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OPTIMIZATION OF LARGE SCALE HARDWARE DURING MAJOR ERP (SAP, ORACLE, ARIBA) IMPLEMENTATIONS

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ABSTRACT

The supported hardware for SAP HANA depends on the deployment method (appliance or TDI). In the year 2014 with SAP HANA SPS08, stakeholders picked up the sort of mission-basic security of the HANA stage that permitted companies to take a portion of the world's biggest SAP frameworks and move them onto HANA platform. The *SAP HANA Hardware Directory* contains all Appliances and Enterprise Storage solutions which have been certified. The list of certified Appliances includes previously validated hardware based on certified technologies. The directory also contains a list of Entry Level Systems which supports SAP HANA but is not certified by SAP.Clients are currently searching for ever-bigger HANA frameworks. The thing about S4 ERP frameworks is that they are not appropriate to conveyed or bunched equipment. For expository stages, this is the thing that permits HANA to scale to expansive frameworks. With S4, machines from Cisco, Hitachi, Huawei, HP, Fujitsu, and SGI are accessible, which are guaranteed and scale to 6TB of equipment. Aside from HP and SGI (more on this later), every one of them are based around 8-attachment Intel frameworks. As a benchmark, the harsh spending cost for a 6TB HANA framework is approximately $600k. The certification is valid for a particular group of appliances from the hardware manufacturer wherein multiple models might be included. During the preparation phase of the certification Partner and SAP can jointly agree on the group of appliances. This paper will give overall expert solution for those stepping into on-premise SAP HANA solutions.

Keywords: SAP, ERP, S/4 HANA, Cloud, On-Premise, Fiori, Mobile applications and Internet.

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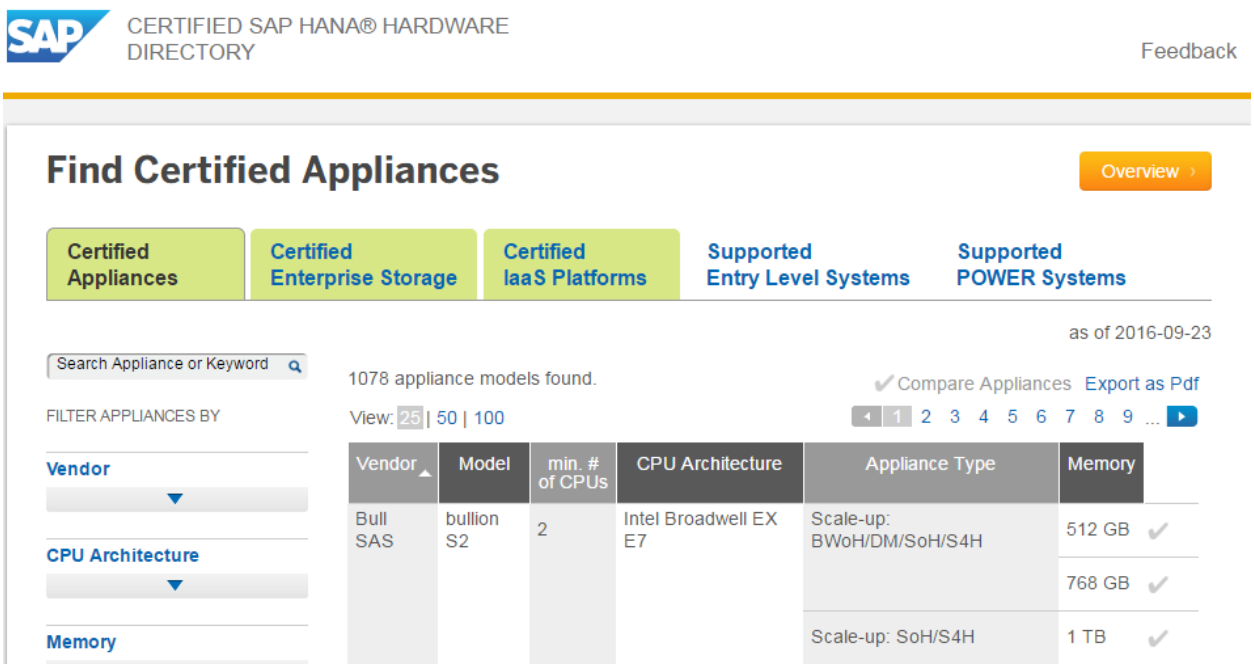

Fig1: Official SAP Certified HANA Hardware Directory site

TYPICAL HANA HARDWARE COST ANALYSIS:

Recent market analysis based on a typical hardware requirement for HANA, when we looked to see what we could buy a HANA system for. Here's what the general hardware requirement to come up with based on the information available in the SAP Product Availability Matrix for SAP HANA and the Dell SAP HANA appliances I have seen in the field. I might have a few small mistakes but it is close.

