HITACHI
Inspire the Next

Windows Server 2008 R2 Broadcom Advanced Control Suite 4 LAN Extension Functions Setup Guide

Hitachi Data Systems

ii

Contents

Preface

Thank you for purchasing the Gigabit LAN controller, the PCI-Express Dual Port Gigabit LAN Card, the PCI-Express Quad Port Gigabit LAN Card and PCI-Express Dual Port 10 Gigabit LAN Card (hereafter referred to simply as Card) supplied as a standard component of the Hitachi system equipment. This manual provides necessary information about the use of the Card and its function.

- ☐ Intended audience
- ☐ Document revision level
- ☐ Document organization
- ☐ Document conventions
- ☐ Getting help
- ☐ Comments

Intended audience

This document is intended for the personnel who are involved in planning, managing, and performing the tasks to prepare your site for Compute Rack installation and to install the same.

This document assumes the following:

- The reader has a background in hardware installation of computer systems.

- The reader is familiar with the location where the Compute Rack will be installed, including knowledge of physical characteristics, power systems and specifications, and environmental specifications.

Document revision level

Revision	Date	Description
00	March 2012	Preliminary release
01	May 2012	Secondary release
02	December 2012	Third release
03	November 2013	Fourth release
04	February 2014	Fifth release

Document organization

The table below provides an overview of the contents and organization of this document. Click the chapter title in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
Chapter 1, Extension Functions	Describes what types of extension functions exist and how to set up the extension functions.
Chapter 2, Setting up extension functions	Describes how to install and set up the LAN extension functions (BACS4). In the following explanation, we suppose the LAN driver is correctly installed.

Document conventions

The term "Compute Rack" refers to all the models of the Compute Rack, unless otherwise noted.

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click **OK**.
Italic	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: `copy source-file target-file` ***Note:*** Angled brackets (< >) are also used to indicate variables.
`screen/code`	Indicates text that is displayed on screen or entered by the user. Example: `# pairdisplay -g oradb`
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: `# pairdisplay -g <group>` ***Note:*** Italic font is also used to indicate variables.
[ ] square brackets	Indicates optional values. Example: [a	b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a	b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a	b] indicates that you can choose a, b, or nothing. { a	b } indicates that you must choose either a or b.
<u>underline</u>	Indicates the default value. Example: [<u>a</u>	b]

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
	WARNING	This indicates the presence of a potential risk that might cause death or severe injury.
	CAUTION	This indicates the presence of a potential risk that might cause relatively mild or moderate injury.
NOTICE	NOTICE	This indicates the presence of a potential risk that might cause severe damage to the equipment and/or damage to surrounding properties.
	Note	This indicates notes not directly related to injury or severe damage to equipment.
	Tip	This indicates advice on how to make the best use of the equipment.

Getting help

When you contact the customer support staff, provide as much information about the problem as possible, including:

- The circumstances surrounding the error or the failure

- The exact content of any error message displayed on the host system Compute Rack

- The service information messages, including reference codes and severity levels, displayed and/or logged at the Compute Rack

The customer support staff is available 24 hours a day, seven days a week. For technical support, visit the portal site at https://portal.hds.com

Comments

Please send us your comments on this document: doc.comments@hds.com. Include the document title and number including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems Corporation

Thank you! (All comments become the property of Hitachi.)

1

Extension functions

This chapter describes what types of extension functions exist and how to set up the extension functions.

☐ Smart Load Balancing and failover

☐ VLAN tagging

☐ Restrictions

The following tables list the types of extension functions.

Table 1-1

Smart Load Balancing and failover (SLB)	
Feature	Using two LAN devices, you can switch to and assign the network processing to the backup LAN device when network failure occurs and you can achieve network redundancy and fault-tolerance.
Prerequisite	Type of HUB you can connect: switching HUB Under Windows 2008 R2, you can assign this feature to a Hyper-V virtual network. Supported protocol: IP Maximum number of team members: 2

Table 1-2

VLAN tagging (IEEE802.1q VLAN tagging)	
Feature	Using the IDs specified in the tags within packets, you can implement VLAN groups and achieve logical segmentation.
Prerequisite	Type of HUB you can connect: switching HUB supporting IEEE802.1q VLAN tagging Maximum number of groups: 10 per system (ID:1-4094) Supported protocol: IP

> **Note** Windows 2012 and Windows 2102 R2 do not support BACS4 the LAN extension functions.In case of Windows 2012 or Windows 2012 R2, you use the OS's "NIC Teaming" function. "NIC Teaming" is included in "Local Server".

Smart Load Balancing and failover

The Smart Load Balancing and failover ("teaming" or "SLB") offers the following three functions.

(1) LAN device redundancy function

(2) LAN device load balancing function

(3) Switch redundancy function

The following part describes an overview of each function.

LAN device redundancy function

This function enables you to use two LAN devices to achieve LAN device redundancy. One of the LAN devices is assigned for a normal connection (the load balance member) and the other for a backup connection (the standby member). Those two devices work as a team in a coordinated manner. While this function is active, the installed LAN driver continuously checks the status of the network connection. If link failure occurs due to, for example, disconnected network cable from the LAN device for a normal connection, this function redirects all the traffic (including the MAC address and the IP address) to the LAN adapter for a backup connection. The user can use the system unit seamlessly without noticing the LAN devices are ever switched.

Load balance member

Standby member

Figure 1-1

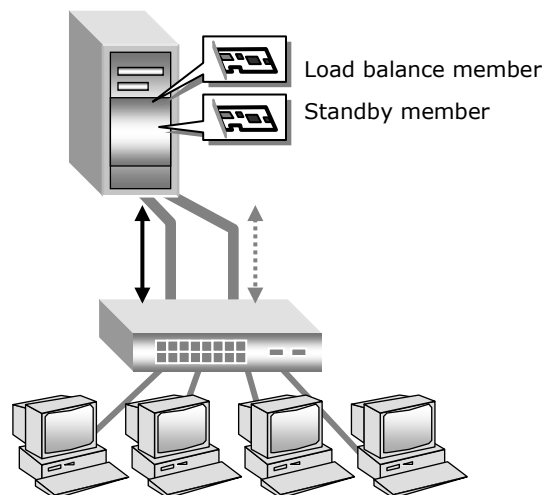|	
Note	If you use this function, connect the two LAN devices to the same switching HUB.
	The standby member does not receive unicast packets but receives broadcast and multicast packets.

	Only under Windows 2008 R2, you can use a Hyper-V virtual network with teaming function.

	The management OS cannot share a Hyper-V virtual network with teaming function. For information about how to disable the sharing, see page 2-28. For communication between the management OS and the external network, use network adapters not using teaming function.

	If you want to use VLAN tagging on the Hyper-V virtual network with teaming function, do not configure VLAN tagging for the team using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines.

LAN device load balancing function

This function enables you to use two LAN devices working as a team in a coordinated manner to increase the communication bandwidth of the network. This function also enables you to achieve LAN device redundancy.

While this function is active, the LAN driver manages the two LAN drivers in the same team, analyzes the amount of send/receive data traffic periodically, and distributes the traffic load to each LAN device. If failure occurs in one of the load balance members, this function redirects all the traffic (including the MAC address and the IP address) to the other load balance member.

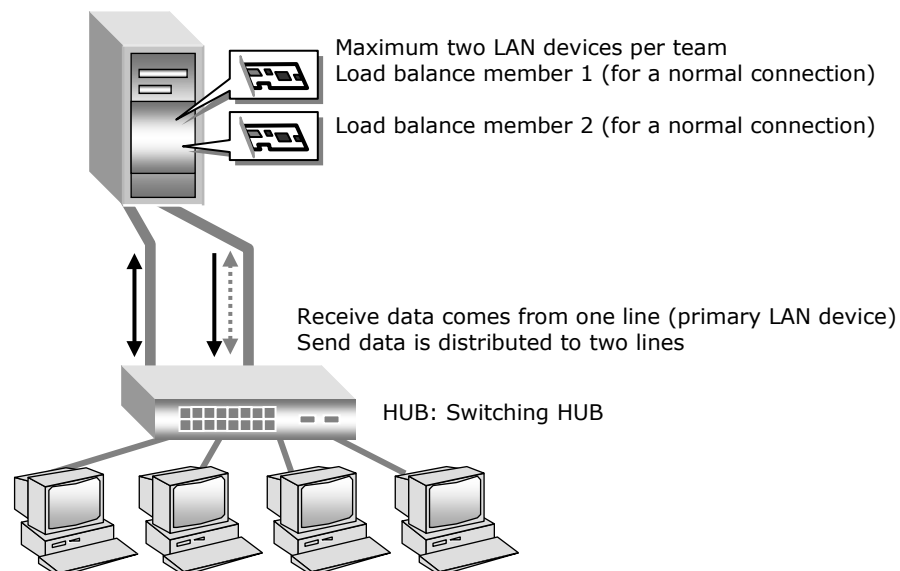Maximum two LAN devices per team
Load balance member 1 (for a normal connection)

Load balance member 2 (for a normal connection)

Receive data comes from one line (primary LAN device)
Send data is distributed to two lines

HUB: Switching HUB

Figure 1-2

	If you use this function, connect the two LAN devices to the same switching HUB.

	Only under Windows 2008 R2, you can use a Hyper-V virtual network with teaming function.

	The management OS cannot share a Hyper-V virtual network with teaming function. For information about how to disable the sharing, see page 2-28. For communication between the management OS and the external network, use network adapters not using teaming function.

