

# EtherChannel Between a Cisco Catalyst Switch That Runs Cisco IOS and a Workstation or Server Configuration Example

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## **Introduction**

### **Prerequisites**

- Requirements
- Components Used
- Related Products
- Conventions

### **Background Information**

- Design Guidelines
- EtherChannel Negotiation Protocols

### **Configure**

- Network Diagram
- Switch Configuration
- Server Configuration

### **Verify**

### **Troubleshoot**

### **NetPro Discussion Forums – Featured Conversations**

### **Related Information**

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## **Introduction**

This configuration example describes how to establish EtherChannel between a Cisco Catalyst Switch that runs Cisco IOS software and a workstation or server.

For Cisco Catalyst switches that run the Catalyst OS, refer to [Configuring EtherChannel Between a Catalyst Switch Running CatOS and a Workstation or Server](#).

EtherChannel allows multiple physical Ethernet links to combine into one logical channel, which allows the links in the channel to share traffic load, as well as redundancy in the event that one or more links in the channel fail.

You can use EtherChannel to interconnect LAN switches, routers, servers, and clients via unshielded twisted pair (UTP) wiring or single-mode and multimode fiber. This document refers to Fast EtherChannel, Gigabit EtherChannel, Port Channel, Channel Group, and Port Group with a single term, EtherChannel. The information in the document applies to all of these EtherChannels.

This document covers the configuration of Layer 2 EtherChannel between a Catalyst switch and a server.

## **Prerequisites**

### **Requirements**

Ensure that you meet these requirements before you attempt this configuration:

- Cisco Catalyst switch that meets the system requirements to implement EtherChannel. For more information, refer to System Requirements to Implement EtherChannel on Catalyst Switches.

Here is a simple command to determine if the switch/module supports EtherChannel:

```
Switch#show interfaces Gi2/0/23 capabilities
GigabitEthernet2/0/23
  Model:                WS-C3750G-24T
  Type:                 10/100/1000BaseTX
  Speed:                10,100,1000,auto
  Duplex:               half,full,auto
  Trunk encap. type:    802.1Q,ISL
  Trunk mode:           on,off,desirable,nonegotiate
  Channel:              yes
  Broadcast suppression: percentage(0-100)
  Flowcontrol:          rx-(off,on,desired),tx-(none)
  Fast Start:           yes
  QoS scheduling:       rx-(not configurable on per port basis),tx-(4q2t)
  CoS rewrite:          yes
  ToS rewrite:          yes
  UDLD:                 yes
  Inline power:         no
  SPAN:                 source/destination
  PortSecure:           yes
  Dot1x:                yes
Switch#
```

- Workstation or server with NICs that are interoperable with Cisco Catalyst switches. For more information, refer to the NIC vendor documentation.

## Components Used

This document is not restricted to specific software and hardware versions.

The information in this document is based on these software and hardware versions:

- Cisco Catalyst 3750 Series switch that runs Cisco IOS software release 12.2(25) SEC2
- Windows 2000 Server that runs Windows OS version 5.00.2195 with HP Dual Port ProLiant Network Adapter

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Related Products

This configuration example can also be used with Cisco Catalyst switches that run Cisco IOS software.

## Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

## Background Information

### Design Guidelines

The EtherChannel should start on a single device and end on another single device. The *device* can be a

switch, a switch stack, a workstation, or a server.

- Within a single switch chassis, the EtherChannel can start or end on different modules. This setup is applicable for Cisco Catalyst 4000/4500/6000/6500 switches.
- Within a single switch stack, the EtherChannel can start or end on different stack members. For more information, refer to Cross-Stack EtherChannel on a Catalyst 3750 Switch Configuration Example.

## EtherChannel Negotiation Protocols

- PAgP (Cisco Proprietary)
- LACP (IEEE 802.3ad)

Refer to the NIC documentation for the support of EtherChannel negotiation protocols.

