IBM **Power Systems**

POWER9 Servers Overview

Scalable servers to meet the business needs of tomorrow.

Contents

IBM Power Systems

Power Systems are built for the most demanding, data-intensive, computing on earth. Our cloud-ready servers help you unleash insight from your data pipeline—from managing mission-critical data, to managing your operational data stores and data lakes, to delivering the best server for cognitive computing.

With industry leading reliability and security, our infrastructure is designed to crush the most data-intensive workloads imaginable, while keeping your business protected.

Enterprise cloud-ready

Power Systems easily integrate into your organization's private or hybrid cloud strategy to handle flexible consumption models and changing customer needs.

No. 1 in reliability by ITIC

Ranked No. 1 in every major reliability category by ITIC*, IBM Power Systems deliver the most reliable on-premises infrastructure to meet around-the-clock customer demands.

Industry-leading value and performance

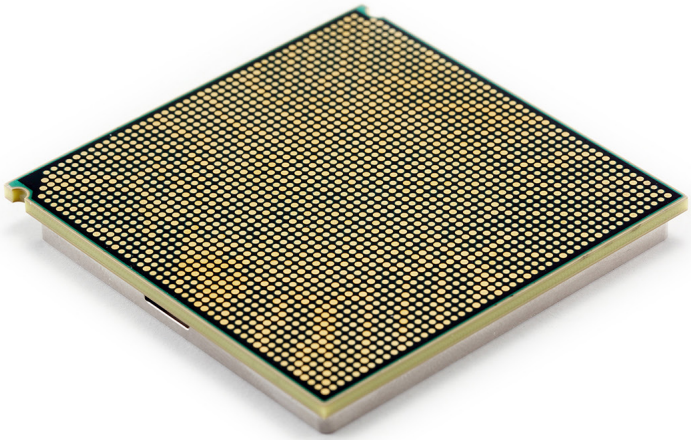
With Power Systems, clients can take advantage of superior core performance and memory bandwidth to deliver both performance and price-performance advantages.

*#1 in every major reliability category, 2017-2018 ITIC Global Server Hardware Reliability Report (PDF, 908KB)

IBM POWER9

IBM POWER9: Enhanced core and chip architecture for next-gen workloads

Built from the ground-up for data intensive workloads, POWER9 is the only processor with state-of-the-art I/O subsystem technology, including next generation NVIDIA NVLink, PCIe Gen4 and OpenCAPI.



POWER9 vs x86 Xeon SP

- 2x[1] — Performance per core
- 2.6x[2] — RAM per socket
- 1.8x[3] — Memory bandwidth per socket

POWER9 with NVLink vs x86 Xeon

- 9.5x[4] — CPU to accelerator bandwidth

POWER9 for Enterprise

Future-forward infrastructure to meet the needs of the enterprise

Take advantage of a scale-up infrastructure that lets you stay ahead of workload challenges, new data sources and compute demands. With these enterprise servers you can cloud enable workloads and build a cloud designed for the most data-intensive workloads.

Feature	E950	E980 1-4 nodes
MTM	9040-MR9	9080-M9S
System Packaging	4U	5U system node & 2U system controller unit
Processor Socket	2S to 4S	4S per node
# of cores	32, 40, 44, or 48 cores	Up to 192 cores
Memory DIMM Slots	128 DDR4 ISDIMMs	Up to 128 DDR4 CDIMMs
Memory – Max	16TB	16TB per node, up to 64TB
Built-In IBM PowerVM	Yes	Yes
PCIe Gen4 Slots	10 Slots	Up to 32 Slots
Operating System	AIX, Linux	AIX, IBM i, Linux

POWER9 for AIX & IBM i

Scale-out servers: future-forward flexible infrastructure

Take advantage of a scale-out infrastructure that lets you grow as you go. IBM scale-out servers are cloud enabled with built-in virtualization and are delivered secure with pre-loaded firmware and operating system security patches that mitigate known Meltdown and Spectre vulnerabilities.

