SAP HANA Tailored Data Center Integration – Overview

SAP HANA Technology & Innovation Network
February 2023

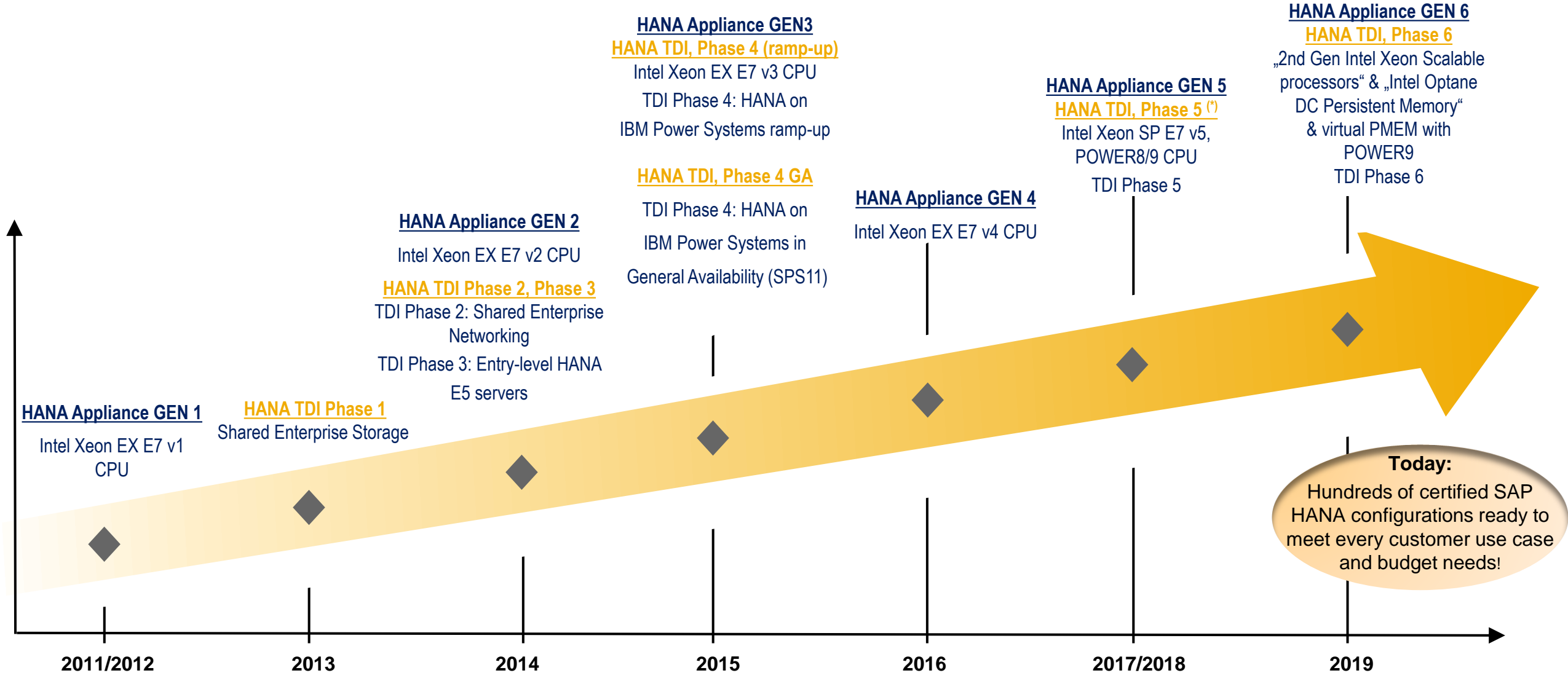PUBLIC

THE BEST RUN **SAP**

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Motivation

Why does SAP offer SAP HANA Tailored Data Center Integration?

SAP HANA Tailored Data Center Integration

A continuous journey towards openness

HANA Appliance GEN 6
HANA TDI, Phase 6
„2nd Gen Intel Xeon Scalable processors" & „Intel Optane DC Persistent Memory" & virtual PMEM with POWER9
TDI Phase 6

HANA Appliance GEN3
HANA TDI, Phase 4 (ramp-up)
Intel Xeon EX E7 v3 CPU
TDI Phase 4: HANA on IBM Power Systems ramp-up

HANA Appliance GEN 5
HANA TDI, Phase 5 (*)
Intel Xeon SP E7 v5, POWER8/9 CPU
TDI Phase 5

HANA TDI, Phase 4 GA
TDI Phase 4: HANA on IBM Power Systems in General Availability (SPS11)

