LOADBALANCER

DEPLOYMENT GUIDE

Load Balancing Fiserv DNA®connect

Version 1.2.0

Table of Contents

1. About this Guide

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

- V8.9.1 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.

3.2. Fiserv DNAconnect

- All versions

4. Fiserv DNAconnect

DNAconnect – a suite of applications and services that facilitate the creation and processing of interfaces between different systems you can use to support communication between a source system and one or more target systems.

5. Load Balancing Fiserv DNAconnect

For high availability and scalability, Fiserv recommends that DNAconnect is deployed in load balanced clusters.

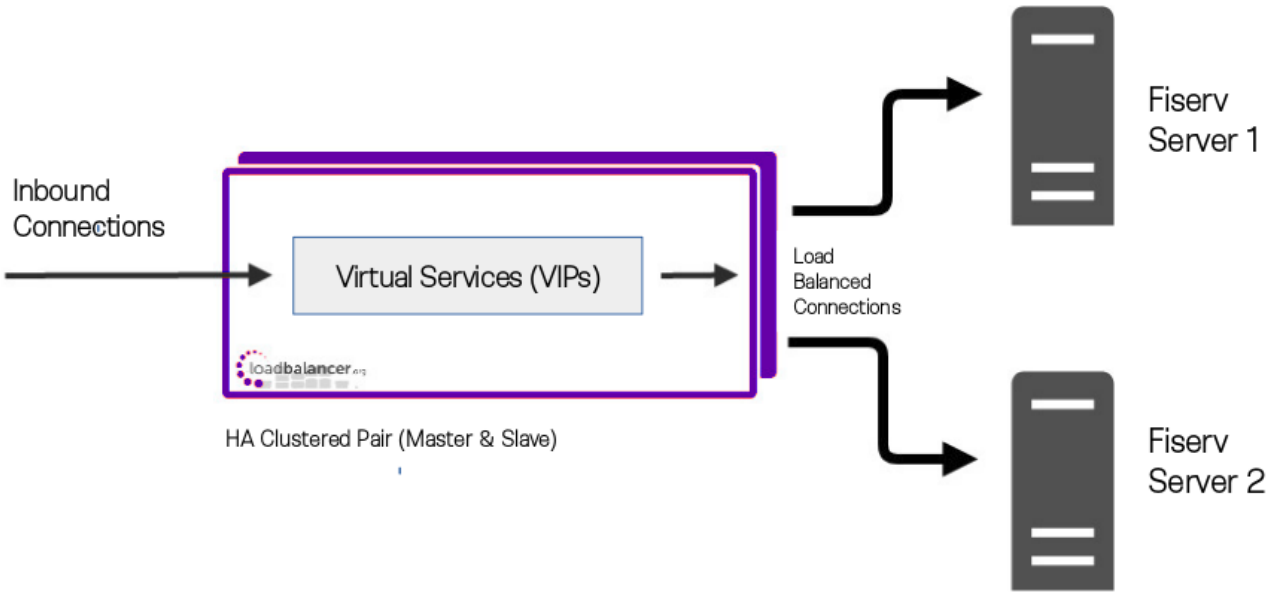
5.1. Port Requirements

The following table shows the ports that are load balanced:

Ports	Protocol	Use
80	TCP	HTTP - Fiserv
2500, 2501, 2507,2601, 2655, 2656,2999	TCP	DNAconnect - Fiserv

6. Deployment Concept

When Fiserv services are deployed with the load balancer, clients connect to the Virtual Service (VIP on the load balancer) rather than connecting directly to one of the Fiserv servers. The load balancer then distributes these connections to the load-balanced servers according to the 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 Configuring HA - Adding a Secondary Appliance for more details on configuring a clustered pair.

