IBM POWER9 processor technology

The POWER9 processor is manufactured by using the IBM 14 nm Silicon-On-Insulator (SOI) technology. Each chip is 693 mm^2 and contains 8 billion transistors. The DS8900F uses the PCIe I/O controllers and an interconnection system that connects all components within the chip. POWER9 processor advancements in multi-core and multithreading are remarkable. These multithreading capabilities improve the I/O throughput of the DS8900F storage servers.

The DS8900F family offers several configurations of CPCs:

- The DS8950F offers two processor configurations:
  - 10-core with 512 GB memory
  - 20-core with 1, or 2 TB memory
- The DS8910F models have an 8-core processor configuration, with 192 GB or 512 GB of system memory.

A central processor complex (CPC) is also referred to as a *storage server*. For more information, see Chapter 3, “DS8900 reliability, availability, and serviceabilty” on page 65.

Internal PCIe-based fabric

The I/O enclosure pairs are PCIe Gen3-capable. The I/O enclosure supports six PCIe adapter slots, two additional direct-attached high-performance flash enclosure ports, and two zHyperLink ports. The I/O enclosures are attached to the POWER servers by two x8 PCIe Gen3 cables. The internal transfer rate to each I/O bay is faster compared to earlier DS8000 models.

For more information, see Chapter 2, “IBM DS8900F hardware components and architecture” on page 23.

High-performance flash enclosure

The HPFEs connect to the I/O enclosures over a PCIe fabric, which increases bandwidth and transaction-processing capability. The HPFE Gen2, which is based on 2.5-inch flash drives, now supports several distinct classifications of flash drives, namely *High-Performance* and *High-Capacity* flash types: The 800 GB / 1.6 TB / 3.2 TB being the High-Performance *Flash Tier 0*, 3.84 TB for the High-Capacity *Flash Tier 1*, and 1.92 TB / 7.68 TB / 15.36 TB for the High-Capacity *Flash Tier 2.*

All these can be installed in models 993, 994 and 996, with the exception of the 1.92 TB flash which is for DS8910F only. They can be installed in pairs of 2U enclosures, with each such pair holding up to 48 flash drives. HPFEs and flash drives provide up to a 4x throughput improvement compared to ordinary flash drives.

When comparing both HPFE generations, the Gen2 integrated flash RAID controller delivers significantly increased performance and capacity figures. Each flash adapter pair, and thus each HPFE pair, delivers up to 900K IOPS reads, 225K IOps writes, and up to 14 GBps and 9.5 GBps for read and write bandwidth respectively.

For more information, see Chapter 2, “IBM DS8900F hardware components and architecture” on page 23.

Drive options

The DS8900F offers the following flash drives to meet the requirements of various workloads and configurations. For more information, see Chapter 7, “IBM DS8900F physical planning and installation” on page 179.