loadbalancer.org

Load Balancing Censornet USS Gateway

Deployment Guide

v1.0.0

Table of Contents

1. About this Guide

This guide details the steps required to configure a load balanced Censornet USS Gateway environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any USS Gateway 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 relevant Administration Manual:

- v7 Administration Manual
- v8 Administration Manual

2. Loadbalancer.org Appliances Supported

The following table shows which Loadbalancer.org Appliances (hardware and virtual) can be used to load balance Censornet USS Gateway.

Discontinued Models	Current Models *
Enterprise R16	Enterprise R20
Enterprise VA R16	Enterprise MAX
Enterprise VA	Enterprise 10G
Enterprise R320	Enterprise Ultra
	Enterprise VA R20
	Enterprise VA MAX

* For full specifications of these models please refer to: http://www.loadbalancer.org/products/hardware

3. Loadbalancer.org Software Versions Supported

- v7.6.4 and later

4. Censornet USS Gateway Versions Supported

- All versions

5. Benefits of Implementing a Load Balancer

Implementing Loadbalancer.org appliances enables multiple USS Gateways to be deployed in a cluster. This provides the following key benefits:

- **High-Availability –** If a Gateway fails, service is not interrupted

- **Maintenance** – Gateways can easily be taken out of the cluster for maintenance
- **Performance** – For additional performance simply add more Gateways to the cluster

6. Load Balancer Configuration

DEPLOYMENT MODE

Layer 4 DR mode is used. In this mode, traffic from the client to the USS Gateway passes via the load balancer, return traffic passes directly back to the client which maximizes performance. Direct Routing mode works by changing the destination MAC address of the incoming packet on the fly which is very fast. This mode is transparent by default meaning that the USS Gateways see the real client IP address and not the IP address of the load balancer.

PERSISTENCE/SERVER AFFINITY

Source IP persistence is used. When enabled (the default setting for new layer 4 VIPs), clients connecting from the same source IP address within the persistence timeout period (the default is 5 minutes) will always be sent to the same USS Gateway.

7. Loadbalancer.org Appliance – the Basics

VIRTUAL APPLIANCE DOWNLOAD & DEPLOYMENT

The VA is currently available for VMware, Virtual Box, Hyper-V, KVM and XEN and has been optimized for each Hypervisor. By default, the VA is allocated 1 CPU, 2GB of RAM and has an 8GB virtual disk.

> Note:
>
> The Virtual Appliance can be downloaded here.

> Note:
>
> Please refer to the Administration Manual and the ReadMe.txt text file included in the VA download for more detailed information on deploying the VA using various Hypervisors.

INITIAL NETWORK CONFIGURATION

The IP address, subnet mask, default gateway and DNS settings can be configured in several ways as detailed below:

Method 1 - Using the Network Setup Wizard at the console

After boot up, follow the instructions on the console to configure the IP address, subnet mask, default gateway and DNS settings.

Method 2 - Using the WebUI

Using a browser, connect to the WebUI on the default IP address/port: **http://192.168.2.21:9080**

To set the IP address & subnet mask, use: *Local Configuration > Network Interface Configuration*

To set the default gateway, use: *Local Configuration > Routing*
To configure DNS settings, use: *Local Configuration > Hostname & DNS*

Method 3 - Using Linux commands
At the console, set the initial IP address using the following command:

```
ip addr add <IP address>/<mask> dev eth0
```

At the console, set the initial default gateway using the following command:

```
route add default gw <IP address> <interface>
```

At the console, set the DNS server using the following command:

```
echo nameserver <IP address> >> /etc/resolv.conf
```

> Note:
>
> If method 3 is used, you must also configure these settings using the WebUI, otherwise the settings will be lost after a reboot.

ACCESSING THE WEB USER INTERFACE (WEBUI)

The WebUI can be accessed via HTTP at the following URL: **http://192.168.2.21:9080/lbadmin**
** Note the port number → **9080***

The WebUI can be accessed via HTTPS at the following URL: **https://192.168.2.21:9443/lbadmin**
** Note the port number → **9443***