HANA Appliance GEN 4
Intel Xeon EX E7 v4 CPU

HANA Appliance GEN 2
Intel Xeon EX E7 v2 CPU
HANA TDI Phase 2, Phase 3
TDI Phase 2: Shared Enterprise Networking
TDI Phase 3: Entry-level HANA E5 servers

HANA Appliance GEN 1
Intel Xeon EX E7 v1 CPU

HANA TDI Phase 1
Shared Enterprise Storage

Today:
Hundreds of certified SAP HANA configurations ready to meet every customer use case and budget needs!

| 2011/2012 | 2013 | 2014 | 2015 | 2016 | 2017/2018 | 2019 |

SAP HANA Tailored Data Center Integration

A variety of configuration choices, scaling from very small servers to very large clusters

12 Petabyte Data Warehouse with SAP HANA ⇨ Guinness world record
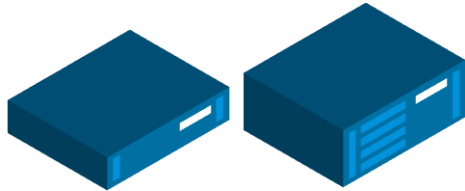
Single Server

- 2 CPU 128GB to 32 CPU 24TB
- Single SAP HANA deployments for data marts or accelerators with performance demands (Socket to Memory ratio)
- Support for high availability and disaster recovery
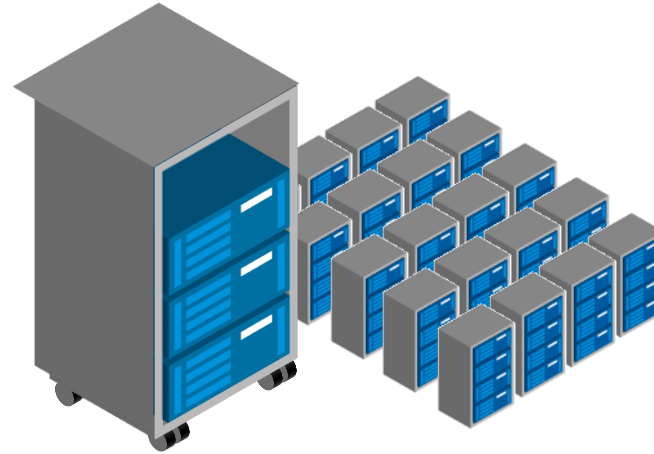
Scale Out Cluster

- 2 to n servers per cluster
- Each server is either 4 CPU/3TB or 8 CPU/6TB (OLAP), 12TB (OLTP [*])
- Largest certified configuration: 112 servers
- Largest tested configuration: 250+ servers
- Support for high availability and disaster recovery
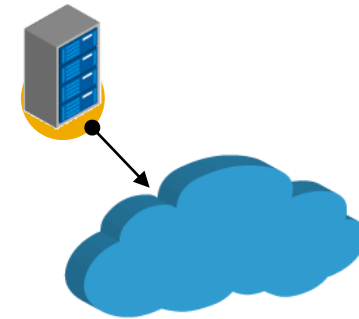
Cloud Deployment

- SAP HANA instances can be deployed to Azure, AWS, GCP, Alibaba etc.
- SAP HANA Enterprise Cloud
- SAP HANA Cloud Platform
- Integration option in on-premise operation (IaaS) e.g. disaster recovery

[*] Note: S4H in scale-out is supported for on-premises only for customers with system sizes that are otherwise not reachable. Minimal node size for S4H cluster is 8s, 12TB (or larger nodes) and maximum cluster size is limited to 4 nodes. See SAP Note 2408419 - SAP S/4HANA Multi-node support for more details.

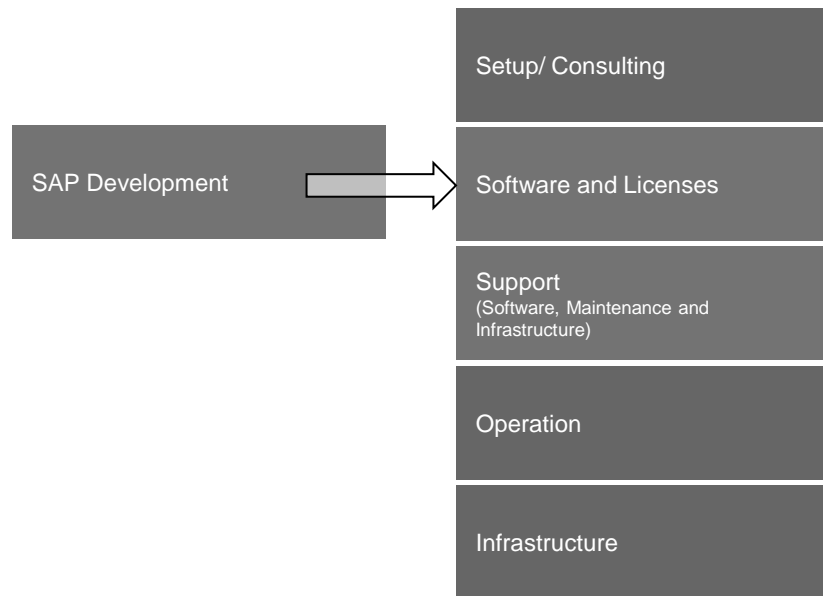# SAP HANA Tailored Data Center Integration

