



The bridge to possible

SAP HANA HW sizing

Qué hacer y qué no hacer

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BRKDCN-2987



Agenda

- Cisco and SAP
- SAP HANA sizing
- vHANA
- Intel Optane memory
- Cisco SAP portfolio

Cisco and SAP



Cisco & SAP

Empowering intelligent enterprises together



Data Center



Build a modern cloud infrastructure

Performance



Ensure systems are operating efficiently

Cloud

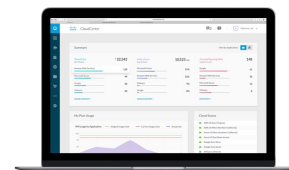
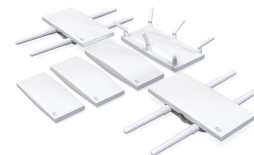


Add new cloud native capabilities

Location



Create business insight from location data



Cisco and SAP Cloud too!

...with *secure multi-tenancy*!



Cisco Market Leadership

- #1 worldwide supplier of cloud infrastructure
- #1 Americas in blade servers, #2 world wide market share
- #1 in SDN – 585+ Customers in prod with ACI
- FY15 – 110% growth SAP “sell with” – on pace to \$1B by 2017

Cisco Cloud Eco-system

- Largest eco-system of SAP Cloud, MS and Hosting Providers



Cisco Enablement of SAP Cloud

- Cisco powered services:
 - Success Factors
 - HANA Cloud Platform
 - SAP Project "Monsoon"
- Cisco technology used by HEC, Ariba, Concur, Hybris, and Customer Clouds

Cisco *Success with a new* SAP HANA TDI Policy-Driven Deployment Model

Greater Business Agility, Security, & Manageability

TDI (Tailored Data Center Integration)

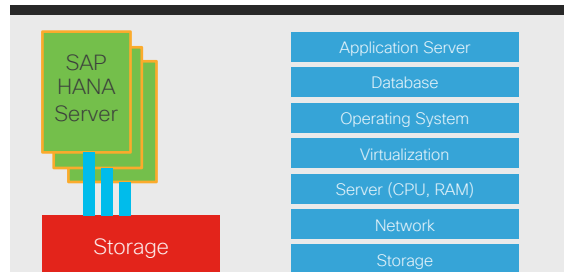


Flexible

Appliance



Easy



Simple

- Scale Up
- Bundled HW
- Single workload per Appliance

Flexible

- Scale Out
- Leveraged, Certified HW
- Multiple workloads on shared infr.

