NVIDIA Networking User's Guide

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Table of Contents

CHAPTER 1

INTRODUCTION AND SYSTEM REQUIREMENTS

The following topic are discussed in this chapter:

Audience

This guide is intended for advanced network users who are running an NVIDIA nForce-based computer and would like to use NVIDIA Networking software to configure networking features for enhanced performance and functionality.

Note: This guide assumes that either you OR a Network Administrator has the appropriate network access privileges on your system to configure the NVIDIA Networking settings described in this guide.

Additional Documentation and Help

The NVIDIA Control Panel *Quick Start* guide contains information on navigating through the NVIDIA Control Panel user interface and using online Help.

About NVIDIA Networking

You can use NVIDIA Networking features to optimize your network performance and increase your network bandwidth or have optimal throughput in case one of your network adapters stops functioning.

- **NVIDIA FirstPacket** offers a new way to manage the traffic on your personal computer, allowing you to more effectively manage and improve the performance of networked games and other applications that are sensitive to network delay (latency), such as Voice-over-IP (VoIP).
- **NVIDIA TCP/IP Acceleration** technology is a networking solution that moves the processing of TCP/IP network traffic from your computer's CPU to its nForce hardware resulting in greatly improved system performance.
- **NVIDIA Teaming** technology combines all the NVIDIA Ethernet interfaces on your system to form a team, resulting in increased bandwidth and network redundancy.

System Requirements

Supported Operating Systems

NVIDIA Networking supports the following operating systems:

- Microsoft Windows® XP (32-bit and 64-bit)
- Windows® XP Home Edition
- Windows XP Professional Edition — Service Pack 1 or later

Software, Memory, and Disk Space Requirements

Note: All figures in Table 1.1 are estimates based on default settings and a standard operating environment

Table 1.1 Software, Memory, and Disk Space Requirements

Software	Memory	Disk space for English	Disk Space for Non-English Languages
nForce Ethernet driver for Windows XP/ 2000 and Windows XP 64	3 MB	500 KB	Approximately 500 KB per language
NVDIA Networking Control Panel	12 MB	7 MB	

Supported NVIDIA nForce Systems

Note: All nForce systems are supported *with the following exceptions*: nForce1, nForce Mobile edition processors, and nForce server class processors

NVIDIA FirstPacket and NVIDIA Teaming

The NVIDIA Networking FirstPacket and Teaming features (see Adjusting Network Performance — NVIDIA FirstPacket and Increasing Network Bandwidth & Fault Tolerance — NVIDIA Teaming) support *only* the following NVIDIA® nForce™ versions:

- NVIDIA nForce 590 SLI
- NVIDIA nForce 570 SLI
- NVIDIA nForce 570 Ultra

NVIDIA TCP/IP Acceleration

The NVIDIA Networking TCP/IP feature (see "Adjusting Network Performance — NVIDIA TCP/IP Acceleration" on page 17) supports the following NVIDIA® nForce™ systems:

- NVIDIA nForce 590 SLI
- NVIDIA nForce 570 SLI

- NVIDIA nForce 570 Ultra
- NVIDIA nForce 570
- NVIDIA nForce 550
- NVIDIA nForce 430
- NVIDIA nForce 410
- NVIDIA nForce4
- NVIDIA nForce4 Ultra
- NVIDIA nForce4 Ultra Intel Edition
- NVIDIA nForce4 SLI
- NVIDIA nForce4 SLI Intel Edition
- NVIDIA nForce4 SLI X16
- NVIDIA nForce4 SLI XE Intel Edition
- NVIDIA nForce4 Professional IO-4
- NVIDIA nForce4 Professional Pro
- NVIDIA nForce4 Professional Pro SLI
- NVIDIA nForce3 Pro250
- NVIDIA nForce3 250Gb
- NVIDIA nForce3 Ultra
- NVIDIA nForce3 250
- NVIDIA nForce3 150
- NVIDIA nForce2 MCP2S

Supported Processors

- All AMD K7 (except Duron) processors
- AMD Athlon 64 FX processors
- AMD Opteron processors
- AMD Sempron processors
- Intel® Pentium® 4 processor with Hyperthreading support

Software

Make sure the current NVDIA nForce driver package for your nForce system is installed.