	If you want to use VLAN tagging on the Hyper-V virtual network with teaming function, do not configure VLAN tagging for the team using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines.

Switch redundancy function

This function achieves network fault-tolerance on the system unit and two HUBs with redundancy. Two LAN devices (the load balance member and the standby member) work with two HUBs supporting spanning tree (one HUB for a normal connection and the other HUB for a backup connection) in a coordinated manner. Spanning tree is a HUB function that supports HUB redundancy using monitor packets to enable mutual monitoring of HUBs and to control the communication path between HUBs. The switch redundancy function passively cooperates with this HUB function to control switching between the two LAN devices.

While this function is active, network communication uses the link between the load balance member and the HUB for a normal connection. The LAN driver on the system unit continuously checks the status of the network connection. If failure occurs and the power for the HUB for a normal connection is turned off, the communication path is switched by the spanning tree control between the two HUBs, one for a normal connection and the other for a backup connection. The LAN driver detects link down caused by the powering off of the HUB for a normal connection and redirects all the traffic (including the MAC address and the IP address) from the load balance member to the standby member.
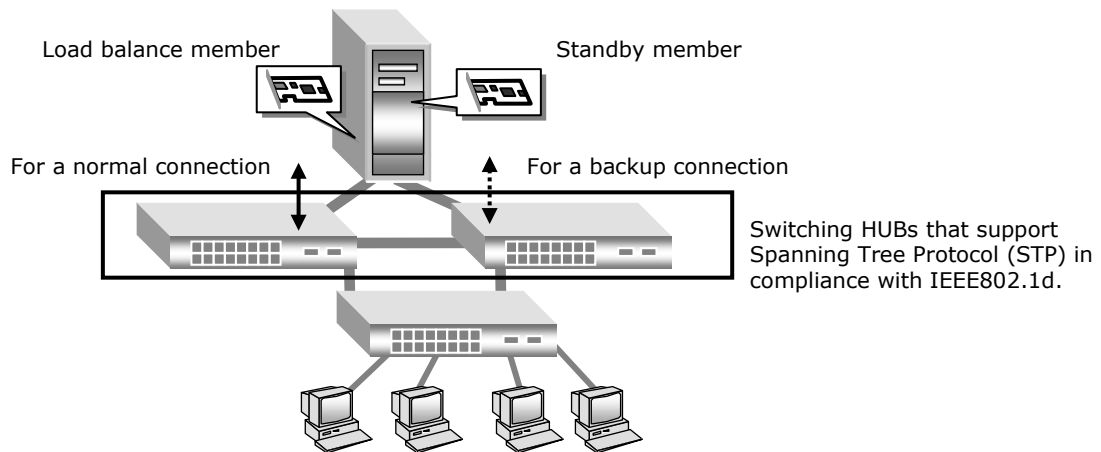
Figure 1-3

| | If failure occurs without link down between the load balance member and the switching HUB, switching to the link between the standby member and the corresponding switching HUB does not occur. |

| | If a LAN device is set as a member of a team, do not enable STP for the LAN device port that connects to a switching HUB. Otherwise, packet loss may result. If you use switch redundancy function, connect the two LAN devices to different switching HUBs and enable STP for the ports connecting between the two switching HUBs. |

| | Only under Windows 2008 R2, you can use a Hyper-V virtual network with teaming function. |

| | The management OS cannot share a Hyper-V virtual network with teaming function. For information about how to disable the sharing, see page 2-28. For communication between the management OS and the external network, use network adapters not using teaming function. |

| | If you want to use VLAN tagging on the Hyper-V virtual network with teaming function, do not configure VLAN tagging for the team using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines. |

| | The standby member does not receive unicast packets but receives broadcast and multicast packets. |

VLAN tagging

When you use a network, not only processing power, reliability, and higher availability but also confidentiality is important. Virtual LAN (VLAN) tagging is supported as a technique to maintain network confidentiality. VLAN tagging can achieve a logical segmentation.

If you use VLAN tagging, you can split one physical network into logical groups. By controlling the area each packet can reach, only the communication within each group is enabled and the communication between groups including broadcast packets is suppressed.

Using IEEE802.1q VLAN tagging, you can distinguish VLAN groups by looking at the IDs specified in the tags inside packets. Previously this function is used only for connections between switching HUBs. Now you can use this function also for LAN devices and can build a network system with higher confidentiality.
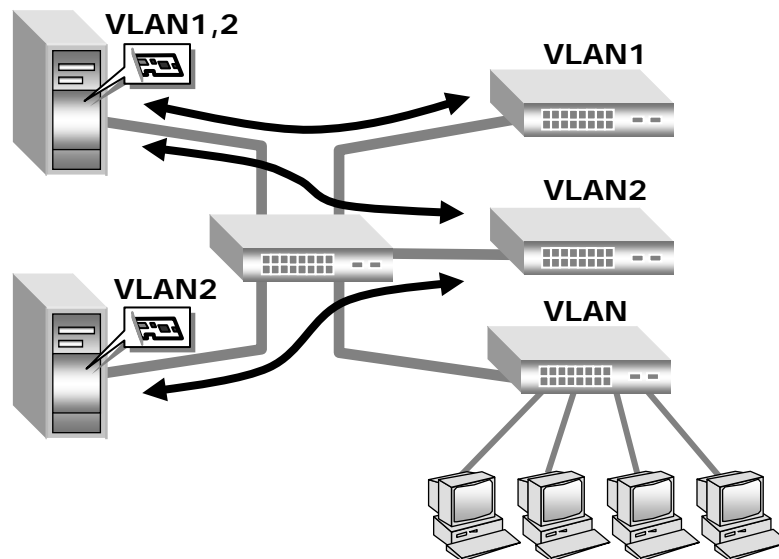

Figure 1-4

Note	The maximum number of VLAN groups you can use per system unit is 10.

Note	If you want to use VLAN tagging on the Hyper-V virtual network with teaming function, do not configure VLAN tagging for the team using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines.

Tip	If you set up to use VLAN tagging, you need to set up VLAN tagging for all devices on the related networks.

Restrictions

(1) Network protocol
Use TCP/IP for the protocol.

(2) Switching between LAN devices
When, for example, the link to the load balance member is disconnected, the network traffic is switched to the standby member. Note that this switching process takes time. You need to check the event viewer and confirm that the network connection has been successfully switched before using the network.

(3) Replacing a LAN device when failure occurs
If all LAN devices in the team have hardware failure, network connection is lost. When one of the LAN devices failed, replace the failed LAN device as soon as possible. After you replace the LAN device, reconfigure the extension functions according to this setup guide.

(4) When the system unit starts up, the following event (warning) may be recorded for a LAN device on the system unit.
LAN device name: The network link is down.

(5) When the system starts up, error events may be recorded in the event log for the LAN device. The LAN device may be linked down.
Check **Network Connections** to see if the reported LAN device is connected.

(6) You cannot enable SLB if Network Load Balancing (NLB) is installed. If you do, network communication may not work properly for created virtual LAN devices, or for LAN devices after disabling SLB.

(7) Do not use LAN extension functions for a LAN used for internal communication within a cluster server.

(8) Temporary communication disruption when a team or a tagged VLAN is created
When a team or a tagged VLAN is created, all teams or tagged VLANs in the system unit may not be able to communicate temporarily. You need to confirm all teams or tagged VLANs can communicate before using the network.

(9) Temporary communication disruption when links in the team switches
Switching links takes a couple of seconds. Depending on applications in use, network connection may be disconnected temporarily.

(10) Bandwidth when the LAN adapter load balancing function is used
Receive data is processed by one LAN device. That means the bandwidth for receive data does not increase.
Teaming is designed to increase the effective throughput of LAN communication by load balancing processing. However, depending on the operating environment (CPU load, communication data, software, and so on), the performance may not be improved due to the overhead of load balancing processing itself.

(11) Switching LAN devices when you use teaming
When you use teaming, if connection failure occurs without link down at the LAN device for a normal connection, switching to the LAN device for a backup connection does not occur.

(12) Maximum number of team members is 8. (Maximum number of teams is 4.)

(13) The standby member does not receive unicast packets but receives broadcast and multicast packets.

(14) Do not update driver parameters such as communication speed in the BACS4 window. You need to change the communication speed on Device Manager. The following errors are recorded in the event log. After those events are recorded in the log, check if communication can be done normally.

Type: Error
Event: 1008
Source: Dhcp
Description : Your computer was unable to initialize a Network Interface attached to the system.

Type: Error
Event: 4307
Source: NetBT
Description: Initialization failed because the transport refused to open initial Addresses

Type: Error
Event: 2505
Source: Server
Description: The server could not bind to the transport \Device\NetbiosSmb because another computer on the network has the same name. The server could not start.

Type: Warning
Event: 2504
Source: Server
Description: The server could not bind to the transport \Device\NetBT_Tcpip_{********-****-****-****-************}.

Type: Error
Event: 2000
Source: Srv
Description: The server's call to a system service failed unexpectedly.

(15) The following event may be recorded when a team or a tagged VLAN is created or deleted. After those events are recorded in the log, check if communication can be done normally.

Type: Error
Event: 4191
Source: Tcpip
Description: IP could not open the registry key for adapter TCPIP\Parameters\Adapters\NDISWANIP. Interfaces on this adapter will not be initialized.