### EtherChannel Modes in Switches:

Mode	Negotiation Protocol	Explanation
on	None	Enables EtherChannel unconditionally.  Recommended if the Workstation/Server does not support any negotiation protocols.
off	None	Disabled EtherChannel unconditionally.
active	LACP	Initiates negotiation by sending LACP packets.  Recommended if the Workstation/Server support LACP.
passive	LACP	If remote end sends LACP packets, negotiation will start.
desirable	PAgP	Initiates negotiation by sending PAgP packets.  Recommended if the Workstation/Server support PAgP.
auto	PAgP	If remote end sends PAgP packets, negotiation will start.

Use appropriate mode in accordance with the negotiation protocol supported by the NIC adapter.

**Note:** This document uses the NIC adapter which supports LACP.

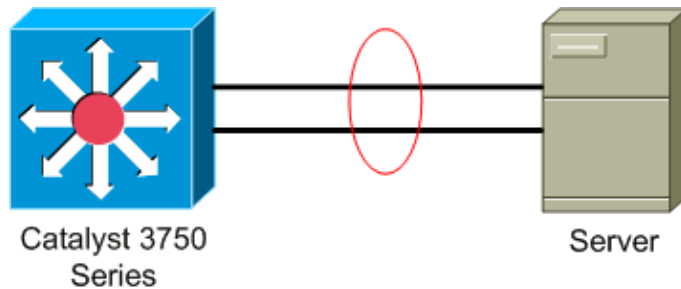
## Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** Use the Command Lookup Tool ( registered customers only) to find more information on the commands used in this document.

## Network Diagram

This document uses this network setup:



## Switch Configuration

In order to configure the switch, complete these steps.

1. Per the Network Diagram, choose the ports to be grouped:

- ◆ Gi 2/0/23
- ◆ Gi2/0/24

2. For each of the listed ports, complete these steps:

a. Configure the port as a Layer 2 switchport.

**Note:** This step is required only for switches that support both Layer 2 switchports and Layer 3 interfaces.

```
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int Gi2/0/23
```

```
Switch(config-if)#switchport
Switch(config-if)#
```

b. Configure the port as an access port and assign the appropriate VLAN.

```
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 100
```

```
Switch(config-if)#
```

c. Configure the port for spanning tree PortFast.

```
Switch(config-if)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when portfast is enabled, can cause temporary bridging loops.
Use with CAUTION
```

```
%Portfast has been configured on GigabitEthernet2/0/23 but will only
have effect when the interface is in a non-trunking mode.
Switch(config-if)#
```

d. Configure the port for EtherChannel with appropriate mode.

```
Switch(config-if)#channel-group 1 mode active
```

Creating a port-channel interface Port-channel 1

Switch(config-if)#

3. Configure the EtherChannel load balancing. This configuration is applicable for all EtherChannels configured on this switch.

```
Switch(config)#port-channel load-balance ?
```

```
dst-ip      Dst IP Addr
dst-mac     Dst Mac Addr
src-dst-ip  Src XOR Dst IP Addr
src-dst-mac Src XOR Dst Mac Addr
src-ip      Src IP Addr
src-mac     Src Mac Addr
```

```
Switch(config)#port-channel load-balance src-mac
```

