



XROADS NETWORKS

Network Appliance How To Guide: Proxy/NAT Load Balancer

How To Guide

EDGE NETWORK APPLIANCE

How To Guide

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Edge Configuration Series

Proxy/NAT Load Balancing

Use this guide as a step-by-step manual for configuring your Edge unit in Proxy/NAT Mode.

The Proxy / NAT Load Balancing configuration is designed for organizations which have existing routable public address space on the LAN networks and want a transparent installation, so as not to require any re-addressing..



About the "Screen Shots"

The included screen shots were taken from a working example configuration in the XRoads Networks lab. This configuration was running on XOS3.1.8.p5 Some screen shots may be different depending on your version of XOS code.

Step-By-Step Method

Use this guide to assist in configuring your own Edge device. The examples provided herein are designed as a template which can translate to your organizations network environment. The three primary configuration steps are outlined below:

- **Interface Configuration – This is the actual configuration of the Edge units interfaces, it is critical that the information entered here is accurate.**
- **NAT / Vector Configuration – In order for the backup link to function properly One-To-One or One-To-Many NAT entries must be made. This example only demonstrates One-To-One. Additionally, two Vector Map rules must be created for each network server.**
- **DNS Configuration – The final step in completing the configuration is enabling DNS to resolve inbound queries correctly. DNS will provide the appropriate WAN1/WAN2 IP address based on the UP/DOWN status of those links and the inbound load balancing preferences.**

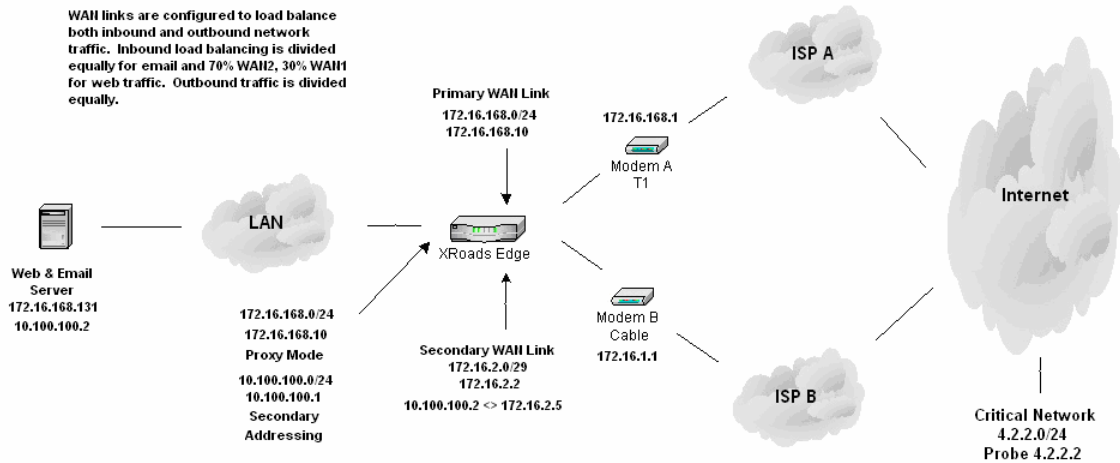
Example Network Overview

This example network is provided as a template which can be used to determine how to best configure your Edge unit. In the example network environment, the Edge device is connected to two WAN interfaces. The WAN1 interface is being proxy'd by the Edge router, while the WAN2 interface is being NAT'd to the LAN network. The LAN network contains several workstations and a single web and email server.

Figure 1.0 demonstrates how the Edge device could be configured in a Proxy/NAT Load Balancing scenario.

Example Proxy / NAT Load Balancing Solution

WAN1 is set for proxy mode with the Edge router assigned an unused address for management.



Network Overview

This network has one WAN network on the 172.16.168.0/24 network and one WAN interface on the 172.16.2.0/29 network. The LAN network is also using the 172.16.168.0/24 space. The WAN2 interface is being NAT'd to the LAN network. A single server on 172.16.168.131 (with a secondary network address assigned 10.100.100.2) is configured with both web and email services. Inbound web services will be load balanced 70% on WAN2 and 30% on WAN1. The Edge unit is only using NAT to firewall inbound traffic in this example. Best Path Routing is also configured with the 4.2.2.0/24 network being setup as critical with monitoring enabled. A single email alert has also been configured in this example.

Example Configuration Forms

These configuration forms can be found in the QuickStart Guide and are designed to make the initial configuration of the Edge device much easier. Please take advantage of these forms as we have found that they significantly reduce installation errors.

Figure 2.0 demonstrates how to fill out the configuration forms for a Proxy/NAT Load Balancing solution.

Network Configuration Form

Please use this network form to obtain the proper information for the configuration template. This form can also be used as a quick overview for the customers' network.

Please enter all of the appropriate fields to ensure a quick installation.