(16) If you create a tagged VLAN on a team, Blfm Warning ID:8 will be recorded in the event log.

Type: Warning
Event: 8
Source: Blfm
Description: Could not bind to adapter \DEVICE\{adapter name}.

Because the following is recorded several seconds after an event, It is not abnormal.

Type: Imformation
Event: 9
Source: Blfm
Description: Successfully bind to adapter \DEVICE\{adapter name}.

(17) Windows 2012 and Windows 2012 R2 do not support BACS4 the LAN extension functions. In case of Windows 2012 or Windows 2012 R2, you use the OS's "NIC Teaming" function. "NIC Teaming" is included in "Local Server".

2

Setting up extension functions

This chapter describes how to install and set up the LAN extension functions (BACS4). In the following explanation, we suppose the LAN driver is correctly installed.

☐ Installing BACS4

☐ Setting up Smart Load Balancing and failover

☐ Status indicated in the event log (Source: Blfm)

☐ Example of setting up a Hyper-V virtual network with SLB

☐ TCP Checksum Offload function

Tip	Supported operating systems are different depending on the system unit. Always check which operating systems are supported by the system unit.

Tip	You need to install BACS4 in order to use the LAN extension functions.

Note	Windows 2012 and Windows 2012 R2 do not support BACS4 the LAN extension functions. In case of Windows 2012 or Windows 2012 R2, you use the OS's "NIC Teaming" function. "NIC Teaming" is included in "Local Server".

Installing BACS4

To install Broadcom BACS4, log in to the system with administrative permission.

Run the setup program in the following directory of "Drivers Kit CD-ROM for Windows 2008 R2 version 1205-10-03".
The CD-ROM is assumed to be drive D.

"Drivers Kit CD-ROM for Windows Server 2008 R2 version 1205-10-03" updates the LAN driver of 1G LAN device and the LAN driver of 10G LAN device. So Run the LargeRxRing batch script after LAN drivers installation.

Table 2-1

OS	Location of LargeRxRing batch
Windows Server 2008 R2 version	D:\Win2008R2\Utility\LargeRxRing

After installation of the LargeRxRing batch, installs BACS4.

Table 2-2

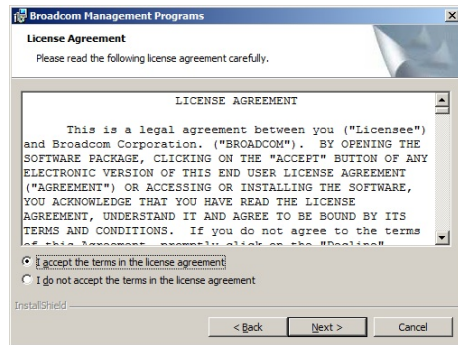| OS	Location of BACS4
Windows Server 2008 R2 version	D:\Win2008R2\Utility\BACS4\LANTOOL_1 \MgmtApps\x64\setup.exe

1. Log on as a user with privileges (Administrator or others).

2. Install the following OS standard feature.

3. Double-click the exe file and click **Next**.
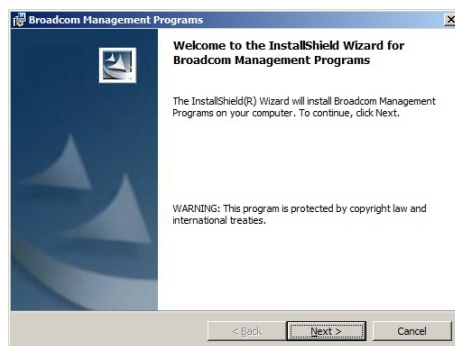
4. Read the LICENSE AGREEMENT, check **I accept the terms in the License Agreement**. to confirm you agree with the terms, and click **Next**.
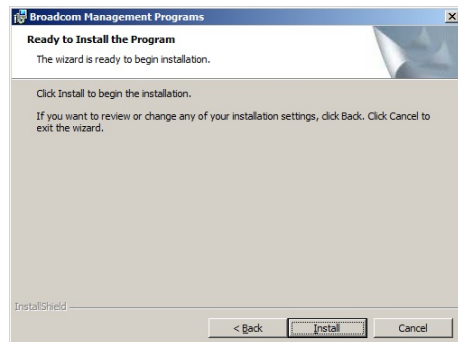

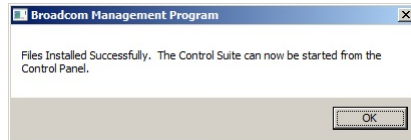5. The **Custom Setup** dialog box is displayed. Click **Next**.
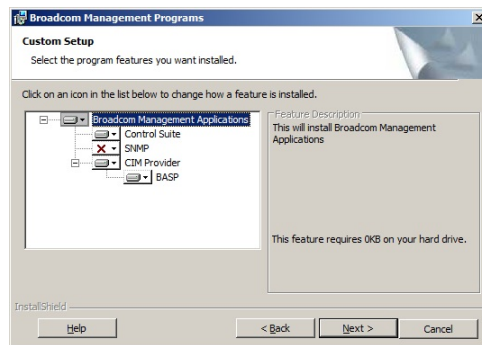
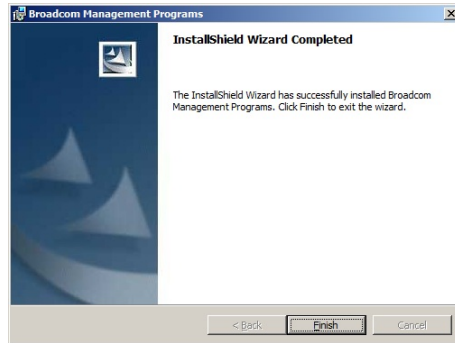> **Note** Do not select the checkbox of " SNMP."

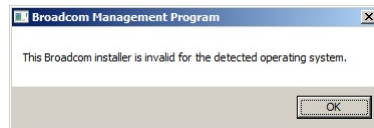6. Click **Install**. Installation starts.

7. Click **OK**.

Click **Finish** and restart the OS.

| Tip | If you do not install the correct BACS4 corresponding to the OS you use, the warning message will be displayed. Example: If you try to install a 32-bit version of BACS to a 64-bit OS, the following warning message will be displayed: |

| Note | After you uninstalled BACS4, make sure you restart the system. If you reinstall BACS4 without restarting the system, BACS4 may not work properly. If you want to uninstall BACS4, uninstall **Broadcom Management Programs** in **Control Panel**. |

| Note | The following warning event is recorded when you install BACS4. This is not a problem. |

Level: Warning
Source: WinMgmt
Event ID: 63

Description: A provider, BnxWmiProvider, has been registered in the WMI namespace, Root\BrcmBnxNS, to use the LocalSystem account. This account is privileged and the provider may cause a security violation if it does not correctly impersonate user requests.
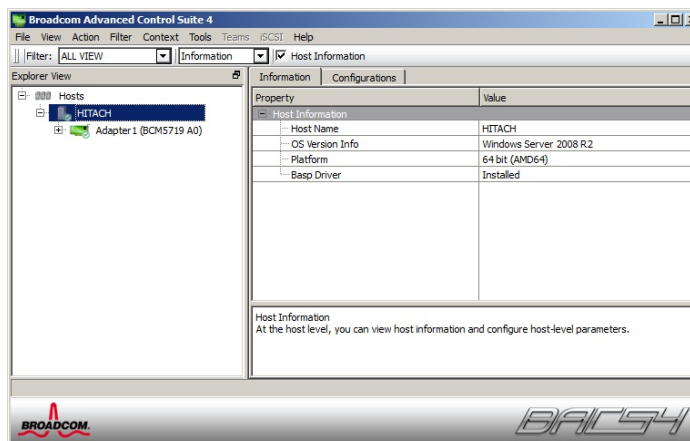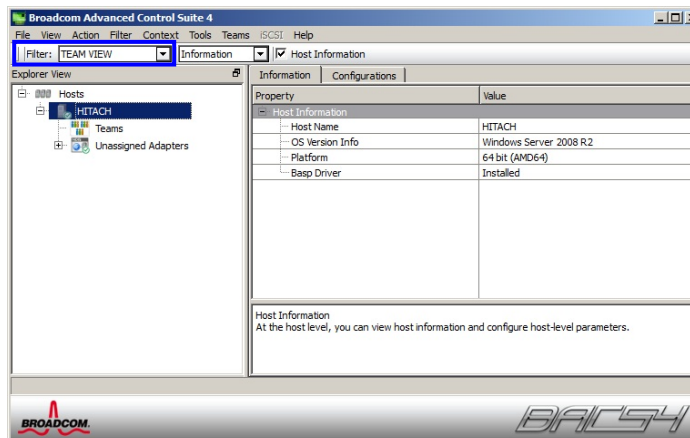
Setting up Smart Load Balancing and failover

> **Note** When you setup, log on as a user with privileges (Administrator or others).
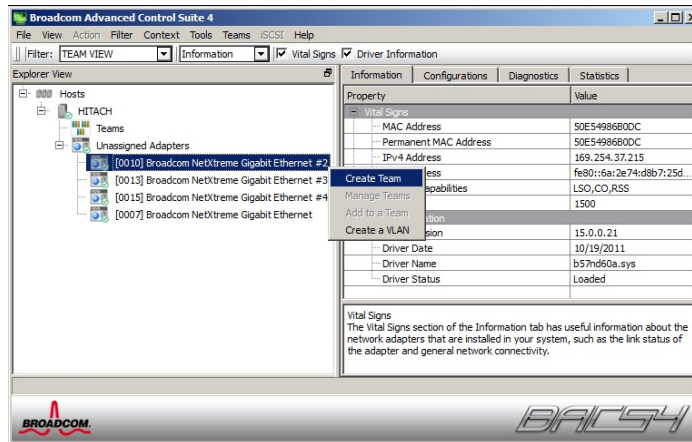
Setting up a team

1. Start Broadcom Advanced Control Suite4.

   Click **Broadcom Advanced Control Suite4** under **Control Panel**.