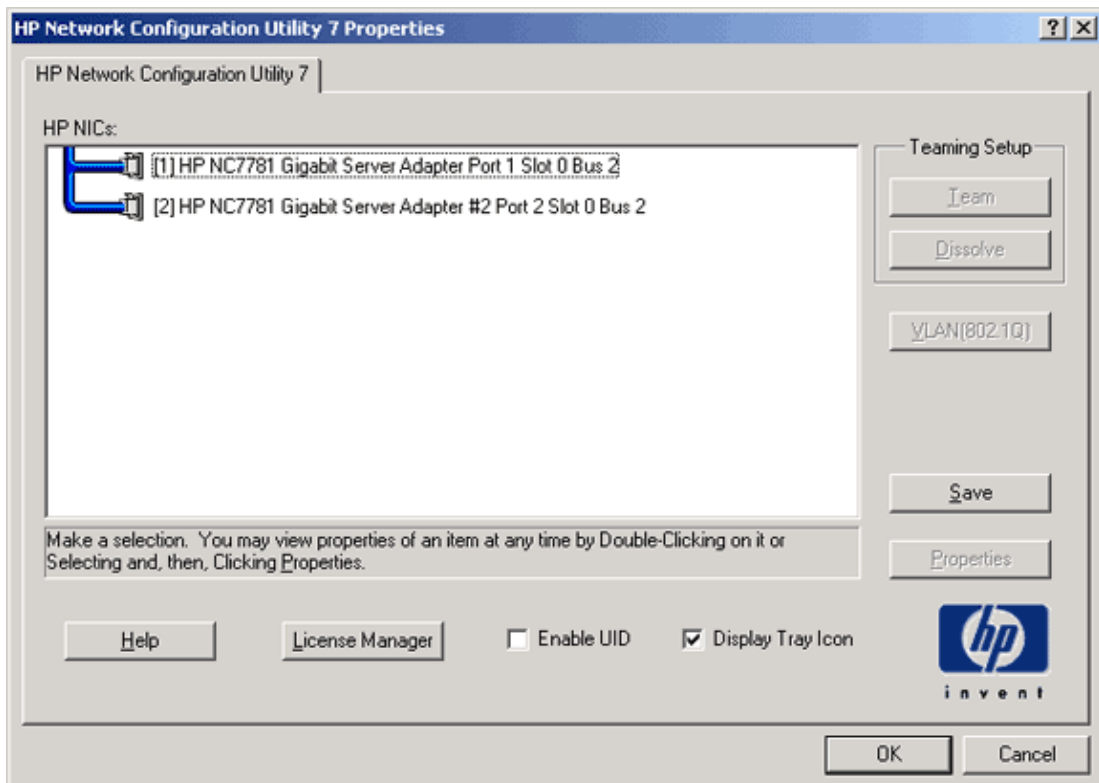
```
Switch(config)#
```

## Server Configuration

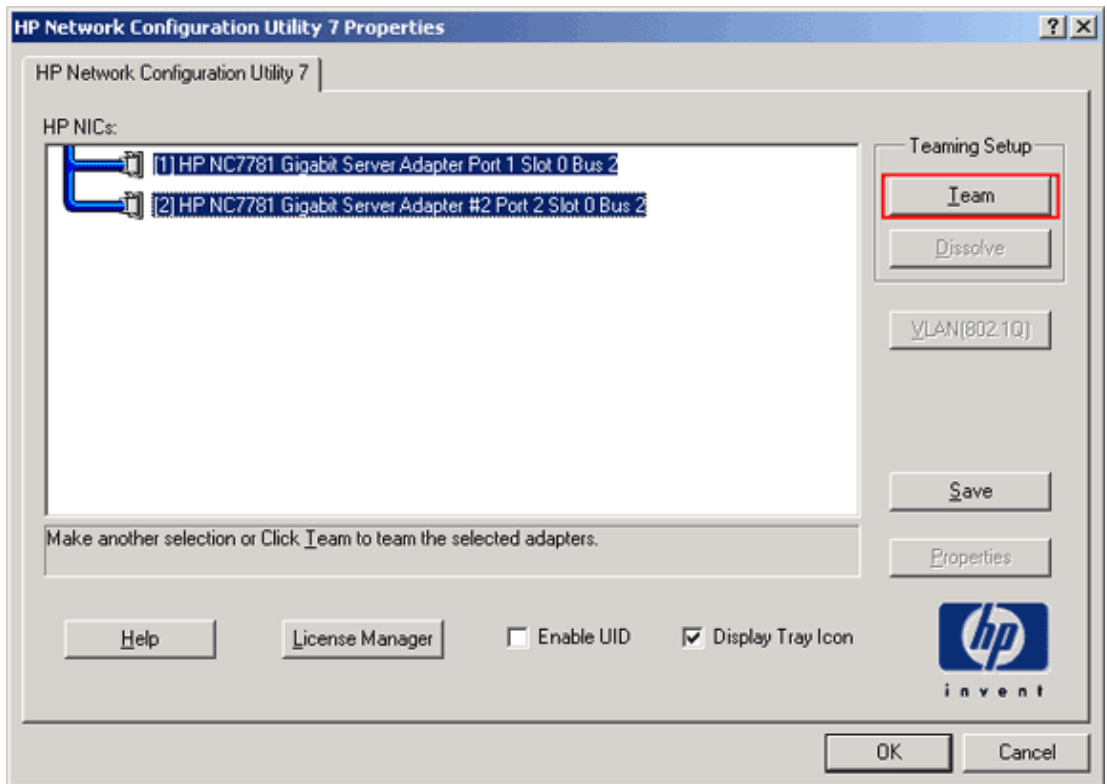
In order to configure the server, complete these steps:

