

# IBM POWER8 and IBM POWER9 technology-based systems deliver hardware enhancements

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## Overview

Hardware enhancements are available for the IBM<sup>(R)</sup> POWER8<sup>(R)</sup> and IBM POWER9<sup>TM</sup> scale-out and scale-up family servers, including:

- A new generation of Mainstream 2.5-inch solid-state drives (SSD), providing enhancements in its 931 GB, 1.86 TB, 3.72 TB, and 7.45 TB capacity point for IBM Power<sup>(R)</sup> System E980, E950, L922, S914, S922, S924, H922, H924, S812L, S822L, S824L, S814, S812, S822, S824, E870, E870C, E880, E880C, E850, and E850C servers
- A new generation of Enterprise 2.5-inch solid-state drives (SSD), providing enhancements in its 387 GB, 775 GB, and 1550 GB (1.55 TB) capacity point for Power E980, E950, L922, S914, S922, S924, H922, H924, S812L, S822L, S824L, S814, S812, S822, S824, E870, E870C, E880, E880C, E850, and E850C servers
- Deactivation of LPM for Dedicated Servers for Power E980, E950, S922, S914, and S924 servers
- IBM i 7.4 Indicator for Power E980, S914, S922, S924, H922, H924, S814, S812, S822, S824, E870, E870C, E880, and E880C servers

POWER9 scale-out and scale-up family servers also support the following new I/O:

- PCIe3 SSD NVMe adapters, providing 1.6 TB, 3.2 TB, and 6.4 TB capacity points for Power E980, E950, L922, S922, S914, S924, H922, and H924 servers
- Mainstream 1.6 TB and 3.2 TB SSD NVMe U.2 modules for Power E980 server
- PCIe3 6-Slot Fanout Module, PCIe x16 to CXP Optical or CU converter Adapter, and Active Optical Cables for PCIe3 Expansion Drawer for Power E980, E950, L922, S922, S914, S924, H922, and H924 servers
- Storage Backplane with HI Performance plus 2x24-Port for Power E950 server

Multiple feature conversions for POWER8 and POWER9 scale-out and scale-up servers provide additional configuration flexibility.

POWER9 scale-out and scale-up family servers also support the following existing I/O:

- PCIe3 3D Graphics Adapter x16 (#EC51) for Power L922, S922, and H922 servers
- PCIe3 2-Port 40 GbE NIC RoCE QSFP+ Adapter (#EC3B) for Power E980 and E950 servers
- PCIe3 LP 2-Port 40 GbE NIC RoCE QSFP+ Adapter (#EC3A) for Power E980 server
- PCIe3 LP 2-port 100 Gb EDR IB Adapter x16 (#EC3E) for Power E980 server
- PCIe3 LP 1-port 100 Gb EDR IB Adapter x16 (#EC3T) for Power E980 server

- PCIe4 LP 2-port 100 Gb EDR IB CAPI adapter (#EC64) for Power E980 server
- PCIe4 LP 1-port 100 Gb EDR IB CAPI adapter (#EC62) for Power E980 server
- PCIe1 SAS Tape/DVD Dual-port 3 Gb x8 Adapter (#EJ1N, #EJ1P) for Power E980 server
- Expanded function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache (#EJ1G) with AIX<sup>(R)</sup> operating system support for Power S922 and H922 servers
- Specify Mode features with SAS Controller (#EJ0L) for EXP12SX/Power EXP24SX for Power E950 server, supported for migration only
- 387 GB (#ES0Q) and 775 GB (#ES0S) SFF-2 4K SAS SSDs for Power E950 server, supported for migration, but not as a new order
- 1.2 TB 10K RPM SAS SFF-2 Disk Drive (#ESD3) for Power E950 server, supported for migration, but not as a new order
- 600 GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block (#ESDP) for Power E950 server, supported for migration, but not as a new order

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## Planned availability date

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- May 17, 2019, for all features except features EPA0, 6671, 6672, and EB74
- April 23, 2019, for feature EPA0
- May 3, 2019, for features 6671 and 6672
- June 21, 2019, for feature EB74

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## Description

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### Power servers are enhanced with the following:

#### Mainstream 931 GB, 1.86 TB, 3.72 TB, and 7.45 TB capacity SSDs

The mainstream 931 GB, 1.86 TB, 3.72 TB, and 7.45 TB capacity SSDs are designed to provide a lower cost per terabyte of SSD storage in a space-efficient footprint. A 2.5-inch SAS SSD is mounted on an SFF-3 carrier/tray for a POWER9 or POWER8 system unit or mounted on an SFF-2 for placement in an expansion drawer such as the EXP24SX drawer when attached to a POWER9 or POWER8 server. The drive is formatted to use 4224-byte (4k) sectors and does not support the 4k JBOD 4096-byte sector. It also does not use the 512-byte or 528-byte (5xx) sector formatting.

When placed in POWER9 or POWER8 system units with SAS SFF-3 bays, the drive is run by the integrated SAS controller such as found in Power E950, L922, S914, S922, S924, H922, H924, S812L, S822L, S824L, S814, S812, S822, S824, E850, and E850C servers. When placed in the EXP24SX (SFF-2) storage enclosure, the drive is run by a PCIe3 SAS RAID adapter, such as the feature EJ0L, EJ14, EJ0J, EJ0M, EL3B, or EL59. These PCIe3 controllers support 4k drives on POWER9 or POWER8 servers. Earlier-generation SAS controllers don't support 4k drives.

When placed in an SSD array of one of these PCIe3 controllers, the array must be all mainstream SSDs or all nonmainstream SSDs. A SAS controller can currently run both 4k and 5xx drives, but they must be in separate arrays. Drives in an array should be the same or similar capacity. HDDs and SSDs can only be mixed in the same array when part of an Easy Tier<sup>(R)</sup> array (RAID 5TS, RAID 6T2, or RAID 10T2) provided by SAS RAID controllers such as the feature EJ0L or EJ14 or POWER9 or POWER8 integrated backplane controllers.

Like all SSDs, the performance of the 931 GB, 1.86 TB, 3.72 TB, and 7.45 TB mainstream SSDs are excellent compared to a disk drive (HDD). Read performance is on par with higher write endurance SSDs such as the enterprise SSDs. Write performance when compared to enterprise SSDs is somewhat slower but still more than 25 times that of a standard 15K HDD. As with any drive, either HDD or SSD,

the number of drives is still a factor in achieving satisfactory performance, especially for IBM i.

These are mainstream drives and are not suitable for write-intensive workloads. Write-intensive workloads are those that write more to the drive each day than its rated capacity. Assuming a typical heavily random workload at about 3394 TB of writes to the drive, it will be at its maximum projected write capability. Writes past the drive's maximum write capacity will continue to work for some period of time, but much more slowly. A Predictive Failure Analysis message will indicate that it is time to replace the drive. If the predictive failure is ignored and writes continue to be sent to the drive, eventually the drive will be unable to accept write commands and will accept only read commands for a period of time. A failed write will result in a more serious error message indicating that the drive must be replaced.