Component	**Price (512GB)**	**Price (256GB)**
Base Price for Dell R910 Server	$8935.00	$8935.00
16-Drive Chassis	$374.88	$374.88
Upgrade to 2x E7-4870 CPU	$6342.86	$6342.86
Upgrade to 4x E7-4870 CPU	$8261.47	N/A
Upgrade to 512GB RAM	$7459.99	$3729.99
Upgrade to 3 year Mission Critical	$1499.49	$1499.49

Component	Price (512GB)	Price (256GB)
Support		
Upgrade to 10 300GB SAS Disks	$2241.70	$2241.70
SuSe Enterprise Linux 3 year subscription	$5597.23	$5597.23
High Output PSU	$448.35	$448.35
785GB FusionIOioDrive	$9371.10	$9371.10
iDRAC Enterprise	$261.66	$261.66
Total	**$66383.00**	N/A
Online Discount	-$16612.48	N/A
Grand Total	**$49770.52**	**$38802.26**

Fig2: Component/Hardware pricing (prices are average, based on present market analysis, October 2016)

STRETCHING 6TB TO 12TB

The proportion amongst CPUs and RAM utilized as a part of a HANA machine is fairly subjective - and identifies with the confirmation procedure and benchmarking more than anything. Positively, it's conceivable to put 12TB of DRAM in a 8-attachment HANA apparatus. Expense will rely on upon customers equipment seller and their reducing, however how about we utilize Lenovo as a decent correlation. 6TB of RAM from Lenovo retails at $279,168 (that is 192x 32GB DIMMS, 46W0676). Road cost is around $220k for 6TB. In the event that we fabricate the same framework with 12TB RAM, we need to utilize 64GB DIMMs (46W0741), which list at a nosebleed $5279 each. Yes, that is a difficult $1,013,568 for the overhaul. In the city, any stakeholder can most likely get this for $750k.

In any case, a 12TB framework worked out of an extended 8 attachment, 6TB framework, will cost the stakeholder > $1.1m in the city. Besides, will even now have the same 8 CPU framework that the stakeholder had before - it won't give any extra throughput. Much more

dreadful, the 64GB sections are timed somewhat slower than the 32GB sections, so the stakeholder will lose a little execution for the redesign.

GOING BEYOND 8 SOCKETS

The Intel Ivy Bridge engineering, on which all present SAP HANA frameworks are fabricated, was intended for 4 CPUs. Every CPU has 3 associations with different CPUs, on an interface called QPI. So in a 4 CPU arrangement, every one of them are associated with each other.

Move to 8 CPUs, and every CPU is just associated with 3 of the 8. The other 4 associations are remote - associated through another CPU. Keep in mind that every association is around 12.8Gbyte/sec - somewhere in the range of 10x quicker than 10GB Ethernet. Still, it implies that getting to remote memory is slower than nearby memory.

Moving past 8 CPUs, and the QPI associations are spread much more slender. This is truly vital in light of the fact that in the Intel engineering, RAM is joined to a particular CPU attachment. This implies nearby RAM to a CPU is much speedier than remote memory. This impact is called NUMA, or Non-Uniform Memory Architecture. Here's an unpleasant thought of memory inertness in Intel Ivy Bridge:

As should be obvious, the extent of neighborhood memory gets to has a tremendous effect to the general framework execution. Much all the more basically, there is constrained data transfer capacity between CPUs on the QPI system. In the event that all gets to are remote, execution tanks. I've by and by witnessed this in early forms of SAP HANA with huge quantities of CPUs - the stakeholder get a corruption of execution as burden increments. Gratefully, SPS09 of HANA contains critical improvements for memory area, which are upgraded in HANA SPS10. The arrangement is to keep as much area between CPU operations and RAM - this will expand throughput by up to 10x, as should be obvious in the table above.

Still, what are our choices for going past 8S/120 centers of handling force? At this moment there are just two choices. Note that with future Intel designs (Haswell, Broadwell), this will obviously change.

HP CONVERGEDSYSTEM 900 (3-24TB)

The HP ConvergedSystem 900, or CS900 for short, depends on the HP SuperDome2 design, and makes a solitary framework in view of a bunch of up to 8x 2S edges for 16CPUs and 12TB DRAM.