1. Start the NIC configuration utility.

**Note:** This examples uses the HP Network Configuration Utility 7. In order to use the HP Network Configuration Utility, locate the icon in the Windows 2000 system tray or click **Start > Settings > Control Panel > HP Network**.

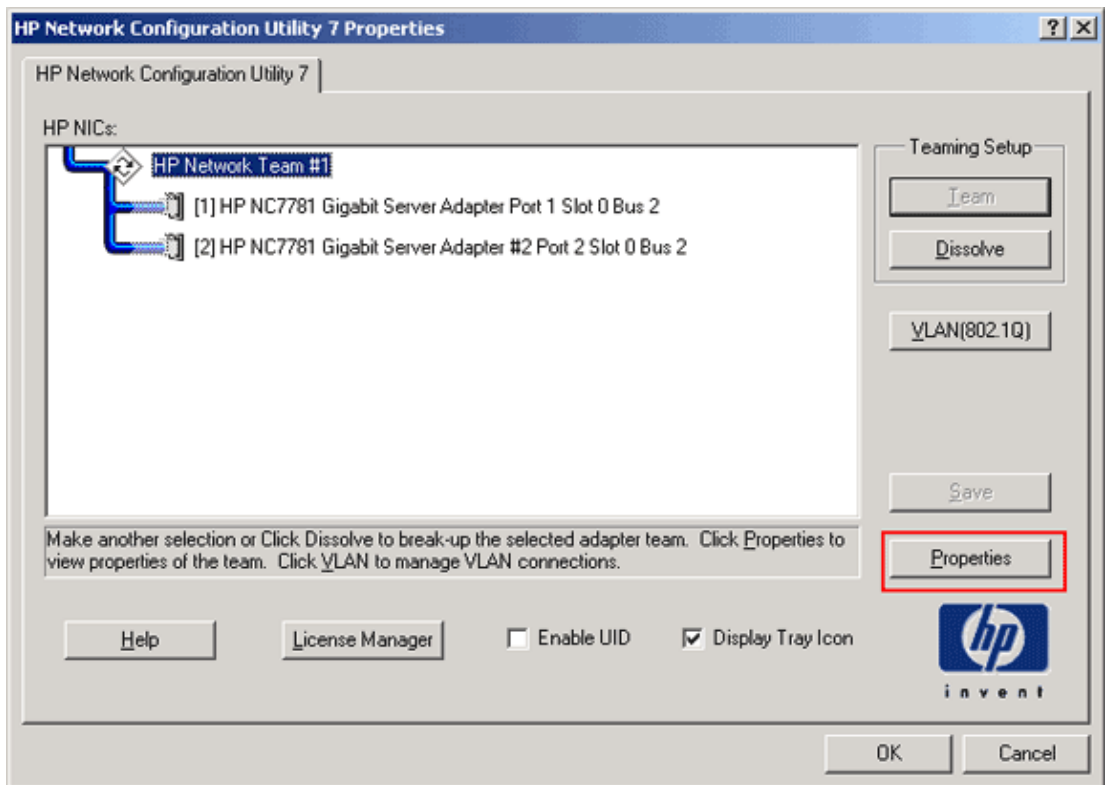


2. Highlight both NICs, and the click **Team**.



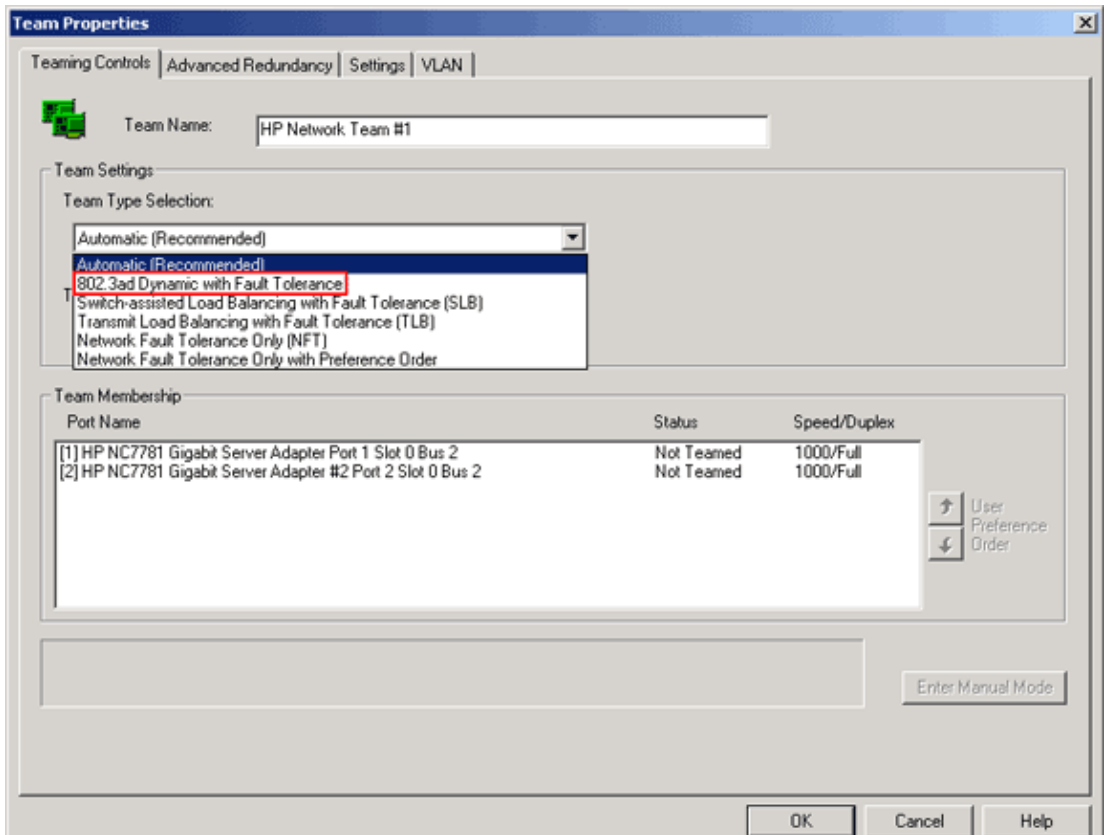
The NIC team is created.

