3. Port Requirements
The following table shows information regarding the port that is load balanced:

<table>
<thead>
<tr>
<th>Port</th>
<th>Protocols</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>10001</td>
<td>TCP</td>
<td>DNA SAF service</td>
</tr>
</tbody>
</table>

6. Deployment Concept

VIPs = Virtual IP Addresses

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. Loadbalancer.org Appliance – the Basics

7.1. 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.

The same download is used for the licensed product, the only difference is that a license key file
Note: (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.

7.2. 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.

7.3. 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.

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:


   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.

**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
7.4. 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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ENTERPRISE VA Max - v8.9.0

Checking for Updates using Online Update

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.

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.

7.5. Ports Used by the Appliance

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

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Port</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>22</td>
<td>SSH</td>
</tr>
<tr>
<td>TCP &amp; UDP</td>
<td>53</td>
<td>DNS</td>
</tr>
<tr>
<td>TCP &amp; UDP</td>
<td>123</td>
<td>NTP</td>
</tr>
<tr>
<td>TCP &amp; UDP</td>
<td>161</td>
<td>SNMP</td>
</tr>
<tr>
<td>UDP</td>
<td>6694</td>
<td>Heartbeat between Primary &amp; Secondary appliances in HA mode</td>
</tr>
<tr>
<td>TCP</td>
<td>7778</td>
<td>HAPProxy persistence table replication</td>
</tr>
<tr>
<td>TCP</td>
<td>9080</td>
<td>WebUI - HTTP (disabled by default)</td>
</tr>
</tbody>
</table>
### Protocol - Port - Purpose

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Port</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>9081</td>
<td>Nginx fallback page</td>
</tr>
<tr>
<td>TCP</td>
<td>9443</td>
<td>WebUI - HTTPS</td>
</tr>
</tbody>
</table>

#### 7.6. 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.

#### 8. Appliance Configuration for Fiserv DNA SAF Server

##### 8.1. 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. **SAF_VIP**.
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 **10001**.
5. Set the **Layer 7 Protocol** to **TCP Mode**.
6. Click **Update** to create the virtual service.

7. Click **Modify** next to the newly created VIP.
8. In the **Other** section click **Advanced** to expand the menu.
9. Check the **Timeout** checkbox.
10. Set **Client Timeout** to **1h** (one hour).
11. Set **Real Server Timeout** to **1h** (one hour).
8.2. 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. Prod_SAF_01.

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 additional servers as required.

8.3. 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.

9. Testing & Verification

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

9.1. Using System Overview
The System Overview can be viewed in the WebUI. It shows a graphical view of all VIPs & RIPs (i.e. the Fiserv DNA SAF servers) and shows the state/health of each server as well as the state of the cluster as a whole. The example below shows that both DNA SAF servers are healthy and available to accept connections:

10. 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.

11. Further Documentation

For additional information, please refer to the Administration Manual.
12. Appendix

12.1. 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.

**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:

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

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.

<table>
<thead>
<tr>
<th>Note</th>
<th>Clicking the <strong>Restart Heartbeat</strong> button on the Primary appliance will also automatically restart heartbeat on the Secondary appliance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>For more details on configuring HA with 2 appliances, please refer to <a href="#">Appliance Clustering for HA</a>.</td>
</tr>
<tr>
<td>Note</td>
<td>For details on testing and verifying HA, please refer to <a href="#">Clustered Pair Diagnostics</a>.</td>
</tr>
</tbody>
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## 13. Document Revision History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Change</th>
<th>Reason for Change</th>
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<td>30 August 2019</td>
<td>Styling and layout</td>
<td>General styling updates</td>
<td>AH</td>
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<td>1.1.1</td>
<td>28 August 2020</td>
<td>New title page</td>
<td>Branding update</td>
<td>AH</td>
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<td></td>
<td>Updated Canadian contact details</td>
<td>Change to Canadian contact details</td>
<td>AH</td>
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<td>Updated health check and ACL options</td>
<td>Changes to the appliance WebUI</td>
<td>AH</td>
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<td>Amended instructions for enabling TPROXY to include new option for per-VIP TPROXY</td>
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<tr>
<td>2.0.0</td>
<td>7 February 2022</td>
<td>Completely reworked document into more typical format</td>
<td>Move to new documentation system</td>
<td>AH</td>
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<td>2.0.1</td>
<td>28 September 2022</td>
<td>Updated layer 7 VIP and RIP creation screenshots</td>
<td>Reflect changes in the web user interface</td>
<td>AH</td>
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<td>2.0.2</td>
<td>5 January 2023</td>
<td>Combined software version information into one section</td>
<td>Housekeeping across all documentation</td>
<td>AH</td>
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<td></td>
<td></td>
<td>Added one level of section numbering</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Added software update instructions</td>
<td></td>
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<td></td>
<td></td>
<td>Added table of ports used by the appliance</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Reworded 'Further Documentation' section</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Removed references to the colour of certain UI elements</td>
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<td>2 February 2023</td>
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<td>Branding update</td>
<td>AH</td>
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<tr>
<td>2.0.4</td>
<td>7 March 2023</td>
<td>Removed conclusion section</td>
<td>Updates across all documentation</td>
<td>AH</td>
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<tr>
<td>2.1.0</td>
<td>24 March 2023</td>
<td>New document theme</td>
<td>Branding update</td>
<td>AH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Modified diagram colours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

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