



IBM Power 520 Express Edition: Optimized performance and value on an entry server

Description2
Product positioning 13



At a glance

The Power 520 servers deliver these features and benefits:

- 4.2 GHz POWER6 technology for entry to mid-size businesses
- One- or two-core server offerings to match your business needs
- High reliability
- Ease of installation and use
- Expandability to manage today's and tomorrow's business demands
- Support for IBM i, AIX, and Linux operating systems

Overview

IBM System i™ and System p™ platforms are unifying the value of their servers into a single, powerful lineup of servers based on industry-leading POWER6™ processor technology with support for the IBM i operating system (formerly known as i5/OS™), and AIX® and Linux™ for Power operating systems. This new, single portfolio of Power Systems servers offers industry-leading technology, continued IBM innovation, and the flexibility to deploy the operating system that your business requires.

The Power 520 Express Edition is the entry member of the portfolio, supporting both IBM i 5.4 and IBM i 6.1 (formerly known as i5/OS V5R4 and i5/OS V6R1). Combining industry-leading POWER6 processor technology from IBM with its flagship operating system for small and medium-size clients, the Power 520 servers deliver outstanding performance and value for clients who want to run IBM i applications. These new Power Systems servers offer exceptional reliability, availability, and serviceability (RAS) functions including:

- Highly reliable components for built-in reliability
- Recovery from intermittent errors or failover to redundant components
- Detection and reporting of failures and impending failures
- Hardware that automatically initiates actions to perform error correction, repair, or component replacement

The innovative POWER6 processor within the Power 520 servers delivers outstanding performance for running your IBM i applications. Combined with IBM i 6.1, you can experience significant improvements in Java™ and WebSphere® applications. Also, the POWER6 architecture with EnergyScale technology includes features that measure the energy use of your system and direct policies toward the energy-efficient operation of the server. The underlying hardware automatically adjusts to deliver the operating solution that you want.

The Power 520 server running the IBM i operating system supports one or two 4.2 GHz POWER6 processor cores and delivers outstanding performance for use as a business-critical application platform or in a high-transaction environment based on the Java platform. The Power 520 is packaged as a desktop or 4U (4 EIA units) rack-mount configuration. It supports IBM i, AIX, and Linux operating systems to broaden the application offerings available and increase the ways you can manage growth, complexity, and risk.

If you are primarily focused on running IBM i applications, or if you own System i servers and plan on migrating to these new POWER6 processor-based servers, the Power 520 is targeted to your needs. The Power 520 i Edition combines POWER6 processor-based server hardware, key system components, and IBM i system software into easy-to-order configurations to get you up and running quickly.

The Power 520 1-way is an affordable and reliable entry server to run your IBM i business applications. It is highly optimized for small business clients and supports up to 16 GB of memory, up to six disk drives, DVD, and tape — all within the single system unit enclosure.

The Power 520 1/2-way gives you more scalability and expandability. It is the ideal package to ensure your Power Systems server can handle business growth. With Capacity on Demand, you can quickly increase processing power when your business requires it. And you can add I/O expansion units and twice the memory of the 1-way, up to 32 GB.

Planned availability dates

- April 18, 2008, except for the following features:
- May 6, 2008:
 - 5616 — GX Dual-port 12x Chan Attch
 - 5796 — PCI-DDR 12X Expansion Drawer
 - 6446 — 12X Short Run 5796 Attach
 - 6457 — 12X Long Run 5796 Attach
 - 7314 — Dual 5796 Unit Enclosure

Note: Features available on May 6, 2008, will require eFW 3.2.2 firmware.

Availability of programs with an encryption algorithm in France is subject to French government approval.

Description



You can order the one-core (1-way) Power 520 Express using 9407-M15 or the two-core (1/2-way) Power 520 using 9408-M25. The second core of the 1/2-way Power 520 is optionally activated using Capacity Upgrade on Demand (permanent processor activation). The POWER6 processor is a 4.2 GHz, one-core 64-bit chip with 4 MB of L2 cache.

Both the one- and two-core Power 520 servers include:

- IBM i user license entitlements
- Full 5250 OLTP capability
- Five PCIe/PCI-X DDR slots
- Up to six hot-swap SAS disk drives in the system unit
- Imbedded SAS disk/tape/DVD controller
- Optional 175 MB write cache with auxiliary write cache protection
- One Integrated Virtual Ethernet (IVE) adapter with up to four ports

- One media bay for a SAS tape drive
- One media bay for a DVD-ROM or DVD-RAM drive
- Redundant, hot-swap power and cooling capability
- EnergyScale technology

In addition, the one-core system features:

- Up to 4300 CPW
- Up to 16 GB of memory

The two-core system features:

- Up to 8300 CPW
- Up to 32 GB of memory
- Option to attach either an HSL/RIO I/O loop or a 12X I/O loop and associated I/O drawers/towers
- Option to attach an SAS or SCSI disk expansion drawer

The Power 520 server, combined with the IBM i 6.1 operating system, supports virtual IBM i partitions, enabling one IBM i partition to host storage for another partition. With this support, additional IBM i partitions for test, development, and production workloads can more easily be created. A new Fibre Channel Adapter that offers enhanced performance with DS8000™ SANs is available for the Power 520 two-core system.

