

SAP HANA and IBM

By Jaqui Lynch

Introduction

In March we discussed SAP HANA on POWER and how it provides an in-memory, column-oriented, relational DBMS (database management system) along with an application server that can be used to assist in the analysis of Big Data. IBM Power Systems is the first platform to provide a fully supported integrated environment for virtualized instances of SAP HANA in production, allowing clients to take advantage of the incredible performance provided by the POWER8 hardware. In April 2016, SAP and IBM took this a step further and announced their plans to work together to co-innovate solutions to increase customer value through extensions to SAP HANA. This collaboration will involve collocating resources in Waldorf, Germany and Palo Alto, California, allowing for the ability for developers to work more closely together.

From a business perspective there are multiple areas that would be impacted by this collaboration. The intent is to offer more cloud based solution, something that was announced in October 2014 along with other improvements. SAP and IBM will be offering onsite engagements to assist in the implementation of SAP HANA on Power installations. Other items in the April announcement include development of cognitive solutions for SAP HANA, improvements to the customer and user experience, better integration of services and clear industry-specific road maps. IBM has also set up a new joint Center of Excellence (COE) in Austin, TX where clients can get access to briefings and/or proof of concepts (POCs) for SAP HANA on POWER systems.

SAP HANA first became available on POWER8 in August 2015. The initial solution was for SUSE Linux with configurations scaling up to 3TB of memory. Additionally, POWER systems was the first to provide the ability to have multiple (up to 4) instances of production SAP HANA running in a virtualized environment.

POWER and SAP

The combination POWER8 hardware with PowerVM for virtualization provides for a level of flexibility, performance and resiliency that provides the best possible environment for running production SAP. Using PowerVM, SAP clients can run up to four virtual machines (or LPARs) containing production HANA databases concurrently. This provides not only performance but it also allows clients to deploy fewer physical systems in their SAP environment which reduces costs associated with maintenance, power and cooling as well as reducing the complexity of the environment. Additionally, POWER systems have the ability to add flash to the environment which can vastly improve performance.

Another key benefit is flexibility. Typically SAP HANA has been run on appliances that had very restrictive configuration options. This has now all changed. POWER customers can integrate their SAP HANA workloads into

currently deployed servers where they can assign each workload the amount of CPU, memory and other resources needed by that specific workload. PowerVM allows each workload (or LPAR) to use micro-partitioning so that you can guarantee a minimum amount of CPU but the workloads can also grow dynamically using CPU that is currently not in use by other LPARs. With proper planning this allows for the best possible use of resources without duplication. IBM POWER8 allows you to take advantage of both dedicated and shared processor resources as well as shared networking and other shared I/O resources. This makes for not just better use of the resources but also simplifies the management and integration options. As mentioned earlier, SAP SE allows users to virtualize up to four production SAP HANA LPARs on a single POWER8 server. Alternatively, you can run up to three production LPARs plus unlimited non-production LPARs in the shared pool. Other platforms are typically limited to one production environment per system.

Two other POWER technologies are also key factors in why clients are moving to POWER for SAP. The first is Capacity on Demand (COD) and the second is Live Partition Mobility (LPM). COD is available on POWER8 servers starting with the E850. COD provides the ability to buy a server with more cores and memory than you activate. So you could buy a 32 core 2TB E850 and only activate 24 cores and 1TB initially. That means you only pay for those activations and you only need to purchase licenses for the 24 cores. At a later date you can activate resources 1 core and 1GB at a time to add additional resources as needed.

The use of the shared processor pool is an important component as well. This is the ability to set an LPAR up with a desired (guaranteed) amount of CPU resource and a maximum that it can grow to dynamically without having to take an outage. As an example, an LPAR could be guaranteed 1.5 cores but could be set up to grow to 3 cores if the resources are available. As long as all the LPARs don't peak at the same time you no longer have to sum up what every LPAR needs at peak time and then plan for a server that size. This provides for significant savings in CPU activations and software licenses. Additionally, licenses can also be controlled by setting up a shared processor pool specific to that product. As an example, you could reserve 8 cores in their own pool for a specific application. You can then run multiple LPAR instances of that application and, as long as you assign them to this pool, they can never exceed the 8 cores. But be aware that you will have to check with each vendor as to whether they allow this kind of sub-capacity licensing or not.

The second virtualization feature that is a key component is LPM. LPM allows you to move an LPAR to another server while it is running. SAP HANA supports this. This means you can move running workloads without disruption for workload balancing or to do planned maintenance on hardware with no downtime.

IBM Solution Offerings

SAP HANA is supported on most POWER8 servers, however, IBM has put together some specific Solution Editions that were designed with SAP HANA in mind. All of these solutions are compliant with the SAP TDI (tailored data center integration) rules that SAP uses for infrastructure planning. There are currently three Solution Editions for POWER8 as follows:

1. S824L – Linux only server. 24 x 3.25Ghz cores and 512GB to 1TB memory
2. E850 – 32 x 3.7ghz cores and 1TB to 2TB of memory. This server can run both Linux and IBM i and AIX, so it can run other non-SAP HANA, non-Linux workloads.
3. E870 – 40 or 80 x 4.19ghz cores and 1 to 8TB memory. It too can run Linux, IBM i and AIX workloads.

Depending on the workloads you need to run these solutions are well architected to provide the best SAP HANA performance and reliability.

Reliability

SAP HANA is an in-memory database which makes reliability and uptime very important. In-memory data is not saved across reboots so every time the operating system is restarted the data must be reloaded from persistent storage which leads to increased startup time. This is one reason why customers want to consolidate onto highly reliable systems and it is also another reason why technologies such as LPM are very attractive. The ability to move a workload live rather than take downtime for a hardware issue allows clients to maximize reliability and minimize reboots which saves significant time in startups. There are a multitude of other hardware reliability features built into POWER8 that assist in ensuring maximum uptime. One of these features, which is a default, is chip-kill memory. This is an advanced memory checking and correcting technology that protects from single memory chip failures. IBM also provides an extra chip per memory bank so that if a chip starts to fail then the contents can be copied to the spare chip ensuring availability.

FlashSystems

SAP HANA can also take advantage of IBM Flash to minimize start-up time and to improve SAP table load times and I/O performance. In all the benchmarks I have run IBM Flash has significantly improved performance in the I/O subsystem. The caveat here is that the environment needs to be planned out with sufficient fibre adapters to support the required performance.

Summary

The business is interested in gaining maximum business value from the underlying systems, preferably at the least cost. Historically, transactional and analytics systems were separate solutions and data had to be moved between them in order to provide for the analytics portion. SAP HANA is a game changer as it combines transactional and analytical systems into a single solution – this is what SAP refers to as “real time business”. The challenge is that combining

these two puts a lot more stress onto the CPU and memory – this is where POWER shines as it can provide significant amounts of memory and an incredibly flexible and reliable environment. The collaboration between IBM and SAP plus the close relationship that IBM has with SUSE ensures the best possible support for the environment. The ability to rapidly scale resources taking advantage of technologies like COD and the shared processor pool provides for a consolidated and very flexible environment, allowing clients to be more agile and to take advantage of savings caused by reductions in the number of servers as well as maintenance and licensing costs. The solution on POWER8 has now been around for almost a year so it is well tested and I would recommend that SAP HANA clients (or potential clients) take a close look at the IBM solutions before going the appliance route.

References

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