

## 2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

### Product Guide (withdrawn product)

The IBM 2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter is the perfect example of IBM's goal to meet user requirements in the BladeCenter environment. In addition to the two onboard Ethernet ports, this card allows the client to add up to four (in IBM BladeCenter H chassis) or two (in BladeCenter S) extra 1 Gb ports, thereby allowing them to take advantage of the benefits of 6 or 4 ports per blade respectively.

Figure 1 shows the 2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter.

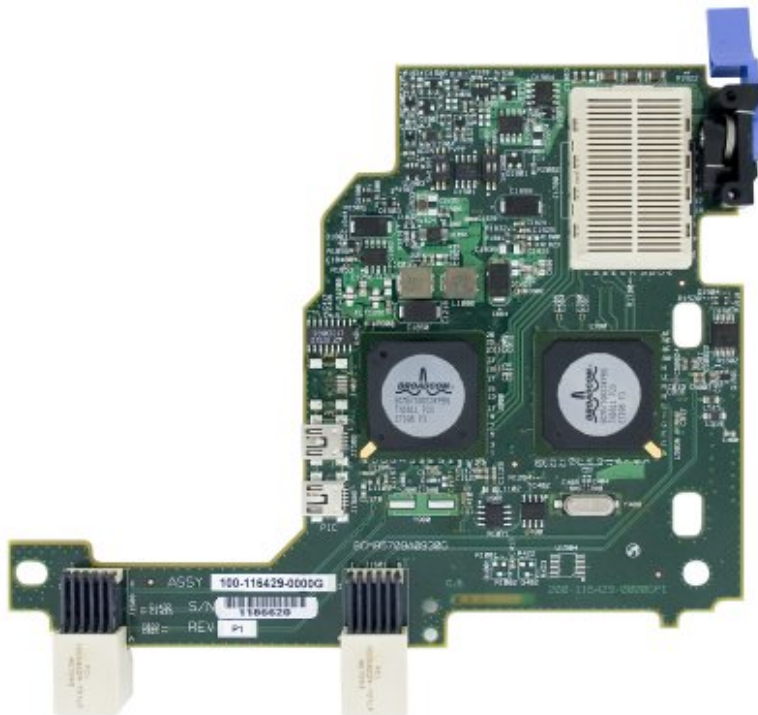


Figure 1. 2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

### Did you know?

The use of the 2/4 Port Ethernet Expansion Card enables Ethernet redundancy in the BladeCenter S chassis. Two Ethernet ports are already enabled through the onboard Ethernet controller of each blade server when routed to the Ethernet switch module in bay 1 of the chassis. With this card in each server, two additional ports are enabled and are routed through a second redundant Ethernet switch module in bay 2. This combination provides four Gigabit Ethernet ports while still enabling redundancy.

## Part number information

Table 1. Ordering part number and feature code

Description	Part number	Feature code
2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter	44W4479	5476

The part number includes the following items:

- One 2/4 Port Ethernet Expansion Card (CFFh)
- Installation and User's Guide
- Documentation CD

## Features

The expansion card has the following features and benefits:

- CFFh form factor; Can be combined with a CFFv or CIOv expansion card in the same server
- Based on the Broadcom 5709 module
- PCI Express x4 host interface for high-speed connection
- Connectivity to either standard or high-speed I/O modules bays (depends on chassis)
- Multiple connections from the blade server to the external network
- Ability to function as a 2-port Ethernet NIC in BC S chassis or a 4-port Ethernet NIC in a BC H chassis
- Supports BladeCenter Open Fabric Manager (BOFM)

Performance features:

- Supports TCP offload engine (TOE)
- TCP, IP checksum offload
- TCP segmentation offload
- PXE 2.0 remote boot support

## **Operating environment**

This is supported in the following environment:

- Temperature: 10 to 35 °C (50 to 95 °F)
- Relative humidity: 8% to 80% (non-condensing)

## Supported servers

The 2/4 Port Ethernet Expansion Card (CFFh) for is supported in the IBM BladeCenter servers listed in Table 2.