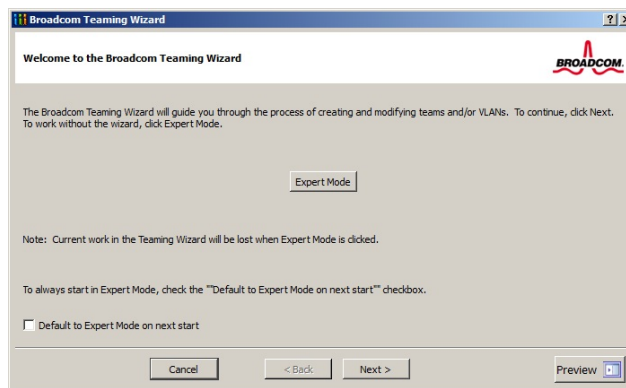   The following window is displayed.

2. Select **TEAM VIEW** for **Filter** just under the menu bar.

3. Select a load balance member from LAN devices, right-click the load balance member, and select **Create Team**.
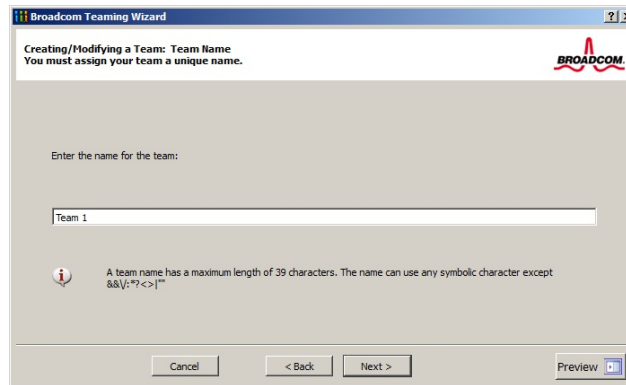

4. Click **Next**.

> **Note**
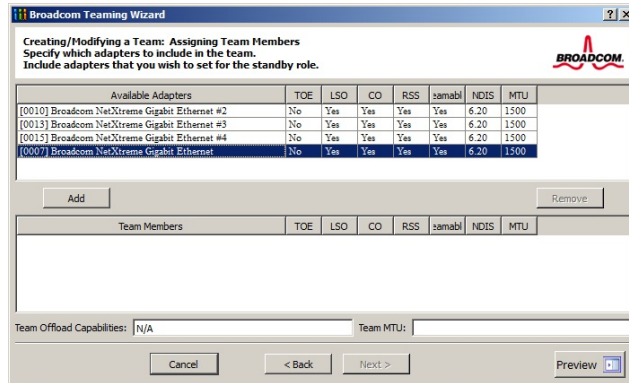> **Expert Mode** is not supported.

> **Note**
> In rare cases, the dialog box may not be displayed properly. If this issue occurs, restart Broadcom Advanced Control Suite4 and retry Setting up a team.

5. Type the team name as shown in the dialog below and click **Next**. (Team 1 in the dialog)

| Tip | You can choose the team name arbitrarily. |

6. Check **Team Type**. Select **Smart Load Balancing and Failover (SLB)** and click **Next**.

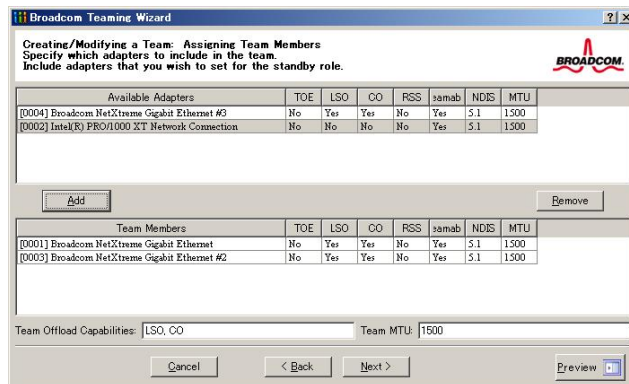| Note | LAN devices used in the system unit only support **Smart Load Balancing and Failover (SLB)**. Do not select other radio buttons. |

7. Select one member for the team from **Available Adapters** and click **Add.**
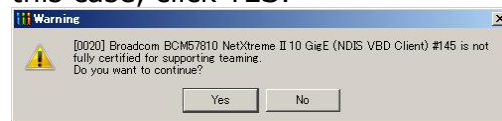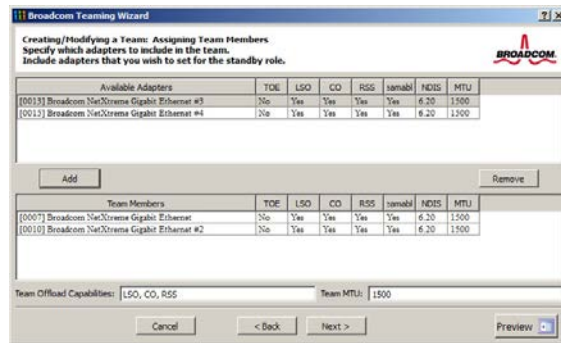

8. Click **Yes**.

9. Select another member for the team and click **Add**.

| Note | When inserting PCI-Express Dual Port 10 Gigabit LAN Card "CN7821" or LAN Mezzanine "CN7M1S", the following message may be displayed. In this case, click YES. |

10. Continue it, and select team member from Available Adapters and Click to **Add**.

11. Click **Next** to configure the standby member.

If you want to create a standby member, check **Use the following member as a standby member**: (If you use the LAN device redundancy function or the switch redundancy function). A standby member is automatically selected. If you want to change the setting, select the standby member from the pull down list.
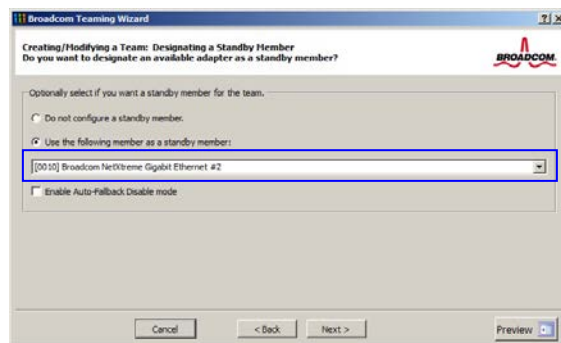
If you do not create a standby member, check **Do not configure a standby member**. (If you use the LAN device load balancing function).

LAN Extension Functions Setup Guide
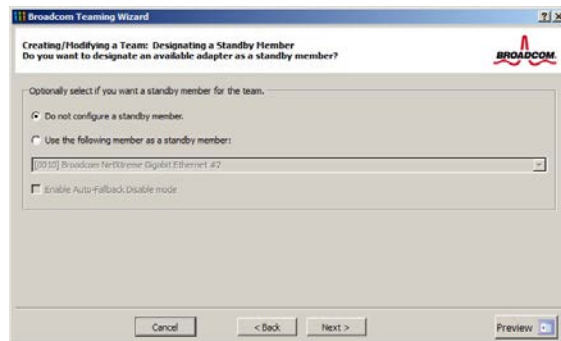
> **Note**
> If you check **Enable Auto-Fallback Disable mode**, when failover to the standby member occurs due to failure in the load balance member and then the load balance member recovers, failback to the load ba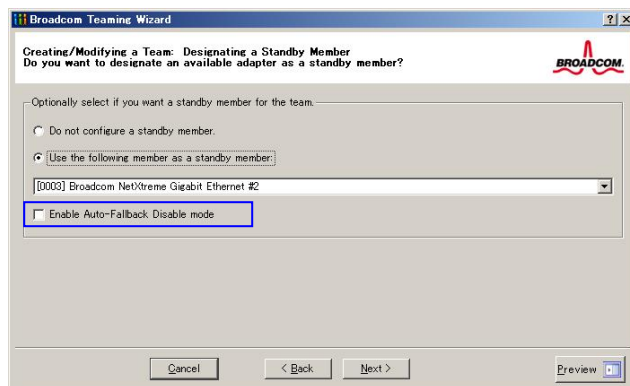lance member does not occur automatically. If you want failback to the load balance member to occur automatically, do not select the box.

> **Note**
> After you finish configuring teaming function, connect the two LAN devices to the same HUB if you use the LAN device redundancy function or the LAN device load balancing function. Connect the two LAN devices to the different HUBs if you use the switch redundancy function.

Table 2-1

Teaming type	Load balance member	Standby member	Network configuration
LAN device redundancy function	LAN1	LAN2	
LAN device load balancing function	LAN1 LAN2	-	
Switch redundancy function	LAN1	LAN2	
*This shows possible combinations.			