The nature of the workload has a great impact on the maximum write capacity. For example, if a high percentage of more sequentially oriented writes is used instead of random writes, the maximum write capacity can be significantly larger. The user should occasionally check to see what percentage of the drive's write life remains and adjust the workload or drive assignment as it makes sense to do so. Checking is done by inspecting the SSD Mainstream Fuel Gauge. This capability is available through IBM AIX, IBM i, and Linux<sup>(R)</sup>. The query or command to view the information varies by operating system. Check the remaining life of the mainstream drives individually, even if all are in the same array.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5-year period. See the following table for the approximate lifetime Total Bytes Written (TBW) supported by each drive capacity:

Drive capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

To read the warranty and maintenance applicable to mainstream devices on POWER8 and POWER9 servers, see the [Terms and Conditions](#) section or [IBM Knowledge Center](#) for additional details.

Multiple feature codes are used to identify the proper mainstream SSD characteristics. Key characteristics are:

- Multi-OS server for AIX/Linux or for IBM i.
- SFF-3 or SFF-2 carrier/trays.

#### Multi-OS server feature numbers

Mainstream SSD	For SFF-3 4k	For SFF-2 4k
931 GB	ESJ8 and ESJ9 <sup>1</sup>	ESJ0 and ESJ1 <sup>1</sup>
1.86 TB	ESJA and ESJB <sup>1</sup>	ESJ2 and ESJ3 <sup>1</sup>
3.72 TB	ESJC and ESJD <sup>1</sup>	ESJ4 and ESJ5 <sup>1</sup>
7.45 TB	ESJE <sup>2</sup> and ESJF <sup>1,2</sup>	ESJ6 <sup>2</sup> and ESJ7 <sup>1,2</sup>

<sup>1</sup> IBM i supported.

<sup>2</sup> Only available for POWER9 servers.

Other feature codes order a quantity of 150 of the SFF-2 drives (#ERJ0, #ERJ1, #ERJ2, #ERJ3, #ERJ4, #ERJ5, #ERJ6, and #ERJ7) and no-charge load source specify features (#EU41, #EU43, #EU45, #EU47, #EU49, #EU4B, #EU4D, and #EU4F).

Software requirements (assuming the server supports this software level):

- AIX supported

- Linux supported
- IBM i supported

See the Feature description section of the Sales Manual for specific software requirements.

### Enterprise 387 GB, 775 GB, and 1.55 TB capacity SSDs

The enterprise SAS SSDs are 2.5-inch SFF drives that can be installed either in the POWER9 or POWER8 system unit SAS bays (SFF-3) or in EXP24SX SAS bays (SFF-2) attached to a POWER9 or POWER8 server.

Power enterprise SSDs include the latest 3D NAND technology flash memory, which improves enterprise-class reliability, endurance, and capacity characteristics. The enterprise SSDs build upon a heritage of performance and endurance to provide a better value proposition to users of POWER9 and POWER8 servers.

The POWER8 servers that support the new enterprise SAS SSDs in their system unit are Power E950, L922, S914, S922, S924, H922, H924, S812L, S822L, S824L, S814, S812, S822, S824, E850, and E850C servers. The SFF-3 SAS bay in these servers uses an SFF-3 carrier/tray, on which the SAS drive is mounted. Other model POWER9 and POWER8 servers E980, E880C, and E870C do not have SAS bays in their system units and therefore cannot support enterprise SFF-3 SSDs. When attached to a POWER9 or a POWER8 server, the EXP24SX I/O drawers can hold up to 24 SAS SSDs. The EXP24SX SAS bays use an SFF-2 carrier/tray, on which the SAS drive is mounted.

The enterprise SSDs refresh the previously available 387 GB, 775 GB, and 1.55 TB capacity points for POWER8 and POWER9 servers. These are 400 GB, 800 GB, and 1600 GB SSDs that are always formatted either to 4224 (4k) byte sectors or to 528 (5xx) byte sectors for additional protection, resulting in 387 GB, 775 GB, and 1550 GB capacities. The 4096 or 512 byte sectors or JBOD are not supported. The 4k drives are not supported on servers older than POWER8.

Multiple features are available for ordering SSDs to meet your business requirements.

Four key characteristics are differentiated in these features:

- Capacity: 387 GB, 775 GB, or 1.55 TB
- Carrier/tray or SAS bay: SFF-3 or SFF-2
- Sector size: 5xx (528) or 4k (4224) byte
- Type server/OS: Multi-OS for IBM i or AIX/Linux

### Multi-OS server feature numbers

SSD	For SFF-3 and 4k	For SFF-3 and 5xx	For SFF-2 and 4k	For SFF-2 and 5xx
387 GB	ES90 and ES91 <sup>1</sup>	ESGT	ES94 and ES95 <sup>1</sup>	ESGV
775 GB	ESNC and ESND <sup>1</sup>	ESGX	ESNA and ESNB <sup>1</sup>	ESGZ
1.55 TB	ESNG and ESNH <sup>1</sup>	Not applicable <sup>3</sup>	ESNE and ESNF <sup>1</sup>	Not applicable <sup>3</sup>

<sup>1</sup> IBM i supported.

<sup>3</sup> 1.55 TB capacity SSD is available as a 4k drive and is not available as a 5xx drive.

Other feature codes order a quantity of 150 of the SFF-2 drives (#ER94, #ER95, #ERGV, #ERGZ, #ERNA, #ERNB, #ERNE, and #ERNF) and no-charge load source specify features (#ELZ1, #ELZ5, #ELZB, #ELZD, #ELZF, and #ELZH).

The new enterprise SSDs are run either by the integrated SAS controllers in the POWER9 or POWER8 system unit or by PCIe3 SAS adapters.

The SSD configuration rules, maximums, limitations, and capabilities of these PCIe3 SAS adapters and integrated SAS controllers are unchanged, whether new enterprise SSDs are used or earlier SSDs are used. You can mix enterprise SSDs and earlier SSDs under the same controller or adapter, as well as mix them in the same array. This allows existing SSD investments to be leveraged and can provide more flexible growth.

Existing SSD rules are unchanged. For example:

- Do not mix different size capacities such as 387 GB and 775 GB in the same array or mix 775 GB and 1.55 TB in the same array.
- Do not mix 4k and 5xx drives in the same array.
- The largest enterprise SSD supported in the 4-core Power S814/S914 server is 387 GB.
- Do not mix SSDs and HDDs in the same array unless it is an Easy Tier array.
- 4k drives are not supported on servers older than POWER8.

Software requirements (assuming the server supports this software level):

- AIX supported
- Linux supported
- IBM i supported

See the Feature description section of the Sales Manual for specific software requirements.

#### **Deactivation of LPM for Dedicated Servers (#EPA0)**

The default state of the POWER9 server firmware is with LPM activated. Feature EPA0 provides appropriate VET codes to change the setting to LPM deactivated prior to shipping the order. This feature is available for Power S922, S914, S924, E950, and E980 servers and for initial and MES orders.

**Note:** Feature EPA0 is mutually exclusive with feature EPVV.

#### **IBM i 7.4 Indicator (#EB74)**

IBM i 7.4 (#EB74) is supported on Power Systems servers with POWER9 and POWER8 technology-based processors. See the [Technical Information](#) section for specific hardware and software prerequisites at [ZP19-0255](#), dated April 23, 2019.