205.147.0.100
65.165.98.38
(2) DNS Servers

768
(3) WAN1 Bandwidth

172.16.168.10
(4) WAN1 Addr / Subnet
(Proxy Mode - select an unused LAN address for WAN1)

255.255.255.0
(1) LAN Network Addr / Subnet

LAN Network

172.16.168.1
(1) LAN Gateway Addr / Subnet

255.255.255.0
(1) LAN Gateway Addr / Subnet

172.16.2.2
(9) WAN2 Addr / Subnet

172.16.2.1
(10) WAN2 Gateway Addr / Subnet

172.16.168.1
(5) WAN1 Gateway Addr

(6) WAN1 - NAT Mode (Yes) / (No)
(7) WAN1 - Proxy Mode (Yes) / (No - Static)
(8) WAN1 - Overflow Mode (Yes) / (No)

(11) WAN2 - Backup Mode (Yes) / (No)

Edge

CPE

CPE

ISP A

ISP B

Inbound Configuration Form

Please use this inbound server/VPN form to obtain the proper information for the configuration template. This form can also be used as a quick overview for the customers' network servers and VPN appliances.

Please enter all of the appropriate fields to ensure a quick installation.

172.16.168.131
(11) Internal Address

10.100.100.2
(13) Dual Address (LB*)

172.16.2.5
(12) External Address (One-To-One)

smtp 25, http 80
(14) Service (http, ftp)

(15) Internal Address

(16) Dual Address (LB*)

(17) External Address (One-To-One)

(18) Service (http, ftp)

(19) Internal Address

(20) Dual Address (LB*)

(21) External Address (One-To-One)

(22) Service (http, ftp)

Server A

Server B

Server C

LAN Network

xyz.com
(23) Domain Name

ns1.xyz.com
(24) Primary DNS - WAN1

ns2.xyz.com
(25) Secondary DNS - WAN2

* Required for any servers that will be load balanced.
If you have more than

Best Path Routing & Reporting Configuration Form

Please use this form to obtain the proper information for the configuration template. This form can also be used as a quick overview for the customers' critical networks and email alerts.

Best Path Routing (BPR)

In addition to 99.999% uptime, the RDC solution offers customers best path routing for their network traffic. BPR insures that over time each of your network connections uses the most efficient network route. BPR does this by performing continuous testing of each of your Internet links to determine which link is best for each route. Administrators may also define "critical routes" which apply immediately and have greater preference over BPR routes.

Branch1

(27) Critical Network Name 1
4.2.2.0 / 255.255.255.0

(28) Critical Network / Subnet

4.2.2.2
(29) Critical Probe Address

250
(30) Alert Threshold

(31) (WAN1) / (WAN2) / (Smart)

(42) Primary Mail Recipient - Name
jsmith@xyz.com

(43) Email Address

(31) Critical Network Name 2

(33) Critical Network / Subnet

(34) Critical Probe Address

(35) Alert Threshold

(36) (WAN1) / (WAN2) / (Smart)

(44) Outages (Yes) / (No)

(45) Login Failures (Yes) / (No)

(46) Thresholds (Yes) / (No)

(47) Reports (Yes) / (No)

(48) Backup Outages (Yes) / (No)

(37) Critical Network Name 3

(38) Critical Network / Subnet

(39) Critical Probe Address

(40) Alert Threshold

(41) (WAN1) / (WAN2) / (Smart)

Configuration Assistance

XRoads Networks has developed an automated configuration generator (“The Edge Configurator”) located at <http://www.myxroads.com/support/template.html> which can be used to create your Edge units configuration file for you. The configuration generator will build a configuration based on the information provided which can then be easily uploaded to the Edge unit, no additional configuration is required.



Information Gathering

It is critical that the correct information be obtained for the Edge unit to be configured properly. Please use the forms and network templates located at the end of this guide to assist in collecting the proper information about your network...

Figure 3.0 demonstrates how the automated configuration generator works.

The screenshot shows a web-based configuration tool titled "SUPPORT Configuration File Generation Tool". It features a form for entering network and contact information, and a preview of the generated configuration file. The form includes fields for Company Name, Contact, Contact Email, Contact Phone, LAN Gateway, WAN1 Gateway, WAN1 NAT, WAN2 Gateway, and WAN2 Backup Mode. A "Generate" button is located at the bottom of the form. The configuration file preview shows a text-based format with various parameters and their values.

Configuration File Generation Tool

Please fill out all of the fields.

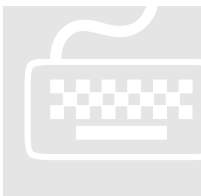
Your configuration file has been generated, you n line and paste it into a text editor. Save the file in then goto the home page of your Edge device to i

Copy everything below this CUT LINE.