Rich and growing partner ecosystem
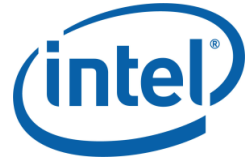
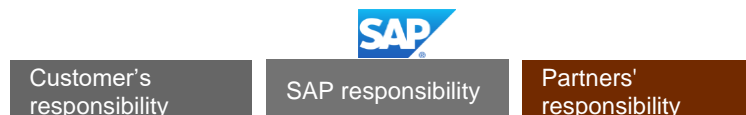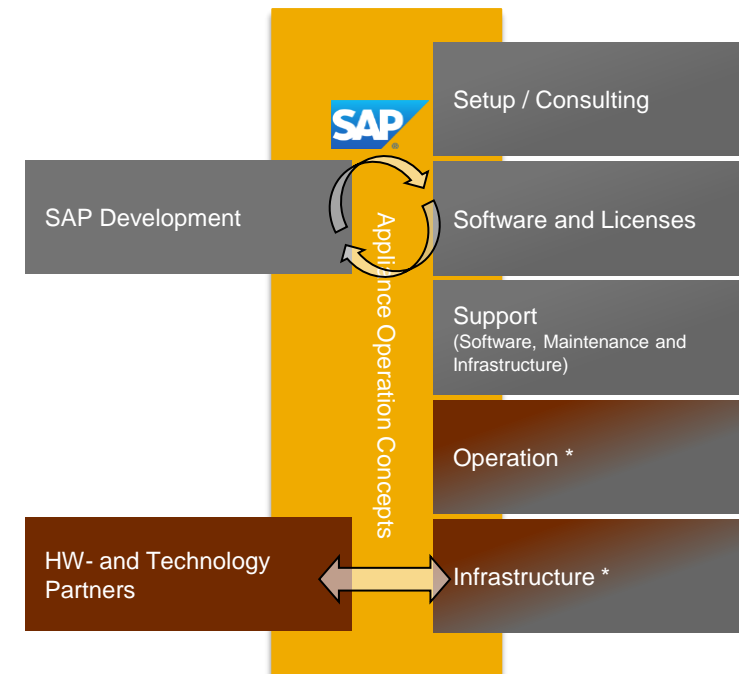# SAP HANA – Started as an Appliance

- **Classic software delivery on-premise solutions**
  - SAP ships only the software
  - Customer is responsible for entire product lifecycle

- **Appliance delivery kind of "SaaS on-site customer"**
  - SAP defines the solution together with its partners
 - SAP & partners control product lifecycle

SAP Development	→	Setup/ Consulting
		Software and Licenses
		Support (Software, Maintenance and Infrastructure)
		Operation
		Infrastructure

Appliance Operation Concepts

SAP Development	Setup / Consulting
	Software and Licenses
	Support (Software, Maintenance and Infrastructure)
	Operation *
HW- and Technology Partners	↔	Infrastructure *