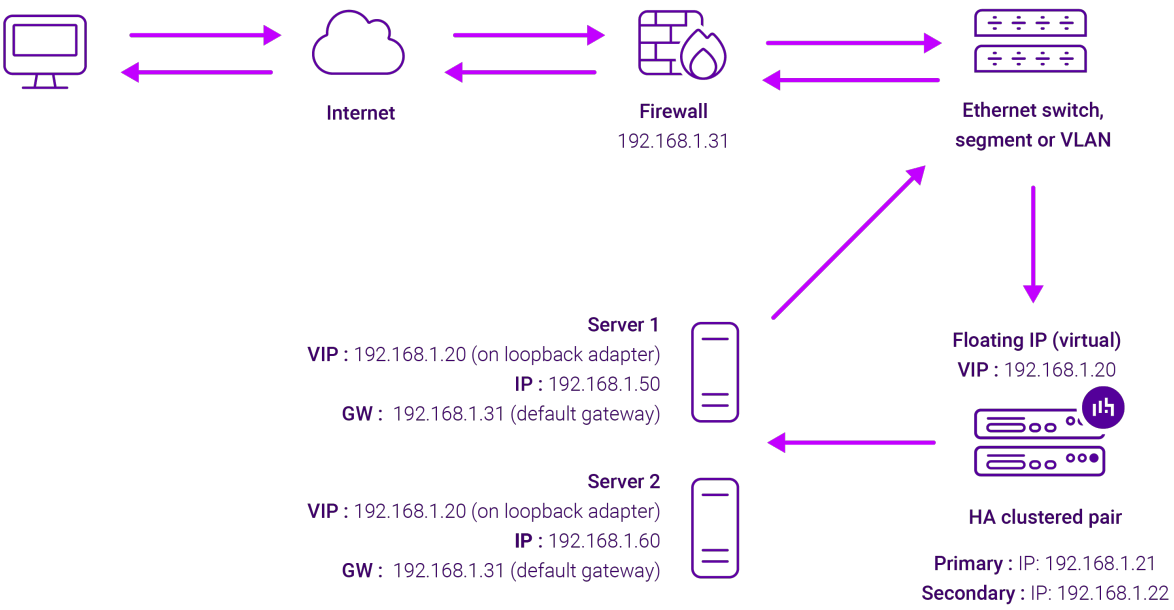
7. Load Balancer Deployment Methods

For Fiserv DNAconnect, using Layer 4 DR mode is the recommended deployment method.

7.1. Layer 4 DR Mode

Layer 4 DR (Direct Routing) mode is a very high performance solution that requires little change to your existing infrastructure. The image below shows an example network diagram for this mode.

> **Note** Kemp, Brocade, Barracuda & A10 Networks call this ***Direct Server Return*** and F5 call it ***nPath***.

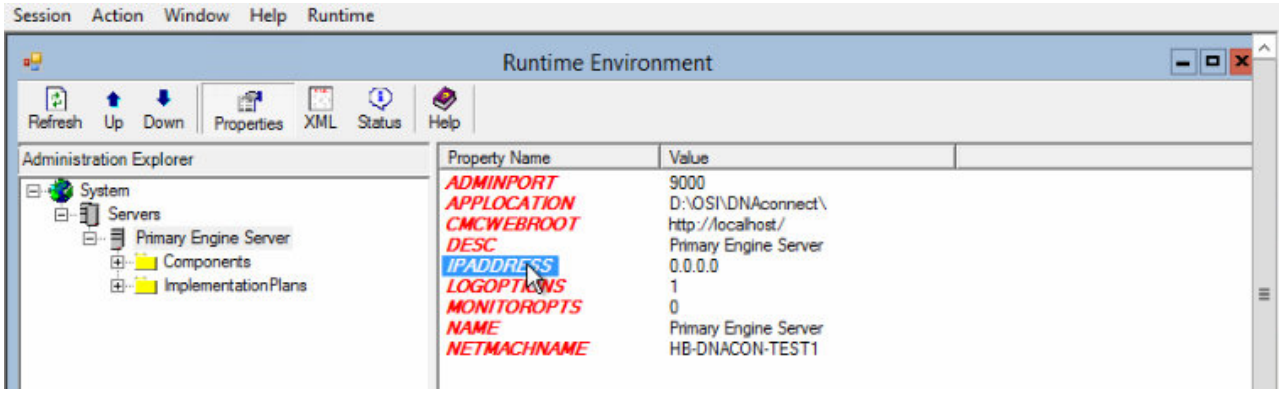


- DR mode works by changing the destination MAC address of the incoming packet to match the selected Real Server on the fly which is very fast.
- When the packet reaches the Real Server it expects the Real Server to own the Virtual Services IP address (VIP). This means that each Real Server (and the load balanced application) must respond to both the Real Server's own IP address and the VIP.
- The Real Server should not respond to ARP requests for the VIP. Only the load balancer should do this. Configuring the Real Server in this way is referred to as "Solving the ARP Problem". For more information please refer to DR Mode Considerations.
- On average, DR mode is 8 times quicker than NAT mode for HTTP and much faster for other applications such as Remote Desktop Services, streaming media and FTP.
- The load balancer must have an interface in the same subnet as the Real Servers to ensure layer 2 connectivity which is required for DR mode to operate.
- The VIP can be brought up on the same subnet as the Real Servers or on a different subnet provided that the load balancer has an interface in that subnet.
- Port translation is not possible with DR mode, e.g. VIP:80 → RIP:8080 is not supported.
- DR mode is transparent, i.e. the Real Server will see the source IP address of the client.

8. Configuring Fiserv DNAconnect for Load Balancing

Please refer to the Fiserv DNAconnect documentation for the configuration of the application.

The following screenshot is an example from the Fiserv Runtime Environment console and shows the listening IP and associated settings.



9. Loadbalancer.org Appliance – the Basics

9.1. 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.

9.2. 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.

9.3. 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.