3. Click **Properties**.

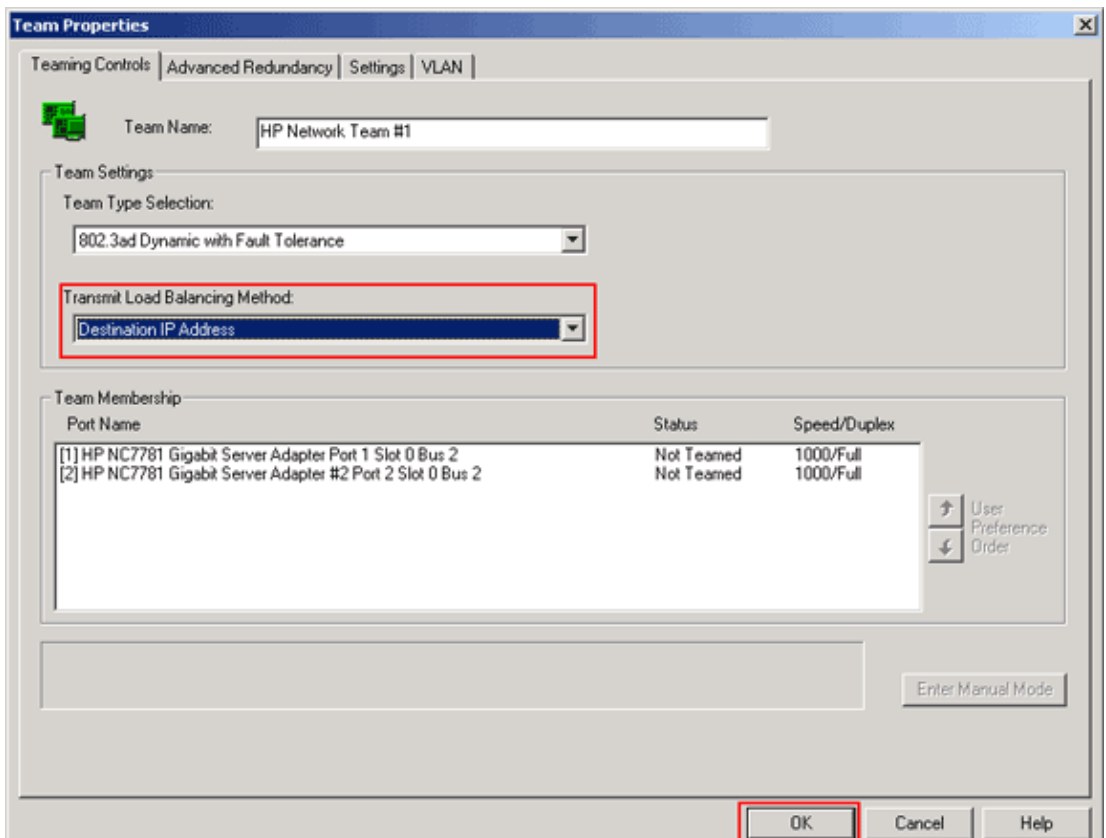


4. In the Team Properties windows, choose the appropriate Team Type Selection.

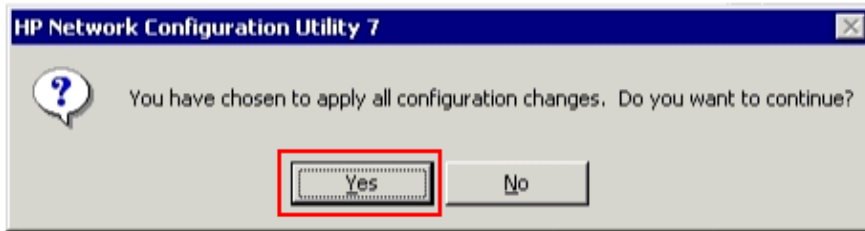
**Note:** Since this example configured the switch with LACP, choose the option with IEEE 802.3ad.



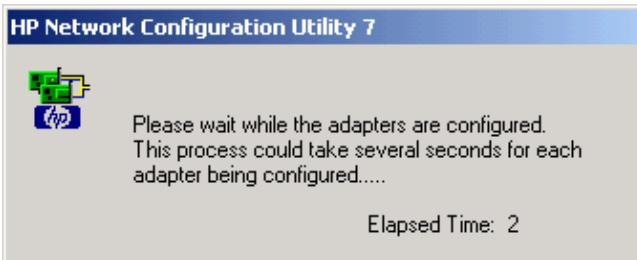
5. Choose the required method from the Transmit Load Balancing Method drop-down list, and click **OK**.