Edge Configuration File

```
#####  
#  
# Version XRoads Version unknow  
#  
# Created on Thu May 20 11:42  
#  
# Warning: Modifying and uploac  
#  
#####  
#  
# Registration - company, conta  
#  
# Example: REG,ABC,John Smith,  
REG,XYZ,John Smith,jsmith@xyz.com,555-555-1212  
#  
# Interfaces - port, address, mask, gateway, dhcp on/off, pppoe on/off, nat  
on/off, state (ACTIVE, INACTIVE, BACKUP)
```

Company Name: XYZ
Contact: John Smith
Contact Email: jsmith@xyz.com
Contact Phone: 555-555-1212
(1) LAN Gateway Addr/Mask: 192.168.168.254 / 255.255.255.0
(4) WAN1 Addr/Mask: 24.5.26.2 / 255.255.255.252
(5) WAN1 Gateway: 24.5.26.1
(6) WAN1 NAT: ON OFF
(9) WAN2 Addr/Mask: 65.165.98.245 / 255.255.255.0
(10) WAN2 Gateway: 65.165.98.1
(11) WAN2 Backup Mode: ON OFF
Comments:
Generate



Config Generation Steps Include:

1. Collect the correct information for the online template.
2. Go to the online template and fill out the fields that match the forms attached to this guide (see pages 12-14).
3. Click the “Generate” button and a configuration file will be displayed. Copy the text from the displayed file, and paste it into a config text file. Finally, access the Edge web GUI, scroll to the bottom of the Home page and upload the configuration file. The Edge will then configure itself and begin testing the interfaces.

XREDGE_CONFIG Example

The XREDGE_CONFIG file is produced by the Edge unit whenever the 'Save' button is clicked. This file can also be used to configure the Edge device. Simply upload the file via the Home page and the file will automatically configure the unit.

Figure 4.0 provides an example of the configuration file.

```
Edge Configuration File
#####
#
# Version XRoads Version 3.1.8.p5
#
# Created on Sun Aug 15 17:02:38 2004
#
# Warning: Modifying and uploading this file will change the configuration.
#
#####
# Registration - company, contact, email, phone
#
# Example: REG,ABC,John Smith,jsmoth@abc.com,555-555-1212

REG,XZY,John Smith,jsmith@xyz.com,555-555-1212

# Interfaces - port, address, mask, gateway, dhcp on/off, proxy on/off, nat on/off, state (ACTIVE, INACTIVE,
BACKUP)
#
# Example: INT,lan,192.168.168.254,255.255.255.0,,off,off,off,ACTIVE
# Example: INT,wan1,10.10.10.10,255.255.255.0,10.10.10.1,off,on,off,ACTIVE

INT,lan,172.16.168.10,255.255.255.0,172.16.168.1,off,off,off,ACTIVE
INT,wan1,172.16.168.10,255.255.255.0,172.16.168.1,off,on,off,ACTIVE
INT,wan2,172.16.2.2,255.255.255.248,172.16.2.1,off,off,on,ACTIVE

# Static Routes - route (network), route subnet (slash notation), route gateway
#
# Example: STATIC,10.10.10.0,24,192.168.168.150

# System Information - dns1_server, dns2_server, wan1_bandwidth (in kbit), GMS_server
#
# Example: SYSTEM,4.2.2.2,4.2.2.2,1544kbit,rac2.myxroads.com

SYSTEM,205.147.0.100,65.165.98.38,768kbit,rac2.myxroads.com

# Alerts - full name, email addr, subject, outages, authfail, threshold, reports, vtech, backup, server
(optional)
#
# Example: ALERTS,john_smith,jsmith@abc.com,xroads alert,on,on,on,on,off,off,10.10.10.10

ALERTS,john_smith,jsmith@xyz.com,xroads alert,on,on,on,on,off,off,

# Firewall Controls - spi firewall on/off, DoS on/off, ICMP WAN on/off, remote access on/off
#
# Example: SECURITY,on,on,off,off

SECURITY,on,on,on,off

# Firewall - src addr, src port (or leave blank), dst addr, dst port (or leave blank), protocol, action, rule
group (no spaces)
#
# Example: FIREWALL,172.16.168.168,80,ANY,ANY,TCP,DROP,wan_group
# Example: FIREWALL,ANY,,192.168.168.250,80,TCP,ACCEPT,lan_group

FIREWALL,ANY,,LAN,8088,TCP,ACCEPT,XRoads
FIREWALL,ANY,,ANY,161,UDP,ACCEPT,XRoads
FIREWALL,172.16.168.130,,ANY,21,TCP,ACCEPT,Begin
FIREWALL,LAN,,ANY,21,TCP,DROP,End
FIREWALL,ANY,,LAN,80,TCP,ACCEPT,Default
FIREWALL,ANY,,LAN,25,TCP,ACCEPT,Default
FIREWALL,ANY,,LAN,25,TCP,ACCEPT,Default
FIREWALL,ANY,,LAN,88,TCP,ACCEPT,Default

# One-To-One (Many-To-Many) - nat name (no spaces), internal address, interface, wan address (must match
interface addressing)
```

```

#
# Example: MMNAT,web,192.168.168.150,WAN1,10.10.10.20
MMNAT,server,10.100.100.2,WAN2,172.16.2.5

# One-To-Many NAT Rules - nat name (no spaces), internal address, interface, wan address (must match interface
addressing)
#
# Example: OMNAT,web,192.168.168.252,TCP,80,80
OMNAT,www,172.16.168.131,TCP,80,80
OMNAT,www_2,172.16.168.131,TCP,80,80
OMNAT,mail,172.16.168.131,TCP,25,25
OMNAT,mail_2,172.16.168.131,TCP,25,25
OMNAT,demo,172.16.168.131,TCP,88,88

# Vector-Mappings - reverse map device (no spaces), address, interface (must match inbound DNS rule)
#
# Example: VMAP,web,192.168.168.252,WAN1
VMAP,server_primary,172.16.168.131,WAN1
VMAP,server_secondary,10.100.100.2,WAN2

# Critical Networks - net name, network, network mask, probe address, interface (wan1, Smart), threshold, delete
#
# Example: BPR,Branch1,10.0.0.0,255.255.255.0,10.0.0.1,wan1,250,1
# Example: BPR,Branch1,10.0.0.0,255.255.255.0,10.0.0.1,wan1,250
BRP,Branch1,4.2.2.0,255.255.255.0,4.2.2.2,wan1,250

# Domain Zones (licensed) - zone id, domain
#
# Example: DOMAIN,1,abc.com.
DOMAIN,3,xyz.com.

# Domain Records (licensed) - zone id, host (no spaces), type, address, load balance weight (1-100), wan
interface, active, dynamic
#
# Example: RECORD,1,web,A,192.168.168.250,1,wan1,1,on
RECORD,3,www,A,10.100.100.2,7,wan2,1,
RECORD,3,www,A,172.16.168.131,3,wan1,1,
RECORD,3,mail,A,10.100.100.2,1,wan2,1,
RECORD,3,mail,A,172.16.168.131,1,wan1,1,
RECORD,3,,MX,mail.xyz.com.,1,wan2,1,
RECORD,3,,MX,mail.xyz.com.,1,wan1,1,
RECORD,3,ns2,A,172.16.2.2,1,wan2,1,on
RECORD,3,,NS,ns2.xyz.com.,1,wan2,1,
RECORD,3,ns1,A,172.16.168.10,1,wan1,1,on
RECORD,3,,NS,ns1.xyz.com.,1,wan1,1,

