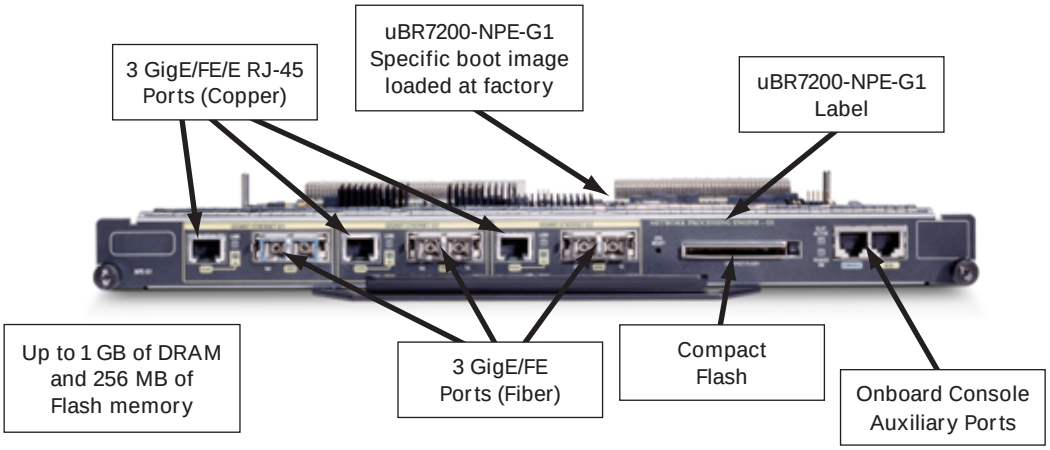
Q & A

Cisco uBR7200-NPE-GI Network Processing Engine for the Cisco uBR7246VXR Universal Broadband Router

Q. What is the Cisco uBR7200-NPE-G1 Network Processing Engine?

A. The Network Processing Engine (NPE) is the primary routing engine of the Cisco uBR7200 Series Universal Broadband Router. The Cisco uBR7200-NPE-G1 is the latest NPE for the Cisco uBR7246VXR. The Cisco uBR7200-NPE-G1 is the highest-performance processor in the family of NPEs for the Cisco uBR7200 Series.

Figure 1
Cisco uBR7200-NPE-G1 for the Cisco uBR7246VXR



Q. How is the Cisco uBR7200-NPE-G1 for the Cisco uBR7246VXR different from the Cisco NPE-G1 for the Cisco 7200VXR?

A. Here are the unique attributes of the Cisco uBR7200-NPE-G1 for the Cisco uBR7246VXR:

a) Ordering code and front carrier label:

- Option: Cisco uBR7200-NPE-G1 (instead of Cisco NPE-G1)
- Spare: Cisco uBR7200-NPE-G1= (instead of Cisco NPE-G1=)

b) Front carrier label:

- Cisco uBR7200-NPE-G1 (instead of Cisco NPE-G1)
- CLEI code, EEPROM contents

c) Ships with:

- Cisco uBR7200-NPE-G1 specific Boot image [ubr7200-kboot-mz.122-xx.CX.bin (where xx = Cisco IOS® Software Release 12.2CX)]
- Blank panel for covering unused I/O controller slot

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– Shielded RJ-45 Ethernet cables for Class B compliance

d) Additional option: Cable Management Bracket designed to support cabling (fiber or copper) for different types of onboard ports including GBIC, RJ-45, console, and auxiliary

e) Cisco Universal Broadband Router (uBR)-specific Power Up program credits in the CTMP trade-in tool

Q. What is a Cable Management Bracket option for the Cisco uBR7200-NPE-G1? What is its ordering product ID?

A. The Cable Management Bracket for the Cisco uBR7200-NPE-G1 is designed to support cabling (fiber or copper) for different types of onboard ports, including GBIC, RJ-45, console, and auxiliary. It is orderable as an "option" for the Cisco uBR7200-NPE-G1 and Cisco uBR7200-NPE-G1=. Its ordering product ID is MAS-7200-CBLMGMT. Currently, it is not orderable as "spare". The following pictures illustrate installation steps for this Cable Management Bracket:

Figure 2a
Installing the Cable Management Bracket on the Cisco uBR7200-NPE-G1

Figure 2b
Managing Fiber and Copper Cables with the Cable Management Bracket Mounted on the Cisco uBR7200-NPE-G1