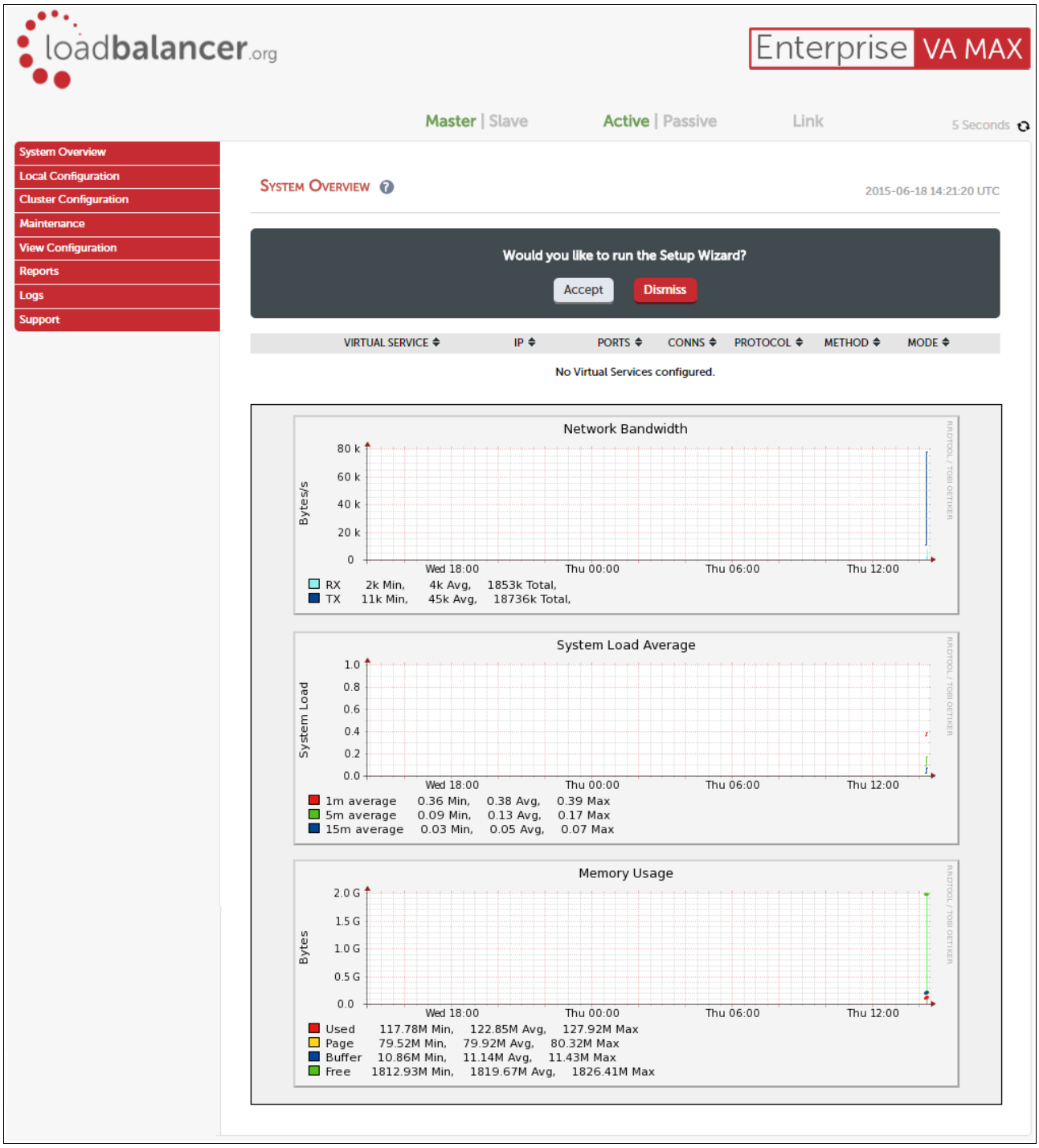
(replace 192.168.2.21 with the IP address of your load balancer if it's been changed from the default)

Login using the following credentials:

Username: loadbalancer
Password: loadbalancer

> Note:
>
> To change the password , use the WebUI menu option: *Maintenance > Passwords.*

Once logged in, the WebUI will be displayed as shown on the following page:

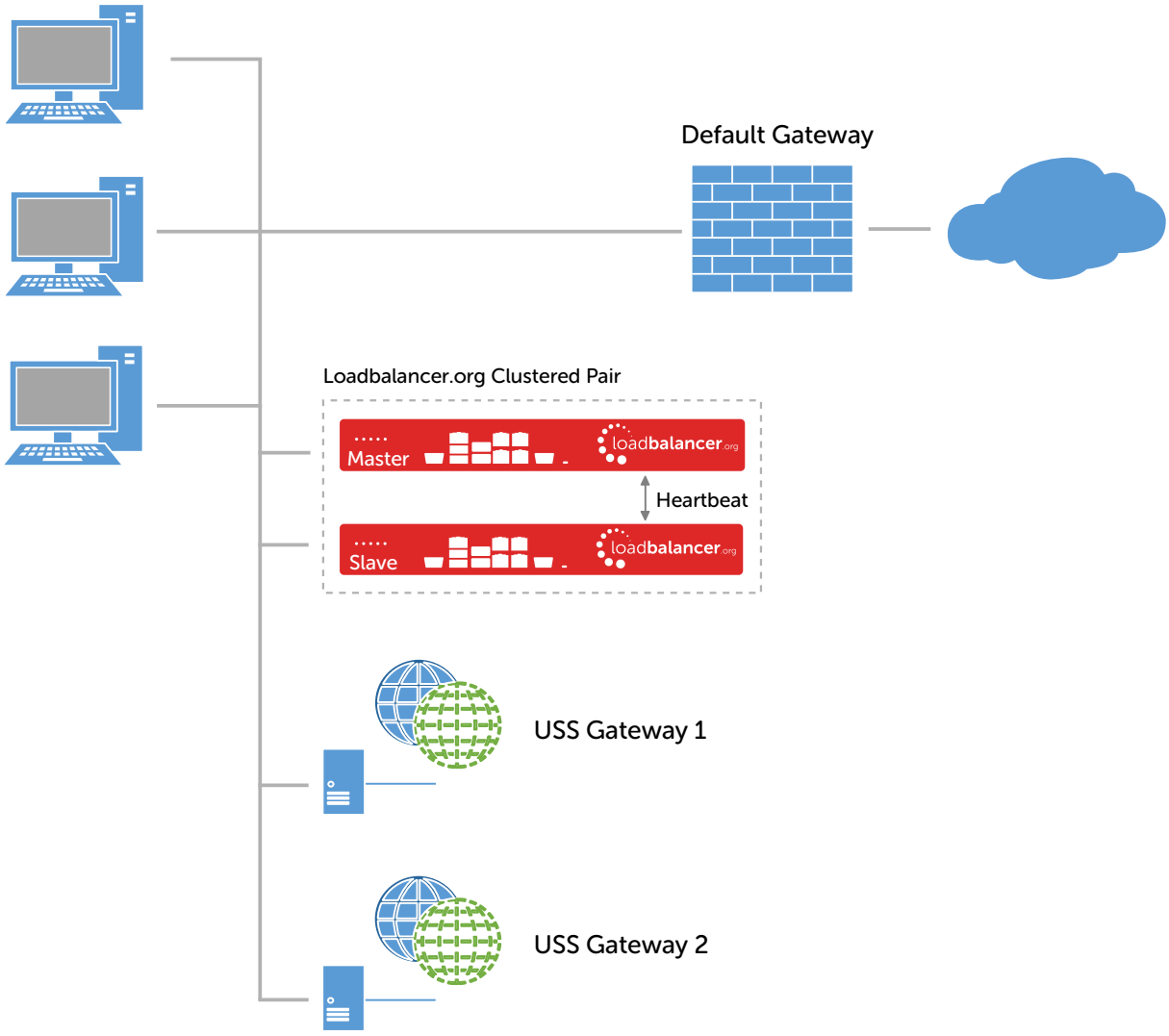


HA CLUSTERED PAIR CONFIGURATION

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 slave unit is covered in section 1 of the Appendix on page 15.

8. Load Balancer & USS Gateway Configuration

DEPLOYMENT ARCHITECTURE



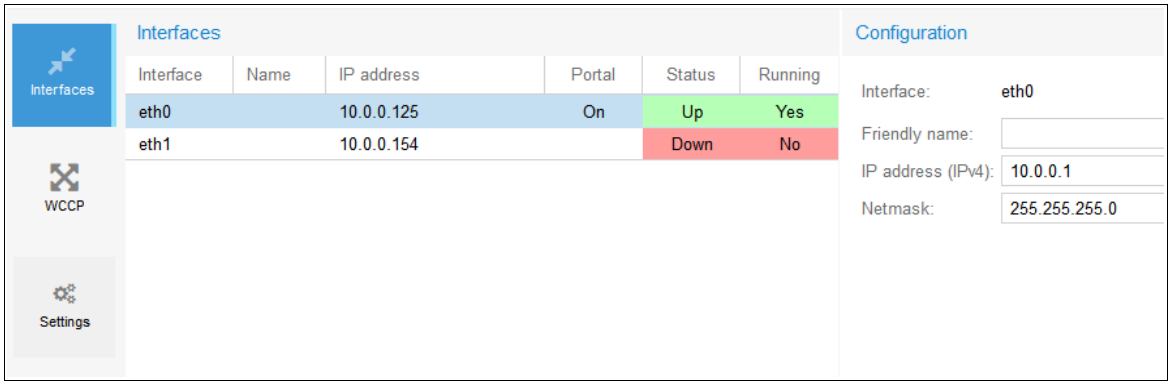
Notes:

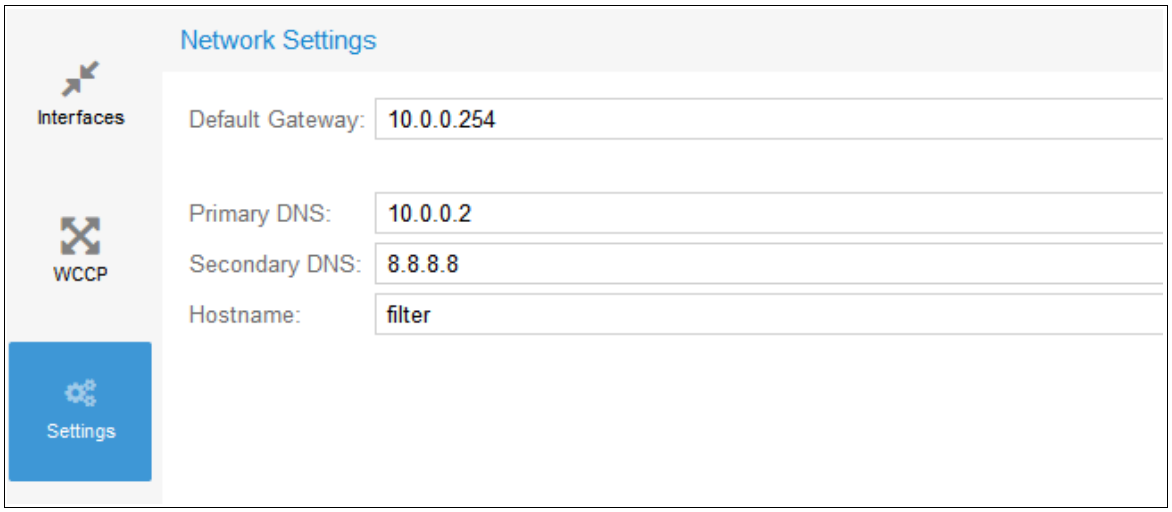
- Browser settings on client PC's must be changed to point at the Virtual Service (VIP) on the load balancer (see page 13)
- The load balancer is configured in one-arm Layer 4 DR mode
- The Censornet USS Gateways must be configured to accept traffic for the VIP (see page 11)
- Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary slave unit is covered in section 1 of the Appendix on page 15
- For more information on the Censornet USS Gateway please refer to this URL

USS GATEWAY CONFIGURATION

CONFIGURING THE PRIMARY GATEWAY

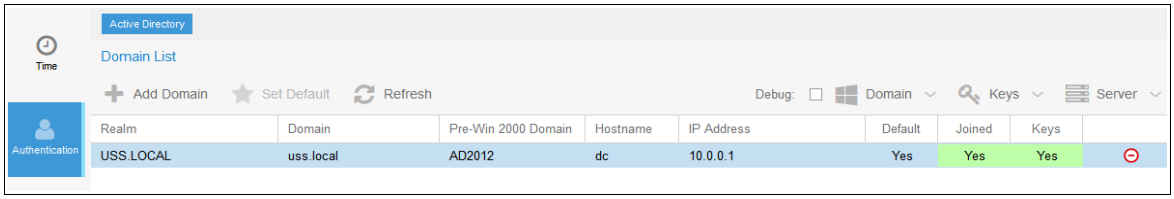
1. Choose one of the Gateways to act as the primary gateway for the purposes of configuration
2. Decide on the hostname and IP address that you want the load balanced proxy service to use, e.g. **filter** and **10.0.0.1**
3. Using the *Network Interfaces* and *Settings* sections in the WebUI temporarily configure the primary Gateway to have that hostname and IP address as shown in the example below:





This will form part of the FQDN that will eventually be used by end user devices to reference the proxy

4. Reboot the Gateway to ensure the new changes have fully taken effect
5. Now join the Gateway to your Active Directory domain. This can be done by following these instructions to add a domain, join the domain and finally create the DNS entry. In this example, the DNS entry **filter.uss.local** must correctly resolve to **10.0.0.1**. The result should be a successfully joined domain configuration entry as shown in the example below:



The important parts to check here are:

1. Joined is in **green** and says **YES**
2. Keys is in **green** and says **YES**

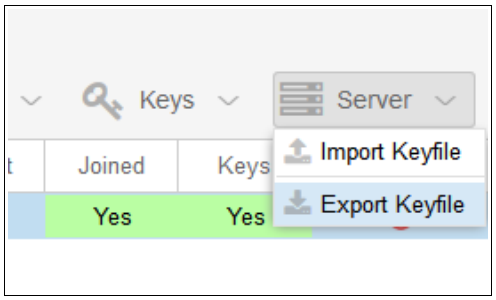
6. Test that the gateway is working as expected by configuring a domain computer with the proxy **filter.uss.local** and port **8080**. You will also need to install the SSL Certificate from the gateway. This can be done by pointing the browser at **http://filter.uss.local/ussgw.der** and installing the certificate in the browsers *Trusted Root Authority* section

> Note:
>
> If you're unable to browse, ensure that the DNS entry for the FQDN has been set up and correctly propagated on the network.

> Note:
>
> Also ensure that the date/time on the Gateway is within 5 minutes of the time on the Active Directory domain controller that the Gateway has joined. This is important for the Kerberos protocol.

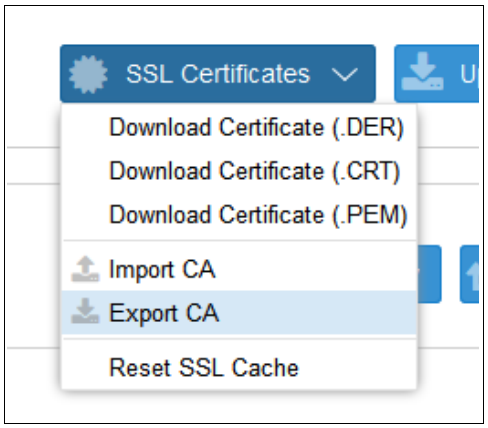
Assuming this works as expected, the next step is to export the Kerberos Keyfile and SSL certificate from this Gateway to use on the other Gateways that will be part of the load balanced cluster