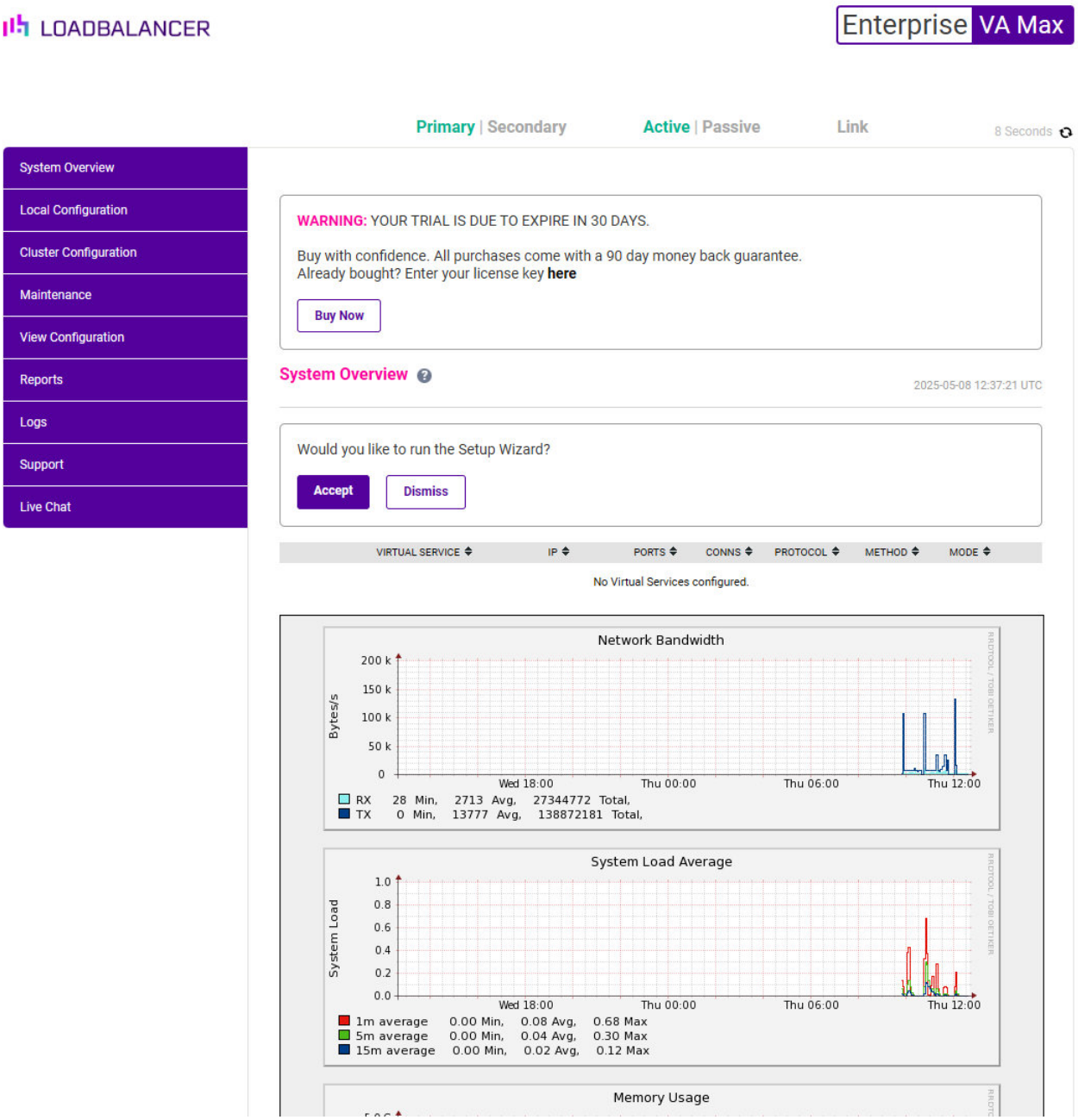
   > **Note** If you need to change the port, IP address or protocol that the WebUI listens on, please refer to Service Socket Addresses.

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.

9.3.1. 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

9.4. Appliance Software Update

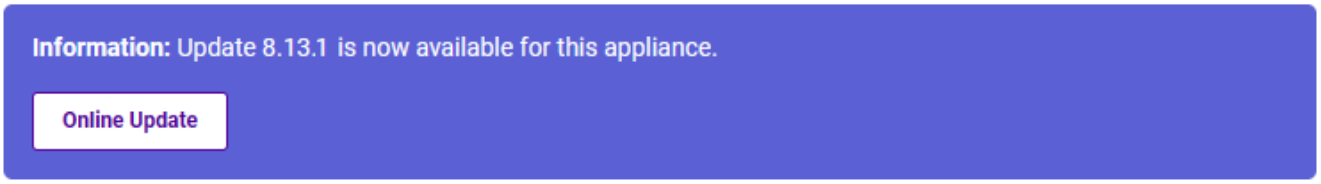
We recommend that the appliance is kept up to date to ensure that you benefit from the latest bug fixes, security updates and feature improvements. Both online and offline update are supported.