```

Connecting To The Edge

The first step in configuring the XRoads Edge platform is to gain access to the web interface. All configurations should be performed via the web interface. Additional configuration may be performed via the console connection using a 15-pin console cable and a terminal program like Hyper Term.

The Figure 5.0 screen shot demonstrates what the Home page will look like when you have properly accessed the web interface.



1. Configure your computer to use an address from 192.168.168.1 – 192.168.168.253 with a subnet/net mask of 255.255.255.0. *Please refer to your OS manual for information on changing its address.*
2. Turn on the XRoads Edge device, and connect the LAN interface of the XRoads Edge device so that it is able to communicate with your computers NIC. Use the PING utility, if available to confirm you are able to communicate with the XRoads Edge 192.168.168.254 (default address).
3. Once communication has been confirmed, use a web browser with the following URL: <http://192.168.168.254:8088> to connect to the XRoads Edge device. The username is “**admin**”, the default password is “**password**”. **CHANGE THE PASSWORD!**

Home

The Home page provides a quick overview of the unit's status. The GREEN/RED/GREEN-RED indicators show the current status of the WAN ports. Where GREEN means the port is up and active, RED means the port is down or unable to access the network, and GREEN-RED indicates that the port is active, but in backup mode.

This is the XRoads Control Panel, using this web interface you can control all of the aspects of the XRoads unit. By clicking on the menu items you can administer those parameters. The G.M.S. variables enable remote updates to the XRoads systems. Only enable this feature if you wish to receive automated updates. The graphics below display basic XRoads system information, including Processor Load, Network Utilization, and Memory. The Alert Log to the right of the home panel displays critical system messages.

Welcome To XRoads

We're Your Edge!

Setup Wizard:

Save Configuration:

G.M.S. Server: Enable Disable

(Serial Number: 0090FB046FF3)

(G.M.S. Identifier)

(G.M.S. Server)

(G.M.S. Interval)

System Load: SLP 29%

Network Utilization: Net. 0%

Remote Monitor

XRoads Log Alerts:

```
Sun Aug 15 14:45:20 2004 Alert xroads alert from 0090FB046FF3 XZY Sent To jsmith@xyz.com
Sun Aug 15 14:45:20 2004 Alert Edge Alert - Interface Active wan1
Sun Aug 15 14:44:30 2004 Alert xroads alert from 0090FB046FF3 XZY Sent To jsmith@xyz.com
```

Features & Functionality Overview.

The Home page allows the administrator to view the current status of the unit, WAN ports, system load, and network utilization. The Home page also enables the administrator to change the Edge units GMS server information, perform technical support diagnostics, SAVE the configuration (always before reboot), check the current critical alerts, and upload firmware and configuration files. Additionally the XRoads administrator can set the current configuration, in case he/she wants to fallback to it after additional changes are made, or revert to the factory default configuration.

Interfaces

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two. When proxy is enabled on WAN1, the LAN interface is automatically changed to information below. There is no need to reconfigure the LAN port once WAN1 has been updated. Also note that both WAN1 and WAN2 have been set to ACTIVE.