#### **POWER9 scale-out and scale-up family servers also support the following new I/O:**

##### **PCIe3 1.6 TB SSD NVMe Adapter (#EC5B, #EC5G)**

The PCIe3 1.6 TB SSD NVMe Adapter (#EC5B) adapter is available for Power S924, S914, and H924 servers, and the PCIe3 LP 1.6 TB SSD NVMe Adapter (#EC5G) is available for Power E980, L922, S922, and H922 servers.

The PCIe3 1.6 TB SSD NVMe Adapter:

- Features 1.6 TB of low write latency, nonvolatile flash memory on a PCIe Gen3 adapter
- Uses NVMe (Non-Volatile Memory express), which is a high-performance software interface to read/write this flash memory
- Is a half-length x8 adapter that can be used in either a x8 or x16 PCIe Gen3 slot in the system unit
- Can provide significantly more read or write IOPS and significantly larger throughput (GB/sec) compared to SAS/SATA SSD

The PCIe3 1.6 TB SSD NVMe Adapter is designed for read-intensive workloads with light write activity. Approximately 8,760 TB to 17,000 TB of data can be written over the life of the adapter, but depending on the nature of the workload that amount may be somewhat larger. After the warranty period, if the maximum write capability is achieved, the adapter's replacement is not covered under IBM maintenance.

**Recommendation:** For high-value applications where the content in the adapter must be protected, use additional NVMe Flash adapters with OS mirroring or software RAID.

Features EC5G and EC5B are identical cards except that the tailstock bracket is different. Feature EC5G fits a half-profile PCIe slot, and feature EC5B fits a full-high PCIe slot. For a card with more memory, see features EC5D and EC5C.

**Limitations:** The PCIe3 1.6 TB SSD NVMe Adapter is not supported in the PCIe Gen3 I/O drawer. Data protection is not implemented in the card; protection is provided by OS mirroring or software RAID.

### **PCIe3 3.2 TB SSD NVMe Adapter (#EC5D, #EC5C)**

The PCIe3 3.2 TB SSD NVMe Adapter (#EC5D) is available for Power E950, S924, S914, and H924 servers, and the PCIe3 LP 3.2 TB SSD NVMe Adapter (#EC5C) is available for Power E980, L922, S922, and H922 servers.

The PCIe3 3.2 TB SSD NVMe Adapter:

- Features 3.2 TB of low write latency, nonvolatile flash memory on a PCIe Gen3 adapter
- Uses NVMe, which is a high-performance software interface to read/write this flash memory
- Is a half-length x8 adapter that can be used in either a x8 or x16 PCIe Gen3 slot in the system unit
- Can provide significantly more read or write IOPS and significantly larger throughput (GB/sec) compared to SAS/SATA SSD

The PCIe3 3.2 TB SSD NVMe Adapter is designed for read-intensive workloads with light write activity. Approximately 8,760 TB to 17,000 TB of data can be written over the life of the adapter, but depending on the nature of the workload that amount may be somewhat larger. After the warranty period, if the maximum write capability is achieved, the adapter's replacement is not covered under IBM maintenance.

**Recommendation:** For high-value applications where the content in the adapter must be protected, use additional NVMe Flash adapters with OS mirroring or software RAID.

Features EC5C and EC5D are identical cards except that the tailstock bracket is different. Feature EC5C fits a low-profile PCIe slot, and feature EC5D fits a full-high PCIe slot. For a card with more memory, see features EC5F and EC5E.

**Limitations:** The PCIe3 3.2 TB SSD NVMe Adapter is not supported in the PCIe Gen3 I/O drawer. Data protection is not implemented in the card; protection is provided by OS mirroring or software RAID.

### **PCIe3 LP 6.4 TB SSD NVMe Adapter (#EC5F, #EC5E)**

The PCIe3 LP 6.4 TB SSD NVMe Adapter (#EC5F) is available for Power E950, S924, S914, and H924 servers, and the PCIe3 LP 6.4 TB SSD NVMe Adapter (#EC5E) is available for Power E980, L922, S922, and H922 servers.

The PCIe3 LP 6.4 TB SSD NVMe Adapter:

- Features 6.4 TB of low write latency, nonvolatile flash memory on a PCIe Gen3 adapter
- Uses NVMe, which is a high-performance software interface to read/write this flash memory

- Is a half-length x8 adapter that can be used in either a x8 or x16 PCIe Gen3 slot in the system unit
- Can provide significantly more read or write IOPS and significantly larger throughput (GB/sec) compared to SAS/SATA SSD

The PCIe3 LP 6.4 TB SSD NVMe Adapter is designed for read-intensive workloads with light write activity. Approximately 8,760 TB to 17,000 TB of data can be written over the life of the adapter, but depending on the nature of the workload that amount may be somewhat larger. After the warranty period, if the maximum write capability is achieved, the adapter's replacement is not covered under IBM maintenance.

**Recommendation:** For high-value applications where the content in the adapter must be protected, use additional NVMe Flash adapters with OS mirroring or software RAID.

Features EC5E and EC5F are identical cards except that the tailstock bracket is different. Feature EC5E fits a low-profile PCIe slot, and feature EC5F fits a full-high PCIe slot. For a card with less memory, see features EC5D and EC5C.

**Limitations:** The PCIe3 LP 6.4 TB SSD NVMe Adapter is not supported in the PCIe Gen3 I/O drawer. Data protection is not implemented in the card; protection is provided by OS mirroring or software RAID.

### **PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer (#EMXH)**

The PCIe3 fanout module for PCIe Gen3 I/O Expansion Drawer (#EMXH) is available for POWER9 E980, E950, L922, S922, S914, S924, H922, and H924 servers. This feature provides six PCIe Gen3 full-high, full-length slots (two x16 and four x8). The PCIe slots are hot plug. The module has two CXP ports, which are connected to two CXP ports on a PCIe Optical Cable Adapter (only allowed to connect to #EJ19, #EJ20, or #EJ1R PCIe3 Optical Cable Adapter). A pair of active optical CXP cables (such as #ECCR, #ECCX, #ECCY, or #ECCZ) or a pair of CXP copper cables (such as #ECCS) are used for this connection. The top CXP port of the fanout module is cabled to the top CXP port of the PCIe3 Optical Cable Adapter. The bottom CXP port of the fanout module is cabled to the bottom CXP port of the same PCIe3 Optical Cable Adapter.

#### **Limitations:**

- Mixing of prior PCIe3 fanout modules (#EMXF, #EMXG, #ELMF, #ELMG) with the PCIe3 fanout module (#EMXH) in the same I/O Expansion Drawer is not allowed.
- Mixing of the I/O Expansion Drawer with prior PCIe3 fanout modules (#EMXF, #EMXG, #ELMF, #ELMG) and the I/O Expansion Drawer with PCIe3 fanout module (#EMXH) in same configuration is allowed.
- PCIe3 Optical Cable Adapters (#EJ19, #EJ20, or #EJ1R) requires to use optical cables (#ECCR, #ECCX, #ECCY, or #ECCZ), or copper cable (#ECCS). CXP copper cables (such as #ECCS) is not supported on E980.
- Firmware 9.30 is required for EMXH and the associated features.