> **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.

9.4.1. Online Update

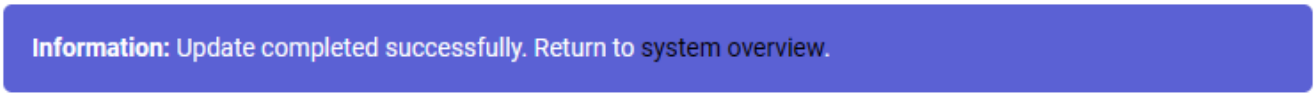
The appliance periodically contacts the Loadbalancer.org update server (**update.loadbalancer.org**) and checks for updates. This is the default behavior and can be disabled if preferred. If an update is found, a notification similar to the example below will be displayed at the top of the WebUI:



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.

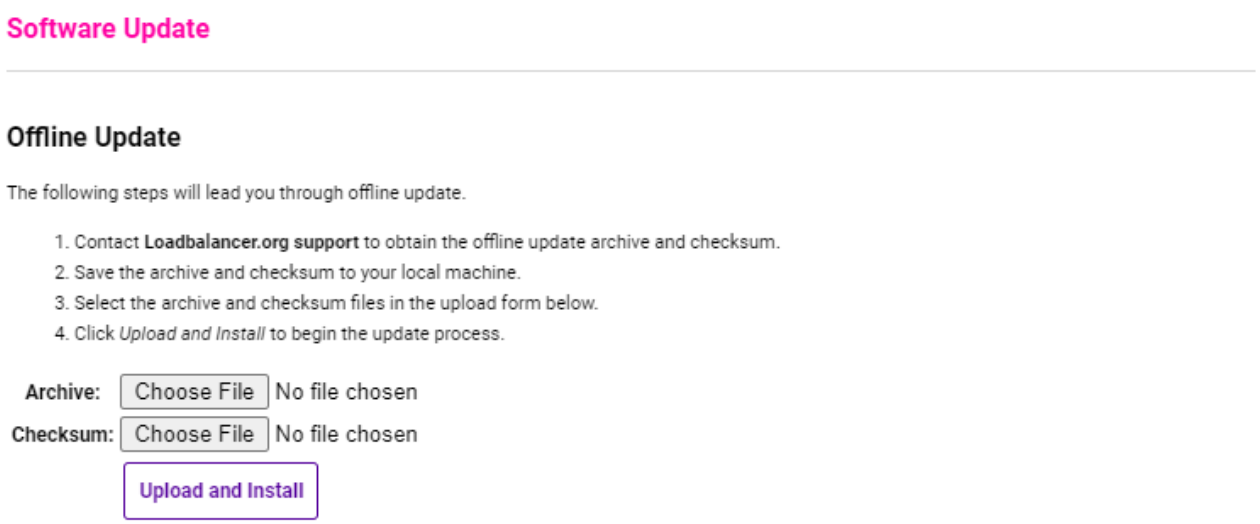
9.4.2. Offline Update

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.

9.5. 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 / 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 (Centralized/Portal Management)
TCP	9080 *	WebUI - HTTP (disabled by default)
TCP	9081 *	Nginx fallback page
TCP	9443 *	WebUI - HTTPS
TCP	25565 *	Shuttle service (Centralized/Portal Management)

> **Note** The ports used for SSH, GSLB, SNMP, the WebUI, the fallback page, the gateway service and the shuttle service can be changed if required. For more information, please refer to Service Socket

Addresses.

9.6. HA Clustered Pair Configuration

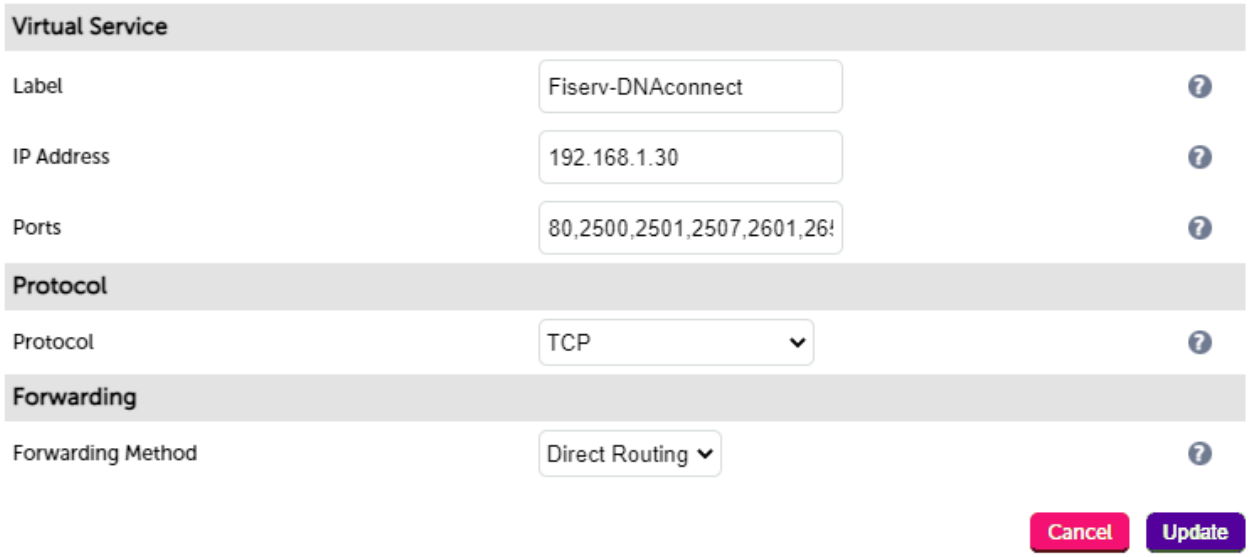
Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary unit is covered in Configuring HA - Adding a Secondary Appliance.