This is the XRoads interface control panel, from here you can make changes to the XRoads LAN and WAN interface IP addresses, subnet masks, at gateways. You can also configure the LAN DHCP server parameters, as well as set preferences for WAN load balancing (if that option is available)

Select An Interface: LAN Interface

WAN Overflow: Enable Disable (Enable to use backup WAN links when primary becomes over utilized)

LAN Configuration: (MAC Address: 00-90-FB-04-6F-F3)
 172 . 16 . 168 . 10 (Interface IP Address) <--- AUTOMATICALLY SET VIA WAN UPDATE
 255.255.255.0 (LAN Subnet Mask)

DNS Resolvers: 205 . 147 . 0 . 100 (Primary Edge Resolver)
 65 . 165 . 98 . 38 (Secondary Edge Resolver)

DHCP Server: Enable Disable
 192 . 168 . 168 . 32 (First DHCP Address)
 192 . 168 . 168 . 224 (Last DHCP Address)
 205 . 147 . 0 . 100 (DHCP DNS Server)
 3600 (Lease Time - Seconds)

NOTE: Click COMMIT to make interface changes, always remember to SAVE your configuration.

NOTE: Whenever configuring an interface, always make sure to UPDATE the page prior to going to the next interface. When you are done UPDATING the interfaces and can then COMMIT the data to the interfaces. COMMIT is what actually changes the interfaces. DON'T FORGET TO 'SAVE'.

PROXY MODE CONFIGURATION: Always select the WAN1 address from an unused address on the LAN network. In this example, we have selected 172.16.168.10, which is automatically also assigned to the LAN interface, as seen above.

A secondary network also needs to be added to the LAN interface so that the Edge router can communicate with the secondary address on the internal server that is being load balanced.

This is the XRoads interface control panel, from here you can make changes to the XRoads LAN and WAN interface IP addresses, subnet masks, at gateways. You can also configure the LAN DHCP server parameters, as well as set preferences for WAN load balancing

Secondary Addresses:

Select	Network	Slash
<input type="radio"/>	10.100.100.1	24

Add Secondary: . . . / (Secondary Address - Note: Do Not Use In HA Or Proxy Modes)

INTERFACES

This is the XRoads interface control panel, from here you can make changes to the XRoads LAN and WAN interface IP addresses and gateways. You can also configure the LAN DHCP server parameters, as well as set preferences for WAN load balancing.

Select An Interface: WAN Interface One

Active Inactive Select 'Active' to load balance or 'Inactive' to shutdown.

WAN1 Configuration: (MAC Address: 00-90-F8-04-6F-F2)

Proxy Disabled Proxy Enabled Enabling proxy mode will set the LAN IP to whatever is entered below.

172 . 16 . 168 . 10 (Interface IP Address)

255.255.255.0 (Subnet Mask)

172 . 16 . 168 . 1 (Interface Gateway IP Address)

Public/Private: Public Private

. . . (Probe Address)

NAT: Enable Disable

Overflow Rate: 768 (kbit = thousands of bits per second, example: 1Mbps = 1000)

Weight: 100 (Percentage Of Link Utilization)

Reset Update NOTE: Click COMMIT to make interface changes, always remember to SAVE your configuration. Commit

SCREEN shot taken from Edge unit showing the example configuration for the WAN1 interface.

INTERFACES

This is the XRoads interface control panel, from here you can make changes to the XRoads LAN and WAN interface IP addresses and gateways. You can also configure the LAN DHCP server parameters, as well as set preferences for WAN load balancing.

Select An Interface: WAN Interface Two

Active Inactive Backup Select 'Active' to load balance or 'Backup' for failover mode.

WAN2 Configuration: (MAC Address: 00-90-F8-04-6F-F1)

Static Dynamic Dynamic addresses require a DHCP server on the WAN network.

172 . 16 . 2 . 2 (Interface IP Address)

255.255.255.248 (Subnet Mask)

172 . 16 . 2 . 1 (Interface Gateway IP Address)

Public/Private: Public Private

. . . (Probe Address)

DMZ/NAT: NAT Mode DMZ Mode

Rate Limit: 2000 (kbit = thousands of bits per second, example: 1Mbps = 1000)

Weight: 100 (Percentage Of Link Utilization)

Reset Update NOTE: Click COMMIT to make interface changes, always remember to SAVE your configuration. Commit

SCREEN shot taken from Edge unit showing the example configuration for the WAN2 interface

EdgeNAT (One-To-One)

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two. In this case we are using One-To-One mappings and only need to apply them on WAN2, since WAN1 is effectively routing the public addresses through the Edge router. There is no need to NAT WAN1 traffic. Using One-To-One NAT means that we are adding a secondary address to the WAN2 interface, in this case 172.16.2.5 which will directly map to the internal address 10.100.100.2, which is assigned to our internal server as its secondary interface address.

The screenshot shows the XRoads EdgeNAT configuration interface. At the top, there is a navigation menu with 'Home', 'Interfaces', 'EdgeDHIS', 'EdgeNAT', 'EdgeWALL', 'EdgeBPR', 'Tools', and 'Reporting'. Below the navigation is a dark blue header with the 'EdgeNAT' title. A warning message states: "This is the XRoads EdgeNAT (Network Address Translation) control panel, from here you can control how inbound network address translation is enabled on any of your WAN interfaces. Example: If you are using 192.168.168.0/24 space for your LAN and your web server is located at 192.168.168.10, then you would create a services rule to pass all inbound web services via web port 80 to 192.168.168.10. Make sure to Save any changes made in this section or they will be lost upon reboot." The configuration form includes: 'Service Selection' set to 'One-To-One'; 'Service Name' set to 'server'; 'Internet Address' set to 172.16.2.5 with a note "(Internet Address - Must be available via the WAN port selected below)"; 'Inbound Interface' set to 'WAN1'; and 'Internal Address' set to 10.100.100.2 with a note "(Forward Address - Must be available via the LAN interface)". At the bottom are buttons for 'Reset', 'Add / Update', and 'View Services >>'.