IBM PowerVM delivers advanced virtualization technologies. With PowerVM Standard Edition, the Power 520 server can support up to 10 partitions per core, supporting multiple IBM i, AIX, and Linux operating environments on a single system. The Power 520 can also support multiple shared processor pools, enabling the capping of processor resources on a group of partitions. Virtual I/O Server (VIOS) offers storage and Ethernet virtualization for IBM i, AIX, and Linux partitions on the Power 520 two-core system. In addition, with PowerVM Lx86, you can run 32-bit Linux on x86 applications in Linux environments on the Power 520. IBM PowerVM is a chargeable product.

Express editions

Express editions enable initial ease of ordering and feature a lower price than if you ordered them "a la carte" or build-to-order. Unlike earlier System i editions on POWER4™ and POWER5™ systems, an edition feature is not required for the Power 520 system. Taking advantage of the edition is the only way you can use no-charge features for processor activations and IBM i user license entitlements. The Express editions are available only during the initial system order and cannot be ordered after your system is shipped.

The IBM configurator offers these easy-to-order Express editions that include no-charge activations or no-charge IBM i user entitlements. You can modify the Express Edition configurations to match your exact requirements for your initial shipment — increasing or decreasing the configuration. If you create a configuration that falls below any of the defined minimums, the IBM configurator replaces the no-charge features with equivalent function regular charge features.

One-core Power 520 Express editions: 1-way entry and 1-way growth

To use the no-charge features on your initial order, you must order a minimum of:

- One IBM i processor license
- Five IBM i user entitlements
- 2 GB memory
- Two SAS IBM i disk drives (any size)

For the lower price, one no-charge processor activation and five no-charge IBM i user entitlements are available. The identical set of no-charge features are used for both one-core Express editions: #6721 and #6725.

#6721 1-way Entry Edition suggested starting configuration:

- One 1-core 4.2 GHz processor card (#5633)
- One 2 GB memory feature (#4521)
- Two 69.7 GB 15k rpm disk drives (#3676)
- One dual-port 1 Gb integrated Ethernet adapter (#5623)
- Two power supplies, 950 watt, base (#7703)
- One PCIe WAN IOA (#2893 or #2894) (country dependent)
- One DVD-ROM (#5756)
- One DASD/media backplane (#8345)
- One 4-mm 36 GB SAS tape drive (#5907)
- Two power cords (6xxx)
- One processor activation (#5676) (no additional charge)
- One server feature #4925
- One IBM i Enablement (#4993)
- Five IBM i user entitlements (no additional charge) (57xx-SSC)
- Five IBM i user entitlements (charge) (57xx-SSC)
- System i Access unlimited users (57xx-XW1)
- WebSphere Development Studio and Rational® development software (V5R4: 5722-WDS, V6R1: 5761-WDS and 5733-RDI)
- PowerVM Standard Edition, or higher
- One year of software maintenance

In addition to the preceding components, the #6725 1-way Growth Edition includes these features as a starting point for easier configuration:

- 2 GB additional memory (one 4 GB feature #4522)
- Two additional disk drives
- One 175 MB write cache (#5679)
- Quad-port IVE (#5624)
- Ten additional IBM i user entitlements (charge) (57xx-SSC)
- 9910 UPS and #1827 cable
- DB2® Web Query (5733-QU2)

Two-core Power 520 Express editions: 1/2-way 30-user, 150-user, and unlimited user

To receive a no-charge feature on the initial order, you must order a minimum of:

- One IBM i processor license
- 30 IBM i user entitlements
- 4 GB memory
- Four SAS or SCSI IBM i disk drives (any size)
- One 175 MB write cache (#5679) for the system unit or one 1.5 GB write cache disk controller (#5583/5782/5778)
- Two power supplies
- PowerVM Standard Edition, or higher

The no-charge feature is one no-charge processor activation. The same single no-charge features are used for all two-core Express editions: #6761, #6762, and #6763. These editions start with the same hardware configuration but offer different numbers of IBM i user entitlements:

- #6761 Express Edition includes 30 IBM i user entitlements.
- #6762 Express Edition includes 150 IBM i user entitlements.
- #6763 Express Edition includes unlimited IBM i user entitlements.

