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Flash Cache Among New Features of AIX 7.2

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AIX V7.2 runs on POWER7 and higher servers and has been updated to include several new capabilities, including AIX live update for interim fixes; CAA (cluster aware AIX) automation; SRIOV-backed VNIC (virtual network interface card) or dedicated VNIC; AIX flash caching; DSO (dynamic system optimizer) included automatically; and IBM BigFix Lifecycle. Additionally, both the AIX V7.1 and V7.2 Enterprise Edition packages for AIX have been modified.

The first key point to note is that AIX V7.2 will only run on POWER7 or higher servers. Given that POWER6 has been around for a very long time, this would be a good time to look at consolidating and/or replacing servers that are older than POWER7. The savings on maintenance alone should make this worthwhile.

New Functions

Below we will focus on a couple of the new capabilities announced with a focus on the new flash cache capability.

AIX Live Update for Interim Fixes
This capability allows for the use of NIM (push or pull) or geninstall to install interim fixes without requiring a reboot, even for kernel or kernel extension interim fixes. This function takes advantage of both NIM and alternate disk install, two well-proven technologies. Prerequisites include an HMC at 840 or higher, specific versions of firmware for the server and NIM. There are also specific levels of the VIO server. There are some restrictions around I/O, including the requirement that all devices be virtualized and that no CAPI devices be open during the update.

Live update for interim fixes solves a serious problem for customers. Typically, security and other HIPERs initially come out as interim fixes. Having to take down the LPAR for a temporary patch is not satisfactory to most clients. This function allows you to no longer have to reboot for interim fixes. Thus, you can put on the urgent fix immediately and then plan downtime for when the permanent fix is available or when you install your next technology level or service pack.

SRIOV-backed VNIC or dedicated VNIC
This capability is an update to the virtual Ethernet technology, allowing client LPARs direct access to the SRIOV adapter resources in the VIO server. This reduces CPU and memory as it avoids the need to copy data between the client LPAR and the VIO server. This also improves performance and scalability and does not affect LPM (live partition mobility) capabilities for the client LPAR. The VNIC support requires specific minimum levels of PowerVM to support virtual network using SRIOV adapters–the minimum level is v2.2.4 of PowerVM.

Flash caching
Flash caching allows an LPAR to take advantage of a read-only cache that is stored in near-line fast storage (flash or SSD). This is used for hot data accessed from storage. The flash can be allocated directly to the LPAR, or a virtual flash device can be provided from the VIO server. Virtual flash LPARs can still take advantage of LPM. The intent of flash cache is to boost performance for reads and to

provide higher throughput with lower latency. AIX decides what data is hot and stores a copy in the flash cache–reads are done from the flash cache while writes continue on to the SAN. The caching is transparent to the application, so no changes are required.

The supported flash memory technology for use with flash cache includes SSDs in an EXP24s drawer attached to the PCIe2/PCIe3 SAS RAID adapter with write cache; SSDs in the POWER servers system unit run by the integrated SAS controller (recommend write cache as well); and IBM FlashSystem. Collectively, these are being referred to as flash memory.

Implementing flash cache requires AIX V7.2, which itself requires POWER7 or higher servers. The LPAR must have a minimum of 4GB of memory. The flash memory is attached to the AIX LPAR, either directly or provisioned from the VIO server, using the new cache management command. The storage can be physical storage or provisioned via NPIV, and the user can target individual or groups of disks to be cached.

IBM also announced a new LVM mirroring policy that allows you to mirror LVs (logical volumes) to a flash drive, which then does a preferred read to the flash drive rather than the spinning disk. This improves read performance.

The key difference between these two is that LVM mirroring allows you to mirror slower spinning disk to flash memory, which you can then specify as the preferred location for all reads. Care must be taken to ensure the flash memory LUNs have the same capacity as the spinning disks. Server-based flash caching is the ability to use flash memory as a cache for spinning disks. It does not rely on LVM mirroring and does not require that the flash memory be the same capacity as the spinning disks.

BigFix Lifecycle
BigFix lifecycle provides a single console that administers an automated, simplified patching process. It now ships as part of AIX Enterprise Edition. BigFix Lifecycle includes OS patching, third-party application patching, offline patching, asset discovery, software distribution and sequenced task automation.

AIX V7.2 Enterprise Edition (5765-CD3)
AIX V7.2 Enterprise Edition now consists of the following product set:
IBM PowerSC Standard Edition V1.1 (5765-PSE)
PowerVC Standard Edition v1 (5765-VCS)
Cloud Manager withOpenStack v4.3 (5765-CMO)
IBM BigFix Lifecycle
Mozilla Firefox (download only)
ITM V6.3

Code Removals
As part of the AIX V7.2 install multiple LPPs (licensed program products) and code items have been removed. These include, but are not limited to, NIS+, rsct.vsd and System director components such as pConsole, Java 5, performance toolbox components and trusted computing base. Additionally, fast connect and performance toolbox are not supported on AIX V7.2, and PowerSC Trusted Surveyor is not supported as a management server. OpenSSH is now added to the BOS install menus, and HTTPD support is now provided in NIM for client "pull" installations. Finally, AIX V6 was withdrawn Sept. 29, 2015, so it's time to upgrade to AIX V7.

Binary Compatibility
As with previous updates, AIX V7.2 is binary compatible with previous versions of AIX, which means applications that ran on earlier versions of AIX will continue to run on AIX V7.2. However, wherever possible, it is best to update your applications to those compiled on more recent versions of AIX to ensure the best performance. The same applies if you are bringing an application across from an earlier hardware platform such as POWER5. The more technologies and/or software versions you come across, the more likely you will encounter emulations or alignments, which are caused by having to emulate instructions that no longer exist or by having to realign to word boundaries that have changed. Your application will work (IBM guarantees Binary Compatibility), but emulations and alignments can affect performance.

Summary

AIX 7.2 offers very exciting new functions that can greatly improve availability, performance and flexibility. In particular, I think flash caching will be of great value to many customers. IBM did bring out a new TL (technology level), TL4, for AIX V7.1, which includes some of the new functions from AIX V7.2. These include the new VNIC support but do not include the Live update for interim fixes.

The functions listed above are just a few of the new capabilities that came out with AIX V7.2. There are many other features and changes that are either part of AIX V7.2 or its associated products (PowerVM, PowerSC, PowerVP, PowerVC, etc). Additionally, a new HMC and a virtual HMC appliance were also announced. Now is a good time to start reviewing your update plans for both hardware and software so you can take advantage of some of these features.

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BigFix Lifecycle

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