This package includes software for the NVIDIA Control Panel interface from which you can access the NVIDIA Networking module and features.

CHAPTER 2

INSTALLING AND STARTING NVIDIA NETWORKING

This chapter discusses the following major topics:

Installing NVIDIA Networking

Before You Begin

- Make sure your hardware meets the "System Requirements" on page 4.

  The installer will not install NVIDIA Networking on non-supported systems, including non-supported nForce systems.

- Uninstall any previous versions of NVIDIA Networking or NVIDIA System Utility before installing the latest version.

Installation Instructions

1. Download the zip file, then unzip to a temporary folder.
2. Double-click **Setup** from your temporary folder.

   The InstallShield Wizard starts, and directs you through the rest of the installation process as described below.
3. At the Welcome window, click **Next**.
4. Read the license agreement, then click **Yes** if you agree to the terms.
5. At the Choose Destination Location window, browse to locate the folder where you want the NVIDIA Networking files installed, or just use the default location and click **Next**.

   Setup proceeds to install the files.

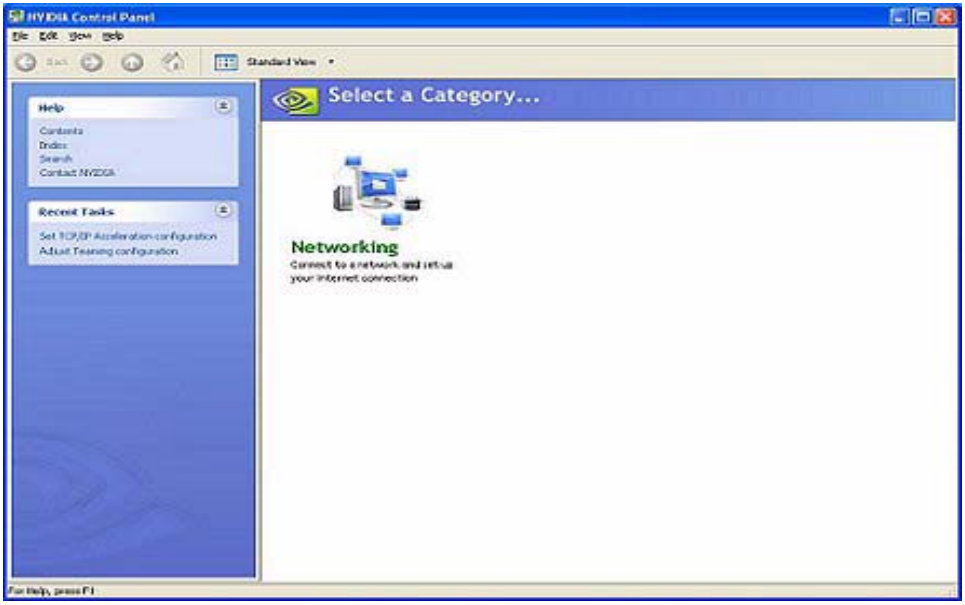
At the InstallShield Wizard Complete window, click **Finish**

Starting NVIDIA Networking

You can start NVIDIA Networking in ONE of several ways:

- From the Windows desktop, click **Start**, then click **All Programs** > **NVIDIA Corporation** > **NVIDIA Control Panel**, and then click **Networking**, or
- From the Windows Control Panel, double-click the NVIDIA Control Panel icon, then from the **Select a Category** page, click **Networking**.