Policy Driven Automated TDI



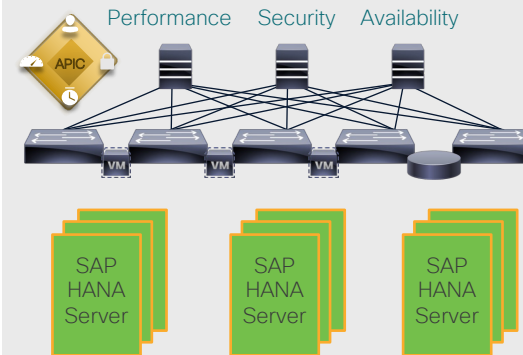
Easy



Flexible



Secure



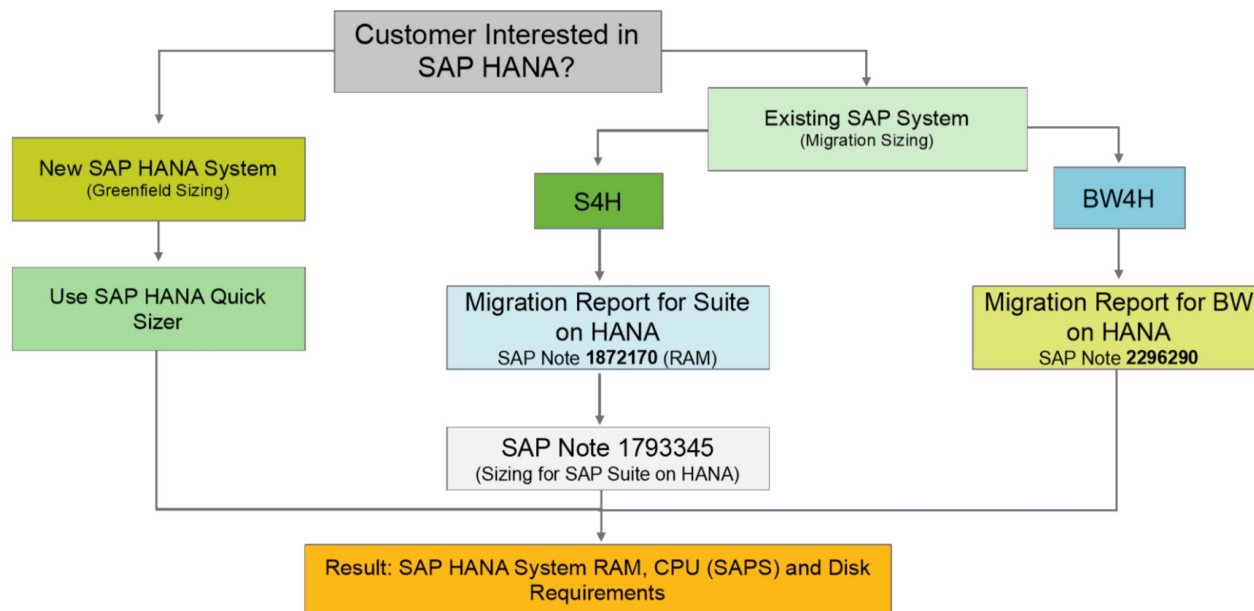
Simple + Flexible

- Scale up + Scale Out
- Inherent security
- Dynamic workloads

SAP HANA sizing



SAP HANA sizing process



SAP HANA scripts output

SIZING RESULTS IN GB

Based on the selected table(s), the anticipated maximum requirements are

for S/4HANA:

- | | |
|--|----------|
| - Memory requirement for the initial installation | 572,8 |
| - Net data size on disk for the initial installation | 546,4 |
| - Estimated SAPS category of the database server | >500.000 |
| - Estimated memory requirement after optimization | 459,8 |
| - Estimated net data size on disk after optimization | 470,7 |

for S/4HANA Public Cloud License:

- | | |
|--|-------|
| - Estimated memory size of client-dependent data | 223,3 |
|--|-------|

Other possible additional memory requirement:

- | | |
|----------------------------------|------|
| - for an upgrade shadow instance | 48,5 |
|----------------------------------|------|

vHANA



Why vHANA?

- Abstraction of the hardware layer
- Higher hardware utilization rates
- Lower TCO due to SAP HANA instance consolidation
- vSphere vMotion/live Migration with SAP HANA VMs
- Only supported with vSphere Standard Edition and vSphere Enterprise Plus.
- Icelake processors are now certified for vHANA

<https://wiki.scn.sap.com/wiki/display/VIRTUALIZATION/SAP+HANA+on+VMware+vSphere>

vHANA considerations

- CPU and Memory over-commitment must not be used.
- SAP HANA VMs can get co-deployed with SAP non-production HANA or any other workload VMs on the same vSphere ESXi host.
- Physical server balanced memory configuration
- No NUMA node sharing between SAP HANA and non-HANA allowed.