SCREEN shot taken from Edge unit showing the example configuration for a One-To-Many rule.

The screenshot shows the XRoads EdgeNAT configuration interface. At the top, there is a navigation menu with 'Home', 'Interfaces', 'EdgeDHIS', 'EdgeNAT', 'EdgeWALL', 'EdgeBPR', 'Tools', and 'Reporting'. Below the navigation is a dark blue header with the 'EdgeNAT' title. A warning message states: "This is the XRoads EdgeNAT (Network Address Translation) control panel, from here you can control how inbound network address translation is enabled on any of your WAN interfaces. Example: If you are using 192.168.168.0/24 space for your LAN and your web server is located at 192.168.168.10, then you would create a services rule to pass all inbound web services via web port 80 to 192.168.168.10. Make sure to Save any changes made in this section or they will be lost upon reboot." The configuration form includes: 'Service Selection' set to 'One-To-Many'; 'Service Name' set to 'server'; 'Inbound Interface' set to 'WAN2'; and 'Internal Address' set to 10.100.100.2. Below the form is a table titled 'One-To-One List' with the following data:

C	Service Name	Interface	External Addr	Internal Addr
<input type="radio"/>	server	WAN2	172.16.2.5	10.100.100.2

At the bottom are buttons for '<< Add Service', 'Select', and 'Delete'.

SCREEN shot taken from Edge unit showing the example One-To-Many listing for all required rules.

EdgeNAT (Vector Mappings)

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two. When load balancing, two vector maps are required, the first mapping to the primary server address, and the second mapping to the secondary server address. In this example we are mapping WAN1 to 172.16.168.131 and WAN2 to 10.100.100.2 which are the two addresses assigned to the internal server.

The screenshot shows the XRoads EdgeNAT control panel. The navigation menu includes Home, Interfaces, EdgeDHIS, EdgeNAT, EdgeWALL, EdgeBPR, Tools, and Reporting. The main heading is "EdgeNAT". A warning message states: "This is the XRoads EdgeNAT (Network Address Translation) control panel, from here you can control how inbound network address translation is enabled on any of your WAN interfaces. Example: If you are using 192.168.168.0/24 space for your LAN and your web server is located at 192.168.168.10, then you would create a services rule to pass all inbound web services via web port 80 to 192.168.168.10. changes made in this section or they will be lost upon reboot." The configuration fields are: Service Selection: Vector-Mappings; Device Name: server_primary; Map Address: 172.16.168.131 (Forward Address - Must be available via the LAN interface); Map Interface: WAN1. Buttons include Reset, Add/Update, and View Services >>.

SCREEN shot taken from Edge unit showing the example configuration for a Vector-Mapping rule.

The screenshot shows the XRoads EdgeNAT control panel. The navigation menu includes Home, Interfaces, EdgeDHIS, EdgeNAT, EdgeWALL, EdgeBPR, Tools, and Reporting. The main heading is "EdgeNAT". A warning message states: "This is the XRoads EdgeNAT (Network Address Translation) control panel, from here you can control how inbound network address translation is enabled on any of your WAN interfaces. Example: If you are using 192.168.168.0/24 space for your LAN and your web server is located at 192.168.168.10, then you would create a services rule to pass all inbound web services via web port 80 to 192.168.168.10. Make sure to Save any changes made in this section or they will be lost upon reboot." The "Vector Mappings" section shows a table with the following data:

C	Device Name	Address	Interface Map
<input type="radio"/>	server_primary	172.16.168.131	WAN1
<input type="radio"/>	server_secondary	10.100.100.2	WAN2

Buttons below the table include << Add Service, Select, and Delete.

SCREEN shot taken from Edge unit showing the example Vector Map listing for all required rules.

EdgeDNS

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two. In this example we are using the domain xyz.com and creating two DNS entries for each service. One entry for WAN1 and another for WAN2, this is similar to the NAT/Backup example. The difference between a backup and load balanced solution is that in the load balanced solution, both DNS entries are ACTIVE. When both entries are ACTIVE they are both given out either equally or based on the administrative load balancing settings. Also note that instead of using the 'Dynamic' WAN addresses, the DNS records are assigned either

XRoads Vector Routing

Home Interfaces **EdgeDNS** EdgeIAT EdgeWALL EdgeBPR Tools Reporting

EdgeDNS

This is the XRoads EdgeDNS (Domain Name Service) control panel, from here you control how the Edge responds to clients. For example, when an external client wants to connect to your internal web or email server the Edge will respond depending on the status of each WAN link. Make sure to Save any changes made in this section or they will be lost.

Inbound DNS Resolution: ? Domain Settings ▾

Name Server Addresses: ?