Feature	S914*	S924*	S922*
MTM	9009-41A	9009-42A	9009-22A
System Packaging	4U & Tower	4U	2U
Processor Socket	1S	1S upgradable or 2S	1S upgradable or 2S
Typical Processor options GHZ (cores/socket) | # of cores	2.3 to 3.8 GHz (1) | 4 (1) | 6 2.8 to 3.8 GHz (1) | 8	3.8 to 4.0 GHz (2) | 8 3.5 to 3.9 GHz (2) | 10 3.4 to 3.9 GHz (2) | 12	2.8 to 3.8 GHz (2) | 4 3.4 to 3.9 GHz (2) | 8 2.9 to 3.8 GHz (2) | 10
Memory DIMM Slots	16	32	32
Memory – Max	1TB	4TB	4TB
Built-In IBM PowerVM	Yes	Yes	Yes
CAPI2.0 via PCIe G4 Slot	2 Slots	4 Slots	4 Slots

*Also Supports Linux

POWER9 for Linux

Future-Forward infrastructure for mission-critical data

Power Systems servers easily integrate into your organization's cloud and cognitive strategy and deliver industry-leading price-performance for your mission-critical Linux workloads.

Feature	L922	LC921	LC922
MTM	9008-22	9006-12P	9006-22P
System Packaging	2U	1U	2U
Processor Socket	1S upgradable or 2S	1S upgradable or 2S	2S
# of cores	Up to 24 cores	Up to 40 cores	Up to 44 cores
Memory DIMM Slots	32	32	16
Memory – Max	4TB	2TB	2TB
CAPI2.0 via PCIe G4 Slot	4 Slots	4 PCIe G4 Slots with 3 CAPI 2.0 enabled	6 PCIe G4 Slots with 5 CAPI 2.0 enabled
HDD/SSD		Max 40TB	Max 120TB

POWER9 for SAP HANA®

Run SAP HANA on the platform built for big data

With built-in virtualization and capacity on demand, IBM Power Systems meet the demands of data-intense in-memory workloads, allowing you to grow your database capacity and the size of your SAP HANA environment without having to provision a new server.

Feature	H922*	H924*
MTM	9223-22H	9223-42H
System Packaging	2U	4U
Processor Socket	1S upgradable or 2S	2S
# of cores	4,8,10 cores/socket	8,10,12 cores/socket
Memory Slots	32	32
Memory – Max	4TB	4TB
CAPI2.0 via PCIe G4 Slot	4 Slots	4 Slots