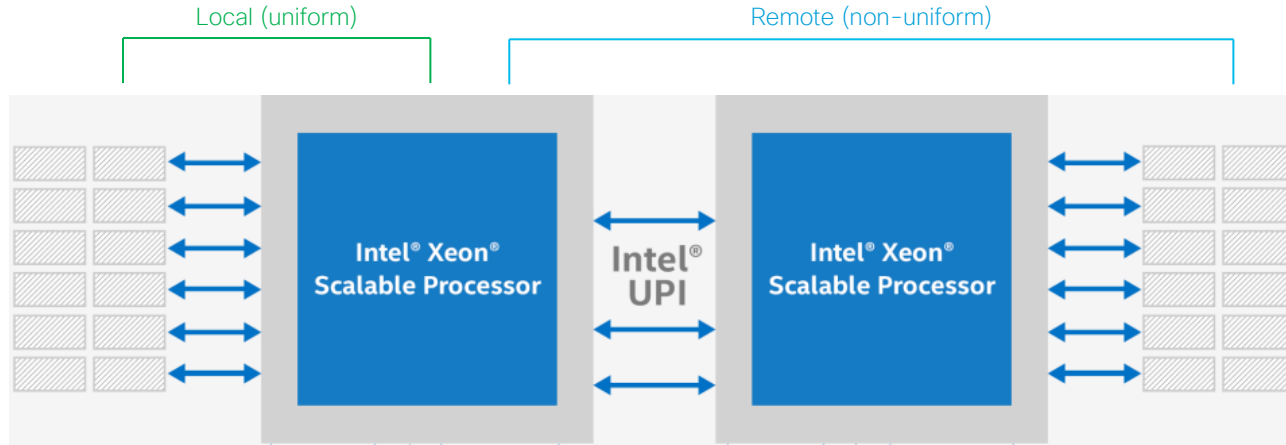
The proper credit

- The following slides were created by Maarten Schneider.

Cisco's TSA EMEA.



Compute – NUMA



Non-uniform memory access (NUMA) is a computer memory design used in multiprocessing, where the memory access time depends on the memory location relative to the processor.

SAP HANA only supports that CPU consumes local controlled memory. It cannot “take” memory from another CPU’s controller (Hypervisor supports that, but HANA does not)

VM sizing for HANA production

Assume we use a CPU (28 cores)

Hyperthreading is enabled (best practice for HANA and vSphere)

28 cores = 56 vCPU per pCPU without oversubscription

VM configuration on 2 socket server: 0.5, 1, and 2-socket VMs

Supported HANA production VM sizes

0,5 CPU – VM with 28 vCPU and $\frac{1}{4}$ of the DRAM of the host

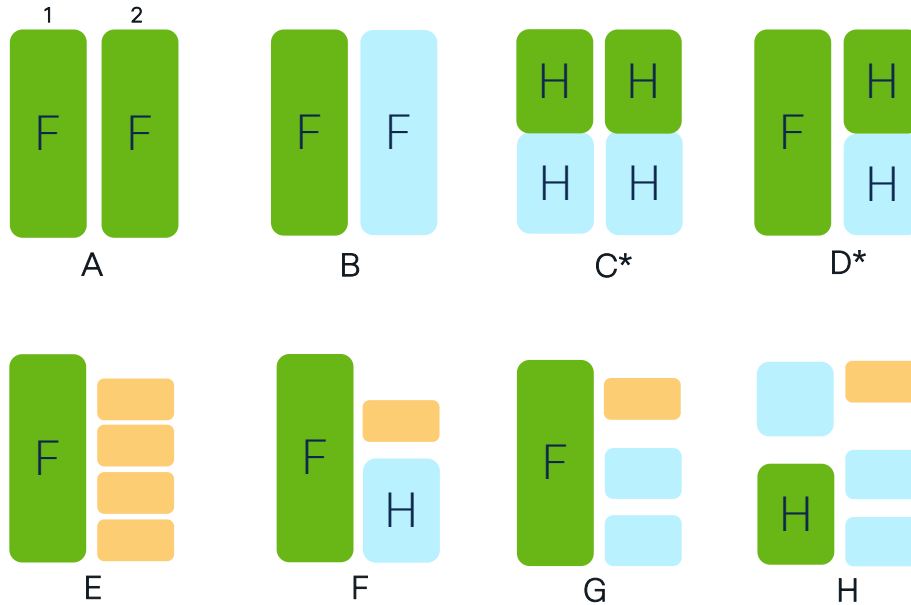
1 CPU – VM with 56 vCPU and $\frac{1}{2}$ of the DRAM of the host