Q. What are the Network Processing Engine options that can be purchased for the Cisco uBR7200 Series?

Product Number	Product Description
Cisco uBR7200-NPE-G1	Cisco uBR7200-NPE-G1 including default 256 MB DRAM and default 64 MB Flash memory; supported on the Cisco uBR7246VX
Cisco NPE-400	Cisco NPE-400 including default 128 MB DRAM; supported on the Cisco uBR7246VXR
Cisco NPE-225	Cisco NPE-225 including default 128 MB DRAM; supported on both the Cisco uBR7246VXR and the Cisco uBR7223

Q. What are the advantages of the Cisco uBR7200-NPE-G1?

A. In addition to increasing performance, the Cisco uBR7200-NPE-G1 offers 3 built-in 10/100/1000Mbps Ethernet ports for LAN/WAN connectivity. These ports include support for 1000/100/10 MBits/sec over copper or 1000 MBits/sec over industry standard GBIC.

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Q. What are the part numbers for the Cisco uBR7200-NPE-G1?

Product Number	Product Description
Cisco uBR7200-NPE-G1	Cisco uBR7200-NPE-G1 including default 256MB DRAM and default 64 MB Flash memory
Cisco uBR7200-NPE-G1=	Cisco uBR7200-NPE-G1 including default 256MB DRAM and default 64 MB Flash memory - Spare

Q. What is the approximate performance of the Cisco uBR7200-NPE-G1?

A. The Cisco uBR7200-NPE-G1 provides up to 2x performance improvement[1] over the Cisco NPE-400 in the Cisco uBR7246VXR.

Q. What is the net cost saving of the Cisco uBR7200-NPE-G1 for customers utilizing on-board GigE for backhaul?

A. The following example illustrates that the Cisco uBR7200-NPE-G1 delivers better price/performance than the Cisco NPE-400 for the Cisco uBR7246VXR with GigE backhaul. All prices are list prices in USD.

	Current Config. with NPE-400	New Config. with uBR7200-NPE-G1
NPE	$7,500	$15,000
PA-GE	$6,000	Not Required
uBR7200-I/O-2FE/E	$3,400	Not Required
Total List Price	$16,900	$15,000
Less Sales Discount	50%	50%
Total ASP	$8,450	$7,500
Net Savings with uBR7200-NPE-GI		**$950**
Plus Performance Improved		Up to 2x

Q. Is there a Cisco Technology Migration Program (CTMP) for the Cisco uBR7200-NPE-G1?

a) Yes; trade-in transactions are handled through the CTMP tool. CTMP for Cisco uBR7246VXR customers

– Cisco NPE-400/300/225 + I/O controller — Cisco uBR7200-NPE-G1= + MEM-NPE-G1-512MB migration

b) Part II: CTMP for Cisco uBR7246 (non-VXR) customers

– Cisco uBR7246 + NPE-225/200/150 + I/O controller — Cisco uBR7246VXR-NPE-G1= (includes Cisco uBR7246VXR chassis + Cisco uBR7200-NPE-G1) + MEM-NPE-G1-512MB migration

Customers must purchase the 512 MB memory option (i.e. MEM-NPE-G1-512 MB) to qualify for the program credit. Also, the disclaimer below applies:

Cisco Disclaimer: All products are subject to availability. All prices, CTMP* or credits and their effective period are subject to change without notice. Cisco reserves the right to add, change, or discontinue any product, and credit from its price list and CTMP respectively.

Q. Does the Cisco uBR7200-NPE-G1 include PXF acceleration for IP services?

A. No; the Cisco uBR7200 Series does not support the Network Services Engine-1 (NSE-1) option.

Q. Which Cisco uBR7200 Series chassis is the Cisco uBR7200-NPE-G1 compatible with?

A. The Cisco uBR7200-NPE-G1 is only supported on the Cisco uBR7246VXR.

Q. What Cisco I/O controllers are compatible with the Cisco uBR7200-NPE-G1?

- Cisco uBR7200-I/O

1. Actual performance improvement varies depending on such factors as traffic and usage patterns, number of subscribers, and the features turned on.

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- Cisco uBR7200-I/O-FE
- Cisco uBR7200-I/O-2FE/E

Although all of the above I/O controllers are supported on the Cisco uBR7246VXR with a Cisco uBR7200-NPE-G1, they are optional. If they are present, the Cisco I/O controller functions for console and auxiliary ports will be active and the corresponding connections on the Cisco uBR7200-NPE-G1 will be deactivated. If a Cisco I/O controller is not present, all connections are active on the Cisco uBR7200-NPE-G1. The PCMCIA slots and any LAN/WAN interfaces present on a Cisco I/O controller will always be available in addition to the Compact Flash slot on the Cisco uBR7200-NPE-G1.

