Deployment Guide

Load Balancing Netsweeper

v1.1.2

Deployment Guide
# Contents

1. About this Guide ................................................................................................................................. 3
2. Loadbalancer.org Appliances Supported .......................................................................................... 3
3. Loadbalancer.org Software Versions Supported ............................................................................... 3
4. Netsweeper Software Versions Supported ...................................................................................... 3
5. Netsweeper ......................................................................................................................................... 4
6. Benefits of Implementing a Load Balancer ....................................................................................... 4
7. Netsweeper Deployment Modes ......................................................................................................... 4
   - Deployment Architecture .................................................................................................................. 4
8. Load Balancing Netsweeper .................................................................................................................. 5
   - Firewall Configuration ..................................................................................................................... 5
   - DR Mode Considerations .................................................................................................................. 5
   - The ARP problem ............................................................................................................................ 5
   - Solving the ARP Problem .................................................................................................................. 5
9. Option 1 – Explicit Mode .................................................................................................................... 6
    - Netsweeper Network Alias Configuration .................................................................................... 6
    - Loadbalancer Appliance Configuration ......................................................................................... 6
    - Deployment and Virtual Service Setup ............................................................................................ 6
    - Client Browser Configuration ......................................................................................................... 8
10. Option 2 – Transparent Mode .......................................................................................................... 9
    - Netsweeper Network Alias Configuration .................................................................................... 9
    - Loadbalancer Appliance Configuration ......................................................................................... 10
    - Deployment and Virtual Service Setup ............................................................................................. 10
    - Firewall Script Configuration ......................................................................................................... 12
    - Additional Netsweeper Configuration ............................................................................................. 12
11. Option 3 – Non-Transparent Mode .................................................................................................. 13
    - Client Browser Configuration ......................................................................................................... 13
12. Technical Support .............................................................................................................................. 14
13. Further Documentation ...................................................................................................................... 14
14. Conclusion ......................................................................................................................................... 14
15. Document Revision History ............................................................................................................. 15
1. About this Guide
This guide details the steps required to configure a load balanced Netsweeper environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Netsweeper 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
All our products can be used for load balancing Netsweeper. The complete list of models is shown below:

<table>
<thead>
<tr>
<th>Discontinued Models</th>
<th>Current Models *</th>
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</thead>
<tbody>
<tr>
<td>Enterprise R16</td>
<td>Enterprise R20</td>
</tr>
<tr>
<td>Enterprise VA R16</td>
<td>Enterprise MAX</td>
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<td></td>
<td>Enterprise AZURE **</td>
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<tr>
<td></td>
<td>Enterprise GCP **</td>
</tr>
</tbody>
</table>

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

** Some features may not be supported, please check with Loadbalancer.org support

3. Loadbalancer.org Software Versions Supported
- V76.4 and later

4. Netsweeper Software Versions Supported
- Netsweeper – all versions
5. Netsweeper
Netsweeper is a Linux based web filtering software developed by the Netsweeper corporation. It provides functions for filtering malicious and inappropriate web content, which can help with meeting compliance and regulatory requirements.

The Netsweeper software comes as both a virtual and hardware product, both of which can be load balanced using Loadbalancer.org appliances.

6. Benefits of Implementing a Load Balancer
Implementing Loadbalancer.org appliances enables multiple instances of the Netsweeper software to be deployed in a cluster. This provides the following key benefits:

- **High-Availability** – If a Netsweeper fails, service is not interrupted
- **Maintenance** – Netsweepers can easily be taken out of the cluster for maintenance
- **Performance** – For additional performance simply add more Netsweepers to the cluster

7. Netsweeper Deployment Modes

Deployment Architecture

For a Netsweeper deployment, the load balancer is deployed using **Layer 4 DR Mode** (Direct Routing, aka DSR / Direct Server Return). This is a very high performance solution which is well suited to web filters and proxies.

Three modes of Netsweeper operation are officially supported with Loadbalancer.org appliances:

- **Explicit Mode**: proxy settings are explicitly set on each client device. Browser settings on client PCs must be changed to point at the Virtual Service (VIP) on the load balancer
• **Transparent Mode**: policy based routing is used on the router/firewall that handles client traffic. These rules at the router/firewall make sure that the required traffic (typically HTTP & HTTPS on port 80 & 443) is sent transparently to the load balancer.