10. Configuration for Fiserv DNAconnect

10.1. Appliance Configuration

10.1.1. A) Setting up the Virtual Service

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

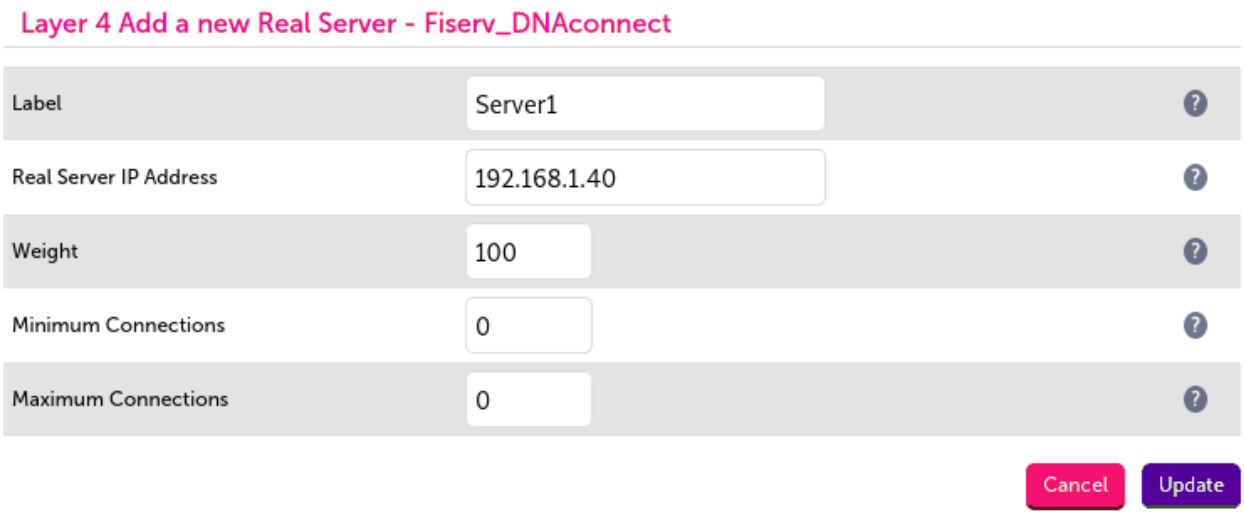


3. Enter an appropriate *Label* for the VIP, e.g. **Fiserv-DNAconnect**.
4. Set the *IP Address* to the required IP address, e.g. **192.168.1.30**.
5. Set the *Ports* field to **80,2500,2501,2507,2601,2655,2656,2999**.
6. Leave the *Protocol* set to **TCP**.
7. Leave the *forwarding Method* set to **Direct Routing**.
8. Click **Update**.

> **Note** You can specify a wildcard (*) for all ports, instead on entering specific posts. This is covered in Adding a Wildcard.

10.1.2. B) Setting up the Real Servers

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



3. Enter an appropriate *Label* for the RIP, e.g. **Server1**.
4. Set the *Real Server IP address* field to the required IP address, e.g. **192.168.1.40**.
5. Leave all other fields at their default values.
6. Click **Update**.
7. Repeat these steps to add the remaining servers.