It is important to remember that the Cisco I/O controller is entirely optional in a Cisco uBR7200-NPE-G1 enabled system. Customers upgrading to a new Cisco uBR7200-NPE-G1 in an existing chassis will have the option of retaining the functionality of their existing Cisco I/O controller, while new chassis purchases will be available without a Cisco I/O controller to reduce cost or with a Cisco I/O controller at the customer's discretion. If a system is purchased without a Cisco I/O controller, it will be shipped with a blank I/O controller slot cover. The Cisco uBR7200-NPE-G1 will still occupy the NPE slot on the rear of the chassis with all of its connections being on the rear (the same side as the power supplies).

Q. Do I need a Cisco I/O controller when using a Cisco uBR7246VXR with a Cisco uBR7200-NPE-G1?

A. No; an I/O controller is optional.

Q. What IOS Software versions support the Cisco uBR7200-NPE-G1?

A. The Cisco uBR7200-NPE-G1 will be supported at release in Cisco IOS Software Release 12.2(11)CX.

Q. What are the memory options for the Cisco uBR7200-NPE-G1?

A. The Cisco uBR7200-NPE-G1 ships with a default of 256 MB of system SDRAM. This can be expanded to either 512 MB or 1 GB. Memory upgrades can be configured to ship on a new Cisco uBR7200-NPE-G1 or they can be ordered as a field-upgradeable spare.

Q. What type of memory does the Cisco uBR7200-NPE-G1 use?

A. The Cisco uBR7200-NPE-G1 introduces the use of double data rate memory to the Cisco uBR7246VXR. DDR memory devices can typically transfer information at twice the rate of conventional DRAM memory modules. That is because DDR memory can transfer data at both the leading and trailing edge of the system clock cycle, while conventional memory only functions at one edge of the clock signal.

The DDR memory used in the Cisco uBR7200-NPE-G1 also includes Error Correcting Code (ECC) support. ECC memory increases the robustness of memory devices by including an extra bit for every byte of memory. This extra bit can be used to detect and possibly correct errors that can occur in the memory device. These errors can be caused by such external factors as external radiation causing a bit in memory to become unstable and report an incorrect value (a 0 becomes a 1 for example). ECC memory can detect these bit flips and report them to the system. If only a single bit is affected, ECC can correct these errors on the fly and report that a correction has occurred. If multiple bits are affected in the same byte of memory, ECC memory can report these errors, but cannot correct them.

Q. How much Boot flash is available on the Cisco uBR7200-NPE-G1?

A. The Cisco uBR7200-NPE-G1 includes 16 megabytes of on-board Boot flash media. This increase in available internal media means that Boot flash can now hold a functional system image instead of just a Boot image. However, we recommend against this because this does not leave enough space for *crashinfo* files. External flash media such as PCMCIA or compact flash cards can hold multiple Cisco IOS images and any image can still be booted through the use of the Boot system command.

As with other Network Processing Engines, boot flash is not upgradeable. The Cisco IOS Boothelper image is *ubr7200-kboot-mz.122-xx.CX.bin (where xx = Cisco IOS Release 12.2CX)*. This should be installed on the *bootflash: device*. The complete Cisco IOS Software image should be installed on the *compact flash device, disk2:*

Q. What are I/O Boothelper image differences between the Cisco uBR7200-NPE-G1 and its predecessor NPEs?

A. Here are the summary of differences between the I/O Boothelper image for the Cisco uBR7200-NPE-G1 and its predecessor NPEs:

a) I/O Boothelper image for the Cisco uBR7200-NPE-G1:

- ubr7200-kboot-mz.122-xx.CX.bin (where xx = Cisco IOS Release 12.2CX)
- Mandatory Boot image for the Cisco uBR7200-NPE-G1
- Loads on-board Cisco uBR7200-NPE-G1 Flash

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– Network Boot support all port adapters that are traditionally supported in Boot images. This does not include network Boot support for the Cisco uBR-MCxx line cards, which have never been supported in Boot images.

b) I/O Boothelper image for predecessor NPEs to the Cisco uBR7200-NPE-G1:

– ubr7200-boot-mz.122-yy.BC.bin (where yy = Cisco IOS Release 12.2BC)
– Boot image for predecessor NPEs to the Cisco uBR7200-NPE-G1
– Loads on I/O controller card limited to 4 MB of Flash
– Besides the restrictions of the "kboot" image, this image does not support network Boot of the following port adapters: 4T, CT1, CE1, M4T, M8T, HSSI, DSX1, CT3, ME1, JT2, E3T3, E1T1, ATM 4T1, ATM 4E1, Voice, Ch-STM-1. Essentially, this boils down to no serial port adapters, no voice, and limited ATM support.