The suggested starting configuration for the 1/2-way Entry Express Editions includes:

- One 2-core 4.2 GHz processor card (#5634)
- One processor activation (#5677) at no charge
- One 8 GB memory feature (#4523)
- Six 69.7 GB 15k rpm SAS disk drives (#3676)
- One 175 MB protected write cache (#5679)
- One Quad-port 1 Gb integrated Ethernet adapter (#5624)
- Two power supplies, 950 watt (#7703)
- One PCIe WAN IOA (#2893 or 2894) (country dependent)
- One DVD-ROM (#5756)
- One DASD/media backplane (#8345)
- One 4 mm 36 GB SAS tape drive (#5907)
- Two power cords (6xxx)
- One GX adapter for 12X I/O loop (#5616)
- One 9910 UPS
- One UPS communication cable (#1827)
- One server feature #4930
- One IBM i Enablement (#4993)
- One IBM i processor enablement (charge) (57xx-SS1)
- PowerVM Standard Edition, or higher
- System i Access unlimited users (57xx-XW1)
- WebSphere Development Studio and Rational development software (V5R4: 5722-WDS, V6R1: 5761-WDS and 5733-RDI)
- DB2 Web Query (5733-QU2)
- One year of software maintenance

Solution Edition

A Solution Edition helps meet the needs of Oracle JD Edwards and SAP application users. Users of JD Edwards' EnterpriseOne and World applications and SAP's mySAP, ERP, BI, CRM, PLM, and SCM can qualify to use this edition.

The Power 520 Solution editions for SAP and Oracle applications require proof of a minimum purchase before the system is shipped from IBM. For details, visit

<http://www.ibm.com/systems/i/editions/solutionedition.html>

For the validation form and entitlement requirements, visit

<http://www.ibm.com/systems/i/editions/validate.html>

Power 520 Solution Edition #6766 includes a larger number of no-charge IBM i user license entitlements than the regular Express editions, resulting in a lower initial list price for qualifying clients.

To receive no-charge features on your initial Solution Edition order, your initial order must include a minimum of:

- One IBM i processor license
- 60 IBM i user entitlements
- 4 GB memory
- Four SAS or SCSI IBM i disk drives (any size)
- 175 MB write cache (#5679) for the system unit, or a 1.5 GB write cache disk controller (#5583/5782/5778)
- Two power supplies
- PowerVM Standard Edition, or higher

The no-charge features are one no-charge processor activation and 30 no-charge IBM i user entitlements.

The #6766 1/2-way Solution Edition suggested starting configuration is the same as the 1/2-way Express configurations except that the quantity of IBM i user entitlements is 60.

When you purchase a two-core (9408-M25) Power 520 system with an i Edition, you are entitled to receive a service voucher at no additional charge. Service vouchers deliver the technical leadership and consulting resources that can help you more fully understand and use the latest features and capabilities of the IBM i operating system. The experts will join your team and help get you started on the road to success with your new operating environment. For more information about vouchers, visit

<http://www.ibm.com/systems/i/hardware/editions/vouchers.html>

Two-core Power 520 Capacity BackUp (CBU) capability

The two-core Power 520 systems' CBU designation can help meet your requirements for a second system to use for backup, high availability, and disaster recovery. It enables you to temporarily transfer IBM i processor license entitlements and IBM i user license entitlements purchased for a primary machine to a secondary CBU system. Temporarily transferring these resources, instead of purchasing them for your secondary system, may result in significant savings. Processor activations cannot be transferred. A CBU option is not offered for the one-core Power 520 (9407-M15).

The CBU specify feature #0444 is available only as part of a new server purchase or during an MES upgrade from an existing CBU system to a 9408-M25. Certain system prerequisites must be met and system registration and approval is required before the CBU specify feature can be applied on a new server.

Standard IBM i terms and conditions do not allow either IBM i processor license entitlements or IBM i user license entitlements to be transferred permanently or temporarily. These entitlements remain with the machine they were ordered for. When you register the association between your primary and on-order CBU system, you must agree to certain terms and conditions regarding the temporary transfer.

After a CBU system designation is approved and the system is installed, you can temporarily move your optional IBM i processor license entitlement and user license entitlements from the primary system to the CBU system when the primary system is down or while the primary system processors are inactive. The CBU system can then better support failover and role swapping for a full range of test, disaster recovery, and high availability scenarios. Temporary entitlement transfer means that the entitlement is a property transferred from the primary system to the CBU system and may remain in use on the CBU as long as the registered primary and CBU systems are in deployment for the high availability or disaster recovery operation.

Systems that can be the primary system for a 9408-M25 are:

- 9409-M50
- 9406-550
- 9408-M25
- 9406-525
- 9406-520 1/2-way

These systems have IBM i software licenses with an IBM i P10 or P20 software tier. The primary machine must be in the same enterprise and country as the CBU system.

Before you can temporarily transfer IBM i processor license entitlements from the registered primary system, you must have more than one IBM i processor license on the primary machine and at least one IBM i processor license on the CBU server. The second processor must be activated on the CBU server to use the transferred entitlement. You can then transfer any IBM i processor entitlements above the minimum one, assuming the total IBM i workload on the primary system does not require the IBM i entitlement that you want to transfer during the time of the transfer. During this temporary transfer, the CBU system's internal records of its total number of IBM i processor license entitlements are not updated, and you may see IBM i license noncompliance warning messages from the CBU system. These warning messages in this situation do not mean you are not in compliance.