10.2. Fiserv DNAconnect Configuration

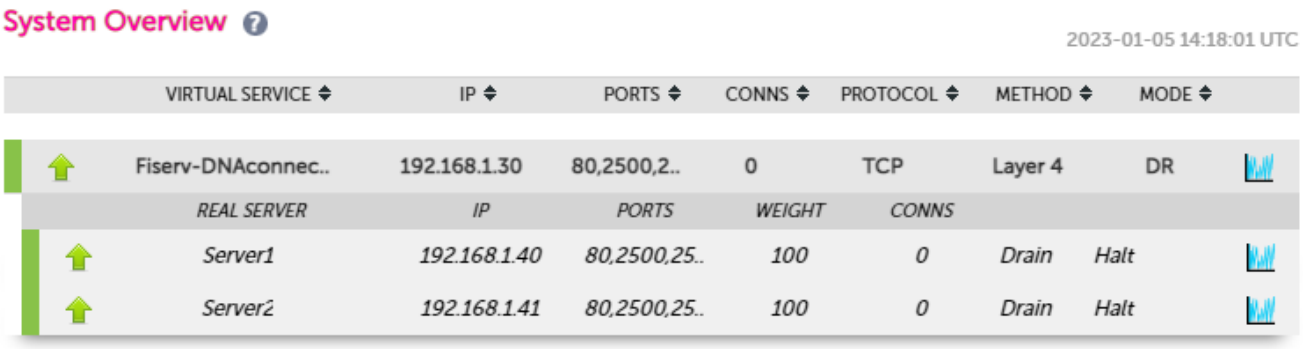
Layer 4 DR mode VIPs require the 'ARP problem' to be solved on each associated Fiserv server as mentioned in Load Balancer Deployment Methods. For full details on how this is done, please refer to DR Mode Considerations.

11. Testing & Verification

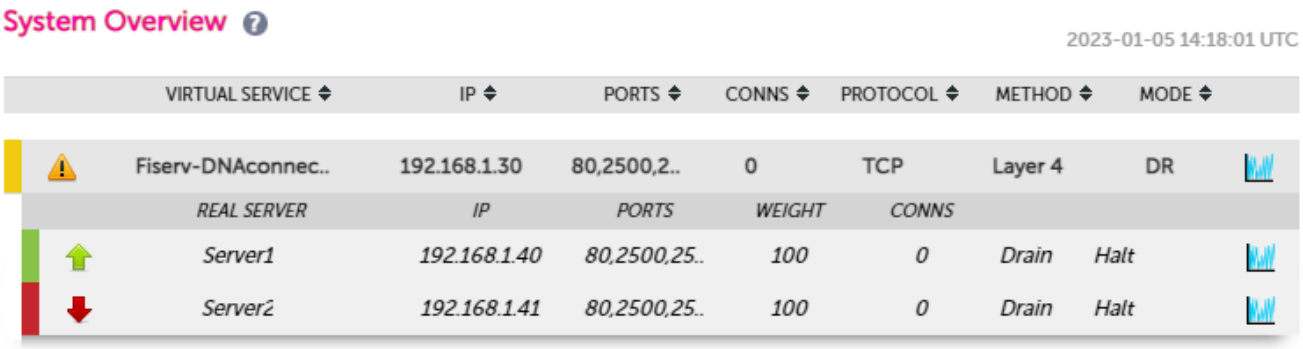
> **Note** For additional guidance on diagnosing and resolving any issues you may have, please also refer to Diagnostics & Troubleshooting.

11.1. Using the System Overview

The System Overview can be accessed via the WebUI. It shows a graphical view of all VIPs & RIPs (i.e. the Fiserv DNAConnect 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 all Fiserv servers are healthy (green) and available to accept connections:



If one of the servers within the cluster fails its health check, that server will be colored red and the cluster will be colored yellow as shown below:



Make sure that all servers are up (green) and verify that clients can connect to the VIP and access all load balanced services.

> **Note** Make sure that DNS points at the VIP 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

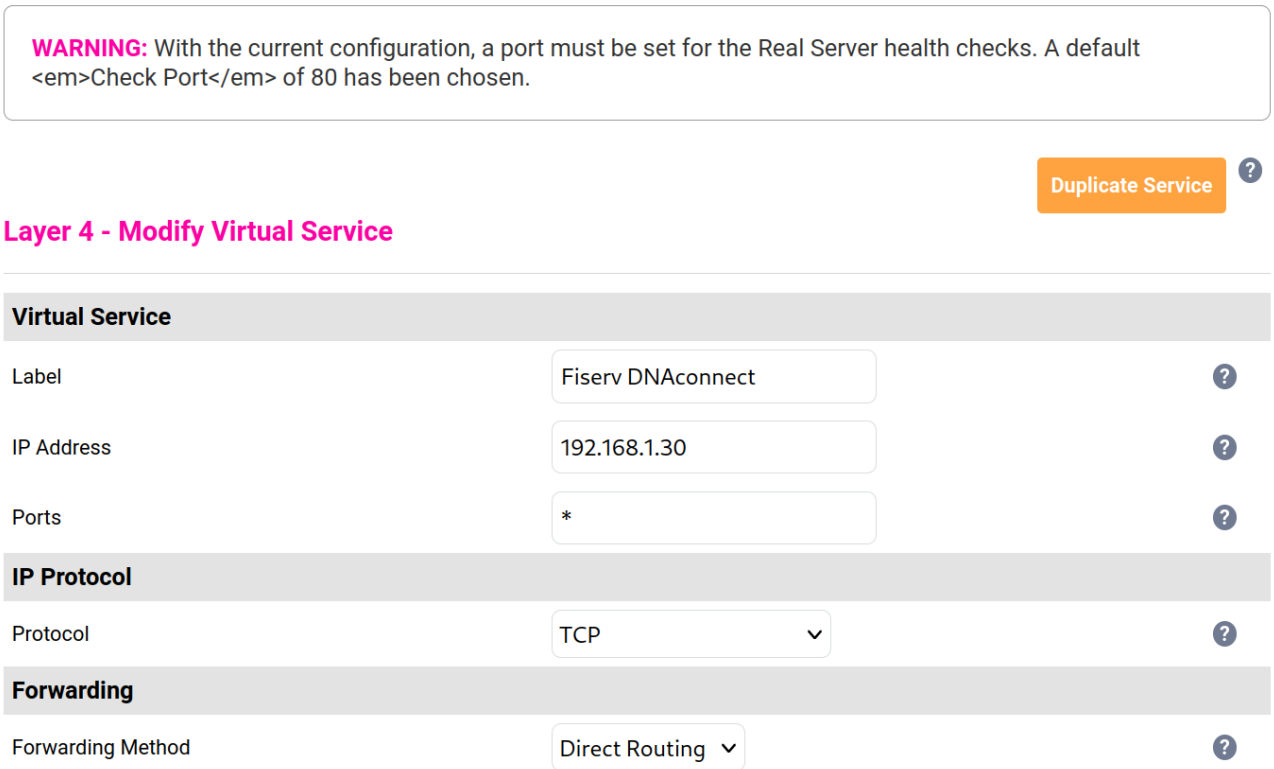
For additional information, please refer to the Administration Manual.