Table 2. Supported servers

		HS12	HS21	HS21 XM	HS22	LS21	LS22	LS41	LS42	JS12	JS21	JS22	JS23/JS43
2/4 Port Ethernet Expansion Card (CFFh)	44W4479	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N

Figure 2 shows where the CFFh card is installed in a BladeCenter server.

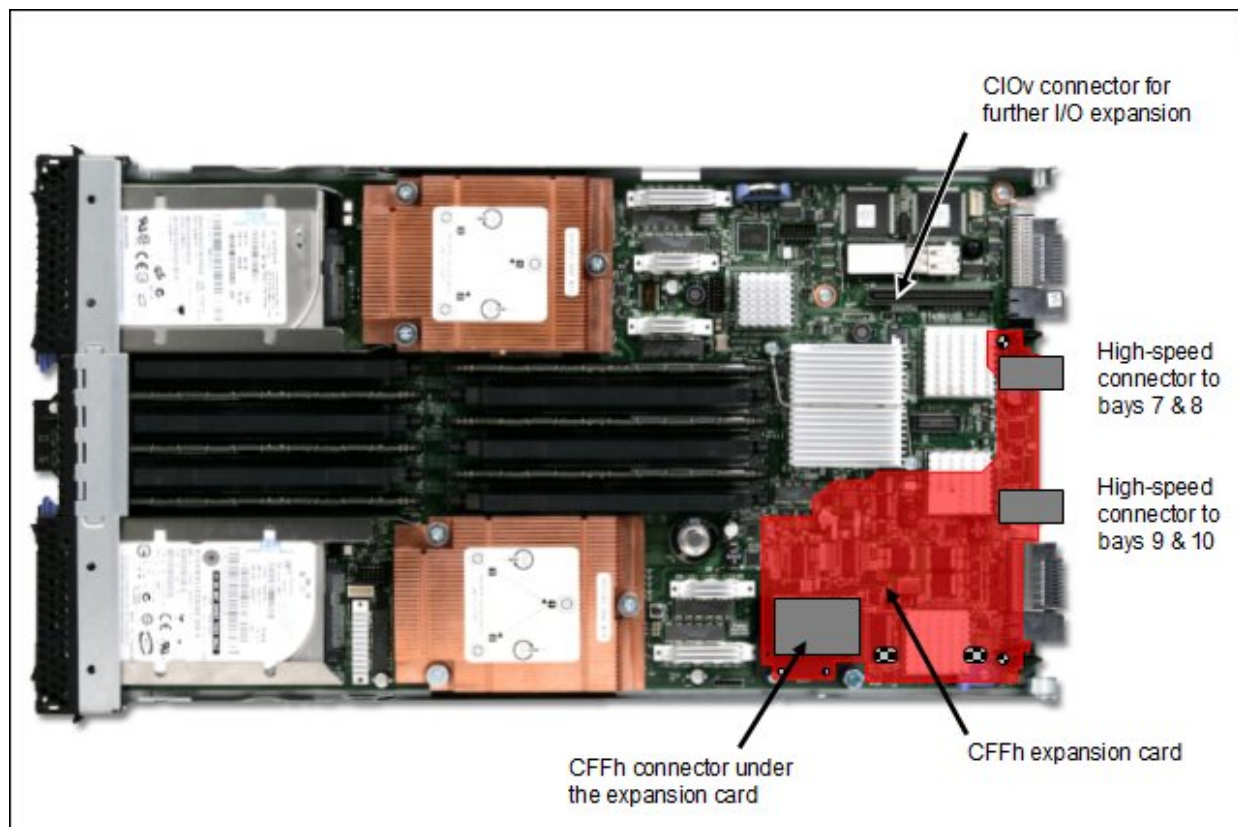


Figure 2. Location on the BladeCenter server planar where the CFFh card is installed

## Supported BladeCenter chassis and I/O modules

IBM BladeCenter chassis support is based on the blade server type in which the expansion card is installed. Consult ServerProven to see which chassis each blade server type is supported in:

<http://ibm.com/servers/eserver/serverproven/compat/us/>.

The 2/4 Port Ethernet Expansion Card (CFFh) is supported attached to blades installed in the BladeCenter

chassis as listed in Table 3.