• **Non-Transparent Mode**: proxy settings are explicitly set on each client device. Browser settings on client PCs must be changed to point at the Virtual Service (VIP) on the load balancer.

8. **Load Balancing Netsweeper**

The following instructions apply to all options/modes of operation for load balancing Netsweeper, and must be carried out on every deployment.

**Firewall Configuration**

Netsweeper uses several different network ports to function. Any firewalls that handle Netsweeper traffic should have the following network port rules configured so that Netsweeper works correctly:

- Open inbound ports: 80, 8080, 8081, 3431, 3432
- Open outbound ports: 25, 53, 80, 443, 3436

**DR Mode Considerations**

**The ARP Problem**

DR mode works by changing the MAC address of the inbound packets to match the Netsweeper server selected by the load balancing algorithm. To enable DR mode to operate:

- Each Netsweeper server must be configured to accept packets destined for both the VIP address and the Netsweeper server’s IP address (RIP). This is because in DR mode the destination address of load balanced packets is the VIP address, whilst for other traffic such as health-checks, administration traffic etc. it’s the Netsweeper server’s own IP address (the RIP). The Netsweeper service must also respond to both addresses.
- Each Netsweeper server must be configured so that it does not respond to ARP requests for the VIP address – only the load balancer should do this.

Configuring the Netsweeper servers in this way is referred to as “**Solving the ARP problem**”. The steps presented below detail the Netsweeper recommended solution for the ARP problem.

**Solving The ARP Problem**

You can use iptables (netfilter) on each Netsweeper server to re-direct incoming packets destined for the Virtual Service IP address. To make this permanent, simply add the command to an appropriate start-up script such as /etc/rc.local. If the Netsweeper server is serving multiple VIPs, add additional iptables rules for each VIP.

```
iptables -t nat -A PREROUTING -d <VIP> -j REDIRECT
```
e.g.

```
iptables -t nat -A PREROUTING -d 10.0.0.21 -j REDIRECT
```

*(Change the IP address to be the same as your Virtual Service)*

This means redirect any incoming packets destined for 10.0.0.21 (the Virtual Service) locally, i.e. to the primary address of the incoming interface on the Netsweeper server.

9. **Option 1 – Explicit Mode**

**Netsweeper Network Alias Configuration**

The following steps should be carried out on the Netsweeper software instances to configure them for load balancing using layer 4 DR mode.

These instructions will create a network alias for the eth0 network interface, so that it can be assigned an additional IP address. This is required for layer 4 DR mode operation.

1. Establish an SSH session with the Netsweeper software
2. Login to the *admin* account using the appropriate credentials
3. Change to the network-scripts directory by executing the command `cd /etc/sysconfig/network-scripts`
4. Execute the following command to create the configuration file for the eth0 network interface alias `cp ifcfg-eth0 ifcfg-eth0:0`
5. Open the newly created configuration file for editing, by executing the command `nano ifcfg-eth0:0`
6. Edit the following lines in the configuration file to read like so:
   ```
   DEVICE=eth0:0
   ONBOOT=YES
   BOOTPROTO=static
   IPADDR=Your Virtual IP address
   NETMASK=Your Subnet Mask for your network
   GATEWAY=Your Gateway address
   NAME=Ethernet
   ```
7. Press Control+X to prompt to exit the text editor, then press Y and hit the Enter key to save the changes
8. Bring up the newly added eth0 network interface alias by executing the command `service network restart`

**Loadbalancer Appliance Configuration**

**Deployment And Virtual Service Setup**

The following steps should be carried out on the Loadbalancer.org appliance.

1. Download the Loadbalancer.org virtual appliance for your hypervisor of choice, e.g. VMware, Hyper-V. The appliance can be downloaded from: [https://www.loadbalancer.org/uk/resources/free-trial](https://www.loadbalancer.org/uk/resources/free-trial)
2. Deploy the virtual appliance in your hypervisor. Once it has been deployed, log in using the credentials “setup” and “setup” to begin the appliance's initial network setup.