### **PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer (#EJ19)**

PCIe3 x16 adapter (#EJ19) is available for the Power E980 server and provides two optical CXP ports for the attachment of two active optical cables (one optical pair feature such as #ECCR, #ECCY, or #ECCZ) . One adapter supports the attachment of one PCIe3 module in a PCIe Gen3 I/O Expansion Drawer. CCIN is 6B53.

Feature EJ19 is a follow-on product to feature EJ07. Feature EJ19 is only supported on an I/O expansion drawer with the new PCIe3 6-slot fanout module (#EMXH).

### **PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer (#EJ20)**

PCIe3 x16 adapter (#EJ20) is available for Power E950, S914, S924, and H924 servers and provides two optical CXP ports for the attachment of two active optical cables (one optical pair feature such as #ECCX or #ECCY or copper cable #ECCS). One adapter supports the attachment of one PCIe3 module in a PCIe Gen3 I/O Expansion Drawer. CCIN is 2CF5.

Feature EJ20 is a follow-on product to feature EJ08. Feature EJ20 is only supported on an I/O expansion drawer with the new PCIe3 6-slot fanout module (#EMXH).

### **PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer (#EJ1R)**

The PCIe3 x16 adapter (#EJ1R) is available for Power L922, S922, and H922 servers and provides two optical CXP ports for the attachment of two active optical cables (one optical pair feature such as #ECCX or #ECCY or copper cable #ECCS). One adapter supports the attachment of one PCIe3 module in a PCIe Gen3 I/O Expansion Drawer. CCIN is 58FF.

Feature EJ1R is a follow-on product to the EJ05. Feature EJ1R is only supported on an I/O expansion drawer with the new PCIe3 6-slot fanout module (#EMXH).

### **Active Optical Cables for PCIe3 6-Slot Fanout Module (#ECCR, #ECCX, #ECCY, #ECCZ)**

Four new Active Optical cable (AOC) features are available on POWER9 servers to connect to the new PCIe x16 to CXP Optical or CU converter Adapter (#EJ19, #EJ20, #EJ1R). Active Optical Cable offers the following length cables:

- 2M Active Optical Cable Pair for PCIe3 Expansion Drawer (#ECCR), only available for E980
- 3M Active Optical Cable Pair for PCIe3 Expansion Drawer (#ECCX)
- 10M Active Optical Cable Pair for PCIe3 Expansion Drawer (#ECCY)
- 20M Active Optical Cable Pair for PCIe3 Expansion Drawer (#ECCZ), only available for E980

### **Storage Backplane with HI Performance plus 2x24-Port (#EJ0C)**

Clients have a new storage option (#EJ0C) along with the existing three storage features (#EJ0B, #EJBB, #EJSB). Each Power E950 server has eight SFF (2.5 in.) SAS bays for HDDs or SSDs, plus four NVMe 2.5-inch bays. One or two PCIe SAS adapters support these SAS bays. One of these SAS options must be selected:

- Storage Backplane with HI Performance plus 2x24-Port (#EJ0C).
- DASD Backplane with no HDD/SDD drive selected. No PCIe SAS adapter is required (#EJ0B).
- Base DASD backplane together with one SAS PCIe adapter and select SAS drives (#EJBB).
- Split DASD backplane together with two SAS PCIe adapters and select SAS drive (#EJSB).

NVMe drive options can be selected with any of the above SAS options.

The base and the split backplane options provide SFF-3 SAS bays in the system unit. These 2.5-inch or small form factor (SFF) SAS bays can contain SAS drives (HDD or SSD) mounted on a tray or carrier. Thus, any drives that are designated for SFF-1, or SFF-2 bays do not fit in an SFF-3 bay. All SFF-3 bays support concurrent maintenance or hot-plug capability. These backplane options support HDDs or SSDs or a mixture of HDDs and SSDs in the SFF-3 bays. If mixing HDDs and SSDs, they must be in separate arrays.

The base and the split options can offer different drive protection options: RAID 0, RAID 5, RAID 6, or RAID 10. RAID 5 requires a minimum of three drives of the same capacity. RAID 6 requires a minimum of four drives of the same capacity. RAID 10



requires a minimum of two drives. Hot spare capability is supported with RAID 5, RAID 6, or RAID 10.

### **Multiple feature conversions for POWER8 and POWER9 scale-out and scale-up servers provide additional configuration flexibility**

See the [Feature conversions](#) section for further information.

### **POWER9 scale-out and scale-up family servers also support the following existing I/O:**

#### **PCIe3 3D Graphics Adapter x16 (#EC51)**

The PCIe3 3D Graphics Adapter x16 is available for Power L922, S922, and H922 servers. This feature provides 2x DISPLAY port outputs. When using a graphic adapter for Partition Firmware Console to select an install or boot device use FC 3632 display or rack mount 7316-TF4 display. Limit of one adapter per LPAR.

#### **PCIe3 2-Port 40 GbE NIC RoCE QSFP+ Adapter (#EC3B)**

The PCIe3 2-Port 40 GbE NIC RoCE QSFP+ Adapter is available for Power E980 and E950 servers. This feature provides two 40 Gb Ethernet QSFP+ ports. NIC and IBTA RoCE protocols are supported.

RoCE is Remote Direct Memory Access (RDMA) over Converged Ethernet. RoCE can support significantly greater bandwidth with low latency and minimize CPU overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalability.

The adapter does not include transceivers. Shorter distance copper cables include transceivers on the end of the QSFP+ cable (see #EB2B (1m), #EB2H (3m), #ECBN (5m)). For longer distances, use two optical SR transceiver (two #EB27). QSFP+ optical cables to be used with the feature EB27 transceiver are feature EB2J (10m) or feature EB2K (30m). Do not mix copper and optical on the same adapter.

AIX NIM and Linux Network Install are supported.

#### **PCIe3 LP 2-Port 40 GbE NIC RoCE QSFP+ Adapter (#EC3A)**

The PCIe3 LP 2-Port 40 GbE NIC RoCE QSFP+ Adapter is available for the E980 server. This feature provides two 40 Gb Ethernet QSFP+ ports. NIC and IBTA RoCE protocols are supported.

RoCE can support significantly greater bandwidth with low latency and minimize CPU overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalability.

The feature EC3A/EC3B adapter does not include transceivers. Shorter distance copper cables include transceivers on the end of the QSFP+ cable (see #EB2B (1 m), #EB2H (3 m), #ECBN (5 m)). For longer distances, use two optical SR transceiver (two #EB27). QSFP+ optical cables to be used with the feature EB27 transceiver are feature EB2J (10 m) or feature EB2K (30 m). Do not mix copper and optical on the same adapter.

Features EC3A and EC3B have identical electronics and function and the same CCIN (57BD), but they have different tail stocks. Feature EC3A is low profile and feature EC3B is full height.

AIX NIM and Linux Network Install are supported.