Table 3. I/O modules supported with the Broadcom 10Gb 2-Port and 4-Port Ethernet Expansion Cards

		BladeCenter S	BladeCenter E	BladeCenter H	BladeCenter T	BladeCenter HT	MSIM	MSIM-HT
2/4 Port Ethernet Expansion Card (CFFh)	44W4479	Y	N	Y	N	Y	Y	Y

Details of this support is described in the following sections.

**BladeCenter H and BladeCenter HT compatibility**

When attached to a blade server that is installed in a BladeCenter H, the 2/4 Port Ethernet Expansion Card is used in conjunction with the Multi-Switch Interconnect Module (MSIM), and requires that supported Gigabit Ethernet Switch Modules be installed in the MSIM. In order for all four Ethernet ports to be used, two MSIMs and four Gigabit Ethernet Switch Modules are required. The same applies to the BladeCenter HT and the MSIM-HT.

Table 4 lists the standard format Ethernet Switch Modules and Pass-thru Modules that are supported in the MSIM and MSIM-HT in conjunction with the 2/4 Port Ethernet Expansion Card (CFFh). Both bays of the MSIM are supported.

Table 4. Standard I/O modules supported in the MSIM and MSIM-HT bays in conjunction with the 2/4 Port Ethernet Expansion Card (CFFh)

<b>Ethernet switch modules</b>	<b>Part number</b>	<b>Supported in MSIM</b>	<b>Supported in MSIM-HT</b>
Cisco Intelligent Gb Ethernet Switch Module	32R1892	Yes	Yes
Cisco Intelligent Gb Fiber Ethernet Switch Module	32R1888	Yes	No
Cisco Catalyst Switch Module 3110G	41Y8523	Yes	No
Cisco Catalyst Switch Module 3110X	41Y8522	Yes	No
Cisco Catalyst Switch Module 3012	43W4395	Yes	No
Server Connectivity Module	39Y9324	Yes	No
BNT Layer 2-7 Gb Ethernet Switch Module	32R1859	No	No
BNT Layer 2/3 Copper Gb Ethernet Switch Module	32R1860	Yes	Yes
BNT Layer 2/3 Fiber Gb Ethernet Switch Module	32R1861	Yes	No
BNT 10Gb Uplink Ethernet Switch Module	32R1783	Yes	No
BNT 1/10 Gb Uplink Ethernet Switch Module	44W4404	Yes	Yes
Optical Pass-thru Module	39Y9316	Yes	No
Copper Pass-thru Module	39Y9320	Yes	No
Intelligent Copper Pass-thru Module	44W4483	Yes	No

Table 5 lists the High Speed Switch Modules that support connectivity to the 2/4 Port Ethernet Expansion Card (CFFh) in the BladeCenter H. All four ports of the expansion card are available for use when four supported switch modules are installed in the BladeCenter H chassis.

Table 5. High Speed Switch Modules supported with the 2/4 Port Ethernet Expansion Card (CFFh)

<b>I/O module</b>	<b>Part number</b>	<b>Supported</b>
BNT Virtual Fabric 10Gb Switch Module	46C7191	Yes
10Gb Ethernet Pass-Thru Module	46M6181	No
BNT 6-port 10Gb Ethernet Switch Module	39Y9267	No
Cisco Nexus 4001I Switch Module	46M6071	Yes

In BladeCenter H, the ports of CFFh cards are routed through the midplane to I/O bays 7, 8, 9, and 10, as shown in Figure 3. The BladeCenter HT is similar in that the CFFh cards are also routed through the midplane to I/O bays 7, 8, 9, and 10.