205 . 147 . 0 . 100 (Primary DNS Resolver)

65 . 165 . 98 . 38 (Secondary DNS Resolver)

Inbound Failover Only: ? Enable Disable (When adding a domain, will the domain be setup for inbound failover only.)

Authoritative Domains: ? (click button to remove)

xyz.com (Add A Domain - NOTE: You must change registrar control to the XRoads Edge's WAN addresses.)

Reset Add/Update Remove Restart DNS

NOTE: When configuring a domain name in backup mode, ALWAYS select the 'Enable' Inbound Failover Only button. This ensures instant DNS failover in case one of the WAN links fail.

NOTE2: When configuring MX records (see below) do not enter any IP address information. MX records must be created first, then the A records associated to the MX record must be created, see example below.

EdgeDNS

This is the XRoads EdgeDNS (Domain Name Service) control panel, from here you control how the Edge responds to incoming requests. For example, when an external client wants to connect to your internal web or email server the Edge will reply with the IP address depending on the status of each WAN link. Make sure to Save any changes made in this section or they will be lost upon reboot.

Inbound DNS Resolution:

Authoritative Domain: (Domain name associated with the host)

Add A Host: (Enter host name [example: www] and inbound interface)

Click for default or (Enter an ip address or cname for this host name)

(Host Type)

(Inbound Load Balancing enter 1 - 10, where '1' is more preferred, or enter '0' for failover only)

(Host Status)

SCREEN shot taken from Edge unit showing the example web server DNS rule being added.

EdgeDNS

This is the XRoads EdgeDNS (Domain Name Service) control panel, from here you control how the Edge responds to incoming requests. For example, when an external client wants to connect to your internal web or email server the Edge will reply with the IP address depending on the status of each WAN link. Make sure to Save any changes made in this section or they will be lost upon reboot.

Inbound DNS Resolution:

Authoritative Domain: (Domain name associated with the host)

Add A Host: (Enter host name [example: www] and inbound interface)

Click for default or (Enter an ip address or cname for this host name)

(Host Type)

(Inbound Load Balancing enter 1 - 10, where '1' is more preferred, or enter '0' for failover only)

(Host Status)

SCREEN shot taken from Edge unit showing the example of the backup web server rule being added.

EdgeDNS


This is the XRoads EdgeDNS (Domain Name Service) control panel, from here you control how the Edge responds to incoming requests from external clients. For example, when an external client wants to connect to your internal web or email server the Edge will reply with the correct IP address depending on the status of each WAN link. Make sure to Save any changes made in this section

Inbound DNS Resolution: ? HostRecords ▼

Authoritative Domain: ? xyz.com ▼ (Domain name associated with the host)

Add A Host: ? mail WAN1 ▼ (Enter host name [example: www] and inbound interface)

Click for default or (Enter an ip address or cname for this host name)

 ▼ (Host Type)

(Inbound Load Balancing enter 1 - 10, where '1' is more preferred, or enter '0' for failover only)

ACTIVE ▼ (Host Status)

Reset Add / Update View Hosts >>



















SCREEN shot taken from Edge unit showing the example of an MX record being added.

EdgeDNS

This is the XRoads EdgeDNS (Domain Name Service) control panel, from here you control how the Edge responds to incoming requests from external clients. For example, when an external client wants to connect to your internal web or email server the Edge will reply with the correct IP address depending on the status of each WAN link. Make sure to Save any changes made in this section or they will be lost upon reboot.

XRoads Edge DNS Verified.

DNS Host List: ?

C	Host Name	Type	Address	L.B.	Interface	Status
<input type="radio"/>	 xyz.com.	 NS	 ns2.xyz.com.	1	 wan2	 1
<input type="radio"/>	 xyz.com.	 NS	 ns1.xyz.com.	1	 wan1	 1
<input type="radio"/>	 xyz.com.	 MX	 mail.xyz.com.	1	 wan2	 1
<input type="radio"/>	 xyz.com.	 MX	 mail.xyz.com.	1	 wan1	 1
<input type="radio"/>	 mail.xyz.com.	 A	 172.16.2.5	1	 wan2	 1
<input type="radio"/>	 mail.xyz.com.	 A	 172.16.168.131	1	 wan1	 1
<input type="radio"/>	 ns1.xyz.com.	 A	 D 172.16.168.10	1	 wan1	 1
<input type="radio"/>	 ns2.xyz.com.	 A	 D 172.16.2.2	1	 wan2	 1
<input type="radio"/>	 www.xyz.com.	 A	 172.16.2.5	1	 wan2	 1
<input type="radio"/>	 www.xyz.com.	 A	 172.16.168.131	1	 wan1	 1

<<Return Select Delete **Verify** Save

SCREEN shot taken from Edge unit showing the example listing of all DNS entries for this configuration.

EdgeBPR

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two.

XRoads Vector Routing

Home Interfaces EdgeDNS EdgeHAT EdgeWALL EdgeBPR Tools Reporting

EdgeBPR

This is the XRoads EdgeBPR (Best Path Routing) control panel, from here you control how critical nodes, etc) are routed using real-time metrics obtained from each of the possible WAN connections of critical services, which enable you to determine which WAN interface a particular protocol/service this section or they will be lost upon reboot.