2 CPU – VM with 112 vCPU and all of the DRAM of the host

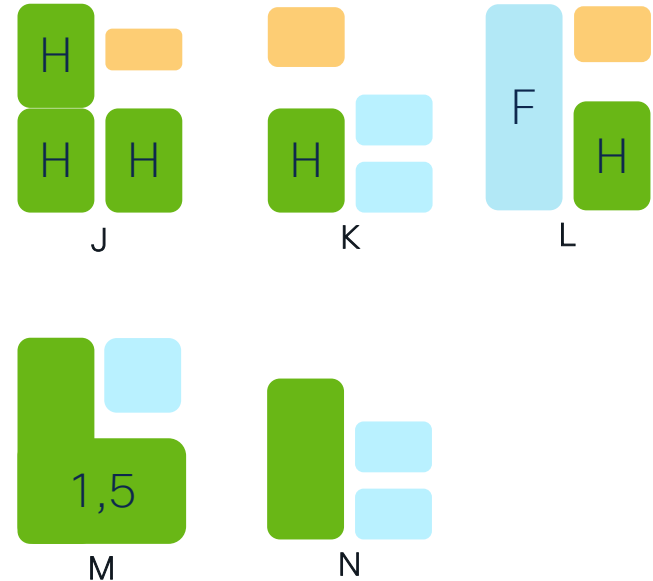
Non-production does not have the same strict rules, so other numbers for DRAM and vCPU can be used for Non-production

SAP HANA on vSphere - CPU mapping 2 socket

Supported



Not Supported



F – full CPU

H – half CPU

 HANA VM Prod

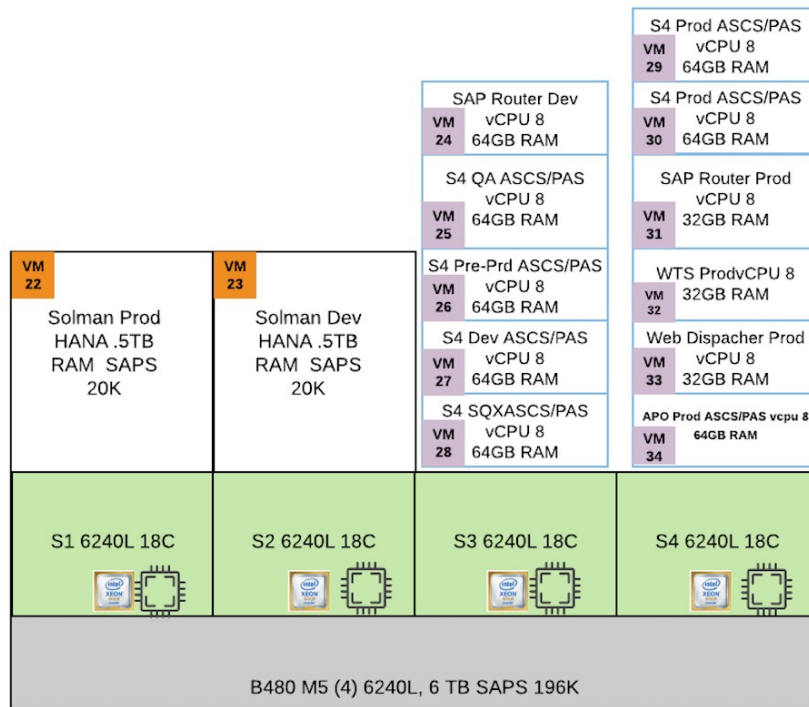
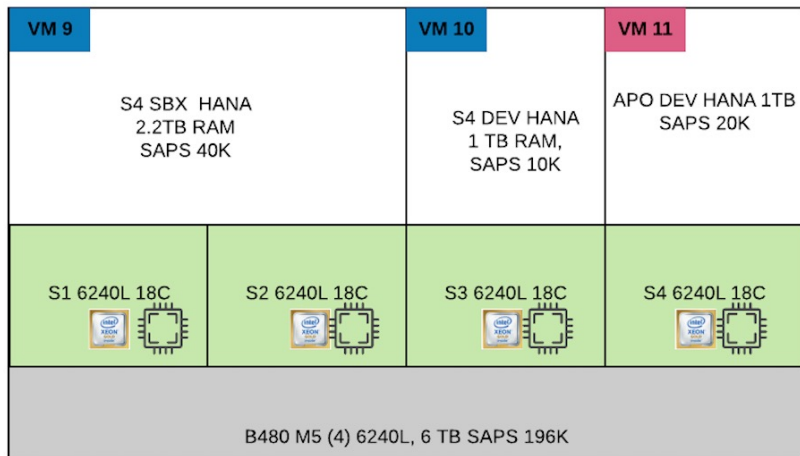
 HANA VM non Prod

 Non HANA VM

vCPU and memory

- The **minimum** size of a virtual SAP HANA instance is a half socket (represented by at least **8 physical cores**) and **128 GB of RAM**.
- The **maximum size** of a virtual SAP HANA instance is **448 vCPUs**. The **maximal** memory is limited to **12 TB**.