#### **PCIe3 LP 2-port 100 Gb EDR IB Adapter x16 (#EC3E)**

The PCIe3 LP 2-port 100 Gb EDR IB Adapter x16 is available for the Power E980 server. This feature provides high-speed connectivity with other servers or IB switches. Each port maximum of 100 Gb assumes no other system or switch bottlenecks are present. A PCIe Gen3 x16 PCIe slot is required. This adapter is

sourced from Mellanox Corporation, based on ConnectX-4 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The two 100 Gb ports have QSFP+ connections, which support EDR cables, either EDR DAC or EDR optical. One adapter can support either or both types of cable. Users can choose to cable up just one port if they want. Transceivers are included in the cables. IBM cable features EB50-EB54 (copper shorter distance) and features EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are supported. Other cables are not supported.

Feature EC3E and EC3F adapters are electronically and functionally identical with the same CCIN of 2CEA. Feature EC3E has a low-profile tailstock bracket. Feature EC3F has a full-high tailstock bracket. See also feature EC3T and feature EC3U for a 1-port version of this adapter.

**Limitation:** The adapter does not fit in a x8 PCIe slot. The adapter is not supported in a PCIe Gen3 I/O drawer.

#### **PCIe3 LP 1-port 100 Gb EDR IB Adapter x16 (#EC3T)**

The PCIe3 LP 1-port 100 Gb EDR IB Adapter x16 is available for the Power E980 server. This feature provides high-speed connectivity with other servers or IB switches. The port's maximum of 100 Gb assumes no other system or switch bottlenecks are present. A PCIe Gen3 x16 PCIe slot is required. This adapter is sourced from Mellanox Corporation, based on ConnectX-4 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The 100 Gb port has a QSFP+ connection, which supports EDR cables, either EDR DAC or EDR optical. Transceivers are included in the cables. IBM cable features EB50-EB54 (copper shorter distance) and features EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are supported. Other cables are not supported.

Feature EC3T and EC3U adapters are electronically and functionally identical with the same CCIN of 2CEB. Feature EC3T has a low-profile tailstock bracket.

**Limitation:** The adapter does not fit in a x8 PCIe slot. The adapter is not supported in a PCIe Gen3 I/O drawer.

#### **PCIe4 LP 2-port 100 Gb EDR IB CAPI adapter (#EC64)**

PCIe4 LP 2-port 100 Gb EDR IB CAPI adapter is available for the Power E980 server. This feature provides high-speed connectivity with other servers or IB switches. Each port maximum of 100 Gb assumes no other system or switch bottlenecks are present. A PCIe Gen4 x16 PCIe slot is required. This adapter is sourced from Mellanox Corporation, based on ConnectX-5 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The two 100 Gb ports have QSFP+ connections, which support EDR cables, either EDR DAC or EDR optical. One adapter can support either or both types of cable. Users can choose to cable up just one port if they want. Transceivers are included in the cables. IBM cable features EB50-EB54 (copper shorter distance) and features EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are supported. Other cables are not supported.

Feature EC64 and EC65 adapters are electronically and functionally identical with the same CCIN of 2CF2. Feature EC64 is low profile and feature EC65 is full high.

**Limitation:** The adapter does not fit in a x8 PCIe slot. The adapter is not supported in a PCIe Gen3 I/O drawer.

#### **PCIe4 LP 1-port 100 Gb EDR IB CAPI adapter (#EC62)**

PCIe4 LP 1-port 100 Gb EDR IB CAPI adapter is available for the Power E980 server. This feature provides high-speed connectivity with other servers or IB switches. The port's maximum of 100 Gb assumes no other system or switch bottlenecks

are present. A PCIe Gen4 x16 PCIe slot is required. This adapter is sourced from Mellanox Corporation, based on ConnectX-5 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The 100 Gb port has a QSFP+ connection, which supports EDR cables, either EDR DAC or EDR optical. Transceivers are included in the cables. IBM cable features EB50-EB54 (copper shorter distance) and features EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are supported. Other cables are not supported.

Feature EC62 and EC63 adapters are electronically and functionally identical with the same CCIN of 2CF1. Feature EC62 is low profile and feature EC63 is full high.

**Limitation:** Adapter does not fit in x8 PCIe slot. Adapter is not supported in a PCIe Gen3 I/O drawer.

### **PCIe1 SAS Tape/DVD Dual-port 3 Gb x8 Adapter (#EJ1N, #EJ1P)**

The PCIe1 SAS Tape/DVD Dual-port 3 Gb x8 Adapter (#EJ1N, #EJ1P) is available for the Power E980 server. It supports the attachment of SAS tape and DVD using a pair of mini SAS 4x connectors. The PCIe1 can be used for external tape drives, which are not supported on the newer and faster 4-port 6 Gb PCIe3 adapter (see #EJ10, #EJ11, #EL60). The adapter supports external SAS tape drives such as the DAT72, DAT160, LTO™-4, LTO-5, LTO-6, and LTO-7 found in the IBM multimedia drawers such as the 7226-1U3 or 7214-1U2 or tape units such as the TS2240, TS2340, TS3100, TS3200, and TS3310. Other removable media devices supported include IBM SAS/SATA DVD-ROM/RAM drives.

SAS adapter-to-enclosure (AE) 3 Gb cables with mini-SAS connectors are used to attach these drives. See features 3684 (3 meter) and 3685 (6 meter). The same AE cables can often alternatively be ordered under the tape enclosure or multimedia drawer.

Feature EJ1P and EJ1N are electrically and functionally identical with the same CCIN of 57B3. EJ1P has a full-high tailstock bracket, and EJ1N has a low-profile tailstock bracket. Feature EJ1P/EJ1N is the same adapter as feature 5901/5278 but designates to IBM configurator tools that the usage will be tape/DVD and will not be used for disk.

PCIe3 12 GB Cache RAID SAS Adapter Quad-port 6Gb x8 (#EJ0L) with AIX and Linux operating system support for the Power E980 server.

### **Specify Mode features with SAS Controller (#EJ0L) for Power E980, available for migration only**

Existing no-charge specify codes are available for the Power E980 server. Specify Mode features are used with each EXP12SX or EXP24SX I/O Drawer to communicate to IBM configurator tools and IBM Manufacturing which mode setting, adapter, and SAS cable are needed. With this specify code, no hardware is shipped. The physical adapters, controllers, and cables must be ordered with their own chargeable feature numbers. There are more technically supported configurations than are represented by these specify codes. IBM Manufacturing and IBM configurator tools such as e-config only understand and support EXP12SX or EXP24SX configurations represented by these specify codes.