Figure 2.1 Networking Icon in the NVIDIA Control Panel

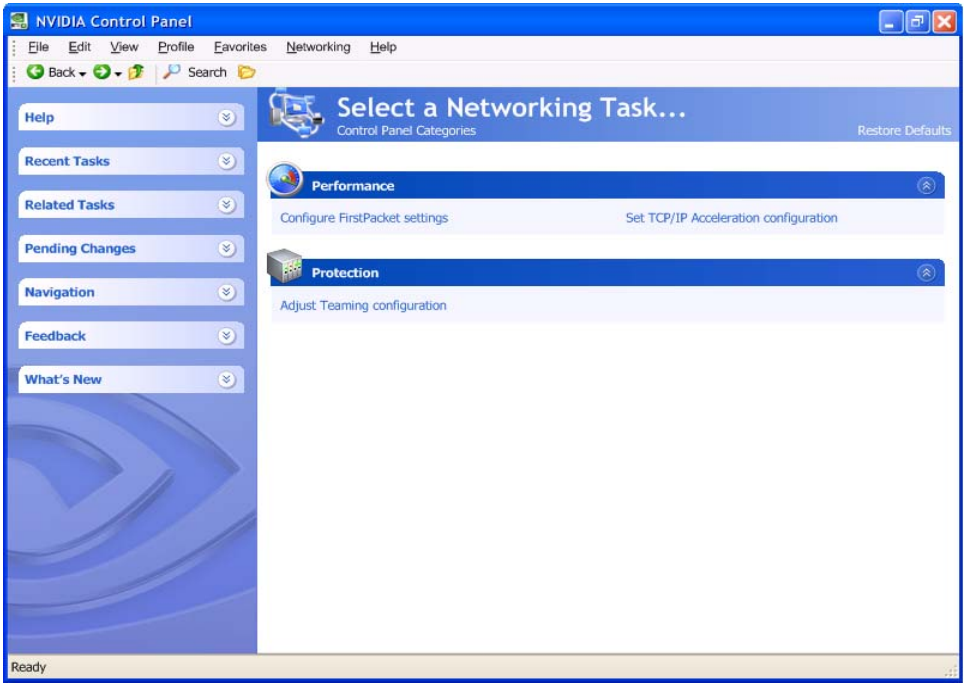


About the NVIDIA Networking Page

The NVIDIA Networking module is incorporated into the new intuitive NVIDIA Control Panel design. Descriptions of the features on various pages are provided online and in Help.

Figure 2.2 shows the Networking page.

Figure 2.2 Networking Menu Page



Getting Technical Support

From the NVIDIA Control Panel main menu, click **Support** > **Support Web site** to open the NVIDIA technical support web site in your browser.

CHAPTER 3

ADJUSTING NETWORK PERFORMANCE — NVIDIA FIRSTPACKET

This chapter discusses the following topics:

About NVIDIA FirstPacket Technology

Note: NVDIA FirstPacket functionality is available only on certain nForce systems. For details, see "System Requirements" on page 4.

NVIDIA FirstPacket offers a new way to manage the traffic on your personal computer, allowing you to more effectively manage and improve the performance of networked games and other applications that are sensitive to network delay (latency), such as Voice-over-IP (VoIP).

FirstPacket creates an additional transmit queue in the network driver so that networked applications can share a limited resource. Based on user preference, FirstPacket can then expedite transmission for user-approved network applications.

For example, when FirstPacket is enabled:

- A game that was previously unplayable can be completely usable.
- VoIP connections will not be dropped due to the network traffic on a local computer.

Disabling FirstPacket

Disabling FirstPacket turns off the FirstPacket feature to allow all network traffic (applications) to travel with the same priority.

To disable NVIDIA FirstPacket functionality, follow these steps:

1. On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.
2. Select **Configure FirstPacket settings** to open the associated page (Figure 3.1) and click the **Settings** tab.
3. Select the **Disable FirstPacket** option.

Enabling FirstPacket

Enabling FirstPacket turns on the NVIDIA FirstPacket feature and prioritizes any applications that exist in the "Programs Prioritized by FirstPacket" tabbed page (Figure 3.1).