Edge Routing: (dropdown)

Route Description: (Network Name - Use '_' Instead Of Spaces)

Define Network: (Network Address - Must be a 'CIDR' network address)
 (Subnet Mask)

Test Node: (Should reside within the above defined network)

Alert Threshold: RRT-msec (Optional - Network Alert Threshold)

Route Method: (Smart - Continuously selects the best route)

Features & Functionality Overview.

The **EdgeBPR** page allows the administrator to configure critical networks, traffic shaping (if licensed), critical services, and route redirect. By defining a critical network, the administrator ensures that traffic destined for that network always used the fastest route possible, or the administrator can select which path that route should always use. By defining a critical service, the administrator ensures that a particular service (i.e. HTTP, SMTP, or FTP) traffic always uses one path over the other. This is primarily used to segment network traffic, i.e. send all HTTP traffic over WAN2 while all other traffic uses WAN1.

Tools

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two.

The screenshot displays the XRoads web interface. At the top, there is a navigation menu with the following items: Home, Interfaces, EdgeDNS, EdgeIAT, EdgeWALL, EdgeBPR, Tools, and Reporting. The 'Tools' menu item is currently selected. Below the navigation menu is a dark blue header area containing the XRoads logo on the left and the word 'TOOLS' in white capital letters. To the right of the logo, a message reads: "This is the XRoads Tools control panel; from here you can perform various tests to troubleshoot network issues." Below this header is a form titled "XRoads Tools: ?" with a dropdown menu set to "Registration". Underneath, there is a section labeled "Registration: ?" containing several input fields: "XZY" (with "(Company Name)" to its right), "John Smith" (with "(Technical Contact)" to its right), "jsmith@xyz.com" (with "(Contact Email)" to its right), "555-555-1212" (with "(Contact Phone)" to its right), and an empty field (with "(Reference ID:if provided)" to its right). At the bottom of the form is an "Update" button.

Features & Functionality Overview.

The **Tools page** primarily allows the administrator to conduct various network tests in order to assist in troubleshooting ISP circuits or local network issues. These tests include: Ping and Traceroute for network issues, Whois, Dig and Nslookup for DNS issues, and Route / ARP for XRoads routing issues. **High Availability (HA)** is also configured from the drop down menu (if licensed) Employing HA requires a second XRoads unit, and ensures that in case of a primary unit hardware failure, all network traffic is immediately transferred to the redundant secondary unit. Upon the restoration of the primary system, all routing functions return back to the main XRoads unit.

Reporting

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two.

XRoads

Home Interfaces EdgeDHS EdgeIAT EdgeWALL EdgeBPR Tools Reporting

REPORTING

This is the XRoads Reporting control panel; from here you can review the system logs, configure the via email and/or pager, and display WAN statistics (bytes [1 byte = 8 bits] per second) and latency , critical network.

Reporting: ? Graphical Reports

Graph Selection: ? WAN1 WAN2 Branch1-eth1 Branch1-eth2 Reset Graphs

Selected Graph - Branch1-eth2

Branch1-eth2-XRoads Network Appliance

Round-Trip Time (ms)

From XRoads to Critical Network Branch1-eth2

Packet Loss Percentage

- 10-25%
- 25-50%
- 50-75%
- 75-100%

Round-Trip Time in milliseconds

- Current: 19 ms
- Average: 32 ms
- Max: 68 ms

Last Update: Tue Jul 20 11:38:18 PDT 2004

NOTE: These graphs are automatically created when critical networks are configured. The WAN1, WAN2, etc graphs are always available even when no critical networks are created. WAN network graphs display the WAN usage information for that particular link. The WAN graphs display usage based in Daily, Weekly, Monthly, and Yearly increments.

Alerts

The following pages show an example of how to configure the Edge unit based on the network environment in the example configuration on page two.

XRoads

Home Interfaces EdgeDHS EdgeIAT EdgeWALL EdgeBPR Tools Reporting

REPORTING

This is the XRoads Reporting control panel; from here you can review the system logs, configure the syslog serv via email and/or pager, and display WAN statistics (bytes [1 byte = 8 bits] per second) and latency / packet los critical network.

Reporting: ? Alert Notifications ▼

Contact Name: ? john_smith (Contact associated with this Alert)

Email Address: ? jsmith@xyz.com (Enter an email address or pager address for this alert)

Subject: ? xroads alert (Enter the standard message subject for this alert, for easy email filtering)

(Optional) Server: ? (To route directly to a specific mail server, enter its IP address; Example 1.1.1.1)

Outages Login Failure Thresholds Edge Reports Vtech Alerts Backup Outages

Reset Add / Update View Emails >>

NOTE: The alerts section allows the administration to configure email alerts based on the selected notification type. ‘Outages’ provides WAN link outage alerts, ‘Login Failures’ provides Edge login security alerts, ‘Thresholds’ are alerts that are triggered when the critical network threshold has been met, ‘Edge Reports’ includes all security reports, ‘Vtech Alerts’ include all virtual technician reports, such as link diagnostics, and problem recommendations, ‘Backup Outages’ sends an alert whenever the backup link fails while still in backup mode.