Real customer scenario



Optane memory



EL OLOR DEL ROMERO AYUDA A AUMENTAR LA MEMORIA



An Innovative, New Type of Memory

Extract more value from larger datasets than previously possible with Intel® Optane™ DC persistent memory

Performance close to DRAM

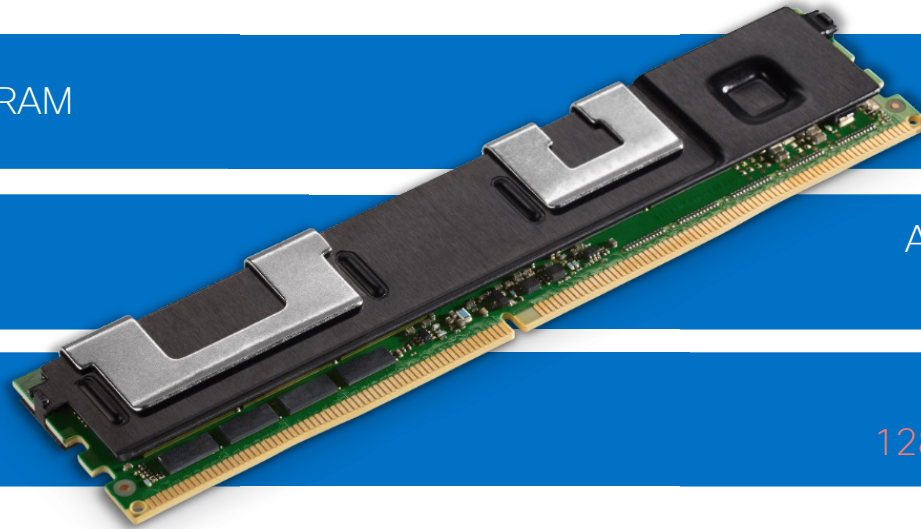
Low total cost of ownership (TCO)

Data persistency

DIMM Form factor

Available in much larger capacities than DRAM

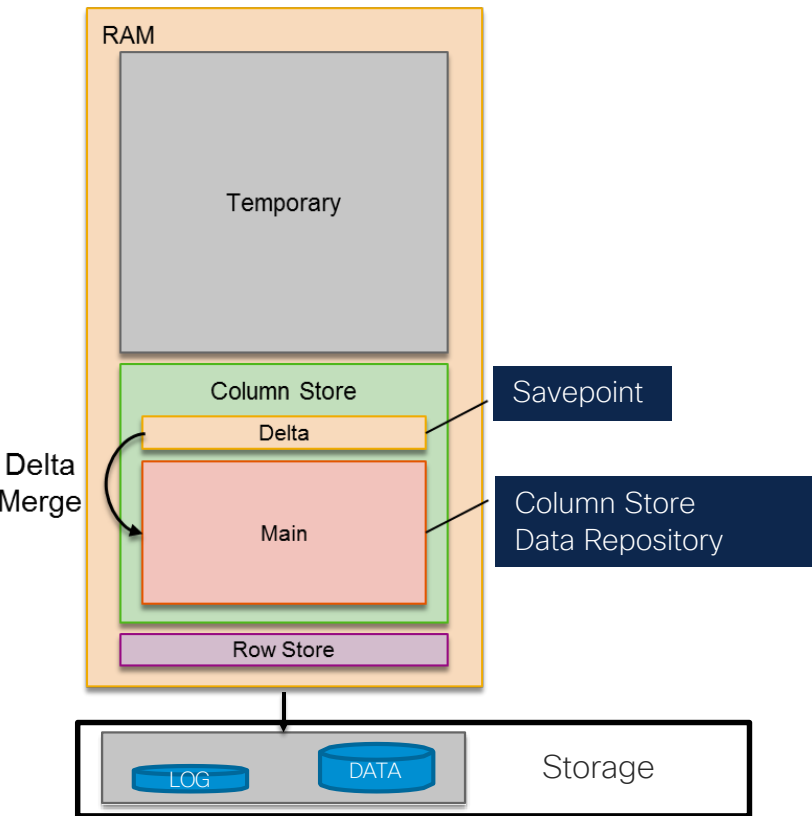
Large DIMM SIZES
128 GB, 256 GB, 256 GB



PMEM considerations

- Intel Cascade Lake SP CPUs (or later).
- Ratio between DRAM and PMEM capacity of 2:1, 1:1, 1:2 or 1:4.
- PMEM is only available on TDI
- SAP HANA 2.00.035 and higher
- SAP HANA PMEM sizer