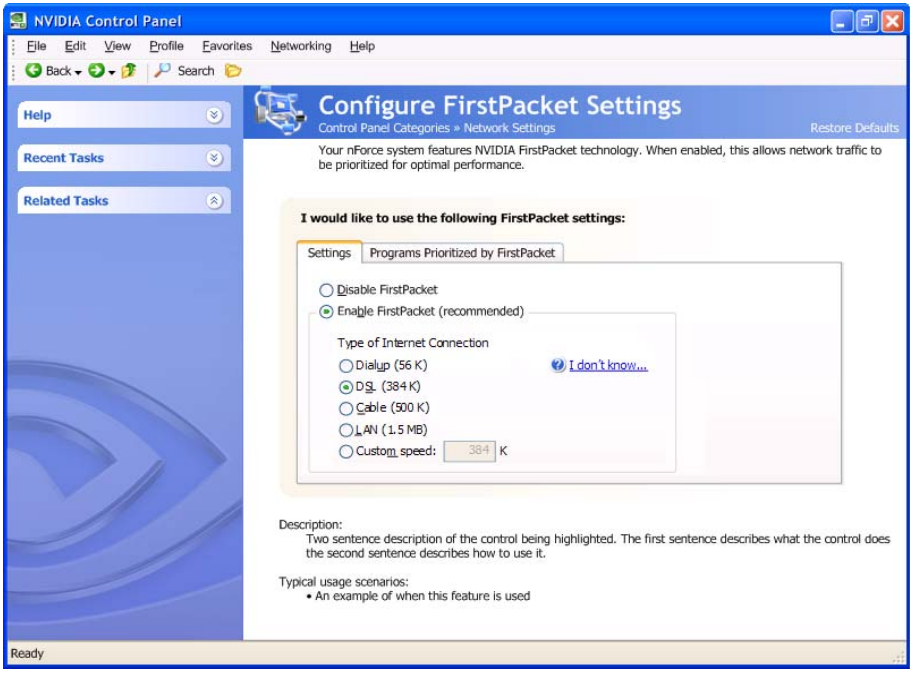
To enable NVIDIA FirstPacket, follow these steps:

1. On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.
2. Select **Configure FirstPacket settings** to open the associated page (Figure 3.1) and click the **Settings** tab.
3. Select the **Enable FirstPacket (recommended)** option.
4. From the **Type of Internet Connection** list, select the type of Internet connection you have; i.e., **Dial-up**, **DSL**, **Cable**, or **LAN**.

   Note: If you are not sure about the connection to choose, contact your Internet Service Provider (ISP) for the uplink speed of your Internet connection

Note: If you are using a network connection other than the selections/speed on the list, choose the **Custom speed** option, then enter a speed value in the text field. The initial default value is 384 - the same as DSL.

Figure 3.1 Configure FirstPacket Settings Page



Prioritizing Applications by FirstPacket Settings

If you enabled FirstPacket from the Settings page (see Figure 3.1) page, the features on this page allow you to add, delete, and temporarily disable applications from a list that is used by FirstPacket to prioritize network applications for optimal performance.