3. Enter the appliance's IP address, subnet mask, default gateway, and DNS server settings as needed, and then hit the enter key twice.

4. Open a web browser and navigate to the appliance's specified IP address on port 9443, for example: https://10.0.0.1:9443.

5. Log in to the appliance's web user interface when prompted, by using the default credentials of “loadbalancer” and “loadbalancer”.


7. Name the new virtual service, for example Netsweeper VIP. Enter the IP Address that you want to use for the virtual service, set the Ports to 31280, set the Protocol to TCP, set the Forwarding Method to Direct Routing, and then click Update.

8. Navigate to Cluster Configuration > Layer 4 – Real Servers and click to Add a new Real Server.

9. Name the new real server as appropriate, for example Netsweeper RIP. Enter the real server's IP address, and then click Update.
10. Navigate back to the System Overview tab in the web user interface. The newly created virtual service should be visible, with its associated real server(s) visible underneath.

Client Browser Configuration
On every client machine, the web browser(s) proxy settings should be changed to use the VIP address of your new load balanced service on port 31280.

An example in the Chrome browser using a VIP address of 192.168.81.38:
Once this is done, the proxy and filter setup can be tested on a client machine as follows:

- Close all running instances of the web browser
- Re-open the web browser, which should now be using the explicit proxy settings
- Try to access a website which should be blocked by Netsweeper

This can be further verified by checking the Netsweeper logs, under **Netsweeper Web Appliance > Logs > Request Log Files**. There should be a new log entry for the blocked web page used in the browser test.

**10. Option 2 – Transparent Mode**

**Netsweeper Network Alias Configuration**

The following steps should be carried out on Netsweeper software instances to configure them for load balancing using layer 4 DR mode.

These instructions will create a network alias for the loopback adaptor, so that it can be assigned an additional IP address. This is required for layer 4 DR mode operation.

1. Establish an SSH session with the Netsweeper software
2. Login to the admin account using the appropriate credentials

3. Change to the network-scripts directory by executing the command `cd /etc/sysconfig/network-scripts`

4. Execute the following command to create the configuration file for the loopback adaptor alias `cp ifcfg-lo ifcfg-lo:0`

5. Open the newly created configuration file for editing, by executing the command `nano ifcfg-lo:0`

6. Edit the following lines in the configuration file to read like so:
   ```
   DEVICE=lo:0
   ONBOOT=YES
   BOOTPROTO=static
   IPADDR=Your Virtual IP address
   NETMASK=255.255.255.255
   GATEWAY=Your Gateway address
   NAME=loopback
   ```

7. Press Control+X to prompt to exit the text editor, then press Y and hit the Enter key to save the changes

8. Bring up the newly added loopback adaptor alias by executing the command `service network restart`

---

**Loadbalancer Appliance Configuration**

**Deployment And Virtual Service Setup**

The following steps should be carried out on the Loadbalancer.org appliance.

1. Download the Loadbalancer.org virtual appliance for your hypervisor of choice, e.g., VMware, Hyper-V. The appliance can be downloaded from: [https://www.loadbalancer.org/uk/resources/free-trial](https://www.loadbalancer.org/uk/resources/free-trial)

2. Deploy the virtual appliance in your hypervisor. Once it has been deployed, log in using the credentials “setup” and “setup” to begin the appliance’s initial network setup.

3. Enter the appliance’s IP address, subnet mask, default gateway, and DNS server settings as needed, and then hit the enter key twice.

4. Open a web browser and navigate to the appliance’s specified IP address on port 9443, for example: [https://10.0.0.1:9443](https://10.0.0.1:9443)

5. Log in to the appliance’s web user interface when prompted, by using the default credentials of “loadbalancer” and “loadbalancer”

6. Navigate to Cluster Configuration > Layer 4 Virtual Services and click to Add a new Virtual Service

7. Name the new virtual service, for example Proxy. Enter the IP Address as 1, set the Protocol to Firewall Marks, set the Forwarding Method to Direct Routing, and then click Update
8. Navigate to Cluster Configuration > Layer 4 – Real Servers and click to Add a new Real Server

9. Name the new real server as appropriate, for example Netsweeper RIP. Enter the real server's IP address, and then click Update

10. Navigate back to the System Overview tab in the web user interface. The newly created virtual service should be visible, with its associated real server(s) visible underneath
Firewall Script Configuration

Making transparent mode work requires making changes to the load balancer’s firewall script. The following instructions should be followed to make the necessary changes.