7. To export the Keytab file, navigate to the *Configure > Authentication* section, select the *Server* menu and click **Export Keyfile**



Ensure that you save the Keyfile somewhere safe on your PC

8. To export the SSL certificate, go to the *System* section, click the *SSL Certificates* menu and click **Export CA**



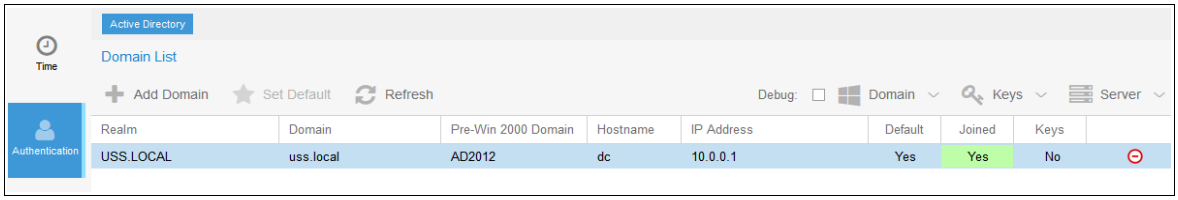
Ensure that you save the CA file somewhere safe on your PC

9. Finally, repeat the first steps from this section to reconfigure this Gateway with a unique hostname and IP that it will use as part of the cluster. For example, set its hostname to **gateway1** and its IP address to **10.0.0.5**. This frees up the **filter** hostname and **10.0.0.1** IP address for the load balancer's Virtual Service to use

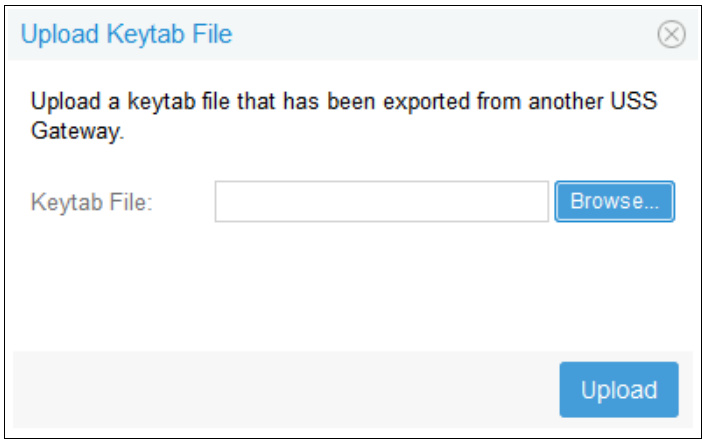
CONFIGURE REMAINING GATEWAYS

On the remaining gateways complete the following steps:

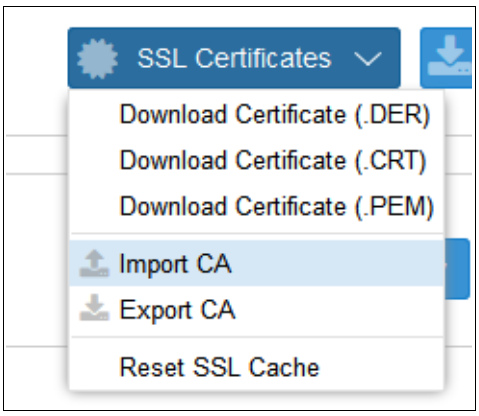
1. Navigate to the *Network Interfaces* section and *Settings* section to set the desired hostname and IP address
2. Next, navigate to the *Configure > Authentication* section and add the same domain as you did in the primary Gateway configuration. Also join the domain but do not create the keys

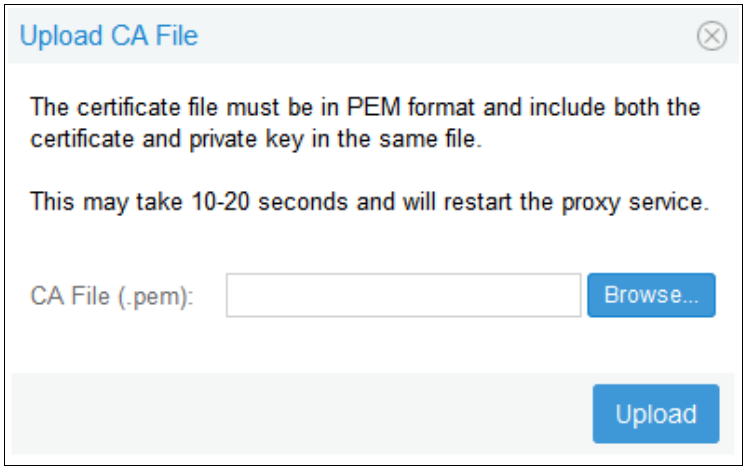


3. Click the *Server* option and then the *Import Keytab* option



4. Click **Browse** and navigate to the Keytab file that was downloaded as part of the section *Configuring the Primary Gateway* on page 8
5. Click **Upload**.
6. Navigate to the *System* section, click the *SSL Certificates* menu and then click **Import CA**





