

Introduction to IBM Virtual Flash Memory

Improving Availability with Virtual Flash Memory

What is IBM Virtual Flash Memory?

Virtual Flash Memory is the next generation of storage class memory designed to help improve availability and performance during workload transitions for improved quality of service. Virtual Flash Memory can help reduce latency for critical paging that might otherwise impact the availability and performance of your key workloads.

Virtual Flash Memory is designed to offer exceptional performance for paging spikes by reducing paging latency. Virtual Flash Memory can be especially helpful during transitional workload processing shifts, where paging might surge, such as during start of day processing, changes in loads, or collection of SVC or standalone dumps.

Virtual Flash Memory is designed to improve availability through improved paging performance at times when it matters most - like periods of peak paging during morning trading sessions or retail shopping days.

Benefits from Virtual Flash Memory

Overflow handling for Coupling Facility

Virtual Flash Memory can provide Coupling Facility clients with cost effective standby capacity to help handle the overflow of WebSphere® MQ® shared queues. Users can now specify overflow areas for certain Coupling Facility list structures in the Storage Class Memory (SCM) provided by the Virtual Flash Memory feature. This is designed to allow structure data to be migrated to Virtual Flash Memory as needed and quickly migrated back to real memory to be processed.

Improve Availability

Virtual Flash Memory can improve availability by reducing significant paging delays that might otherwise slow system performance and impact mission critical workloads.

Improve Diagnostic Time

During diagnostic collection, as in SVC or standalone dumps, systems can become sluggish effectively rendering key systems unavailable. When data is transferred into main memory as part of a dump, fast IO rates and low latency of Virtual Flash Memory provide decreased first failure data capture time, faster page-ins of the critical pages needed to create the dump. The system is able to return to normal workload performance faster, without delays.

Improve Paging

z/OS® uses both Virtual Flash Memory and page data sets for auxiliary storage. Wherever possible the system will page first to Virtual Flash Memory resulting in faster performance. Especially for data intensive applications the use of pageable large pages with Virtual Flash Memory enables the transfer of large amounts of data at faster speeds, which can result in improved performance for critical workloads like Db2®.

Improve Performance at Transition Times

Banks and financial institutions need highly responsive start of day performance. When the workload shifts from a transactional workload, say, from prime shift to batch and back, response time delays can occur. This is due to the required page-ins of critical work needed to resume transactional processing. These delays can be dramatically reduced when data for the next shift is transferred from flash storage into memory. The large number of page-ins could otherwise delay performance at “start of day” or “market open” activities, vital to operations like trading and banking.

Reduce CPU Cycles

Virtual Flash Memory works to reduce CPU cycles associated with page translations. Typically, page translations from virtual to real memory can impact the performance of workloads like Db2 or Java®. When using small pages (4K pages), paging is less efficient than paging using fewer larger 1 MB pages.

Benefit to Service Levels for Any Industries

Virtual Flash Memory is useful for *any* industry needing improved service levels:

- Applications requiring high availability like bank, insurance, or trading applications
- Development and test teams that collect diagnostics frequently
- Service providers competing on superior performance
- Retail applications with a web presence
- Public sector applications requiring high availability, like emergency preparedness
- Any organization that needs high SLAs

Planning and Configuring Virtual Flash Memory

Virtual Flash Memory is an IBM Z® feature and is located within Random Array of Independent Memory (RAIM) on the IBM z14™ (z14). For models M01, M02, M03, M04 and M05 it is orderable in 4 sizes - 1.5 TB, 3.0 TB, 4.5 TB, 6.0 TB. On the Model ZR1 it is available in four sizes - .5 TB, 1.0 TB, 1.5 TB and 2.0 TB. Virtual Flash Memory does not require PCIe I/O Slots so users of Virtual Flash Memory can free up at least two I/O slots for other users such as accelerators, channels, network, etc.

Incremental Virtual Flash Memory can be brought online or offline as needed using HMC reconfiguration capabilities. VFM allocation is done in Image Profile panel on the HMC and specifies the amount of flash memory initially brought online to a z/OS partition. In addition, Virtual Flash Memory may be virtualized across partitions (LPARS) for further flexibility.

Sizing Virtual Flash Memory

Plan to assign the same amount of memory on Virtual Flash Memory as defined for paging datasets on disk. Usually 1.5 TB of Virtual Flash Memory provides enough paging space for the entire z/OS partition. There is no need to perform detailed capacity sizing to plan for Virtual Flash Memory. Adding Virtual Flash Memory to your auxiliary storage can improve paging performance and availability.

Virtual Flash Memory is not persistent across IPLs, and cannot be used for Virtual I/O or PLPA data used in warm starts.

Bottom line

- Virtual Flash Memory is designed to improve availability and can reduce paging latency at critical times such as during morning transitions or other periods experiencing paging spikes.
- Virtual Flash Memory can improve performance with pageable large pages, for instance with DB2 and Java workloads
- Virtual Flash Memory can also reduce delays from SVC or standalone dumps
- Virtual Flash Memory is automatically secured by 128 bit AES encryption for your security and compliance needs
- Virtual Flash Memory is easily deployed and configured
- Virtual Flash Memory is supported beginning with the IBM z14
- IBM will continue to support IBM Flash Express for the IBM z13s™, IBM z13®, IBM zEnterprise® BC12 and IBM zEnterprise EC12

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