

# NeoRouter Performance Tuning Guide

The network revolves around you™

## Contents

1. Overview .....	1
2. Server Configurations .....	1
2.1 Hardware and OS .....	1
2.2 Broadcast and Multicast Filter .....	2
2.3 NR Server Parameters .....	3
2.4 OS Parameters .....	3
3. Client Configurations .....	4
3.1 Enable P2P Connection .....	4
3.2 Network Explorer .....	4

## 1. Overview

NeoRouter is designed to be high performance and scalable. With support for P2P, multi-threading and event-based I/O, NeoRouter is the “muscle car” among various VPN solutions. However, each user may have a different situation and the manufacture’s default settings are not “one size fits all”. In order to fully unleash the power of NeoRouter and achieve the best performance, administrators managing large networks are recommended to follow this guide and fine tune the system.

This document is for advanced users only. The suggestions in this document are only applicable to large networks.

## 2. Server Configurations

### 2.1 *Hardware and OS*

NR server should be installed on a host meeting the following requirements:

- **Multi-core high-performance CPU:** nrserver is a multi-threaded application that can leverage multiple CPU cores efficiently. Due to SSL encryption, nrserver can be CPU intensive when under high load.
- **Operating System:** We recommend Linux and Windows, because nrserver supports event-based I/O on these platforms. Specifically nrserver utilizes I/O completion port on Windows and epoll on Linux.
- **Stable and fast Internet connection**

NR server does **\*not\*** have special requirements for Memory or Storage.

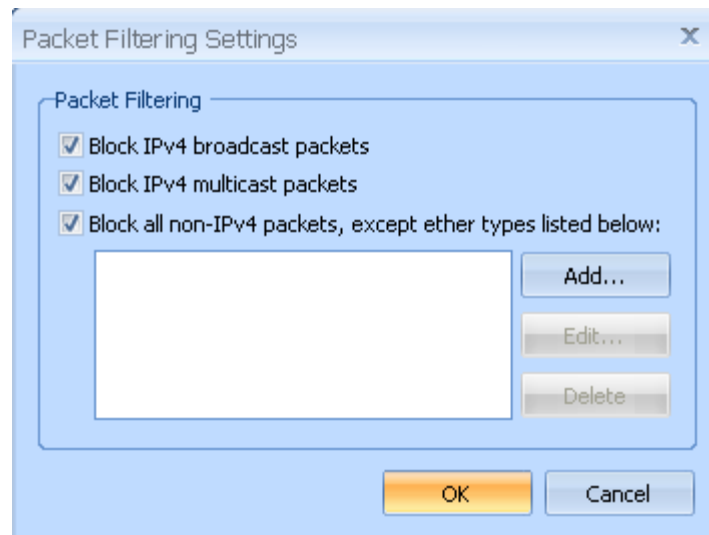
- **Memory:** nrserver does not require much RAM. During our tests, it uses <200 MB to maintain 1000 client connections.
- **Storage:** nrserver uses less than 10 MB disk space.

## 2.2 Broadcast and Multicast Filter

To simulate broadcast/multicast behavior in LAN, nrserver fans out such packets to all clients. This works well on small networks; but on large NR domains, such packets can use much bandwidth and affect performance.

NeoRouter Professional v1.2 and above support packet filter that allows administrator to block broadcast/multicast packets by protocols and thus reduce the performance impact. See User's Manual "5.2 Change Packet Filtering" for details.

It is recommended to block all broadcast/multicast packets as shown in the following screenshot. Administrators can allow additional protocols as needed. Nrserver treats ARP as a special case and will never block it regardless of the setting.



## 2.3 NR Server Parameters

Some NR server parameters can be changed using Feature.ini file. It is a text file with the following format placed under “%AllUsersAppdata%\ZebraNetworkSystems\NeoRouter\” folder on Windows or “/usr/local/ZebraNetworkSystems/NeoRouter/” folder on Linux.

```
[Default]
ProtocolVersion=2
MaxInstanceThreads=5
SoSendBuf=2097152
SoRecvBuf=2097152
```

- **ProtocolVersion:** NR Protocol 2 greatly improves server performance for large domains. This new protocol is supported in releases v1.4 and above. It is currently turned off by default because it is not compatible with v1.3 or older NR clients. If all the NR clients in your domain are upgraded, you can enable this new protocol and benefit from the performance improvement. We plan to turn on the new protocol by default when releasing NeoRouter v2.\*.
- **MaxInstanceThreads:** Number of threads used to handle IOCP/epoll events. Its default value is 5. The recommended value is “2 \* number of CPU cores”.
- **SoSendBuf / SoRecvBuf:** Socket send/receive buffer size. The default value is 2097152 which is 2MB in bytes.

Changes to Feature.ini will be effective when nrserver is restarted.

## 2.4 OS Parameters

- **Linux file descriptor limit:** its default value is 1024 and socket is a type of file. This value can be changed using “ulimit -n” or by editing “/etc/security/limits.conf” directly. Please adjust this value according to the number of expected clients.
- **Linux thread stack size:** its default value is 10MB on Linux. If you are using many threads, consider changing this value to 1MB to reduce working set. The stack size is default to 1MB on Windows.
- **Linux sigpending value:** its default value is 3941 on Linux. If you are using many concurrent connections, consider changing this value to 65535 or bigger.

## 3. Client Configurations

### 3.1 *Enable P2P Connection*

NeoRouter performs better when data packets between client computers are sent peer-to-peer instead of through server relay.

- **Avoid Symmetric NAT:** P2P NAT traversal often fails when client computer is behind a Symmetric NAT or highly restrictive firewall.
- **Disable Linux Firewall:** P2P NAT traversal does not work with Linux iptable, and Linux does not support an application based firewall like Windows or Mac OSX. If the client computer is already protected by an external firewall, user can disable the OS level iptable firewall and allow NeoRouter to establish P2P connections.

### 3.2 *Network Explorer*

In order to maintain the computer list in the Network Explorer, nrserver needs to query the full list when user signs in and notify the user whenever a computer in view comes online or offline. It can become expensive in a very large network.

- **Avoid very large computer list:** create multiple user accounts and assign a subset of computers to each account.
- **When to run Network Explorer:** NeoRouter client consists of a daemon (nrservice) and a GUI/CLI application (Network Explorer). Nrservice alone is responsible to maintain the connection to the virtual LAN and send/receive data P2P. Network Explorer only provides a way for users to interact with the network. Do not keep Network Explorer running on remote unattended servers.