<b>Specify</b>	<b>Mode</b>	<b>Adapter/ Controller</b>	<b>Cable to Drw</b>	<b>Environment</b>
EJVP	1	Two EJ0L	Two YO12	See EXP12SX for supported OS levels
EJWP	1	Two EJ0L	Two YO12	See EXP24SX for supported OS levels
EJWR	2	Four EJ0L	Two X12	See EXP24SX for supported OS levels

Specify	Mode	Adapter/ Controller	Cable to Drw	Environment
EJWS	2	Two EJ0L	Two X12	See EXP24SX for supported OS levels
EJWT	2	Two EJ0L	One X12	See EXP24SX for supported OS levels

### Existing SSDs and HDDs available for migration only for E950 server

#### Multi-OS server feature numbers

SSD	For SFF-2 and 4k
387 GB	ES0Q for AIX/Linux
775 GB	ES0S for AIX/Linux
HDD 10K	For SFF-2 and 5xx
1.2 TB	ESD3 for AIX/Linux
HDD 15K	For SFF-2 and 5xx
600 GB	ESDP for AIX/Linux

Software requirements (assuming the server supports this software level):

- AIX
- Linux

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## Product number

The following are newly announced features on the specific models of the IBM Power Systems 9040 and 9080 machine type:

### New feature available April 23, 2019

Description	Machine		Feature number
	type	Model	
Deactivation of LPM for Dedicated Servers	9040	MR9	EPA0
	9080	M9S	

The following are newly announced features on the specific models of the IBM Power Systems 5148 machine type:

### New features available May 3, 2019

Description	Machine		Feature number
	type	Model	
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	5148	21L	6671
	5148	22L	
Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A	5148	21L	6672
	5148	22L	

The following are newly announced features on the specific models of the IBM Power Systems 8247, 8284, 8286, 8408, 9008, 9009, 9040, 9080, 9119, and 9223 machine type:

### New features available May 17, 2019

Description	Machine		Feature number
	type	Model	

SAS Cable (AE) Adapter to Enclosure, single controller/single path 3M	9040	MR9	3684
	9080	M9S	
SAS Cable (AE) Adapter to Enclosure, single controller/single path 6M	9040	MR9	3685
	9080	M9S	
PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter	9080	M9S	EC3A
PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter	9040	MR9	EC3B
PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter	9080	M9S	EC3B
PCIe3 LP 2-port 100Gb EDR IB Adapter x16	9080	M9S	EC3E
PCIe3 LP 1-port 100Gb EDR IB Adapter x16	9080	M9S	EC3T
PCIe3 LP 3D Graphics Adapter x16	9008	22L	EC51
	9009	22A	
	9223	22H	
PCIe3 1.6 TB SSD NVMe Adapter	9009	41A	EC5B
	9009	42A	
	9040	MR9	
	9223	42H	
PCIe3 LP 3.2 TB SSD NVMe adapter	9008	22L	EC5C
	9009	22A	
	9080	M9S	
	9223	22H	
PCIe3 3.2 TB SSD NVMe Adapter	9009	41A	EC5D
	9009	42A	
	9040	MR9	
	9223	42H	
PCIe3 LP 6.4 TB SSD NVMe adapter	9008	22L	EC5E
	9009	22A	
	9080	M9S	
	9223	22H	
PCIe3 6.4 TB SSD NVMe Adapter	9009	41A	EC5F
	9009	42A	
	9040	MR9	
	9223	42H	
PCIe3 LP 1.6 TB SSD NVMe Adapter	9008	22L	EC5G
	9009	22A	
	9080	M9S	
	9223	22H	
Mainstream 1.6 TB SSD NVMe U.2 module	9080	M9S	EC5K
Mainstream 3.2 TB SSD NVMe U.2 module	9080	M9S	EC5L
PCIe4 LP 1-port 100Gb EDR IB CAPI adapter	9080	M9S	EC62
PCIe4 LP 2-port 100Gb EDR IB CAPI adapter	9080	M9S	EC64
2M Active Optical Cable Pair for PCIe3 Expansion Drawer	9080	M9S	ECCR
3M Active Optical Cable Pair for PCIe3 Expansion Drawer	9008	22L	ECCX
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9223	22H	
	9223	42H	
10M Active Optical Cable Pair for PCIe3 Expansion Drawer	9008	22L	ECCY
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9223	22H	
	9223	42H	
20M Active Optical Cable Pair for PCIe3 Expansion Drawer	9080	M9S	ECCZ
Storage Backplane with HI Performance plus 2x24-Port	9040	MR9	EJ0C
PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	9080	M9S	EJ19
PCIe1 LP SAS Tape/DVD Dual-port 3Gb x8 Adapter	9080	M9S	EJ1N
PCIe1 SAS Tape/DVD Dual-port 3Gb x8 Adapter	9080	M9S	EJ1P
PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	9008	22L	EJ1R
	9009	22A	
	9223	22H	
PCIe x16 to CXP Optical or CU converter Adapter			

for PCIe3 Expansion Drawer	9009	41A	EJ20
	9009	42A	
	9040	MR9	
	9223	42H	
Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)	9008	22L	EJRP
	9009	22A	
	9009	41A	
	9009	42A	
	9223	22H	
Specify mode-2 & (4) EJ0L for EXP24S #5887/EL1S	9223	42H	EJRR
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
Specify Mode-2 & (2)EJ0L & (2) X for EXP24S (#5887/EL1S)	9223	22H	EJRS
	9223	42H	
	9008	22L	
	9009	22A	
	9009	41A	
Specify Mode-2 & (2)EJ0L & (1) X for EXP24S (#5887/EL1S)	9009	42A	EJRT
	9223	22H	
	9223	42H	
	9008	22L	
	9009	22A	
Non-paired Indicator EJ0L PCIe SAS RAID Adapter	9009	41A	EJRU
	9009	42A	
	9223	22H	
	9223	42H	
	9008	22L	
Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJVP
	9009	41A	
	9009	42A	
	9223	22H	
	9223	42H	
Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP12SX #ESLL/ELLL	9080	M9S	EJVP
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP12SX #ESLL/ELLL	9223	22H	EJVP
	9223	42H	
	9040	MR9	
	9008	22L	
	9009	22A	
Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP24SX #ESLS/ELLS	9009	41A	EJWP
	9009	42A	
	9223	22H	
	9223	42H	
	9080	M9S	
Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP24SX #ESLS/ELLS	9008	22L	EJWP
	9009	22A	
	9009	41A	
	9009	42A	
	9223	22H	
Specify Mode-2 & (4)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS	9223	42H	EJWR
	9080	M9S	
	9008	22L	
	9009	22A	
	9009	41A	
Specify Mode-2 & (4)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS	9009	42A	EJWR
	9223	22H	
	9223	42H	
	9080	M9S	
	9008	22L	
Specify Mode-2 & (2)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWS
	9009	41A	
	9009	42A	
	9223	22H	
	9223	42H	

	9223	42H	
Specify Mode-2 & (2)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS	9080	M9S	EJWS
Specify Mode-2 & (2)EJ0L& (1)X12 for EXP24SX #ESLS/ELLS	9008	22L	EJWT
	9009	22A	
	9009	41A	
	9009	42A	
	9223	22H	
	9223	42H	
Specify Mode-2 & (2)EJ0L& (1)X12 for EXP24SX #ESLS/ELLS	9080	M9S	EJWT
Specify Mode-1 & (2)EJ14 & (2)Y012G for EXP24SX #ESLS/ELLS	9040	MR9	EJWV
ES91 Load Source Specify (387GB SSD SFF-3)	8284	21A	ELZ1
	8286	41A	
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ES95 Load Source Specify (387GB SSD SFF-2)	8286	41A	ELZ5
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESNB Load Source Specify (775GB SSD SFF-2)	8286	41A	ELZB
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESND Load Source Specify (775GB SSD SFF-3)	8286	41A	ELZD
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ESNF Load Source Specify (1.55TB SSD SFF-2)	8286	41A	ELZF
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESNH Load Source Specify (1.55TB SSD SFF-3)	8286	41A	ELZH
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	9008	22L	EMXH
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9223	22H	
	9223	42H	
Quantity 150 of #ES0Q 387GB SFF-2 4k SSD (AIX/ Linux)	9040	MR9	EQ0Q
Quantity 150 of #ES0S 775GB SFF-2 4k SSD (AIX/			