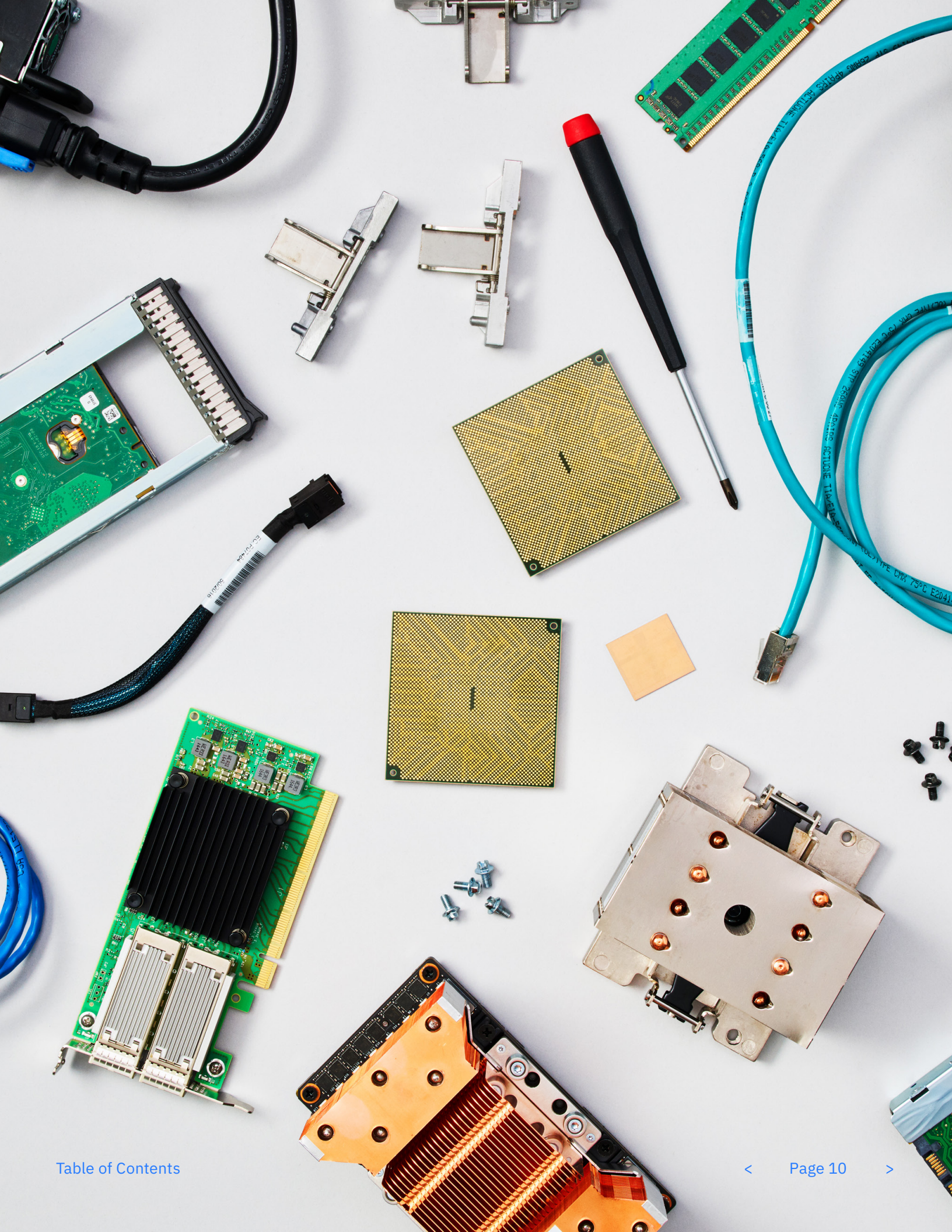
*Supports AIX, IBM I and Linux

POWER9 for Enterprise AI, Deep Learning & Machine Learning

Fastest, simplest way to deploy industry-leading DL and AI frameworks

These servers provide the fastest, simplest way to deploy deep learning frameworks—with enterprise-class support—to fuel new thinking and capabilities across your organization.

Feature	AC922	LC922
MTM	8335-GTH | 8335-GTX	9006-22P
System Packaging	2U	2U
Processor Socket	2S	2S
# of cores	Up to 44 cores	Up to 44 cores
Number of GPUs	4 or 6 Nvidia Tesla GPU processors (NVLink 2.0 attached)	Not Available
Memory DIMM Slots	16	16
Memory – Max	1TB	1TB
HDD/SSD	Two SFF (2.5”) SATA drives for Max 4 TB (HDD) Max 7.68 TB (SSD)	12 SFF/LFF (HDD/SSD) (4x NVMe enabled) Max 120 TB (HDD) Max 45.6 TB (SSD)
PCIe G4 Slot	4 Slots	6 Slots



1. 2X performance per core is based on IBM Internal measurements as of 2/28/18 on various system configuration and workload environments including (1) Enterprise Database (2.22X per core): 20c L922 (2x10-core/2.9 GHz/256 GB memory): 1,039,365 Ops/sec versus 2-socket Intel Xeon Skylake Gold 6148 (2x20-core/2.4 GHz/256 GB memory): 932,273 Ops/sec. (2) DB2 Warehouse (2.43X per core): 20c S922 (2x10-core/2.9 GHz/512 GB memory): 3242 QpH versus 2-socket Intel Xeon Skylake Platinum 8168 (2x24-core/2.7 GHz/512 GB memory): 3203 QpH. (3) DayTrader 7 (3.19X per core): 24c S924 (2x12-core/3.4 GHz/512 GB memory): 32221.4 tps versus 2-socket Intel Xeon Skylake Platinum 8180 (2x28-core/2.5 GHz/512 GB memory): 23497.4 tps.
2. 2.6X memory capacity is based on 4TB per socket for POWER9 and 1.5TB per socket for x86 Scalable Platform Intel product brief: https://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/xeon-scalable-platform-brief.pdf?asset=14606
3. 1.8X bandwidthy is based on 230 GB/sec per socket for POWER9 and 128GB/sec per socket for x86 Scalable Platform Intel product brief: https://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/xeon-scalable-platform-brief.pdf?asset=14606
4. 9.5X is based on POWER9 and next-generation NVIDIA NVLink peak transfer rate is 150 GB/sec = 48 lanes x 3.2265625 GB/sec x 64 bit/66 bit encoding compared to x86 PCI Express 3.0 (x16) peak transfer rate is 15.75 GB/sec = 16 lanes X 1GB/sec/lane x 128 bit/130 bit encoding.

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