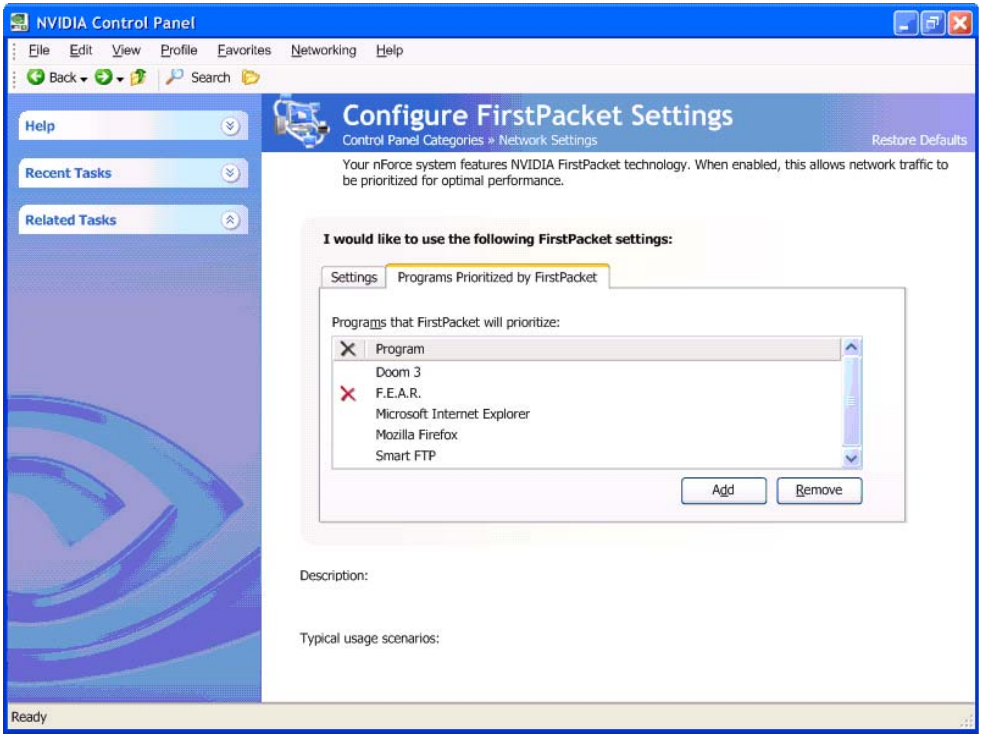
To prioritize applications by FirstPacket settings, follow these steps:

1. On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.

2. Select **Configure FirstPacket settings** to open the associated page.

3. Click the **Programs Prioritized by FirstPacket** tab to open the associated page (Figure 3.2).

Figure 3.2 Programs Prioritized by NVIDIA FirstPacket.



Enabling and Disabling Application Prioritization

To toggle (enable/disable) prioritization for an application, follow these steps:

1 Move your move your cursor over the application name that you want to configure in the “Program” column

2 The mouse cursor turns into the “hand” cursor in the area to the left of the “Program” column.

3 Click this column to toggle the current state of the application on that row.

- No icon indicates that an application is being prioritized.
- An “**X**” icon indicates that it is not being prioritized.

Adding Applications for Prioritization

To add an application to be prioritized by FirstPacket

1. Click the **Add** button to open a browser dialog box.
2. Select an application and click **OK**.
   The application is added to the list box and will be prioritized by FirstPacket.

Removing Applications from Prioritization

To permanently remove an application from being prioritized by FirstPacket, follow these steps:

1. Select the application to remove from the list named “Programs that FirstPacket will prioritize”.
2. Click the **Remove** button to delete the application from the list.

CHAPTER 4

ADJUSTING NETWORK PERFORMANCE — NVIDIA TCP/IP ACCELERATION

The following topics are discussed in this chapter:

About NVIDIA TCP/IP Acceleration Technology

Note: Enabling TCP/IP acceleration enhances your network performance but can cause your network traffic to bypass the firewall because all processes are off-loaded to the hardware.