14. Appendix

14.1. Adding a Wildcard, "*", Instead of the Suggested Ports

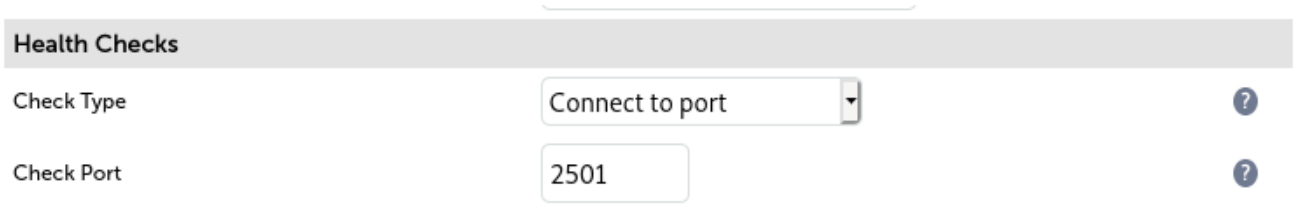
The specified ports (80, 2500, 2501, 2507, 2600, 2601, 2655, 2656, 2999) may vary between customer installations, so it is possible to allow all ports through the Layer 4 VIP by using the wildcard (*) in the ports section.

So, the VIP edited for the wildcard would look like this:



Please note the warning at the top of the WebUI. As we now use the wildcard to access the VIP, the load balancer needs to choose a port for health-checking and automatically chooses the first one, 80.

If the automatically chosen port is unsuitable to use for health checking then please choose another port that can be checked against. To change the health checking port, modify the VIP like shown in this example which uses port 2501:



14.2. 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.

14.2.1. 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	Fallback Page	Fallback page configuration
Maintenance	Firewall Script	Firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings

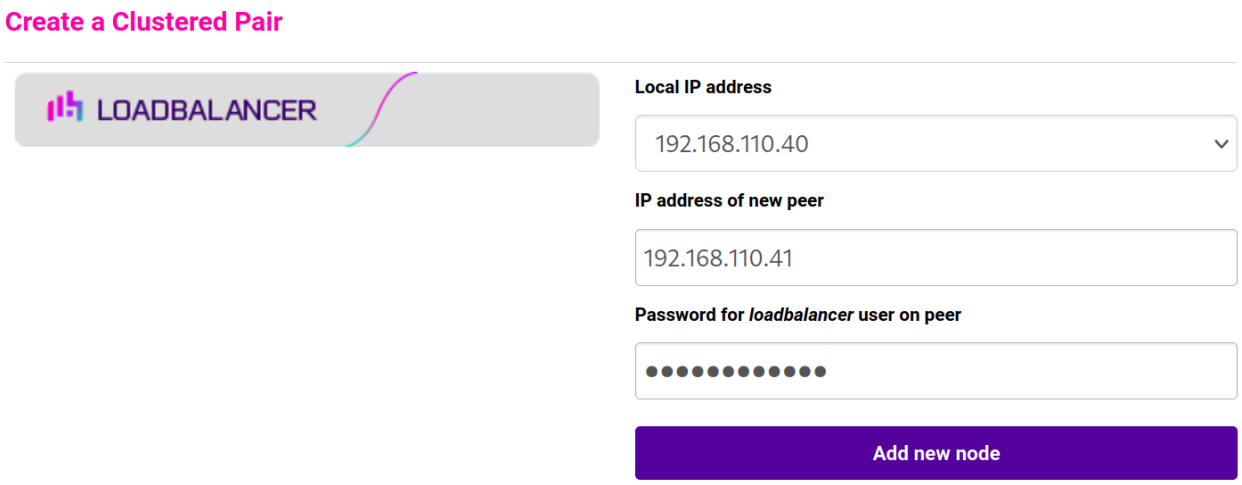
> **Important** Make sure that where any of the above have been configured on the Primary appliance, they're also configured on the Secondary.