12. In the following dialog box, click **Next**.
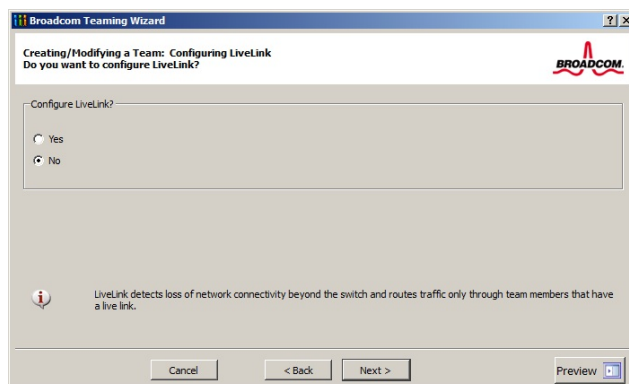
> **Note**: Do not select **Yes** for **Configure LiveLink**. The LiveLink function is not supported.

13. In the following dialog box, check **Skip Manage VLAN** and click **Next**. Then, click **Finish**.
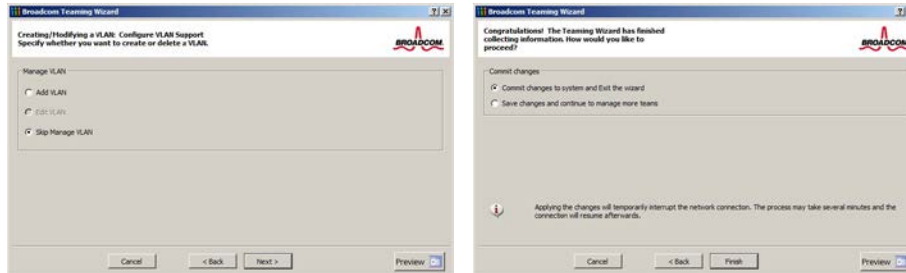
14. In the following message box, click **Yes**.
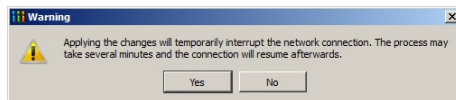
> **Note**: After you uninstalled BACS4, make sure you restart the system. If you reinstall BACS4 without restarting the system, when you click **Yes** at step 14, the following error message appears and a team cannot be created.
>
>
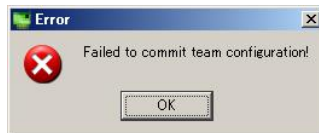
15. A new team is added as shown in the window below. (Team 1 in the window)

	When you create a new team, select two LAN devices. You can select a maximum of two LAN devices if you select from the LAN devices the system unit uses.

	Completing the setup may take time.

	BACS4 is designed to increase communication reliability with LAN device redundancy. However, depending on the operating environment (network configuration and application), communication recovery when failover or failback of the link occurs may take about ten seconds to a couple of minutes.

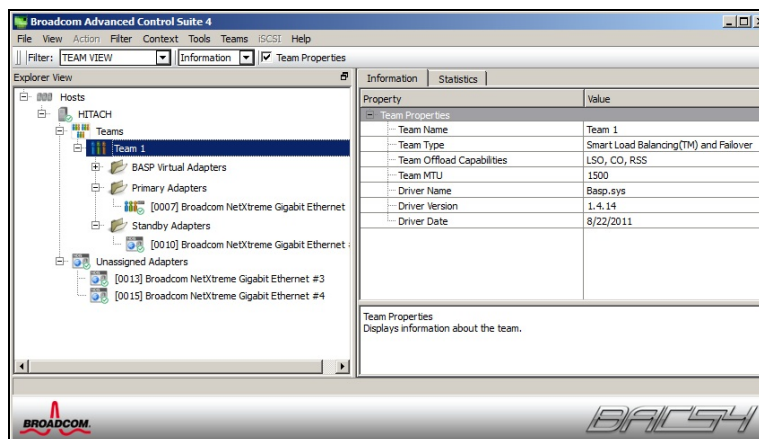|	Receive data is processed by one LAN device. That means the bandwidth for receive data does not increase. Teaming is designed to increase the effective throughput of LAN communication by load balancing processing. However, depending on the operating environment (CPU load, communication data, and so on), the performance may not be improved due to the overhead of load balancing processing itself.

	When teaming or VLAN tagging is set up, error events for the LAN driver or BACS4e recorded in the event log (system or application). The LAN device may be linked down. Select **ALL VIEW** for **Filter** just under the menu bar on the **Broadcom Advanced Control Suite 4** window. Select **Portxx** (xx can be any number) corresponding to the LAN device set as a member of the team. Confirm the value of **Link State** is **UP**.
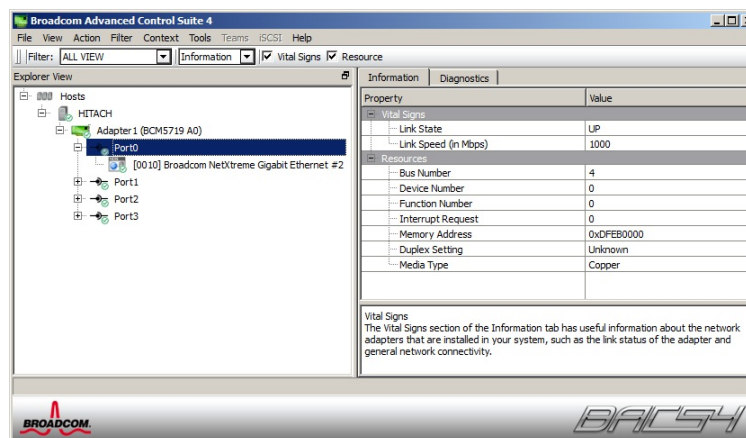
    Type:Error
    Event: 4191
    Source:TCP/IP
    Description:IP could not open the registry key for adapter
    TCPIP\Parameters\Adapters\NDISWANIP. Interfaces on this adapter
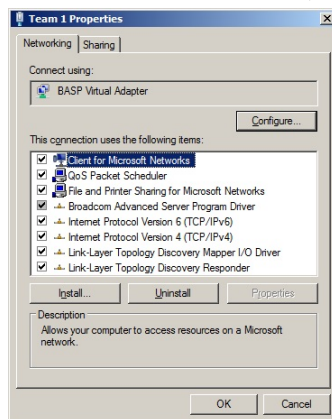   will not be initialized

	Error events regarding the LAN drivers for the LAN device that has set the team setting may be recorded in the event log (system or application) regularly when the system starts up. Select **ALL VIEW** for **Filter** just under the menu bar in the **Broadcom Advanced Control Suite 4** window. Select **Portxx** (xx can be any number) corresponding to the LAN device set as a member of the team. Confirm the value of **Link State** is **UP**.

	After you set up teaming, Click **Control Panel** > **Network and Internet** > **View network status and tasks**. The **Network and Sharing Center** window is displayed. Click **Change adapter settings**. In the **Network Connections** window, confirm a new **Local Area Connection** is added.

	In the **Network Connections** window, for each LAN device and for each team configured on the LAN extension functions, a **Local Area Connection** icon is displayed. For the IP address, the IP address value specified in **Local Area Connection** created for the team (not in the ones created for the LAN devices) is used. If you want to change the IP address, on **Properties** of **Local Area Connection**, select **Properties** of **Internet Protocol (TCP/IP)**.

Team 1 Properties

Networking | Sharing

Connect using:
BASP Virtual Adapter

Configure...

This connection uses the following items:
- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Broadcom Advanced Server Program Driver
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Install... | Uninstall | Properties

Description
Allows your computer to access resources on a Microsoft network.

OK | Cancel

	After you set up teaming on a network adapter, in some cases, the adapter may not be able to communicate normally. Go to the **Device Manager** and check the network adapter. If you see the "!" at the side of the network adapter, you can resolve the issue by restarting the OS.

	Immediately after you set up teaming, the team created on the **Network Connection** window may be displayed as two identical icons. Wait for a while and refresh the window. Then the issue will be resolved.

16. Confirm the IP address setting.
    The initial setting for the IP address is **Obtain an IP address automatically**. When you use a fixed IP address, you need to change the setting of the IP address. After you change the setting, confirm the network connection is OK.

17. Repeat steps 3 through 16 for each team you want to create.

18. Restart the OS. After you restart the OS, the LAN extension functions get effective. You can check the status of LAN devices configured as members of the team in the System log of the Event Viewer.


> **Note** When you replace some parts in the system unit for maintenance, delete the team settings before the replacement. When the OS starts, new hardware is automatically detected. After that, reconfigure the team settings of the LAN extension functions.