Linux)	9040	MR9	EQ0S
Qty 150 of #6577	9080	M9S	EQ77
Quantity 150 of #ESD3 (1.2TB 10k SFF-2)	9040	MR9	EQD3
Quantity 150 of #ESDP (600GB 15K RPM SAS SFF-2 for AIX/LINUX)	9040	MR9	EQDP
Quantity 150 of ES94 387GB SAS 4k	8247	21L	ER94
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
Quantity 150 of ES95 387GB SAS 4k	8286	41A	ER95
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
Quantity 150 of ESGV 387GB SSD 4k	8247	21L	ERGV
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
Quantity 150 of ESGZ 775GB SSD 4k	8247	21L	ERGZ
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	



Quantity 150 of ESJ0 931GB SAS 4k	9223	42H	ERJ0
	8247	21L	
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	Quantity 150 of ESJ1 931GB SAS 4k	9223	
9223		42H	
8286		41A	
8286		42A	
9009		41A	
9009		42A	
9080		M9S	
9080		MHE	
9080		MME	
9119		MHE	
9119		MME	
Quantity 150 of ESJ2 1.86TB SAS 4k	9223	42H	ERJ2
	8247	21L	
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	Quantity 150 of ESJ3 1.86TB SAS 4k	9223	
9223		42H	
8286		41A	
8286		42A	
9009		41A	
9009		42A	
9080		M9S	
9080		MHE	
9080		MME	
9119		MHE	
9119		MME	
Quantity 150 of ESJ4 3.72TB SAS 4k	9223	42H	ERJ4
	8247	21L	
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
9009	41A		
9009	42A		
9040	MR9		

	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
Quantity 150 of ESJ5 3.72TB SAS 4k	9223	42H	
	8286	41A	ERJ5
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
Quantity 150 of ESJ6 7.45TB SAS 4k	9223	42H	
	9008	22L	ERJ6
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9223	22H	
Quantity 150 of ESJ7 7.45TB SAS 4k	9223	42H	
	9009	41A	ERJ7
	9009	42A	
	9080	M9S	
Quantity 150 of ESNA 775GB SSD 4k	9223	42H	
	8247	21L	ERNA
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
Quantity 150 of ESNB 775GB SSD 4k	9223	42H	
	8286	41A	ERNB
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
Quantity 150 of ESNE 1.55TB SSD 4k	9223	42H	
	8247	21L	ERNE
	8247	22L	
	8247	42L	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	

	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
Quantity 150 of ESNF 1.55TB SSD 4k	8286	41A	ERNF
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
387GB SFF-2 4k SSD for AIX/Linux	9040	MR9	ES0Q
775GB SFF-2 4k SSD for AIX/Linux	9040	MR9	ES0S
387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ES90
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
387GB Enterprise SAS 4k SFF-3 SSD for IBM i	8284	21A	ES91
	8286	41A	
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ES94
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
387GB Enterprise SAS 4k SFF-2 SSD for IBM i	8286	41A	ES95
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
1.2TB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)	9040	MR9	ESD3
600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block (AIX/Linux)	9040	MR9	ESDP
387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux	8247	21L	ESGT

	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux	8247	21L	ESGV
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux	8247	21L	ESGX
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux	8247	21L	ESGZ
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ESJ0

	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
931GB Mainstream SAS 4k SFF-2 SSD for IBM i	8286	41A	ESJ1
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ESJ2
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
1.86TB Mainstream SAS 4k SFF-2 SSD for IBM i	8286	41A	ESJ3
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ESJ4
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	

	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
3.72TB Mainstream SAS 4k SFF-2 SSD for IBM i	8286	41A	ESJ5
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
7.45TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	9008	22L	ESJ6
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9223	22H	
	9223	42H	
7.45TB Mainstream SAS 4k SFF-2 SSD for IBM i	9009	41A	ESJ7
	9009	42A	
	9080	M9S	
	9223	42H	
931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ESJ8
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
931GB Mainstream SAS 4k SFF-3 SSD for IBM i	8284	21A	ESJ9
	8286	41A	
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ESJA
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
1.86TB Mainstream SAS 4k SFF-3 SSD for IBM i	8286	41A	ESJB
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ESJC

	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
3.72TB Mainstream SAS 4k SFF-3 SSD for IBM i	8286	41A	ESJD
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
7.45TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	9008	22L	ESJE
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
7.45TB Mainstream SAS 4k SFF-3 SSD for IBM i	9009	41A	ESJF
	9009	42A	
	9223	42H	
775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ESNA
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
775GB Enterprise SAS 4k SFF-2 SSD for IBM i	8286	41A	ESNB
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ESNC
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	

	9040	MR9	
	9223	22H	
	9223	42H	
775GB Enterprise SAS 4k SFF-3 SSD for IBM i	8286	41A	ESND
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	8247	21L	ESNE
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	
1.55TB Enterprise SAS 4k SFF-2 SSD for IBM i	8286	41A	ESNF
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	8247	21L	ESNG
	8247	22L	
	8247	42L	
	8284	21A	
	8284	22A	
	8286	41A	
	8286	42A	
	8408	44E	
	8408	E8E	
	9008	22L	
	9009	22A	
	9009	41A	
	9009	42A	
	9040	MR9	
	9223	22H	
	9223	42H	
1.55TB Enterprise SAS 4k SFF-3 SSD for IBM i	8286	41A	ESNH
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ESJ1 Load Source Specify (931GB SSD SFF-2)	8286	41A	EU41
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESJ3 Load Source Specify (1.86TB SSD SFF-2)	8286	41A	EU43
	8286	42A	
	9009	41A	
	9009	42A	



	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESJ5 Load Source Specify (3.72TB SSD SFF-2)	8286	41A	EU45
	8286	42A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	42H	
ESJ7 Load Source Specify (7.45TB SSD SFF-2)	9009	41A	EU47
	9009	42A	
	9080	M9S	
	9223	42H	
ESJ9 Load Source Specify (931GB SSD SFF-3)	8284	21A	EU49
	8286	41A	
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ESJB Load Source Specify (1.86TB SSD SFF-3)	8286	41A	EU4B
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ESJD Load Source Specify (3.72TB SSD SFF-3)	8286	41A	EU4D
	8286	42A	
	9009	41A	
	9009	42A	
	9223	42H	
ESJF Load Source Specify (7.45TB SSD SFF-3)	9009	41A	EU4F
	9009	42A	
	9223	42H	

The following are newly announced features on the specific models of the IBM Power Systems 8284, 8286, 9009, 9080, 9119, and 9223 machine type:

### **New feature available June 21, 2019**

Description	Machine type	Model	Feature number
IBM i 7.4 Indicator	8284	21A	EB74
	8284	22A	
	8286	41A	
	8286	42A	
	9009	22A	
	9009	41A	
	9009	42A	
	9080	M9S	
	9080	MHE	
	9080	MME	
	9119	MHE	
	9119	MME	
	9223	22H	
	9223	42H	

### **Feature conversions**

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The existing components being replaced during a model or feature conversion become the property of IBM and must be returned.