14.2.2. Configuring the HA Clustered Pair

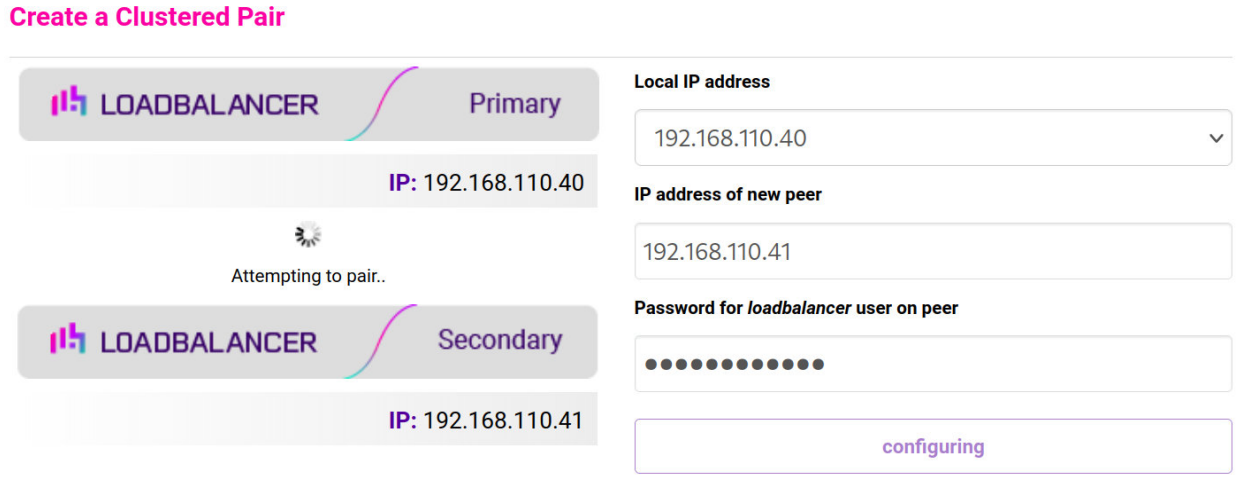
> **Note** If you have already run the firewall lockdown wizard on either appliance, you'll need to ensure

that it is temporarily disabled on both appliances whilst performing the pairing process.

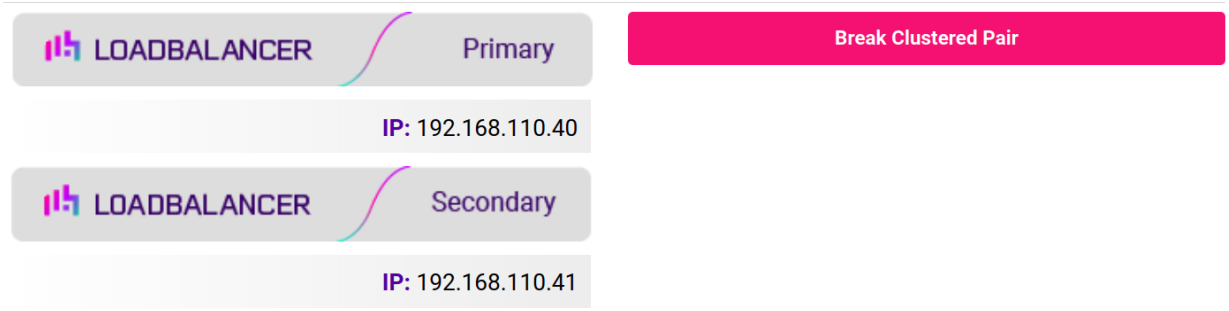
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.



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.

> **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 Appliance Clustering for HA.

> **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	3 July 2020	Initial version		RPC
1.1.0	1 January 2022	Converted the document to AsciiDoc	Move to new documentation system	AH, RJC, ZAC
1.1.1	5 January 2023	Updated Testing & Verification section	General Improvements	RJC
1.1.2	5 January 2023	Combined software version information into one section Added one level of section numbering Added software update instructions Added table of ports used by the appliance Reworded 'Further Documentation' section	Housekeeping across all documentation	AH
1.1.3	2 February 2023	Updated screenshots	Branding update	AH
1.1.4	7 March 2023	Removed conclusion section	Updates across all documentation	AH
1.2.0	24 March 2023	New document theme Modified diagram colours	Branding update	AH

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