> **Note** If a different LAN device is used as a team member, the settings for the new LAN device may be adjusted to fit the device.
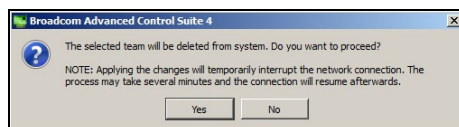

Deleting a team

1. Start Broadcom Advanced Control Suite4.
   Click **Broadcom Advanced Control Suite4** under **Control Panel**.
   The following window is displayed.
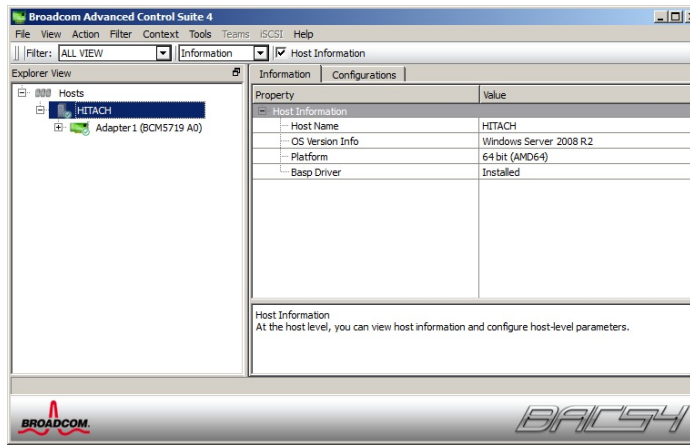
2. Select **TEAM VIEW** for **Filter** just under the menu bar. Right-click the team name and select **Delete Team**. (Team 1 in the window)
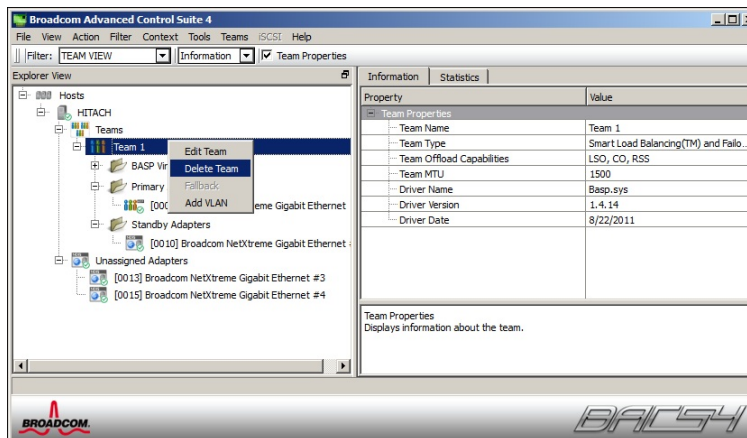
3. The following message box opens. Click **Yes**.

4. If you want to delete other teams, repeat steps 1 through 3.

5. <u>**Make sure you restart the OS.**</u>

Note	When you delete a team, error events for the LAN driver or the BACS4 be recorded in the event log (system or application). If error events are recorded, the LAN device may be linked down. Select **ALL VIEW** for **Filter** just under the menu bar on the **Broadcom Advanced Control Suite 4** window. Select **Portxx** (xx can be any number) corresponding to the LAN device set as a member of the team. Confirm the value of **Link State** is **UP**.

Type:Error

Event: 4191

Source:TCP/IP

Description:IP could not open the registry key for adapter

TCPIP\Parameters\Adapters\NDISWANIP. Interfaces on this adapter will not be initialized.

Setting up a tagged VLAN

> **Note** If you want to use VLAN tagging on the Hyper-V virtual network with teaming function, do not configure VLAN tagging for the team using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines.

> **Note** If you use VLAN tagging, disable the Checksum function. For information about how to set up, see page 2-29.

> **Note** If you add a tagged VLAN to a team, do not specify a fixed IPv6 address for the team before adding a tagged VLAN. Specify a fixed IPv6 address for the team after adding a tagged VLAN. If you specify a fixed IPv6 address for the team before adding a tagged VLAN, specify DHCP for the IPv6 address setting of the team temporarily to fix the issue.
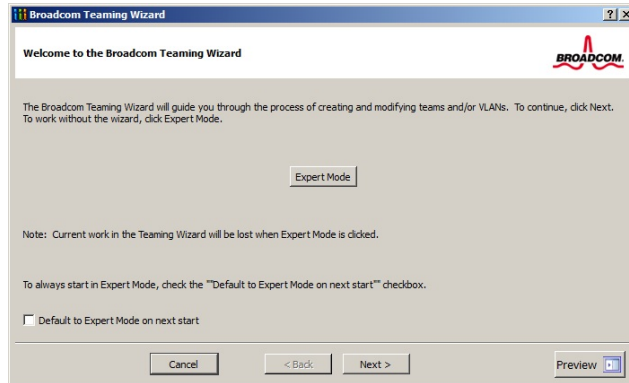
1. Start Broadcom Advanced Control Suite4. Click **Broadcom Advanced Control Suite4** under **Control Panel**. The following window is displayed.
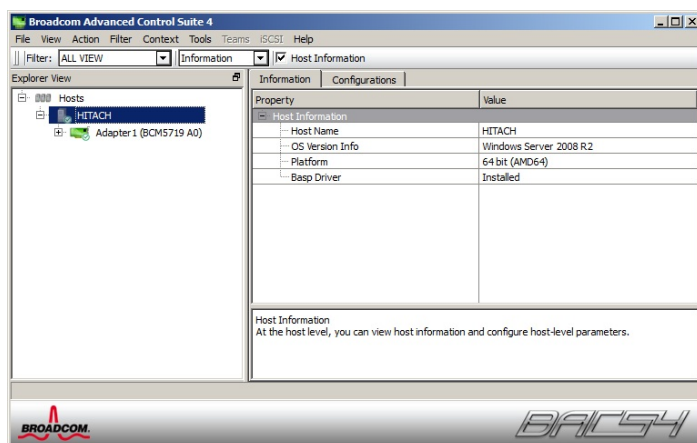
2. Select a LAN device you want to add a tagged VLAN to, right-click the LAN device, and select **Create a VLAN**.
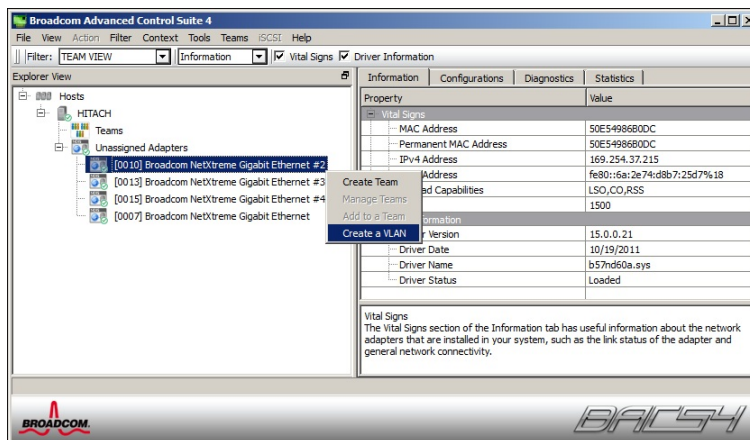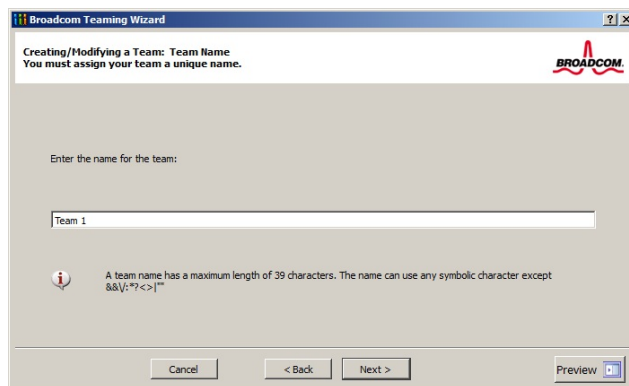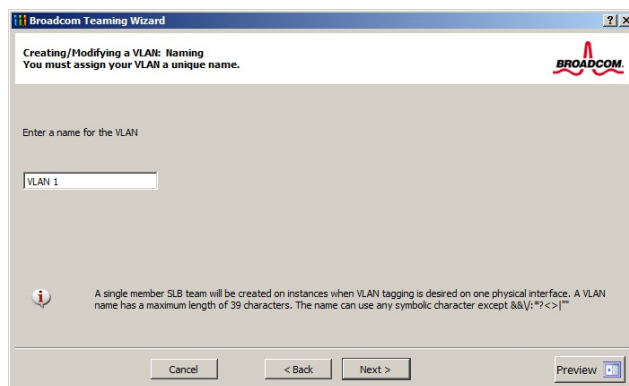
3. Click **Next**.

| Note | Expert Mode is not supported. |

4. Type the team name as shown in the window below and click **Next**. (Team 1 in the window)
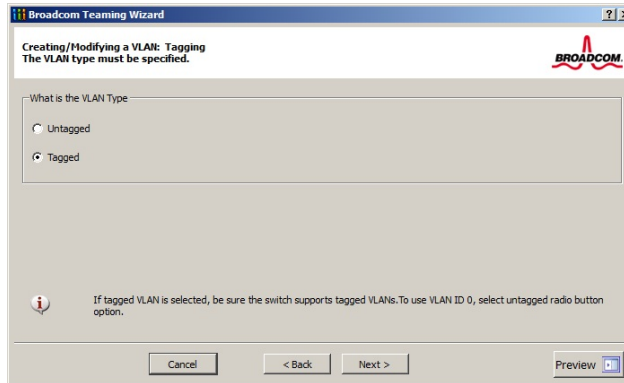

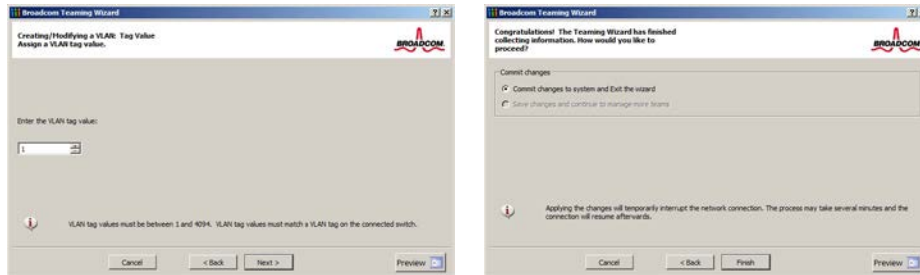| Tip | You can choose the team name arbitrarily. |

5. Type the VLAN name as shown in the window below and click **Next**. (VLAN1 in the window)

6. Check **Tagged** and click **Next**.

7. The dialog boxes for setting up the VLAN ID are displayed. Enter the VLAN ID and click **Next**.
Then click **Finish**.