Q. How much NVRAM is available on the Cisco uBR7200-NPE-G1?

A. The NVRAM on the Cisco uBR7200-NPE-G1 has been increased to 512 Kbytes. This increase in NVRAM means that larger configuration files can be saved on the Cisco uBR7200-NPE-G1. The increase in NVRAM is due to frequent requests from service provider customers who often run extremely large configuration files. The NVRAM is physically located on the Cisco uBR7200-NPE-G1, not on the Cisco I/O controller as with other NPEs. Router configuration follows the Cisco uBR7200-NPE-G1 if you move it to another chassis. If you are upgrading from an older NPE, save your current configuration to a Flash disk first. You will not be able to access the old one once the Cisco uBR7200-NPE-G1 is installed.

Q. What Flash options are available with the Cisco uBR7200-NPE-G1?

A. A Cisco uBR7246VXR has two basic types of Flash media: Boot Flash and removable Flash media.

Boot Flash is non-removable and is usually located on the Cisco I/O controller in a system. When a Cisco uBR7200-NPE-G1 is used in combination with a supported I/O controller, the Boot Flash present on the Cisco uBR7200-NPE-G1 will be used. The Cisco uBR7200-NPE-G1 comes with 16 MB of Boot Flash. This cannot be upgraded or changed as it is fixed on the system board.

The second type of Flash media available on the Cisco uBR7246VXR is Removable Flash media. These are available in either PCMCIA size Flash cards or Compact Flash cards. An I/O controller in a Cisco uBR7200-NPE-G1 system will support PCMCIA Flash (or Compact Flash with the appropriate adapter). Most Cisco I/O controllers also support both Linear Flash media and ATA Format Flash disk, (slot0: vs disk0:) in sizes from 8 MB to 128 MB.

The Cisco uBR7200-NPE-G1 also supports Removable Flash media in the form of Compact Flash cards. These cards are ATA format and can also be used in other ATA compatible systems. The Cisco uBR7200-NPE-G1 supports Compact Flash sizes from 64 MB to 256 MB. The compact flash card on the Cisco uBR7200-NPE-G1 can be accessed whether or not there is a Cisco I/O controller installed in the chassis. The Compact Flash card must be formatted on a Cisco uBR7246VXR before use. Do not format the Compact Flash card on a PC or laptop. The Compact Flash card may be read or written using a PC or laptop with the appropriate PCMCIA connectors.

Q. How is backplane bandwidth sharing among port adapters and line cards different with a Cisco uBR7200-NPE-G1 enabled system?

A. Since the Cisco uBR7200-NPE-G1 utilizes a different architecture than previous NPEs, the concept of sharing backplane bandwidth is slightly different in a Cisco uBR7200-NPE-G1 enabled system. This is because the Cisco uBR7200-NPE-G1 comes with three 10/100/1000Mb Ethernet ports fixed to the NPE, as well as a dedicated PCI connection to the I/O controller slot. These Ethernet ports feed directly into the CPU without consuming any bandwidth from the system PCI buses. With that much LAN/WAN connectivity built into the Cisco uBR7200-NPE-G1, the traditional port adapter slots are now freed up. Only the port adapters and the optional I/O controller consume PCI bus bandwidth.

A first for the Cisco uBR7200-NPE-G1-enabled Cisco uBR7246VXR is a dedicated PCI bus for the I/O controller. With previous NPEs, the I/O controller shared PCI bus bandwidth with three of the port adapter and line card slots. That meant that any interfaces on the I/O controller subtracted from the bandwidth available for three of the port adapter and line card slots. With the latest generation of 2xFE/E I/O controller, this becomes a greater concern with the large amount of bandwidth required for the I/O controller. With the introduction of the Cisco uBR7200-NPE-G1, the I/O controller is placed on its own, dedicated PCI bus. That means that any interfaces on the Cisco I/O controller will no longer steal bandwidth from any of the port adapter and line card slots.

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Q. What are the advantages of the built-in 10/100/1000Mb Ethernet interfaces?