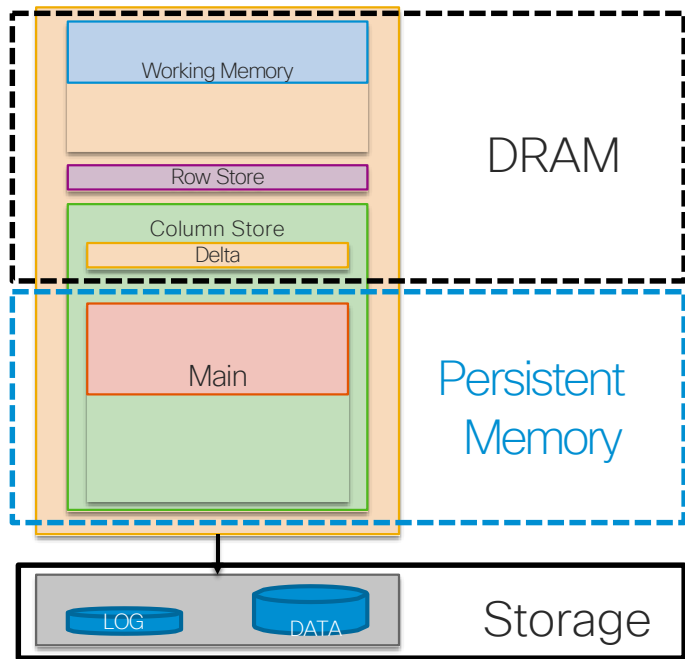
SAP HANA memory map before Persistent Memory



- All configs based on DDR memory since the launch of HANA in late 2011
- Contiguous memory in **volatile** memory
- HANA master node with the potential for partitioned datastores residing on slave nodes