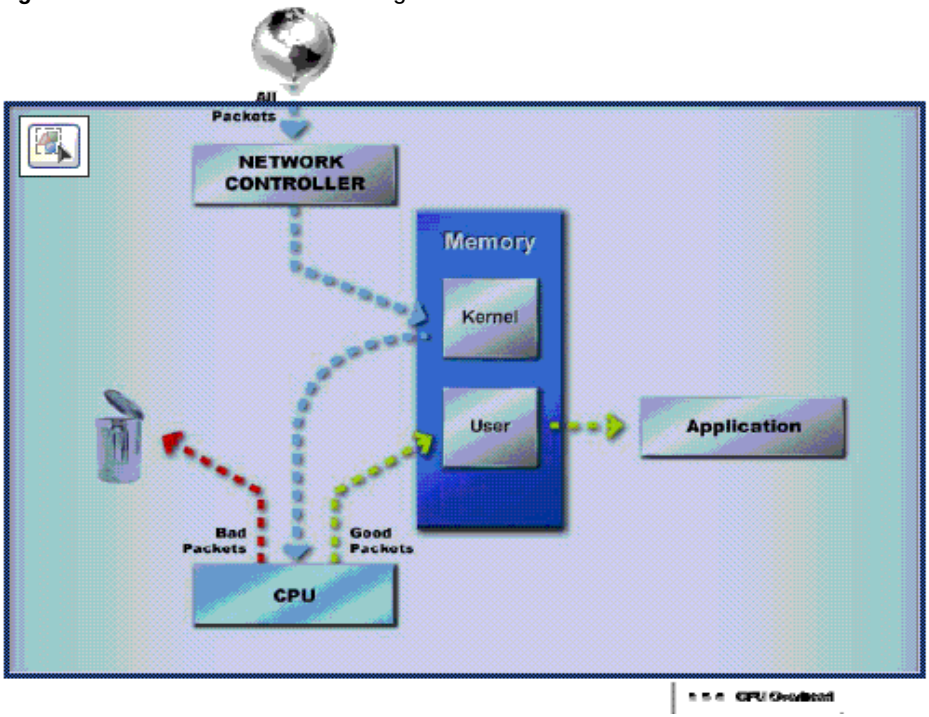
NVIDIA TCP/IP Acceleration technology is a networking solution that moves the processing of TCP/IP network traffic from your computer's CPU to its nForce hardware resulting in greatly improved system performance.

Reduced CPU Utilization

In traditional networking environments, inspecting packets is laborious and affects CPU overhead, memory bandwidth, and overall system latency (Figure 4.1). For example, packets move from MAC to driver; from driver to stack within kernel

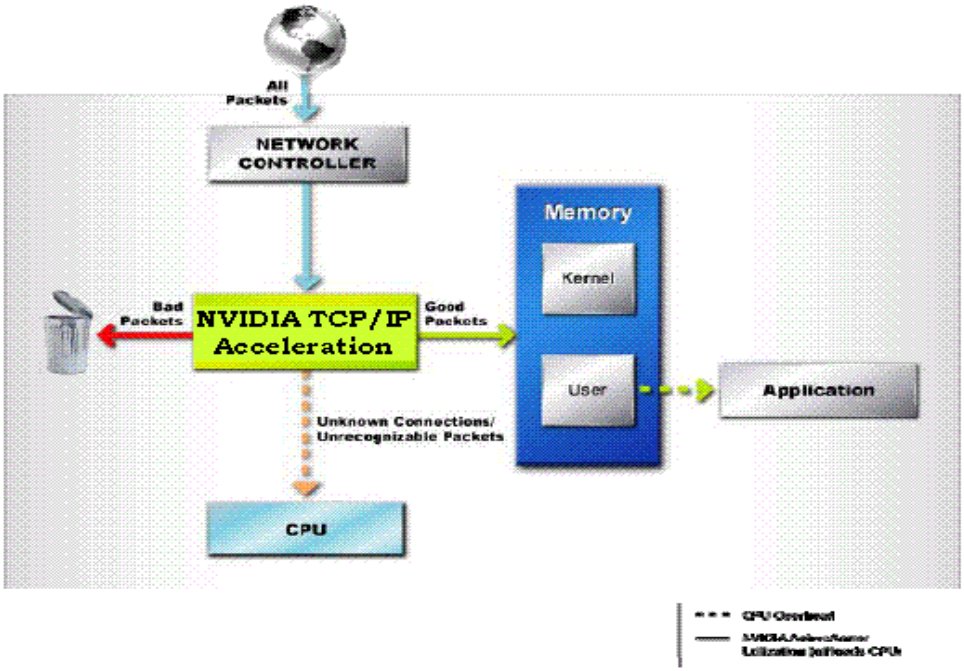
space; and from stack to application, crossing the kernel-space/user-space boundary. All those memory copy operations are CPU intensive and time consuming, and the driver and stack processing that occurs between the copies uses an excessive number of CPU cycles.