> **Note** If you use VLAN tagging, connect to a switching HUB that supports IEEE802.1q VLAN tagging.

> **Note** You cannot change the VLAN ID or VLAN name for an already created VLAN. For information about how to change those settings, see Deleting a tagged VLAN on page 2-24.

8. In the following message box, click **Yes**.
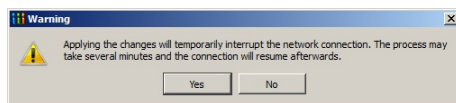
> **Note** The maximum number of tagged VLAN groups (IDs) you can use per system unit is 10. TCP/IP is the only supported protocol. If you create 11 or more groups or if you specify a protocol other than TCP/IP, the system unit may get unstable.

Tip

As in the window below, a new tagged VLAN team is added on the **Broadcom Advanced Control Suite 4** window.

Tip

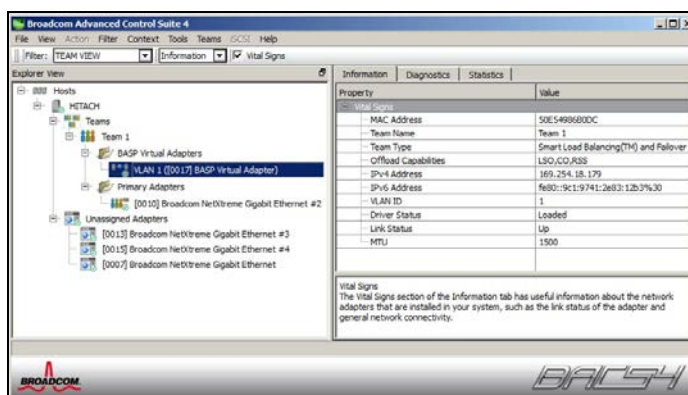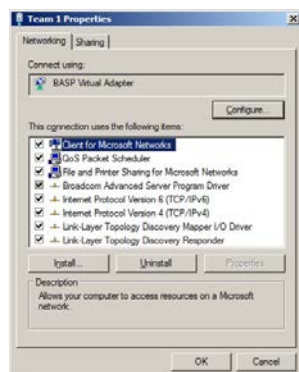After you set up a tagged VLAN, click **Control Panel** > **Network and Internet** > **View network status and tasks**. The **Network and Sharing Center** window is displayed. Click **Change adapter settings**. In the **Network Connections** window, confirm a new **Local Area Connection** is added.

Tip

In the **Network Connections** window, for each LAN device and for each team configured on the LAN extension functions, a **Local Area Connection** icon is displayed. For the IP address, the IP address value specified in **Local Area Connection** created for the team (not in the ones created for the LAN devices) is used. If you want to change the IP address, on **Properties** of **Local Area Connection**, select **Properties** of **Internet Protocol (TCP/IP)**.

Note

After you set up the tagged VLAN on a network adapter, in some cases, the adapter may not be able to communicate normally. Go to the **Device Manager** and check the network adapter. If you see the "!" at the side of the network adapter, you can resolve the issue by restarting the OS.

9. Confirm the IP address setting. The initial setting for the IP address is **Obtain an IP address automatically**. When you use a fixed IP address, you need to change the setting of the IP address. After you change the setting, confirm the network connection is OK.

10. When you add another VLAN, select **TEAM VIEW** for **Filter** just under the menu bar. Right-click the team name and select **Add VLAN**. Repeat steps 5 through 10.

11. Restart the OS. After you restart the OS, VLAN tagging gets effective. You can check the status of a LAN device with VLAN tagging in the System log of the Event Viewer.

Note When you create a tagged VLAN, error events for the LAN driver or BACS4 may be recorded in the event log (system or application). If error events are recorded, the LAN device may be linked down. Select **ALL VIEW** for **Filter** just under the menu bar in the **Broadcom Advanced Control Suite 4** window. Select **Portxx** (xx can be any number) corresponding to the LAN device set as a member of the team. Confirm the value of **Link State** is **UP**.

Level:Error

Event: 4191

Source:TCP/IP

Description:IP could not open the registry key for adapter

TCPIP\Parameters\Adapters\NDISWANIP. Interfaces on this adapter will not be initialized

---

Note If you create a tagged VLAN on a team, Blfm Warning ID:8 will be recorded in the event log.

Level: Warning
Event: 8
Source: Blfm
Description: Could not bind to adapter \DEVICE\{adapter name }.

Level: Information
Event: 9
Source: Blfm
Description: Successfully bind to adapter \DEVICE\{adapter name }.


Note When you replace some parts in the system unit for maintenance, delete the tagged VLAN settings before the replacement. When the OS starts, new hardware is automatically detected. After that, reconfigure the tagged VLAN settings.

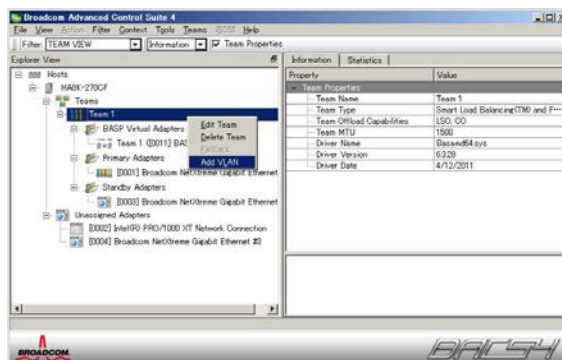Adding a tagged VLAN to an already existing team

(1) Start Broadcom Advanced Control Suite4. Click **Broadcom Advanced Control Suite4** under **Control Panel**. The following window is displayed.
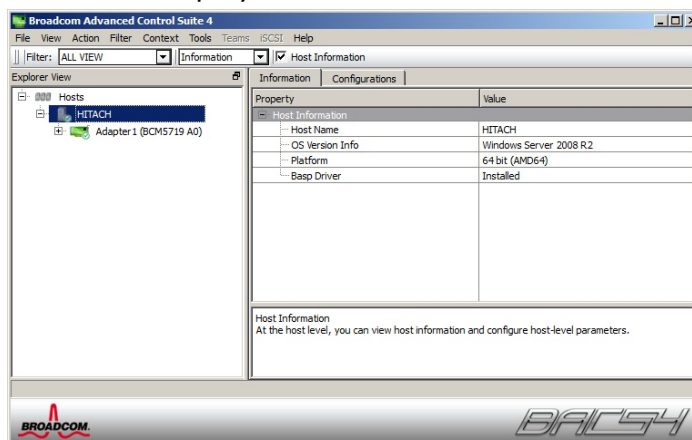
(2) Select **TEAM VIEW** for **Filter** just under the menu bar. Right-click the team name and select **Add VLAN**. (Team 1 in the window)

(3) Click **Next**.

(4) See the page 2-18 and follow steps 5 through 12.□

Deleting a tagged VLAN

1. Start Broadcom Advanced Control Suite4. Click **Broadcom Advanced Control Suite4** under **Control Panel**. The following window is displayed.

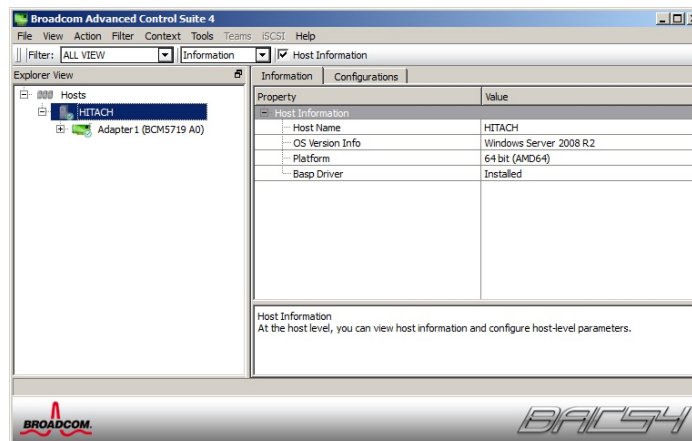2. Select **TEAM VIEW** for **Filter** just under the menu bar. Right-click the team name, and select **Delete Team**. (Team 1 in the window) Team 1 and all VLAN IDs assigned to Team 1 are deleted.
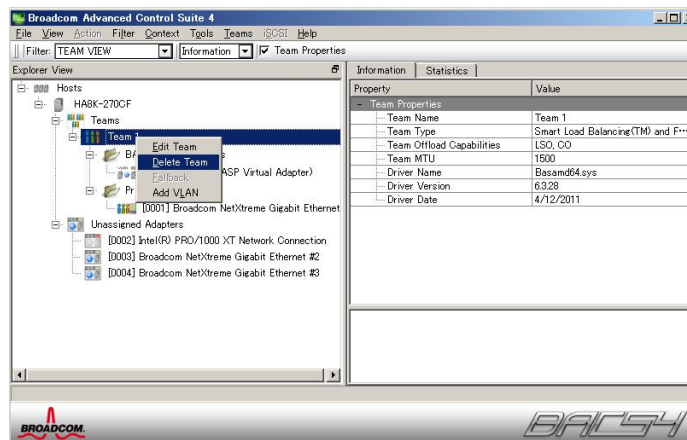

If you want to delete only some of the VLAN IDs assigned to a team, right-click the VLAN name and select **Remove VLAN**. (VLAN 1 in the window)
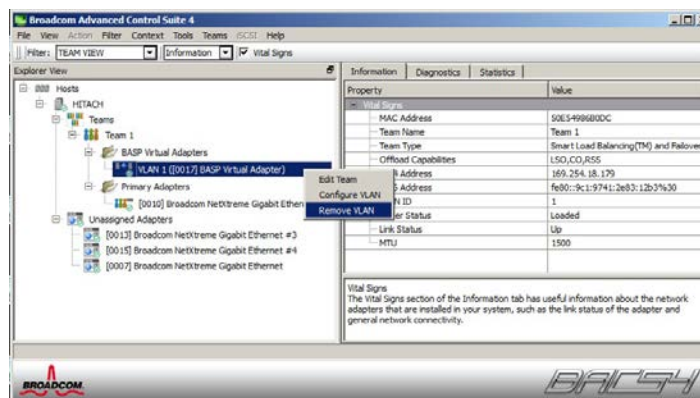
3. The following message box is displayed. Click **Yes**.