SAP HANA Persistent Memory

HANA 2.0 SPS03+

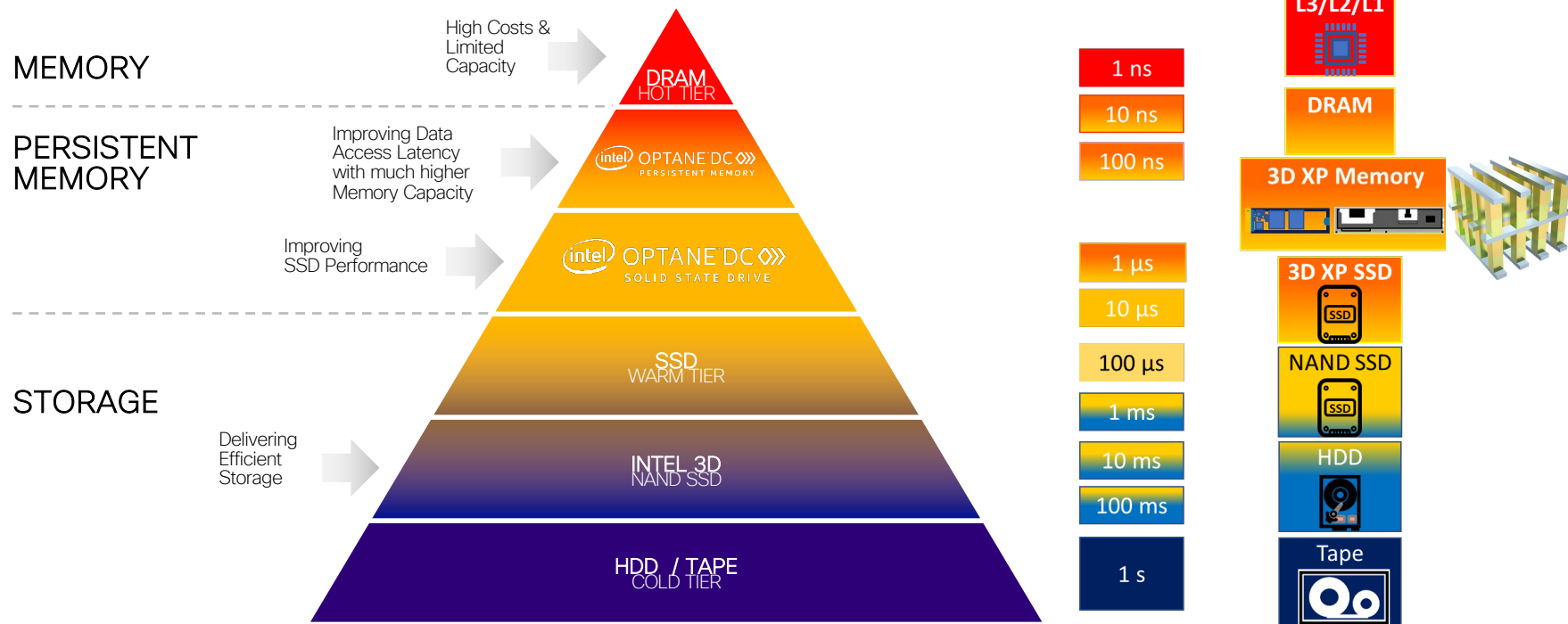


- Volatile data structures remain in DRAM/DDR
- SAP HANA controls what is placed in Persistent Memory and what remains in DRAM/DDR
- **Column Store Main moves to Persistent Memory**
 - More than 95% of data in most HANA systems.
 - Loading of tables into memory at startup becomes obsolete.
 - Lower TCO, larger capacity.



No changes to the persistence.

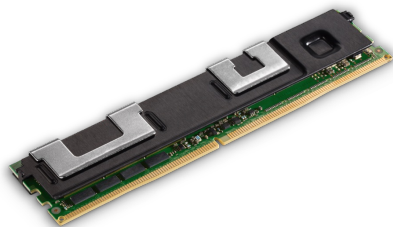
INTEL® OPTANE™ FILLING THE LATENCY GAP



SAP HANA® Tailored Customer Sizing

Supported configurations with Intel® Optane™ DC persistent memory

- All Intel Optane configurations are SAP HANA TDI supported
- HANA 2.0 SPS03/SPS04/SPS05 on SuSE12SP4/SuSE15 or Red Hat 7.6/8.0
- Equal number of DRAM and PMEM modules—one each per CPU memory channel.



Ratio DRAM:PMEM	DIMM module sizes		Capacity per CPU	Capacity with # CPU Sockets**	
	DRAM	PMEM		2	4
1:1	128 GB	128 GB	1,536 GB	3,072 GB	6,144 GB
	256 GB	256 GB	3,072 GB	6,144 GB	12,288 GB
1:2	64 GB	128 GB	1,152 GB	2,304 GB	4,608 GB
	128 GB	256 GB	2,304 GB	4,608 GB	9,216 GB
	256 GB	256 GB	4,608 GB	9,216 GB	18,432 GB
1:4	32 GB	128 GB	960 GB	1,920 GB	3,840 GB
	64 GB	256 GB	1,920 GB	3,840 GB	7,680 GB
	128 GB	256 GB	3,840 GB	7,680 GB	15,360 GB

** Examples only. Configurations based on other numbers of CPU sockets are also supported.

PMEM usage recommendations

- Homogeneous symmetrical assembly of DRAM and PMEM DIMMs with maximum utilization of all memory channels per processor.
- If the memory requirements per server node (as per Sizing Report) is **less than 3 TB**, a DRAM only configuration is recommended.

Optane memory status

- Intel recently announced that it is winding down the Intel Optane business ([Intel Q2 earnings call](#)).
- SAP and Intel, remain committed to supporting Optane customers for the existing PMem product line through end-of-life.

Intel Optane PMem is a relevant technology for SAP HANA to optimize recovery times in case of hardware failure with positive impact on Total-Cost-of-Ownership (TCO).