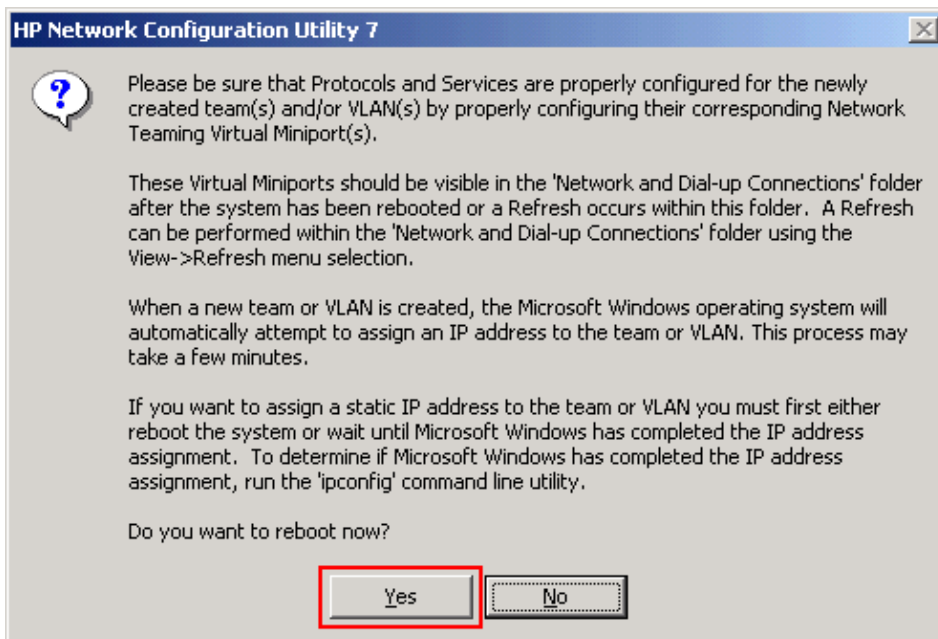
6. In the Team Properties window, click **OK**, and when the confirmation window appears, click **Yes** to continue.



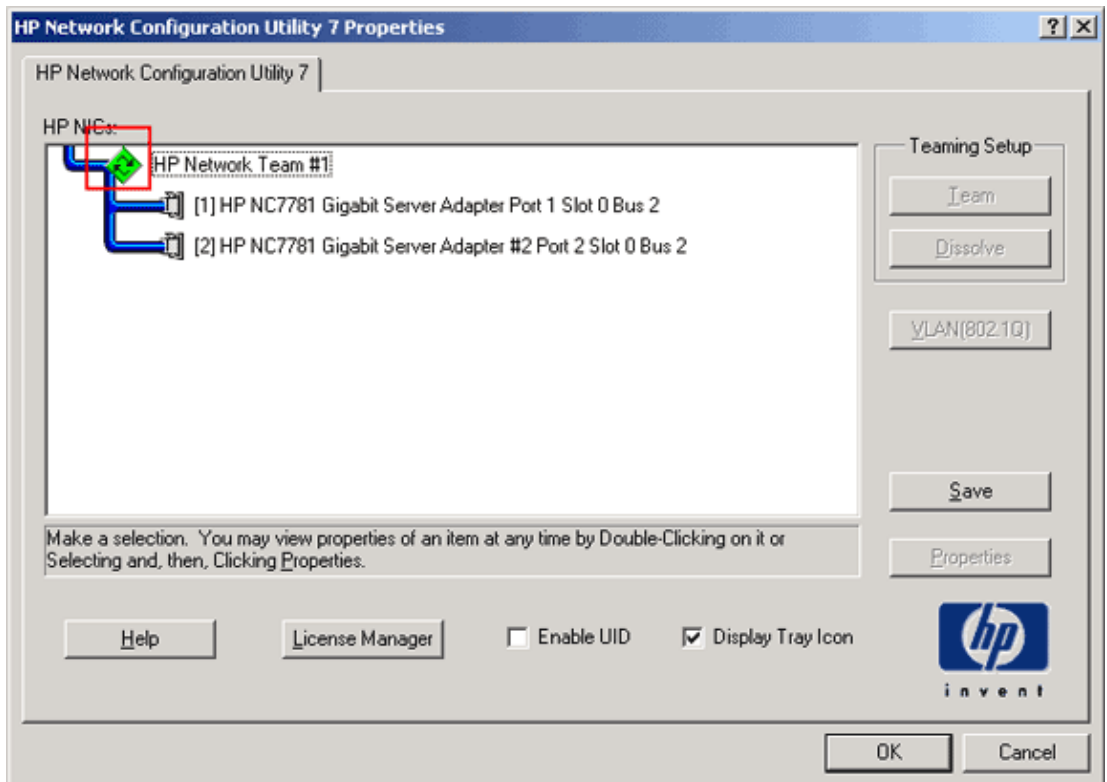
A dialog box appears that displays the status of the process.