4. If you want to delete other tagged VLANs, repeat steps 1 through 3.

5. **Make sure you restart the OS**.

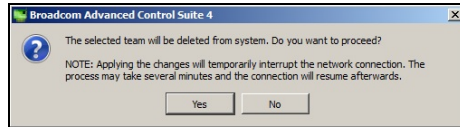| Note	When you delete a tagged VLAN, error events for the LAN driver or BACS4 may be recorded in the event log (system or application). If error events are recorded, the LAN device may be linked down. Select **ALL VIEW** for **Filter** just under the menu bar on the **Broadcom Advanced Control Suite 4** window. Select **Portxx** (xx can be any number) corresponding to the LAN device set as a member of the team. Confirm the value of **Link State** is **UP**.

Level:Error

Event: 4191

Source:TCP/IP

Description:IP could not open the registry key for adapter

TCPIP\Parameters\Adapters\NDISWANIP. Interfaces on this adapter will not be initialized

---

Status indicated in the event log (Source: Blfm)

You can check the operating status of the LAN extension functions in the OS event log. The following table is a list of events recorded for Source: Blfm.

Table 2-2

ID (Type)	Description	Meaning and corrective action
1 (Information)	Event logging enabled for Broadcom Advanced Server Program Driver.	Events are now recorded.
2 (Error)	Unable to register with NDIS.	The driver cannot register with the NDIS interface.
		Unload other NDIS drivers.
3 (Error)	Unable to instantiate the management interface.	The driver cannot create a device instance.
		Reboot the operating system.
4 (Error)	Unable to create symbolic link for the management interface.	Another driver has created a conflicting device name.
		Unload the conflicting device driver that uses the name Blf.
5 (Information)	Broadcom Advanced Server Program Driver has started.	The driver has started.
6 (Information)	Broadcom Advanced Server Program Driver has stopped.	The driver has stopped.
7 (Error)	Could not allocate memory for internal data structures.	The driver cannot allocate memory from the operating system.
		Close running applications to free memory.
8 (Warning)	Could not bind to adapter [Adapter Name].	The driver could not open one of the team physical adapters.
		Unload and reload the physical adapter driver, install an updated physical adapter driver, or replace the physical adapter.
9 (Information)	Successfully bind to adapter [Adapter Name].	The driver successfully opened the physical adapter.
10 (Warning)	Network adapter [Adapter Name] is disconnected.	The physical adapter is not connected to the network (it has not established link).
		Check that the network cable is connected, verify that the network cable is the right type, and verify that the link partner (switch or hub) is working correctly.
11 (Information)	Network adapter [Adapter Name] is connected.	The physical adapter is connected to the network (it has established link).
12 (Error)	Broadcom Advanced Program Features Driver is NOT designed to run on this	The driver does not support the operating system on which it is installed.

ID (Type)	Description	Meaning and corrective action
	version of Operating System.	Consult the driver release notes and install the driver on a supported operating system or update the driver.
14 (Information)	Network adapter [Adapter Name] does not support Advanced Failover.	The physical adapter does not support the Broadcom NIC Extension.
17 (Information)	Network adapter [Adapter Name] is activated and is participating in network traffic.	A physical adapter has been added to or activated in a team.
18 (Information)	Network adapter [Adapter Name] is de-activated and is no longer participating in network traffic.	The driver does not recognize the installed adapter.
19 (Information)	The LiveLink feature in BASP connected the link for network adapter [Adapter Name].	LiveLink function is enabled
20 (Information)	The LiveLink feature in BASP disconnected the link for network adapter [Adapter Name].	LiveLink function is disabled

Example of setting up a Hyper-V virtual network with SLB

Set up a Hyper-V virtual network with SLB so that the management OS does not share the Hyper-V virtual network with SLB. The following is an example of how to set up.

1. Click **Start** > **Administrative Tool** > **Hyper-V Manager** to start the Hyper-V Manager.

2. In the **Hyper-V Manager** window, click **Action** > **Virtual Network Manager**. The **Virtual Network Manager** dialog box opens.

3. In the **Virtual Network Manager** dialog box, select the Hyper-V virtual network with SLB. (Basp Virtual Adapter in the window)

4. Clear **Allow management operating system to share this network adapter**.
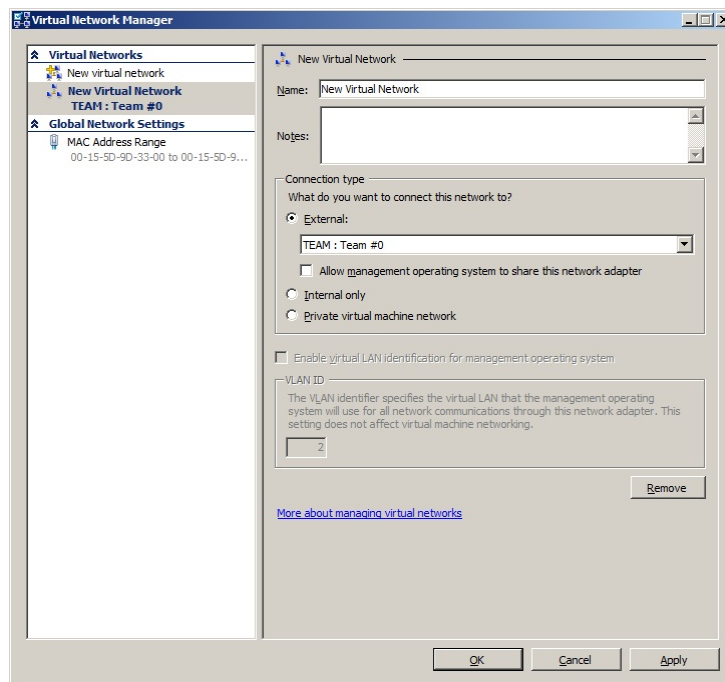
5. Click **OK**. The dialog box closes.

> **Note** For communication between the management OS and the external network, use other network adapters not allotting an SLB.

> **Note** If you want to use VLAN tagging on the Hyper-V virtual network with SLB, do not configure VLAN tagging using Broadcom Advanced Control Suite 4 (BACS4). Configure virtual LAN IDs only on Hyper-V virtual machines.

TCP Checksum Offload function(1Gbps only)

The LAN cards on the system unit can calculate the checksums for the TCP/IP protocol inside the LAN controllers. However, we recommend not using this function but using the OS standard function to calculate the TCP/IP checksums. If the OS is configured to calculate the checksums, integrity check of received packet data is performed at the last stage of the protocol processing by the OS, which means higher reliability is established.

Steps to set up for Windows 2008 R2

In **Control Panel**, double-click **Device Manager**. in the **Properties** dialog box for each LAN adapter under **Network Adapters**, click the **Advanced** tab. Configure each setting as shown in the following table.

Table 2-3   Settings

Setting item	Value
IPv4 Checksum Offload	Rx & Tx Enabled→Disable
TCP/UDP Checksum Offload (IPv4)	Rx & Tx Enabled→Disable
TCP/UDP Checksum Offload (IPv6)	Rx & Tx Enabled→Disable
Large Send Offload (IPv4)	Enable→Disable
Large Send Offload v2 (IPv4)	Enable→Disable
Large Send Offload v2 (IPv6)	Enable→Disable

After you configure all the items, click **OK** to restart the OS.

> **Note** If "IPv4 Checksum Offload" and "Large Send Offload (IPv4)" do not exist in "Advanced tab", ignore these items.

Steps to set up for Windows 2012 or Windows 2012 R2

In **Control Panel**, double-click **Device Manager**. in the **Properties** dialog box for each LAN adapter under **Network Adapters**, click the **Advanced** tab. Configure each setting as shown in the following table.

Table 2-6   Settings

Setting item	Value
TCP/UDP Checksum Offload (IPv4)	Rx & Tx Enabled→Disable
TCP/UDP Checksum Offload (IPv6)	Rx & Tx Enabled→Disable
Large Send Offload v2 (IPv4)	Enable→Disable
Large Send Offload v2 (IPv6)	Enable→Disable

After you configure all the items, click **OK** to restart the OS.

@Hitachi Data Systems

MK-90CRS012-03