Before you can temporarily transfer IBM i user entitlements, you must have more than 30 IBM i user entitlements on the 9406-525 or 9408-M25 primary server and at least 30 IBM i user entitlements on the CBU server. You can then transfer any IBM i user entitlements above the minimum 30, assuming the total IBM i users on the primary system do not require the IBM i entitlement you want to transfer during the time of the transfer. The 9409-M50, 9406-550, and 9406-520 1/2-way do not have user entitlements that can be transferred. However, you can purchase user entitlements for the Power 520 users to run on your new CBU system in blocks of either 10 or unlimited. If you purchase these entitlements when you purchase your 520 CBU system, the price will be discounted.

For example, if you have a 2-core Power 520 (9408-M25) as your primary system with two IBM i processor license entitlements (one above the minimum) and 50 IBM i user entitlements (20 above the minimum), you can temporarily transfer up to one IBM i entitlement and up to 20 user entitlements. During this temporary transfer, the CBU system's internal records of its total number of IBM i processor and user license entitlements is not updated, and you may see IBM i license noncompliance warning messages from the CBU system.

If your primary or CBU machine is sold or discontinued from use, any temporary entitlement transfers must be returned to the machine on which they were originally acquired.

For CBU registration and further details, visit

<http://www.ibm.com/systems/power/hardware/cbu>

Upgrades

MES upgrades into the 9408-M25 from the 9406-525 and from selected 9406-520 editions are available. They preserve the existing machine serial number. IBM i processor and user license entitlements are also preserved during the upgrade. Upgrade paths into the 9408-M25 from the 9406-520 Value editions, 9406-520 Telephony editions, 9407-515, 9407-M15, or 9405-520 are not available.

MES upgrades into the 9408-M25 from the 9406-520 Enterprise Edition can include a specific number of IBM i user license entitlements at no charge. They must be ordered with the MES upgrade and not as a later MES order. The two-way 9406-520 #7457 and 1/2-way #7736 Enterprise Edition systems can have up to two 10-user blocks, or 20 entitlements. The one-way 9406-520 #7459, #7453, #7455, #7734, and #7735 Enterprise Edition systems can have up to one 10-user block, or 10 entitlements.

If you are upgrading from a 9406-520/525 CBU Edition, and assuming the primary system has not changed from the originally registered primary/secondary pairing, the #0444 CBU Specify code is added to an MES upgrade. This avoids unnecessary registration on the CBU Web site.

Continuance of warranty service level

If you are upgrading to a 9408-M25 from an IBM 9406-520 or -525 system that is still under warranty, you will continue to have the warranty service level of the 9406 for the remainder of the 9406 one-year warranty period. Contact your IBM representative or Business Partner for more details.

Power 520 Capacity Upgrade on Demand (CUoD)

CUoD enables you to turn on capacity as your needs grow. You can permanently activate an inactive processor by ordering a #5654 activation feature for your 4.2 GHz 9408-M25 system. After IBM receives your order, an activation code unique to your server is generated. The activation code is mailed to you and also posted at

<http://www.ibm.com/systems/power/hardware/cod>

Enter the activation code into your server using the hardware management console or the advanced system manager interface, and your newly activated processor is ready to be dynamically allocated when needed.

Adequate operating system processor licenses (IBM i, AIX, or Linux) must be available for all permanently activated processors that have been assigned to a partition or pool.

Detailed information, including step-by-step directions for ordering, enabling, and using CUoD, is available in the Capacity on Demand Planning Guide found at

<http://www.ibm.com/systems/power/hardware/cod>

Summary of Power 520 configurations

	One-core 520 9407-M15	Two-core 520 9408-M25
Processor	POWER6 4.2 GHz	POWER6 4.2 GHz
Processor cache	4 MB L2	8 MB (4 MB per core) L2
Processor card feature	#5633	#5634
n-way	1-way	1/2-way
CPW	4300	4300/8300
Memory/Main store	1 GB minimum 16 GB maximum	1 GB minimum 32 GB maximum
Disk storage*	140 GB minimum 1.7 TB maximum in system unit*	70 GB minimum 1.7 TB maximum in system unit 78 TB system max
Disk arms*	2 minimum 6 maximum	2 minimum 6 maximum in system unit 278 system maximum
Disk controller *	1 imbedded minimum and maximum	Minimum 1 imbedded Maximum 30 system
Tape drive	0 minimum 1 maximum in system unit 2 system maximum	0 minimum 1 maximum in system unit 18 system maximum
DVD drive	1 minimum 2 system maximum	1 minimum 36 system maximum
HSL or 12X loops	0	0 minimum 1 maximum
HSL I/O drawers/towers	0	0 minimum 6 maximum
12X I/O drawers	0	0 minimum 4 maximum
PCI slots	5 in system unit	5 in system unit 88 system max
Communication lines	2 minimum ** 12 maximum	2 minimum ** 12 maximum in system unit 108 system maximum
LAN ports usable by IBM i	2 minimum 8 maximum	2 minimum 8 maximum in system unit 36 system maximum
Maximum twinax devices	0	50
IOP based cards supported (like twinax or older tape)	No	No in system unit

Windows(R) integration		Yes in HSL-attached I/O
Integrated xSeries(R) Servers	0	Yes, max of 12
Integrated xSeries Adapters	0	Yes, max of 6
iSCSI adapters (PCI-X)	Yes, max of 2	Yes, max of 18
Crypto coprocessor	0	8
Crypto accelerator	0	2
IBM i Software Tier	P05	P10
Server feature	#4925	#4930

* Does not include the option of Fibre Channel attached disk storage via SAN.