Click **Browse** and navigate to the CA file that was downloaded as part of the section *Configuring the Primary Gateway* on page 8

MODIFY THE USS GATEWAYS TO ACCEPT TRAFFIC FOR THE VIP

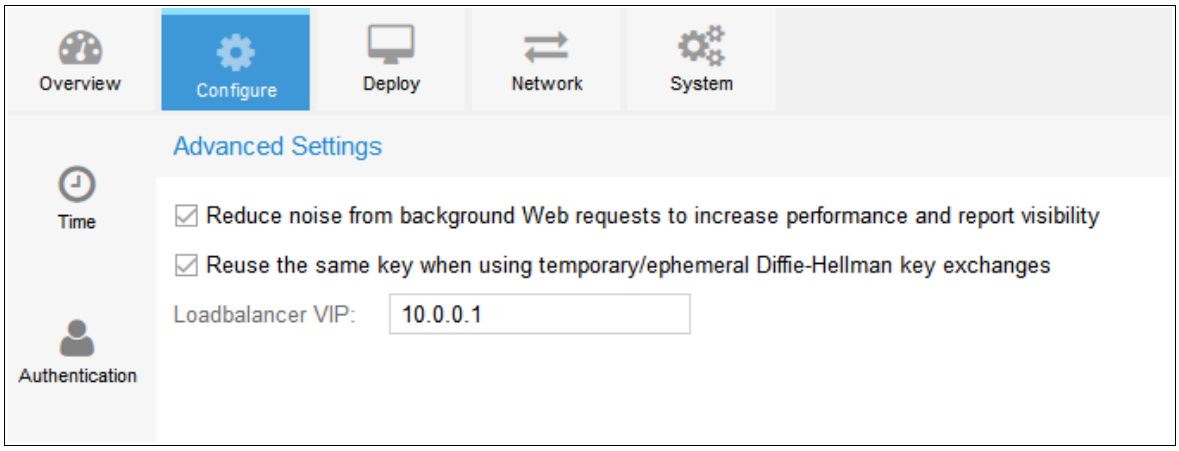
> Note:
>
> This final step must be followed on all Gateways.

Concept

To enable DR mode to function, changes are required to the real servers, i.e. the USS Gateways. The real servers must accept traffic for the VIP, but they must not respond to any ARP requests for that IP, only the VIP should do this.

Configuring the Censornet USS Gateway Appliances

1. Using the USS Gateway's WebUI, navigate to: *Configure > Advanced*
2. Enter the IP address of the VIP created on the load balancer, .e.g. **10.0.0.1**



3. Click the **Save** button

LOAD BALANCER CONFIGURATION

CONFIGURE THE IP ADDRESS AND HOSTNAME

1. Using one of the methods described on page 4, configure an appropriate IP address for the appliance's eth0 network interface, e.g. **10.0.0.2/24**

> Note:
>
> Based on the example values used in this guide, do not use **10.0.0.1** – this is reserved for the Virtual Service (VIP). This IP was used when configuring the Primary Gateway as described on page 8.

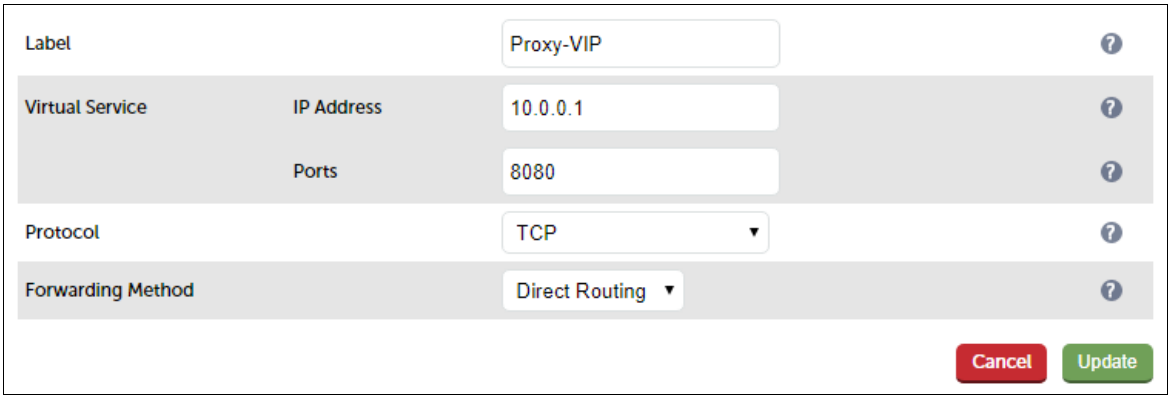
2. Using the WebUI, navigate to: *Local Configuration > Hostname & DNS*
3. Set the hostname to an appropriate value, e.g. **filter**

> Note:
>
> The hostname '**filter**' was used when configuring the Primary Gateway as described on page 8.