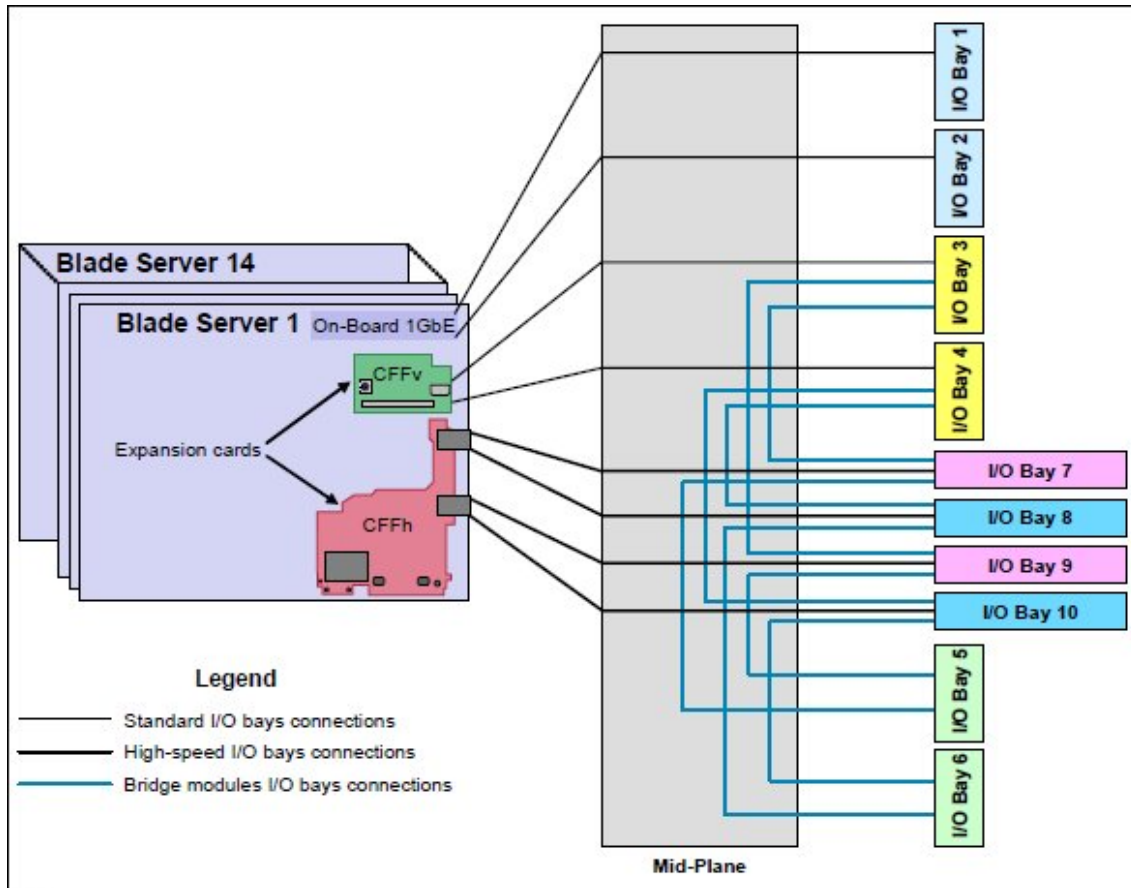


Figure 3. IBM BladeCenter H I/O topology showing the I/O paths from CFFh expansion cards

### BladeCenter S compatibility

When attached to a blade server that is installed in a BladeCenter S chassis, only two ports are used and both of these two ports are routed to bay 2. A supported Gigabit Ethernet Switch Module will need to be installed in bay 2 of the BladeCenter S chassis.

Table 6 lists the Ethernet Switch Modules and Pass-thru Modules that are supported in bay 2 of the BladeCenter S chassis to be used in conjunction with the 2/4 Port Ethernet Expansion Card (CFFh).

Table 6. I/O modules supported in bay 2 of the BladeCenter S chassis in conjunction with the 2/4 Port Ethernet Expansion Card (CFFh)

<b>Ethernet switch modules</b>	<b>Part number</b>	<b>Bay 2 of BC-S</b>
Cisco Intelligent Gb Ethernet Switch Module	32R1892	No
Cisco Intelligent Gb Fiber Ethernet Switch Module	32R1888	No
Cisco Catalyst Switch Module 3110G	41Y8523	No
Cisco Catalyst Switch Module 3110X	41Y8522	No
Cisco Catalyst Switch Module 3012	43W4395	Yes
Server Connectivity Module	39Y9324	Yes
BNT Layer 2-7 Gb Ethernet Switch Module	32R1859	Yes
BNT Layer 2/3 Copper Gb Ethernet Switch Module	32R1860	Yes
BNT Layer 2/3 Fiber Gb Ethernet Switch Module	32R1861	Yes
BNT 10Gb Uplink Ethernet Switch Module	32R1783	Yes
BNT 1/10 Gb Uplink Ethernet Switch Module	44W4404	Yes
Optical Pass-thru Module	39Y9316	Yes
Copper Pass-thru Module	39Y9320	Yes
Intelligent Copper Pass-thru Module	44W4483	Yes



In BladeCenter S, only two ports are used on the card and both of these two ports are routed to bay 2 as shown in Figure 4.