Figure 4.1 Current Packet Processing



In comparison, the NVIDIA TCP/IP Acceleration engine discards bad packets before the CPU detects them. In addition, good packets take an "express lane" and bypass the traditional "network stack" process, improving overall throughput and lowering CPU utilization (Figure 4.2). TCP/IP Acceleration places the payload of all good packets directly into application memory, thus eliminating up to three CPU-intensive copy operations — from MAC to driver; from driver to stack within kernel space; and

Figure 4.2 NVIDIA TCP/IP Packet Processing



from stack to application, which involves crossing the kernel-space/user-space boundary.

The NVIDIA TCP/IP Acceleration processes all the relevant protocol headers and validates them against the list of allowed connections and the most recent connection state so that only valid packets are accepted from or allowed into the network.

By examining the packets in hardware and placing the packet data directly into the application's buffers, NVIDIA TCP/IP Acceleration provides the highest performance and most efficient networking security solution available for any personal computer platform.

Disabling Hardware TCP/IP Acceleration

Note: You may want to disable TCP/IP Acceleration if you want to ensure that *your network traffic does not bypass the firewall*.

To disable hardware TCP/IP Acceleration, follow these steps:

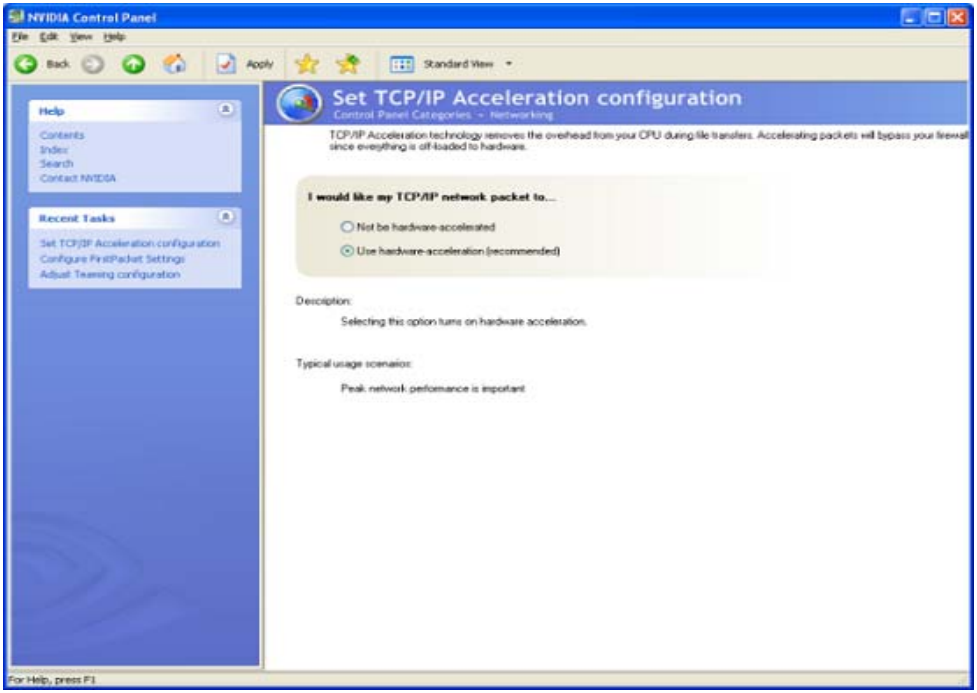
1 On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.

2 Select **Set TCP/IP Acceleration Configuration** to open the associated page (Figure 4.3).

3 Select **Not be hardware-accelerated,** which is the default setting.

Note: The CPU and software stack operate normally.

Figure 4.3 NVIDIA TCP/IP Packet Processing



Enabling Hardware TCP/IP Acceleration

Note: Enabling TCP/IP acceleration enhances your network performance but can cause your network traffic to bypass the firewall; i.e., the firewall may not work.