** One 2-line WAN adapter in most countries.

Note: Some maximums and combinations of devices may be subject to configuration restrictions.

Memory considerations

Four DDR2 memory DIMM slots with error checking and correcting (ECC) are used in the one- and two-core Power 520 system. Memory DIMMs are plugged in pairs (one memory feature equals two DIMMs). At least one pair of memory DIMMs (one memory feature) is required. Memory features of different sizes cannot be mixed. For example, if one 4 GB memory feature is initially installed, the only future memory addition supported is another 4 GB memory feature (assuming the first 4 GB memory feature is not removed).

The one-core Power 520 (9407-M15) supports 1, 2, 4, and 8 GB memory features. The two-core Power 520 (9408-M25) supports 1, 2, 4, 8, and 16 GB memory features.

Memory GB	Memory Feature	# DIMMs	Maximum GB with 2 features	MHz
1 GB	#4520	2 x 512 MB	2 GB	667
2 GB	#4521	2 x 1 GB	4 GB	667
4 GB	#4522	2 x 2 GB	8 GB	667
8 GB	#4523	2 x 4 GB	16 GB	667
16 GB	#4524*	2 x 8 GB	32 GB*	400

* Only two-core Power 520

PCI slots/GX+ slot

The system unit includes five hot-swap PCI slots:

- Slots 1 and 2 are PCIe x8 2.5 GHz short-length slots.
- Slot 3 is a PCIe x8 2.5 GHz full-length slot.
- Slots 4 and 5 are PCI-X DDR 266 MHz full-length slots.

None of these slots supports an IOP or IOP-based IOA. This means that features such as twinax controllers and tape drives requiring an older IOP-driven controller are not supported on the one-core 520.

The two-core Power 520 has one GX+ slot that shares space with PCIe x8 slot 1. If a GX+ adapter is inserted to attach a HSL/RIO or 12X loop, a PCIe card cannot be placed in slot 1. The GX+ slot is not supported on the one-core Power 520 system.

Additional PCI slots can be added to the two-core Power 520 system (9408-M25) using HSL/RIO-attached I/O towers/drawers or 12X-attached I/O drawers.

SAS disk and SAS disk controller

Six 3.5-inch 15k rpm SAS disk drive bays or disk slots are in the system unit, allowing up to 1.7 TB of IBM i disk storage. SAS disk drives formatted for IBM i are supported in three capacities: 69.7, 139.5, or 283.7 GB. AIX, Linux, or VIOS-formatted SAS drives are also supported in 73.4, 146.6, or 300 GB capacities in the two-core 9408-M25.

The six disk bays are run by the imbedded SAS disk controller. Because the controller is "owned" by one partition, the owning partition needs to virtualize storage controlled by the imbedded disk controller to any secondary partition that needs disk storage from these disks.

Many client environments can improve disk performance of the six SAS drives by using the optional #5679 175 MB write cache. This card has a special slot in the Power 520 and does not require a PCI slot. The 175 MB write cache is protected by a 175 MB auxiliary write cache to help avoid single points of failure that would cause extended outages. The auxiliary write cache comes with #5679 and does not require a PCI slot.

With the #5679 175 MB write cache feature, RAID 5 or RAID 6 disk protection can be implemented for the six drive slots in the system unit. The two-core Power 520 can also use the imbedded disk controller with #5679 write cache to drive up to 12 disk slots in a #5886 EXP 12S. Mirroring protection is available through the operating system. RAID 5 requires a minimum of three drives, and RAID 6 requires four.

The same imbedded controller that runs the disk drives also runs the SAS tape slot and the slimline DVD drive in the system unit. The #5679 write cache is not used in tape or DVD operations.

For a supported Power 520 configuration, IBM i disk drives must be protected by either mirroring or RAID.

#5886 EXP 12S

The #5886 EXP 12S is a 2U (2 EIA) SAS disk drawer in a 19-inch rack. It is attached to an SAS port on the back of the two-core Power 520 system unit via an external SAS cable (#3686 or #3687). It supports up to 12 hot-swap SAS disk drives (#3676/3677/3678 or #3646/3647/3648) and includes redundant power supplies. Its disk controller is the imbedded disk controller in the Power 520 system unit. The #5679 175 MB write cache is a prerequisite to attaching #5886.

Two-core Power 520 I/O loop, drawer, and tower options

The two-core Power 520 system can optionally support one GX+ adapter, enabling you to choose either an HSL/RIO loop (#5614) or a 12X loop (#5616). The one-core Power 520 system does not support attachment of either the HSL/RIO or 12X loop.