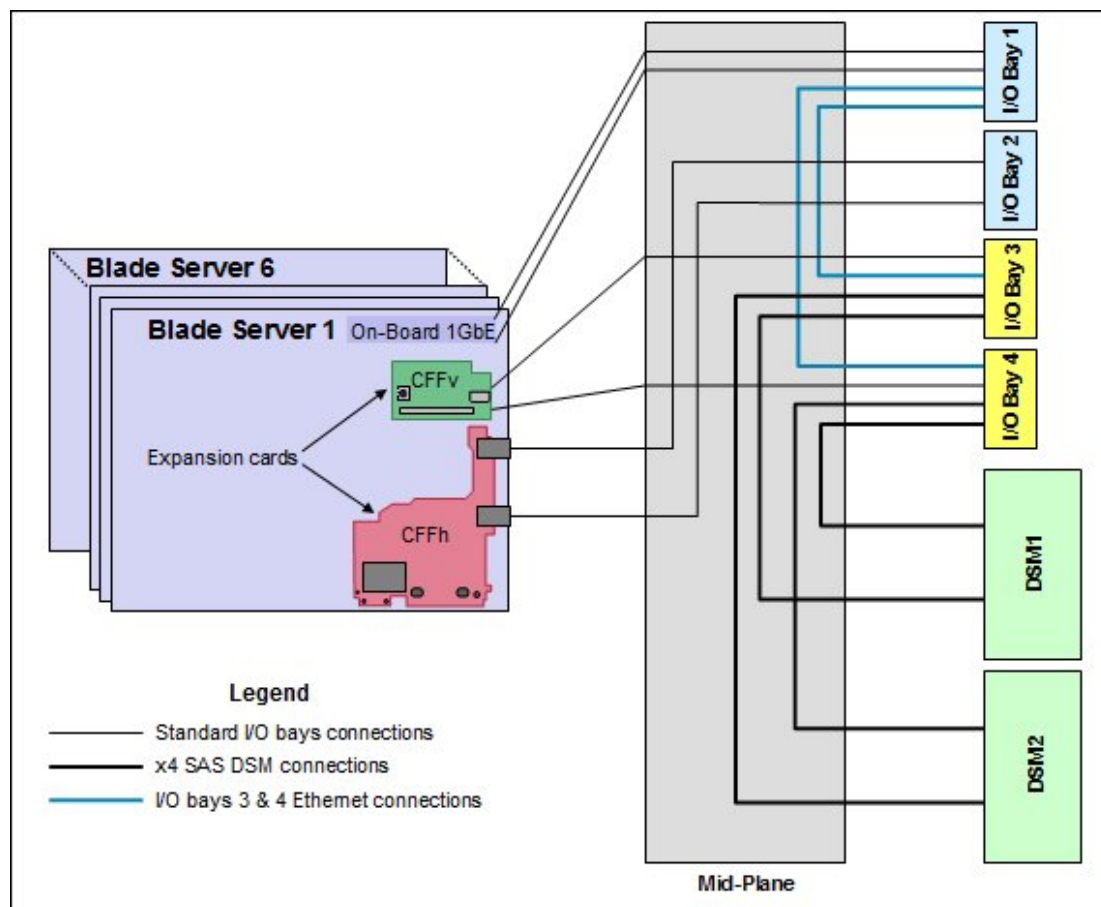


Figure 4. IBM BladeCenter S I/O topology showing the I/O paths from CFFh expansion cards

## Popular configurations

This section shows two configurations that use the 2/4 Port Ethernet Expansion Card (CFFh).