Follow these steps to enable hardware TCP/IP Acceleration:

1. On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.
2. Select **Set TCP/IP Acceleration Configuration** to open the associated page (Figure 4.3).
3. Select **Use hardware-acceleration (recommended)**.

CHAPTER 5

INCREASING NETWORK BANDWIDTH & FAULT TOLERANCE — NVIDIA TEAMING

The following topics are discussed in this chapter:

About NVIDIA Teaming Technology

Note: NVDIA Teaming functionality is available only on certain nForce systems. For details, see "System Requirements" on page 4.

NVIDIA Teaming technology combines two or more Ethernet interfaces on your system into a single logical interface to form a team, resulting in increased bandwidth and network redundancy. The Windows operating system detects only one logical NVIDIA interface to which an administrator can then assign an IP address.

NVIDIA Teaming technology improves network throughput by distributing traffic efficiently across all available Ethernet interfaces, also known as "load balancing". In normal network conditions, both transmit and receive traffic are distributed.

NVIDIA Teaming technology also improves network uploading time. If one of the physical Ethernet interfaces fails, the network can remain accessible because the remaining interface can take over the network traffic of the failed interface, achieving "fault tolerance". The operating system and network application do not detect a network failure because network connection is bound to the logical interface rather than to a single physical interface.

Disabling Teaming

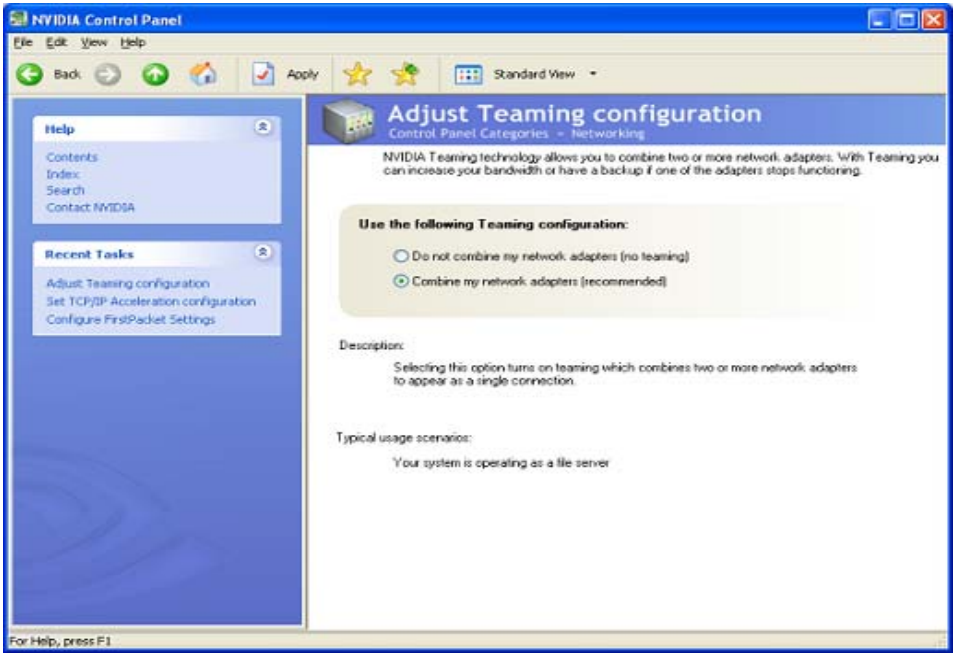
Note: You may want to disable NVIDIA Teaming if your system is *not* operating as a file server.

To disable NVIDIA Teaming, follow these steps:

1 On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.

2 Select **Adjust Teaming configuration** to open the associated page (Figure 5.1).

Figure 5.1 Adjusting Teaming Configuration



3 Select **Do not combine my network adapters (no teaming)**.

Enabling Teaming

To enable NVIDIA Teaming, follow these steps:

1 On the NVIDIA Control Panel **Select a Category...** page, select **Networking**.

2 Select **Adjust Teaming configuration** to open the associated page (Figure 5.1).

3 Select **Combine my network adapters (recommended).**