4. Click **Update**

CREATE THE VIRTUAL SERVICE (VIP)

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

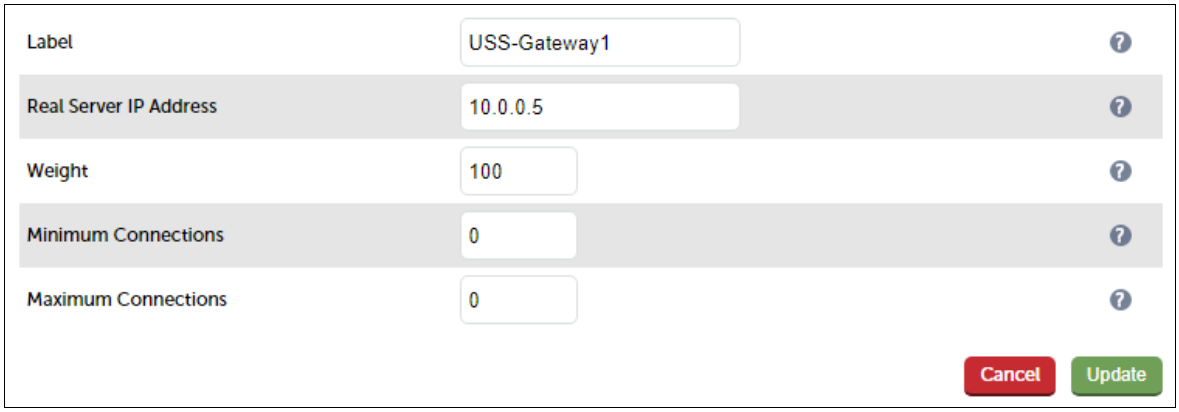


4. Enter an appropriate label (name) for the VIP, e.g. **Proxy-VIP**
5. Set the *Virtual Service IP address* field to the required IP address, e.g. **10.0.0.1**
6. Set the *Virtual Service Ports* field to the required port, e.g. **8080**
7. Ensure that *Protocol* is set to **TCP**
8. Ensure that *Forwarding Method* is set to **Direct Routing**
9. Click **Update**

Define the Real Servers (RIPs)

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Real Servers*

2. Click **Add a new Real Server** next to the newly created VIP
3. Enter the following details:



4. Enter an appropriate label (name) for the first USS Gateway, e.g. **USS-Gateway1**
5. Change the *Real Server IP Address* field to the required IP address, e.g. **10.0.0.5**
6. Click **Update**
7. Repeat the above steps to add your other USS Gateway(s)

9. Client Configuration

Client Web browser settings must be configured to connect via the VIP on the load balancer. In a Microsoft based LAN environment, this is typically achieved using AD Group Policy. Please refer to this Censornet URL for details on configuring client Web browsers.

10. Testing & Validation

To verify that traffic is passing correctly through the load balancer, the following WebUI reporting options can be used on the load balancer:

System Overview
Reports > Layer 4 Status
Reports > Layer 4 Current Connections

Various reporting options are also available in the Censornet USS Gateway user interface. For more details please refer to the appropriate Censornet documentation.

11. 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.

12. Further Documentation

The Administration Manual contains much more information about configuring and deploying the appliance. It's available here: http://pdfs.loadbalancer.org/loadbalanceradministrationv8.pdf

13. Conclusion

Loadbalancer.org appliances provide a very cost effective solution for highly available load balanced Censortnet USS Gateway environments.

14. Appendix

1 – CLUSTERED PAIR CONFIGURATION – ADDING A SLAVE UNIT

If you initially configured just the master unit and now need to add a slave - our recommended procedure, please refer to the relevant section below for more details:

> Note:
>
> A number of settings are not replicated as part of the master/slave pairing process and therefore must be manually configured on the slave appliance. These are listed below:
>
> - Hostname & DNS settings
> - Network settings including IP addresses, bonding configuration and VLANs
> - Routing configuration including default gateways and static routes
> - Date & time settings
> - Physical – Advanced Configuration settings including Internet Proxy IP address & port, Firewall table size, SMTP relay and Syslog server
> - SNMP settings
> - Graphing settings
> - Firewall Script & Firewall Lockdown Script settings
> - Software updates