A. The Cisco uBR7200-NPE-G1 incorporates three 10/100/1000 Mbps (either copper or fiber) ports as part of the integrated system processor. That means that the Media Access Controllers (MACs) for those interfaces are able to directly connect to the system CPU at high speeds due to the fact that they all exist on the same integrated circuit chip. Therefore, these ports do not take up any backplane bandwidth on the Cisco uBR7246VXR. With the large LAN bandwidth available into the system from the 10/100/1000 Mbps interfaces, there is less need for LAN interfaces in the port adapter slots. That means that all port adapter slots can be primarily used for WAN connectivity without losing any bandwidth to LAN port adapters.

Q. What are the physical connectivity options for the built-in Cisco uBR7200-NPE-G1 interfaces?

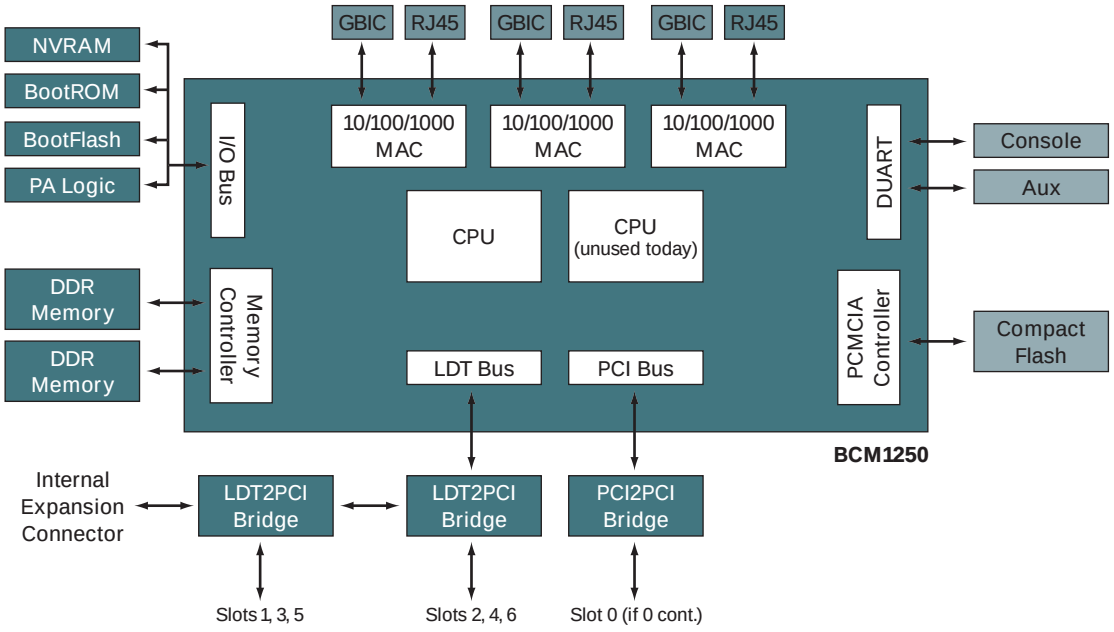
A. In addition to having three 10/100/1000 Mbps Ethernet interfaces, the Cisco uBR7200-NPE-G1 also incorporates enormous flexibility in the physical connections to those interfaces. Each of the three interfaces can independently operate at either 10 Mb/s Ethernet, 100 Mb/s Fast Ethernet or 1000 Mb/s Gigabit Ethernet speeds. In addition to speed flexibility, each interface can also operate with either copper RJ-45 or GBIC connections. That means that the Cisco uBR7200-NPE-G1 supports 10 Mb, 100 Mb or 1000 Mb full/half duplex speeds over copper RJ-45, as well as 1000 Mb full/half duplex Gigabit Ethernet with standard GBICs.

The Cisco NPE-G1 supports SX, LX/LH and ZX GBICs. No copper GBICs are supported since the Cisco uBR7200-NPE-G1 supports copper Gigabit Ethernet with the fixed RJ-45 connector for each interface.

Q. How is the functional structure of the Cisco uBR7246VXR different with a Cisco uBR7200-NPE-G1 than previous NPEs?

A. The Cisco uBR7200-NPE-G1 takes advantage of the latest industry development in integrated system processors that integrate a general purpose CPU core with most of the system components on a single chip. Components that would take up an entire NPE can now be integrated into a single chip, which greatly reduces system cost, while significantly increasing system speed and reliability.

Figure 3



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