Note: The Firewall Script page is locked by default on newer Loadbalancer.org appliances as part of “Secure Mode”, which makes applying the changes described below impossible. To enable editing of the firewall script, navigate to Local Configuration > Security, set Appliance Security Mode to Custom, and click the Update button to apply the change. Editing the Firewall Script page will then be possible.

1. From the load balancer’s web user interface, navigate to Maintenance > Firewall Script.

2. Under the “Manual Firewall Marks” section, uncomment the following three lines, and change the value of VIP1 to the IP address you want the virtual service to listen on:

   ```
   VIP1="10.0.0.1"
   iptables -t mangle -A PREROUTING -p tcp -d $VIP1 --dport 80 -j MARK --set-mark 1
   iptables -t mangle -A PREROUTING -p tcp -d $VIP1 --dport 443 -j MARK --set-mark 1
   ```

3. Press the Update button to apply the changes.

Additional Netsweeper Configuration

Further configuration changes need to be made on the Netsweeper software. The following steps should be followed to make the necessary changes.

1. Establish an SSH session with the Netsweeper software.

2. Login to the admin account using the appropriate credentials.

3. Change to the “netsweeper/etc” directory by executing the command:

   ```
   cd /usr/local/netsweeper/etc
   ```

4. Open the Netsweeper port mapping configuration file for editing, by executing the command:

   ```
   nano nsportmap.conf
   ```

5. Add the following two lines of text like so:
6. Press Control+X to prompt to exit the text editor, then press Y and hit the Enter key to save the changes.

7. Open the Netsweeper proxy configuration file for editing, by executing the command `nano nsproxy.conf`.

8. Locate the section above *Access control settings* and add the following lines:

   ```
   listen proxy 0.0.0.0 31280
   listen http 0.0.0.0 31281
   listen https 0.0.0.0 31282
   listen denypage 0.0.0.0 9443 localhost 443
   ```

9. Press Control+X to prompt to exit the text editor, then press Y and hit the Enter key to save the changes.

10. Restart the port mapping service, by executing the command `service nsportmapctl restart`.

11. Restart the proxy service, by executing the command `service nsproxyctl restart`.

12. Start the port mapping service, by executing the command `service nsportmapctl start`.

After making these changes, the Netsweeper software should now work in a transparent mode style deployment.

11. **Option 3 – Non-Transparent Mode**

   **Client Browser Configuration**

   For a non-transparent deployment, first follow through **all** of the instructions for **Option 2 – Transparent Mode**.

   An additional step is needed to turn a transparent deployment into a non-transparent deployment. On every client machine, the web browser(s) proxy settings should be changed to use the VIP address of your new load balanced service on port 31280.

   An example in the Chrome browser using a VIP address of 192.168.81.38:
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

14. Conclusion
Loadbalancer.org appliances provide a very cost effective solution for highly available load balanced Netsweeper environments.
## 15. Document Revision History

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<td>1.0.0</td>
<td>3 March 2018</td>
<td>Initial version</td>
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<td>AH</td>
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<td>1.0.1</td>
<td>27 March 2018</td>
<td>Change of ‘ARP problem’ solution to use iptables method, based on feedback from Netsweeper</td>
<td>Required updates</td>
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<td>Terminology change at the request of Netsweeper</td>
<td>Required updates</td>
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<td>9 December 2019</td>
<td>Styling and layout</td>
<td>General styling updates</td>
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<td>17th January 2020</td>
<td>Added note explaining how to disable “Secure Mode” to unlock the firewall script page</td>
<td>Required update</td>
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<td></td>
<td></td>
<td>Updated Canadian contact details</td>
<td>Change to Canadian contact details</td>
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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.

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