A 12X loop can attach up to four #5796 12X I/O enclosures. A HSL/RIO loop can attach up to six HSL/RIO I/O enclosures. 12X cables are used for the 12X loop. HSL/RIO cables are used for the HSL/RIO loop.

The 12X I/O enclosure is the #5796 12X PCI-DDR expansion drawer that contains six full-length PCI-X DDR high-speed slots in a space-efficient package. Because each #5796 takes only half the 19-inch rack width, two #5796 features require only 4U or 4 EIA of 19-inch rack space. Up to two #5796 features can be placed in a #7314 dual 5796 unit enclosure.

Each #5796 takes one of four possible positions per 12X loop. The #5796 attaches to the 12X loop using one of two #5796 12X adapters, one for shorter distances and one for longer distances. You can use the short run adapter #6446 with 12X loops on which all units are contained in the same rack. Use the long run adapter #6457 for units spread across multiple racks. Short run and long run adapters can be mixed on the same loop.

In the following table, Yes indicates that the 12X cable identified in that column can be used to connect the configuration identified to the left.

12X Cable Options

	(1) (#1829)	(#1830)	(2) (#1840)	(#1834) (3)
#5796 to #5796 with Short Run adapter (#6446) in both drawers	Yes	Yes	No	No
#5796 with Short Run adapter (#6446) to #5796 with Long Run adapter (#6457)	Yes	Yes	Yes	No
#5796 to #5796 with Long Run adapter (#6457) in both drawers	Yes	Yes	Yes	Yes
#5796 with Short Run adapter (#6446) to 12X Channel CEC adapter	No	Yes	Yes	No

#5796 with Long Run adapter (#6457) to 12X Channel CEC adapter	No	Yes	Yes	Yes
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- (1) The 0.6 m 12X cable (#1829) cannot be used to connect to a processor enclosure because of its short length. It is intended for use between two #5796 drawers mounted side-by-side in the same #7314 enclosure or to connect between two #5796 drawers located one beneath the other in a rack.
- (2) It is possible in some limited configurations to use the 3.0 m 12X cable (#1840) to locate #5796 drawers in adjacent racks. The cable length requires careful management of each drawer location within the rack. The best choice for connecting a #5796 drawer in an adjacent rack is the 8.0 m 12X cable (#1834).
- (3) The 12X cable (#1834) is intended for use when connecting between two modules that are located in adjacent racks. This cable may not be connected to the 12X Short Run adapter (#6446).

The #5796 supports only smart IOAs and does not support an IOP or a card that requires an IOP. The #5796 includes redundant concurrently maintainable power and cooling. The blind swap PCI mechanism allows for PCI card servicing without removing the I/O expansion drawer.

HSL/RIO

The two-core Power 520 system supports HSL I/O enclosures that allow for PCI-X slots and, in some cases, disk slots. These enclosures were previously available on POWER5 systems. The PCI slots are PCI-X slots that support IOPs, not PCI-X DDR slots. These enclosures are:

- #0595/5095 (7 PCI-X slots and 12 SCSI disk slots)
- #5094/5294 (14 PCI-X slots and 15 to 45 SCSI disk slots)
- #5096/5296 (14 PCI-X slots and 0 disk slots)
- #0588/5088 (14 PCI-X slots and 0 disk slots)
- #5790 (6 PCI-X slots and 0 disk slots)

The #0588 and #5088 are withdrawn from marketing but are supported on the two-core Power 520 system. The #5094 and #5294 are not orderable as new I/O enclosures but are supported. The #0595, #5095, #5096, #5296, and #5790 can be ordered as new HSL I/O enclosures for the two-core Power 520.

All of these HSL/RIO I/O enclosures are attached to the two-core Power 520 system via HSL-2 physical ports and run over an HSL-2 interface. I/O units that were attached to earlier systems using the HSL-1 interface (#9877, #9886, #9887, #2886, #2887) must be upgraded before being attached to the two-core Power 520 system. This includes the #0588/5088, which previously had supported the HSL-2 interface only with an RPQ on POWER5 and POWER5+™ systems. You can order the HSL-2 interface as #6417 (MES), or it may have been shipped previously with #9517.

The #5786 EXP24 Disk Enclosure is also supported. This I/O enclosure holds up to 24 internal 15k rpm SCSI disk drives that are run by a disk controller in a PCI slot located in the two-core Power 520 processor, 12X, or HSL enclosure.

Disk and disk controller protection rules

The Power 520 is designed to minimize single points of failure. In order to have an IBM-supported configuration, the following minimum level of integrated disk storage is required:

- All disk drives must to be protected by RAID or mirroring.
- All disk controllers with write cache must be protected by either auxiliary write cache or by mirroring the controller. If SCSI disk controllers such as the 40 MB write cache #5703 or #0628 and the 90 MB write cache #5776, #5737, and #0648 are used, they must be mirrored, as these cards do not have an auxiliary write cache option.

Note that the optional write cache option for the system unit #5679 includes auxiliary write cache protection.