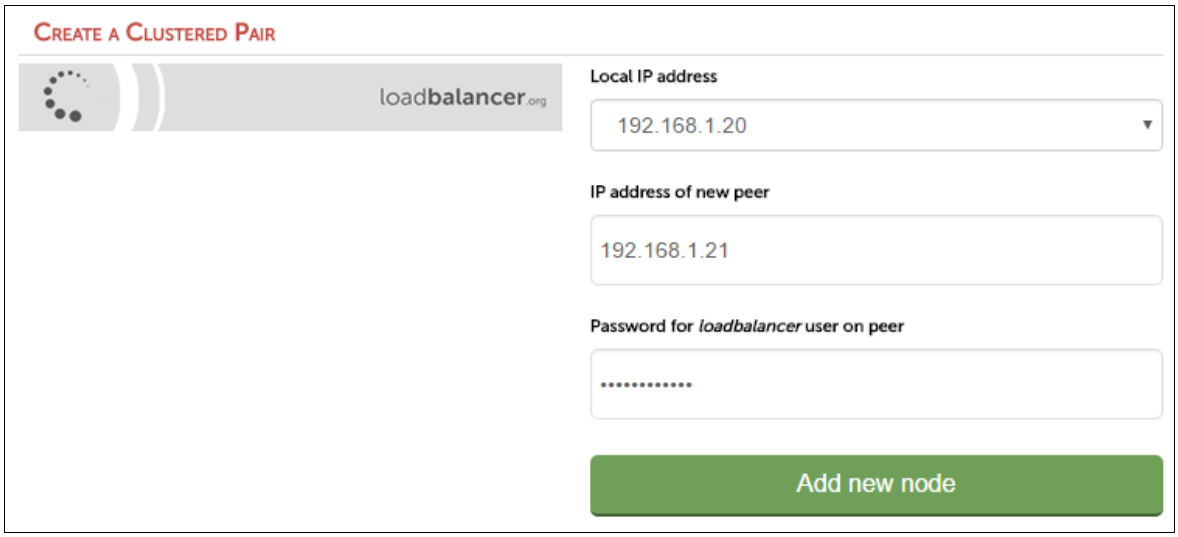
Version 7:

Please refer to **Chapter 8 – Appliance Clustering for HA** in the v7 Administration Manual.

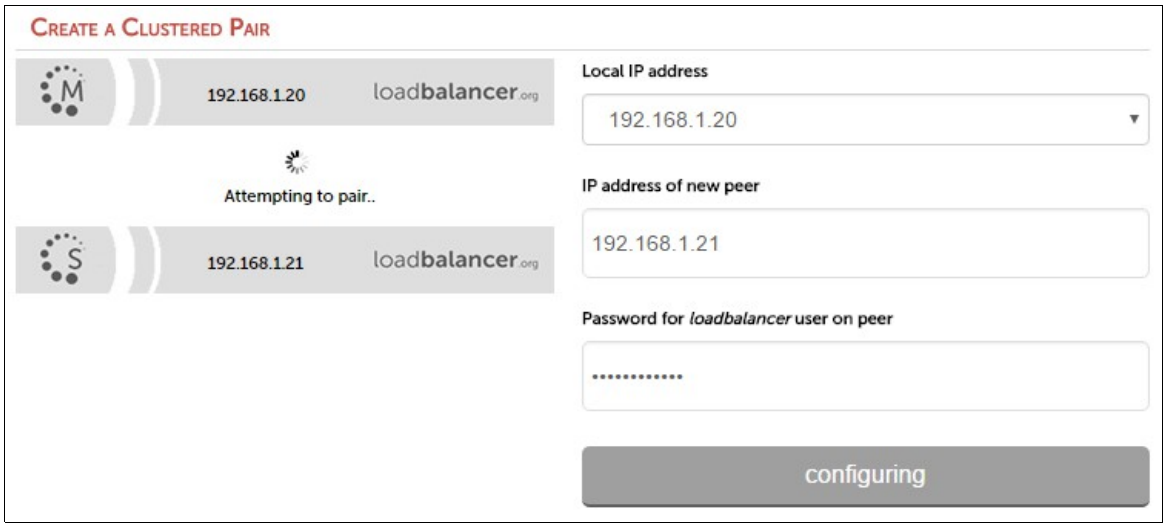
Version 8:

To add a slave node – i.e. create a highly available clustered pair:

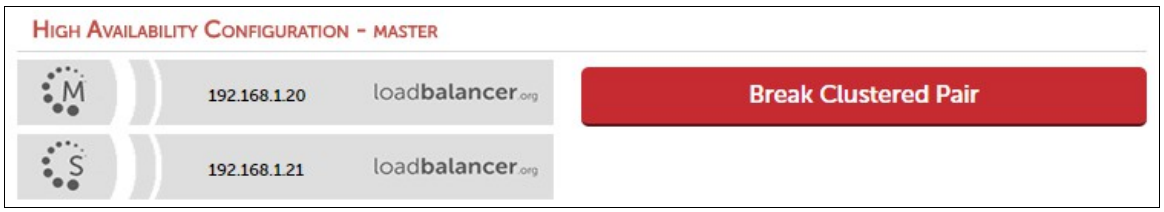
- Deploy a second appliance that will be the slave and configure initial network settings
- Using the WebUI, navigate to: *Cluster Configuration > High-Availability Configuration*



- Specify the IP address and the *loadbalancer* users password (the default is 'loadbalancer') for the slave (peer) appliance as shown above
- Click **Add new node**
- The pairing process now commences as shown below:



- Once complete, the following will be displayed:



- To finalize the configuration, restart heartbeat and any other services as prompted in the blue message box at the top of the screen

> Note:
>
> Clicking the **Restart Heartbeat** button on the master appliance will also automatically restart heartbeat on the slave appliance.

> Note:
>
> Please refer to chapter 9 – Appliance Clustering for HA in the Administration Manual for more detailed information on configuring HA with 2 appliances.

2 - COMPANY CONTACT INFORMATION

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