It utilizes an exclusive transport based QPI structure which utilizes 1 QPI association between the 2 CPUs, and liberates the other 2 QPI associations with the transport. It is intended to be designed as two 8S servers as 2 LPARs however can be arranged as a solitary 16S server.

As an unpleasant request of extent, the memory expense is around $500k for 12TB utilizing 32GB DIMMs. With 64GB DIMMs it is conceivable to design 24TB, however that shoots up to over $1.5m, in addition to the rest of the expense of the framework. Regardless, HP has a transport based framework equipped for 16S and 12TB of DRAM, or 24TB if cash is no item.

SGI UV300H (3-48TB)

The SGI UV300H depends on SGI's NUMAlink innovation, which gets from the SGI Origin 2000 and Onyx2 frameworks in the 1990s, and was later marked CrayLink. Like HP, it utilizes building pieces, however not at all like HP it doesn't concentrate on a cutting edge based arrangement. Rather, SGI use 4S building hinders with 3TB of DRAM. 8 of these are daisy-tied utilizing NUMAlink for up to 32S and 24TB DRAM in an ordinary arrangement. SGI's setup is distinctive to HP, on the grounds that in the SGI design, all the QPI connectors are presented to the front of every building square. How they are disseminated amongst the building squares relies on upon the setup. SGI have some mystery sauce which builds the RAS (dependability, accessibility, and serviceability) of the Intel stage, and abatements the possibility of DRAM disastrous disappointment. To put it plainly, SGI scales to 32S and 24TB. For this arrangement the stakeholder can hope to pay around $1m for the memory alone.The SGI UV300H can be stretched out to 32S and 48TB of DRAM, if cash is no article, however that is $3m of DRAM. Swallow.

CERTIFICATION

It's important that none of the setups I've discussed are guaranteed (yet). The 16S/12TB arrangements will be bolstered first - the stakeholder can see on the accreditation site that the HP and SGI 8S/6TB setups are as of now upheld, and these are only expansions of that design. Our testing demonstrates that HANA SPS08 was adaptable to 8S, yet 16S did not give expanded throughput. SPS09 of HANA gives not-exactly direct adaptability to 16S.

Based on the DKOM slides that were appeared, NUMA coding is a key center for HANA SPS10, which we hope to be discharged in May 2015. With that, we are anticipating that great versatility should 32S. We seek that confirmation after 32S will take after not long after HANA SPS10.

The decent thing about both the HP and the SGI design is they can be reached out in building pieces. These look something like this:

HP	SGI
2 Sockets, 1.5TB	4 Sockets, 3TB
4 Sockets, 3TB	8 Sockets, 6TB
6 Sockets, 4.5TB	12 Sockets, 9TB
8 Sockets, 6TB	16 Sockets, 12TB
10 Sockets, 7.5TB	20 Sockets, 15TB
12 Sockets, 9TB	24 Sockets, 18TB
14 Sockets, 10.5TB	28 Sockets, 21TB
16 Sockets, 12TB	32 Sockets, 24TB

Fig3: Hardware market leaders comparison

In both cases, the stakeholder could begin with the littlest setup, and develop to the biggest, reasonably flawlessly. With HP, the stakeholder need to purchase a 3Par SAN in advance, while SGI includes plate of NetApp direct connected stockpiling - this makes the SGI valuing more straight. In any case, it's a to a great degree rich approach to manufacture future-focussed stages. Likewise in both cases, the stakeholder could overhaul from the present Ivy Bridge CPUs up to

Haswell and Broadwell CPUs, and in the SGI case the stakeholder can trade the memory risers for DDR4 memory (I haven't had affirmation of this for HP).

CONCLUSION:

I've been included with these machines, and they work to a great degree well. SGI just discharged SPECInt 2006 Resultsfor their UV300H framework, and it is directly versatile from 4,8,16,32 attachments. Truth be told, they have the most astounding result for any framework ever manufactured, aside from a couple comes about with 64 and 128 attachments from SGI and Fujitsu. From what I see of the HP CS900, much the same applies, however HP have not discharged SPECInt comes about yet. In any case, do take note of that 24TB, and even 12TB of SAP HANA goes far. We as of late moved a 50TB DB onto HANA, and it utilized 10TB of space. Unless the stakeholder have a goliath database, even a 12TB apparatus will go far.

What's more, when the stakeholder make sense of the expense of building a HANA-based engineering with nearby SAS circle, contrasted with an identical Oracle, IBM, or Microsoft-based RDBMS with SAN plate, the stakeholder will discover the TCO quantities of HANA are smashing.

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