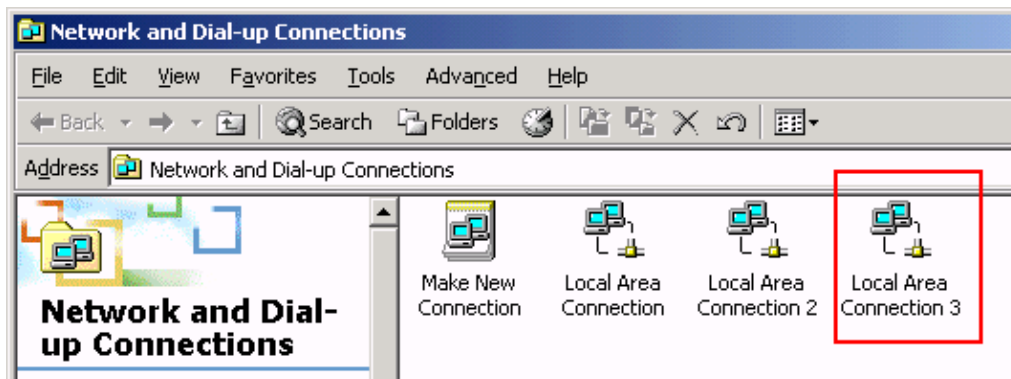
7. When you are prompted to reboot the server, click **Yes**.



8. Once the server is rebooted, open the network configuration utility in order to verify the teaming status.



- Right-click **My Network Places**. An additional network card, *Local Area Connection 3*, displays in the window.



- Once the NIC adapters are teamed and a new connection is formed, the individual NIC adapters are disabled and are not accessible through the old IP address. Configure the new connection with static IP address, default gateway, and DNS/WINS settings or for dynamic configuration.

## Verify

Use this section to confirm that your configuration works properly.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

- **show etherchannel summary** Displays a one-line summary per channel group.

```
Switch#show etherchannel 1 summary
Flags: D - down          P - in port-channel
       I - stand-alone   s - suspended
       H - Hot-standby (LACP only)
       R - Layer3        S - Layer2
       U - in use        f - failed to allocate aggregator
```

```

u - unsuitable for bundling
w - waiting to be aggregated
d - default port

```

```

Number of channel-groups in use: 1
Number of aggregators:          1

```

```

Group  Port-channel  Protocol  Ports
-----+-----+-----+-----
1      Po1(SU)         LACP      Gi2/0/23(P) Gi2/0/24(P)

```

```
Switch#
```

- **show spanningtree interface** Displays spanning tree information for the specified interface.

```
Switch#show spanning-tree interface port-channel 1
```

```

Vlan          Role Sts Cost          Prio.Nbr Type
-----+-----+-----+-----
VLAN0100      Desg FWD 3           128.616 P2p

```

```
Switch#
```

- **show etherchannel load-balance** Displays the load-balance or frame-distribution scheme among ports in the port channel.

```

Switch#show etherchannel load-balance
EtherChannel Load-Balancing Operational State (src-mac):
Non-IP: Source MAC address
IPv4: Source MAC address
IPv6: Source IP address
Switch#

```

## Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

## NetPro Discussion Forums – Featured Conversations

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NetPro Discussion Forums – Featured Conversations for LAN
Network Infrastructure: LAN Routing and Switching
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## Related Information

- **Configuring EtherChannel Between a Catalyst Switch Running CatOS and a Workstation or Server**
- **Cross-Stack EtherChannel on a Catalyst 3750 Switch Configuration Example**
- **Understanding EtherChannel Load Balancing and Redundancy on Catalyst Switches**
- **System Requirements to Implement EtherChannel on Catalyst Switches**
- **ProLiant networking – Network adapter teaming**
- **HP network adapter teaming: load balancing in ProLiant servers running Microsoft® Windows® operating systems**

- **EtherChannel Support Page**
  - **LAN Switching Support Page**
  - **Switches Support Page**
  - **Technical Support & Documentation – Cisco Systems**
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