<https://blogs.sap.com/2022/10/10/sap-hana-support-update-for-intel-optane-persistent-memory/>

Cisco SAP Portfolio



Cisco Solutions for SAP

The basics



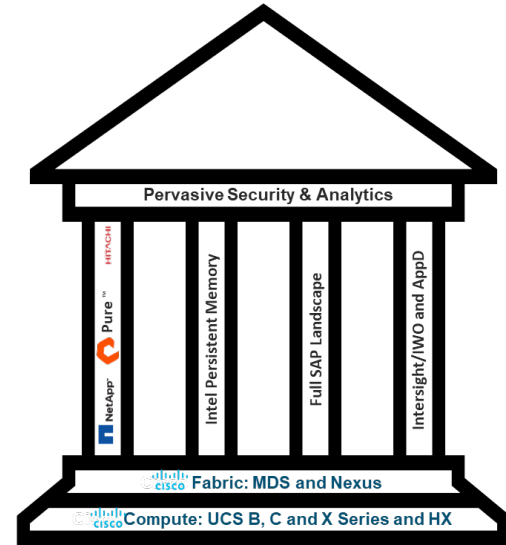
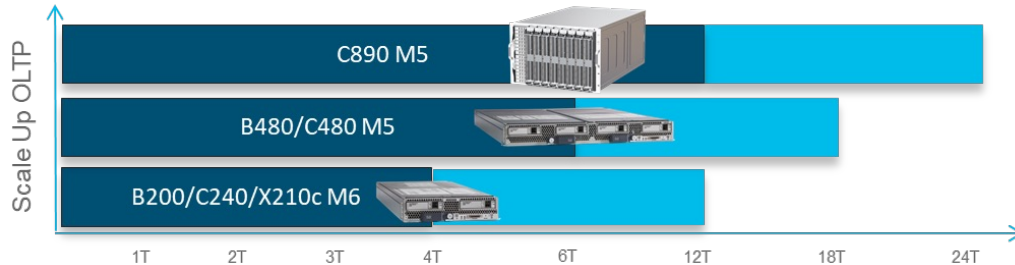
Proven solutions
Documented with CVDs



HANA TDI and Certified
Appliances



Known performance supported with
Sales (SD) Benchmarks



UCS Portfolio for HANA

For SAP HANA

Server	Type	Max Sockets	Intel Generation	HANA Appliance	HANA Appliance Size	Max TDI Size DRAM Only / with PMEM
UCS B200 M5	Blade	2	Cascade Lake	N	NA	3T / 9T
UCS B480 M5	Blade	4	Cascade Lake	N	NA	6T / 18T
UCS C220 M5 and UCS C240 M5	Rack Server	2	Cascade Lake	Y	192G – 3T	3T / 9T
UCS C480 M5	Rack Server	4	Cascade Lake	Y	192G – 6T	6T / 18T
UCS C890 M5	Rack Server	8	Cascade Lake	Y	1.5 – 12T	12T / 24T
UCS B200 M6	Blade	2	Ice Lake	N	NA	4T / 12T
UCS C220 M6 and UCS C240 M6	Rack Server	2	Ice Lake	Y	256G – 4T	4T / 12T
UCS X210c M6	Compute Node	2	Ice Lake	Y	256G – 4T	4T / 12T

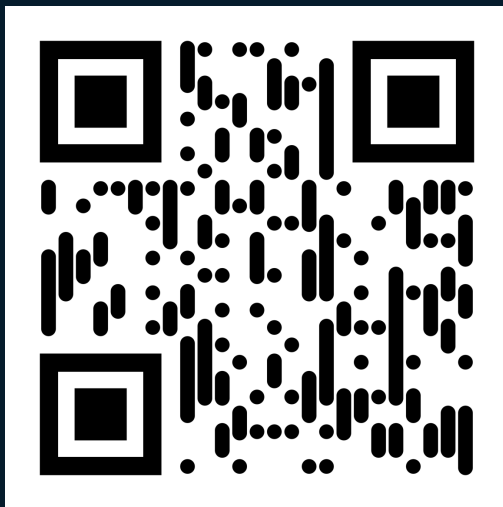
[SAP HANA Certified Hardware Directory](#)
[SAP Sales and Distribution Benchmarks](#)

[Cisco Cloud and Compute Solutions for SAP](#)
[FlexPod for SAP](#) [FlashStack for SAP](#)



The bridge to possible

Thank you



CISCO *Connect* LatAm