### BladeCenter H configuration

The 2/4 Port Ethernet Expansion Card (CFFh) and the BladeCenter H chassis makes it possible to supply eight Gigabit Ethernet ports to every BladeCenter server. Figure 5 shows the eight Ethernet switch modules, four of which are connected to the 2/4 Port Ethernet Expansion Card (CFFh). The other four connections are via the onboard Ethernet controller and the CIOv or CFFv expansion card. All connections between the cards and the switch modules are internal to the chassis. No extra cabling is needed.

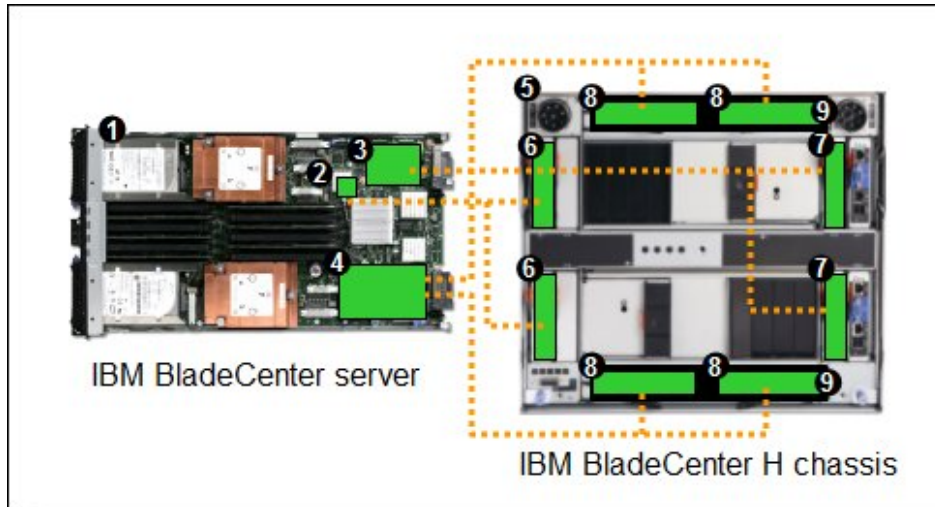


Figure 5. Eight Ethernet connections to each blade in the BladeCenter H chassis

Table 7 lists the components that are used in the eight Ethernet ports per server configuration shown in Figure 5.

Table 7. Components used in the eight ports per server configuration

Diagram reference	Part number / machine type	Description	Quantity
1	Varies	IBM BladeCenter HS22 or other server that supports CFFh cards	1 to 14
2	None	Ethernet controller on the system board of the server	1 per server
3	Varies	Ethernet CFFv or CIOv expansion card	1 per server
4	44W4479	2/4 Port Ethernet Expansion Card (CFFh)	1 per server
5	8852	BladeCenter H chassis	1
6	Varies	Support Ethernet Switch Modules routing signals from the integrated controller 2 (see Table 4)	2
7	Varies	Supported Ethernet Switch Modules routing signals from the CFFv or CIOv card 3 (see Table 4)	2
8	Varies	Supported Ethernet Switch Modules routing signals from the CFFh card 4 (see Table 4)	4
9	39Y9314	Multi-Switch Interconnect Module	2

## BladeCenter S configuration

Figure 6 shows a configuration using the 2/4 Port Ethernet Expansion Card (CFFh) in a BladeCenter S configuration. This solution enables a total of four Gigabit Ethernet connections from each blade server, two routed through the Ethernet switch module in bay 2 of the BladeCenter S chassis. The other two connections are via the onboard Ethernet controller.