PCI Express (PCIe) adapters

PCIe adapter slots can support higher speeds and capacities than the PCI-X generation of PCI

slots. PCIe and PCI-X slots are physically different. PCIe adapters cannot plug into a PCI-X slot and vice versa. PCIe adapters do not use an IOP.

The Power 520 processor enclosure has three PCIe slots. The following PCIe adapters are available:

- #2893/9693 PCIe 2-Line WAN with Modem (IBM i, Linux)
- #2894/9694 PCIe 2-Line WAN with Modem (CIM) (IBM i, Linux)
- #5773 PCIe 4Gb Fibre Channel Adapter (IBM i 6.1, Linux, AIX)
- #5767 PCIe 1Gb Ethernet UPT 2-Port IOA (IBM i, Linux, AIX)
- #5768 PCIe 1Gb Ethernet Fiber 2-Port IOA (IBM i, Linux, AIX)

The PCIe 2-Line WAN with Modem IOA supports the use of IBM i Operations Console-Direct Attach (commonly called ops console). This IBM i console option uses a special cable #0367 attached to a user-supplied Microsoft® Windows workstation.

IBM i consoles

Select one of the following IBM i consoles:

- Operations console attached via Ethernet port (LAN console) or WAN port (ops console)
- Hardware Management Console (HMC)

A twinax console is not supported unless a HMC is present on the system. A 9944-100 Thin Console is not supported.

Integrated Virtual Ethernet (IVE) daughter card

An IVE daughter card is required on the Power 520 system. This daughter card has a special slot. It does not use a PCI slot. You can select either a #5623 dual-port 10/100/1000 Mb or #5624 quad-port 10/100/1000 Mb card. The Ethernet ports can be virtualized to different partitions offering flexible configuration.

EnergyScale technology

The Power 520 server includes EnergyScale technology that includes power trending, power saving, capping of power, and thermal measurement capabilities.

Additional components

One #7703 950 watt ac power supply is required. Optionally, a second #7703 power supply provides redundancy and allows either power supply to be hot-swapped. Each power supply requires a power cord.

An op panel cable is required. For a deskside system, use #1843. For a rack-mount system, use #1877 to specify a cable.

For a deskside system, include a #7250 deskside specify with a #7224 door feature. For a rack-mount system, include a #7251 rack-mount specify with a #7267 adjustable rails and bezel feature.

Other system components include:

- Two system ports and three USB ports for AIX usage
- Two HMC ports
- Two SPCN ports
- One imbedded service processor
- One DASD/Media backplane (#8345)

The minimum Power 520 system configuration (9407-M15 or 9408-M25) must include:

- One IBM i processor license entitlement and either five IBM i user license entitlements (9407-M15) or 30 IBM i user license entitlements (9408-M25)
- One processor card
- One processor activation

- 1 GB memory
- One power supply
- One power cord
- Two disks (unless a Fibre Channel adapter is used for SAN disk drive attachment)
- One DASD/Media backplane (#8345)
- One operations panel cable
- One IVE daughter card
- One DVD drive
- One WAN adapter
- Rack-mount or desktide features
- IBM i enablement specify
- IBM i console specify
- Server feature
- Language specify

For additional information on the Power 520, visit

<http://www.ibm.com/systems/power>

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www-3.ibm.com/able/product_accessibility/index.html

Product positioning

The Power 520 Express one-core or 1-way server offers you an affordable and reliable solution if you require an entry server to run your IBM i business applications. The Power 520 one-core, optimized for small business clients, supports up to 16 GB of memory, up to six disk drives, DVD, and tape — all within the single system unit enclosure. The Power 520 one-core offers clients who in the past would have purchased a System i 515 or System i 520 Express a ready-to-run packaged offering.

If you are looking for more scalability and expandability, the Power 520 two-core or 1/2-way is the ideal package to ensure the Power Systems server can handle your business growth. The Power 520 two-core server supports Capacity on Demand to quickly increase your processing power when your business requires it. It also supports adding I/O expansion units and twice the memory of the one-core, up to 32 GB. Clients, who in the past would have purchased a System i 525 or System i 520 Standard, Enterprise, or Solution edition, should consider the Power 520 two-core.

The Power 520 is offered as either a one- or two-core server. The two-core server delivers more performance and a much greater expandability than the one-core server. Advantages of the two-core server include:

- Double the processors (one-core versus two-core)
- Double the L2 cache (4 MB per core)
- Double the maximum memory (16 GB versus 32 GB)
- Support for an I/O loop and associated PCI slots, disk slots, and other I/O expansion
- Support for additional types of heritage I/O supported by IOP-based cards
- CUoD to permanently activate the second processor
- Upgrade paths from the 9406-520 (specific editions) and 9406-525

The one-core Power 520 has a lower entry price and lower IBM i software tier (P05 as opposed to P10). Choose the one-core Power 520 system where you are comfortable with the performance and growth options within the system unit and where price is a critical part of the purchase decision. Choose the two-core Power 520 system when additional I/O capacity and CPU performance is required now or in the future.