Feature conversions are always implemented on a "quantity of one for quantity of one" basis. Multiple existing features may not be converted to a single new feature. Single existing features may not be converted to multiple new features.

The following conversions are available to clients:

**Feature conversions for 9040-MR9 adapter features:**

From FC:	To FC:	Return parts
EJ08 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ20 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9040-MR9 miscellaneous features:**

From FC:	To FC:	Return parts
EJ0B - Storage Backplane with Zero DASD 8 SAS 2.5" HDD/SDD Controllers	EJ0C - Storage Backplane with HI Performance plus 2x24-Port	No
EJBB - Storage Backplane Base DASD 8 SAS 2.5" HDD/SDD Controllers	EJ0C - Storage Backplane with HI Performance plus 2x24-Port	No
EJSB - Storage Backplane Split DASD 8 SAS 2.5" HDD/SDD Controllers	EJ0C - Storage Backplane with HI Performance plus 2x24-Port	No

**Feature conversions for 9040-MR9 rack-related features:**

From FC:	To FC:	Return parts
EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-M9S adapter features:**

From FC:	To FC:	Return parts
EJ07 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ19 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-M9S cable features:**

From FC:	To FC:	Return parts
ECC6 - 2M Optical Cable Pair for PCIe3 Expansion Drawer	ECCR - 2M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC8 - 10M optical Cable Pair for PCIe3 Expansion Drawer	ECCY - 10M Active optical Cable Pair for PCIe3 Expansion Drawer	No
ECC9 - 20M optical Cable	ECCZ - 20M Active optical	No

Pair for PCIe3 Expansion Drawer	Cable Pair for PCIe3 Expansion Drawer
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**Feature conversions for 9080-M9S memory features:**

From FC:	To FC:	Return parts
EMBG - 500 GB Mobile Enabled Memory Activations	EMBH - 500 GB Mobile Memory Activations	No

**Feature conversions for 9080-M9S rack-related features:**

From FC:	To FC:	Return parts
EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MHE to 9080-M9S adapter features:**

From FC:	To FC:	Return parts
EJ07 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ19 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MHE to 9080-M9S cable features:**

From FC:	To FC:	Return parts
ECC6 - 2M Optical Cable Pair for PCIe3 Expansion Drawer	ECCR - 2M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC8 - 10M Optical Cable Pair for PCIe3 Expansion Drawer	ECCY - 10M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC9 - 20M Optical Cable Pair for PCIe3 Expansion Drawer	ECCZ - 20M Active Optical Cable Pair for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MHE to 9080-M9S rack-related features:**

From FC:	To FC:	Return parts
EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MME to 9080-M9S adapter features:**

Return

From FC:	To FC:	parts
EJ07 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ19 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MME to 9080-M9S cable features:**

From FC:	To FC:	Return parts
ECC6 - 2M Optical Cable Pair for PCIe3 Expansion Drawer	ECCR - 2M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC8 - 10M Optical Cable Pair for PCIe3 Expansion Drawer	ECCY - 10M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC9 - 20M Optical Cable Pair for PCIe3 Expansion Drawer	ECCZ - 20M Active Optical Cable Pair for PCIe3 Expansion Drawer	No

**Feature conversions for 9080-MME to 9080-M9S rack-related features:**

From FC:	To FC:	Return parts
EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MHE to 9080-M9S adapter features:**

From FC:	To FC:	Return parts
EJ07 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ19 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MHE to 9080-M9S cable features:**

From FC:	To FC:	Return parts
ECC6 - 2M Optical Cable Pair for PCIe3 Expansion Drawer	ECCR - 2M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC8 - 10M Optical Cable Pair for PCIe3 Expansion Drawer	ECCY - 10M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC9 - 20M Optical Cable Pair for PCIe3 Expansion Drawer	ECCZ - 20M Active Optical Cable Pair for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MHE to 9080-M9S rack-related features:**

From FC:	To FC:	Return parts
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EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MME to 9080-M9S adapter features:**

From FC:	To FC:	Return parts
EJ07 - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	EJ19 - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MME to 9080-M9S cable features:**

From FC:	To FC:	Return parts
ECC6 - 2M Optical Cable Pair for PCIe3 Expansion Drawer	ECCR - 2M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC8 - 10M optical Cable Pair for PCIe3 Expansion Drawer	ECCY - 10M Active Optical Cable Pair for PCIe3 Expansion Drawer	No
ECC9 - 20M optical Cable Pair for PCIe3 Expansion Drawer	ECCZ - 20M Active optical Cable Pair for PCIe3 Expansion Drawer	No

**Feature conversions for 9119-MME to 9080-M9S rack-related features:**

From FC:	To FC:	Return parts
EMXF - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No
EMXG - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	EMXH - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	No

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## Publications

No publications are shipped with the announced products.

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### National language support

Not applicable.

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For details on available services, contact your IBM representative or go to the [IBM Global Technology Services<sup>\(R\)</sup>](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

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## Technical information

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### **Planning information**

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#### ***Cable orders***

No cables required.

### **Security, auditability, and control**

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The client is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

### **IBM Systems Lab Services**

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For details on available services, contact your IBM representative or go to the [IBM Systems Lab Services](#) website.

### **Global Technology Services**

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Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, or integration of this product.

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## IBM Electronic Services

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IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, go to the [IBM Electronic Service Agent](#) website.

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## Terms and conditions

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### Field-installable feature

Yes

### Warranty period

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

### Warranty and maintenance for mainstream SSDs for POWER8 servers

Any IBM mainstream devices (previously called *read-intensive devices*) for POWER8 servers identified in this document have a maximum number of write cycles. If a mainstream drive reaches its maximum write operation capability during the warranty period, IBM replaces the drive at no cost. After the warranty period, the replacement of the drive is not covered under IBM maintenance if the maximum number of write operations exceed the threshold value. You must order a new, chargeable SSD as a replacement. Other aspects of SSD maintenance are consistent with SSDs that are not mainstream drives.

## Warranty and maintenance for mainstream SSDs for POWER9 servers

Any IBM mainstream devices (previously called *read-intensive devices*) for POWER9 servers identified in this document have a maximum number of write cycles. IBM mainstream device failures will be replaced during the standard warranty and maintenance period for devices that have not reached the maximum number of write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Individual service life may vary and can be monitored using an operating system command.

### Customer setup

Yes

### Machine code

The same license terms and conditions as the base machine apply.

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## Prices

For all local charges, contact your IBM representative.

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## Announcement countries

All European, Middle Eastern, and African countries, except Islamic Republic of Iran, Sudan, and Syrian Arab Republic.

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## Corrections

### (Corrected on May 16, 2019)

The PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer (#EMXH) topic was revised in the Description section.