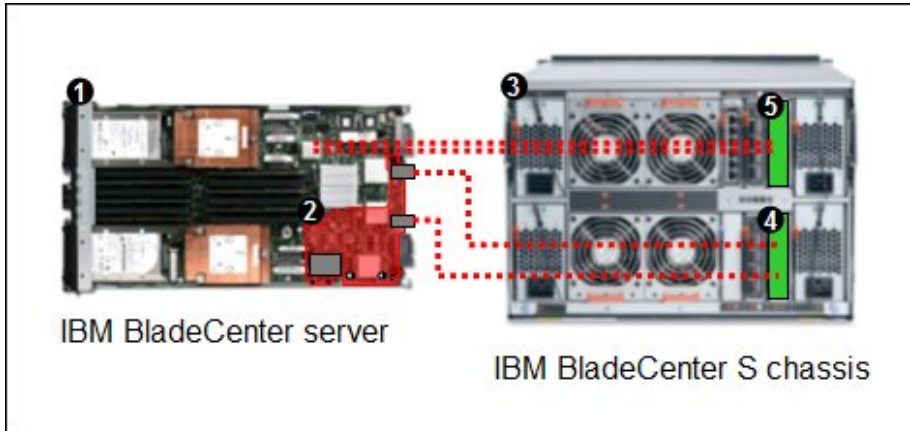


Figure 6. Four Ethernet connections to each blade in the BladeCenter S chassis

The components used in this configuration are listed in Table 8.

Table 8. Components used when connecting Broadcom 4-port 10Gb Ethernet Expansion Card (CFFh) to four BNT 10Gb High Speed Switch Modules

Diagram reference	Part number/ machine type	Description	Quantity
1	Varies	IBM BladeCenter HS22 or other supported server	1 to 14
2	44W4479	2/4 Port Ethernet Expansion Card (CFFh)	1 per server
3	8886	BladeCenter S	1
4	Varies	Supported Ethernet switch module to connect to the 2/4 Port Ethernet Expansion Card (CFFh) (See Table 5)	1
5	Varies	Supported Ethernet switch module to connect to the onboard Ethernet controller (See Table 5)	1

## Operating system support

The 2/4 Port Ethernet Expansion Card (CFFh) supports the following operating systems:

- Microsoft Windows Server 2003, Web Edition
- Microsoft Windows Server 2003/2003 R2, Datacenter x64 Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise x64 Edition
- Microsoft Windows Server 2003/2003 R2, Standard Edition
- Microsoft Windows Server 2003/2003 R2, Standard x64 Edition
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- NetWare 6.5
- Red Hat Enterprise Linux 4 AS for AMD64/EM64T
- Red Hat Enterprise Linux 4 AS for iSeries and pSeries
- Red Hat Enterprise Linux 4 AS for x86
- Red Hat Enterprise Linux 4 ES for AMD64/EM64T
- Red Hat Enterprise Linux 4 ES for x86
- Red Hat Enterprise Linux 4 WS/HPC for AMD64/EM64T
- Red Hat Enterprise Linux 4 WS/HPC for x86
- Red Hat Enterprise Linux 5 for System i and System p
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server Edition with Xen
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise MRG 1.0 Realtime (x64)
- SUSE LINUX Enterprise Real Time 10 AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for IBM POWER
- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 with Xen for x86
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 9 for AMD64/EM64T
- SUSE LINUX Enterprise Server 9 for x86
- VMware ESX 3.5
- VMware ESX 4.0
- VMware ESX Server 3.0
- VMware ESXi 4.0

Support for operating systems is based on the combination of the expansion card and the blade server in which it is installed. See IBM ServerProven for the latest information about the specific versions and service packs supported: <http://ibm.com/servers/eserver/serverproven/compat/us/>. Select the blade server, and then select the expansion card to see the supported operating systems.

## Related publications

For more information refer to the following documents:

- *2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter Installation and User's Guide*  
<http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5082171>
- IBM U.S. Announcement Letter for the 2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter  
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS108-601>
- IBM BladeCenter Interoperability Guide  
<http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5073016>
- IBM Redbooks publication *IBM BladeCenter Products and Technology*, SG24-7523  
<http://www.redbooks.ibm.com/abstracts/sg247523.html>

## Related product families

Product families related to this document are the following:

- [Blade Network Adapters](#)

## Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.  
1009 Think Place - Building One  
Morrisville, NC 27560  
U.S.A.  
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

**© Copyright Lenovo 2019. All rights reserved.**

This document, TIPS0698, was created or updated on October 23, 2009.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at: <http://lenovopress.com/TIPS0698>
- Send your comments in an e-mail to: [comments@lenovopress.com](mailto:comments@lenovopress.com)

This document is available online at <http://lenovopress.com/TIPS0698>.

## Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

BNT®

BladeCenter Open Fabric

BladeCenter®

Lenovo®

ServerProven®

The following terms are trademarks of other companies:

Linux® is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft®, Windows Server®, and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.