Power 520 system compared to a Power 550 Express system:

The four-core Power 550 (POWER6 9409-M50) delivers higher performance and larger I/O capacities than the Power 520. In addition to larger n-way, memory, and I/O, you benefit from more I/O flexibility. The Power 550 has two I/O loops instead of the one I/O loop offered by the two-core Power 520 (9408-M25). With two loops you can attach more I/O, and you can choose to mirror the I/O at a loop level. You can also more easily transition from existing HSL/RIO I/O to 12X I/O. This means you can choose to use both an HSL/RIO and a 12X loop on the same system. Having both types of I/O loops allows you to migrate existing I/O and invest in the newest I/O drawer technology at the same time. In addition, the Power 550 is a P20 IBM i software tier.

Two-core Power 520 compared to POWER5 systems:

The two-core Power 520 (POWER6 9408-M25) is a follow-on product to the POWER5 9406-525. Although the systems are similar, a number of differences exist, particularly in the area of new technologies.

Similarities between the two-core Power 520 and the 9406-525 include:

- IBM i licensing with user entitlements (same concurrent user definition) and the P10 software tier
- Minimum of 30 and up to an unlimited number of IBM i users
- Support for IBM i 5.4, and later
- Two-core processor, with a minimum of one processor active (1/2-way)
- Either rack-mounted (4U) or in a deskside configuration
- Full 5250 OLTP capability
- Support for the attachment of up to six I/O tower/drawers via one HSL/RIO loop
- Offered in packages with 30, 150, or unlimited IBM i user entitlements
- Model upgrades from POWER5 9406-520 (not including Value or Telephony editions)

Differences include:

- Uses 4.2 GHz POWER6 technology as opposed to 1.9 GHz POWER5+ technology.
- Uses all PCIe and PCI-X DDR slots as opposed to slower PCI-X slots in the system unit. (An IOP or IOP-based adapter card can be placed in an HSL-attached I/O drawer/tower.)
- Can use either a 12X I/O loop or HSL/RIO loop as opposed to only HSL/RIO loop.
- Includes a 175 MB protected write cache disk controller option for the integrated disk controller in the system unit as opposed to 40 MB unprotected write cache.
- Requires that all internal disk controllers with write cache be protected with either auxiliary write cache or be mirrored.
- Can use the new 2U SAS disk drawer for additional internal disk growth as opposed to only SCSI drives in expansion units.
- Supports a half-high SAS tape drive in the system unit as opposed to SCSI tape drive. Note that the SAS tape drive and SCSI tape drive options are different.
- Includes up to four IVE daughter card Ethernet ports as opposed to two integrated Ethernet ports.
- Supports the following:
 - Optional use of an edition package
 - Virtual IBM i partitions
 - Multiple Shared Processor Pools
 - PowerVM Lx86

- Requires PowerVM (previously named Advanced Power Virtualization) for Micro-Partitioning™.
- Includes base warranty of one year with 9 x 5 next-business-day support and customer replaceable unit (CRU) that is upgradable to a higher level of coverage as opposed to 24 x 7 same-business-day support with optional CRU.

One-core Power 520 compared to POWER5 systems

The one-core Power 520 (POWER6 9407-M15) is a follow-on product to the POWER5 9407-515. A number of similarities exist in the overall product offering as well as differences associated with new technologies. Similarities between the 9407-515 and the 9407-M15 include:

- IBM i licensing with user entitlements (same concurrent user definition) and the P05 software tier
- Support for IBM i 5.4, and later
- Either rack-mounted (4U) or in a deskside configuration
- PowerVM required for Micro-Partitioning
- Full 5250 OLTP capability
- No support for the attachment of I/O tower/drawers, but uses the PCI slots and disk slots available in the system unit
- Base warranty of one year with 9 x 5 next-business-day support and CRU that is upgradable to a higher level of coverage

Differences include:

- Uses 4.2 GHz POWER6 technology as opposed to 1.9 GHz POWER5+ technology.
- Includes worldwide option for unlimited IBM i users as opposed to 40 to unlimited users, depending on the country.
- Uses all PCIe and PCI-X DDR slots as opposed to slower PCI-X slots. (Faster 9407-M15 PCI slots do not support the use of an IOP or IOP-based adapter card.)
- Supports the following:
 - Virtual IBM i partitions
 - Multiple Shared Processor Pools
 - PowerVM Lx86
- Supports smart Fibre Channel adapter with IBM i 6.1.
- Uses up to six 15k SAS disk drives of 70, 140, or 284 GB capacities in the system unit as opposed to eight 15k SCSI disk drives of 70 GB capacity.
- Has a 175 MB protected write cache disk controller option for the integrated disk controller as opposed to 40 MB unprotected write cache.
- Supports a half-high SAS tape drive in the system unit as opposed to SCSI tape drive.
- Uses up to four IVE daughter card Ethernet ports as opposed to two integrated Ethernet ports.
- Supports optional use of an edition.

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