| Customer's responsibility | SAP responsibility | Partners' responsibility |

* Might be outsourced or owned by customer

SAP HANA Appliance Delivery Model
Pros and Cons

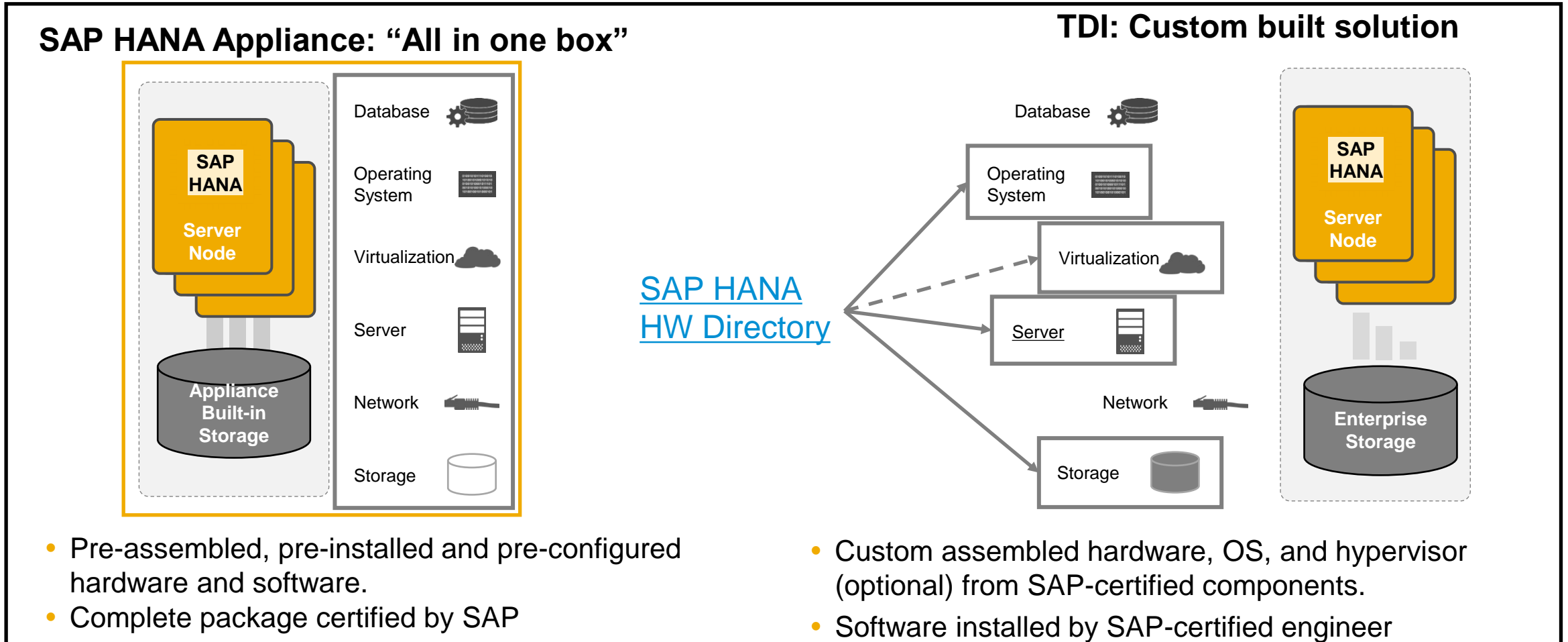**The appliance delivery of SAP HANA is pretty comfortable, …**
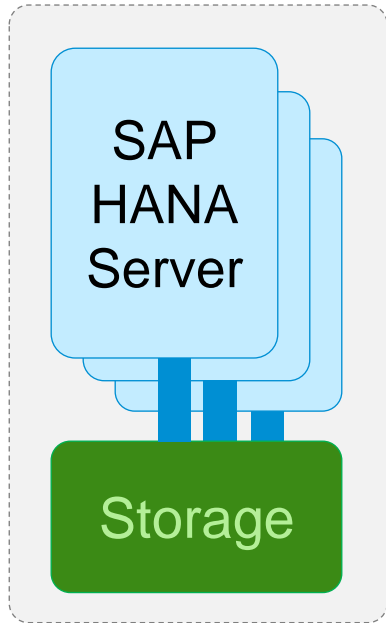
- Standardized and highly optimized

- Preconfigured hardware set-up and preinstalled software package

- Fully supported by SAP

… but, on the other hand, it comes with limitations regarding hardware flexibility. Using appliances may require changing established IT operation processes.

Introducing SAP HANA Tailored Datacenter Integration (TDI)

SAP HANA Tailored Datacenter Integration offers customers additional flexibility to integrate HANA into their datacenters.

SAP HANA Appliance: "All in one box"

TDI: Custom built solution

SAP HANA

Server Node

Appliance Built-in Storage

Database

Operating System

Virtualization

Server

Network

Storage

SAP HANA HW Directory

Database

Operating System

Virtualization

Server

Network

Storage

SAP HANA

Server Node

Enterprise Storage

- Pre-assembled, pre-installed and pre-configured hardware and software.
- Complete package certified by SAP

- Custom assembled hardware, OS, and hypervisor (optional) from SAP-certified components.
- Software installed by SAP-certified engineer

SAP HANA TDI Phases
Delivered in phases with each phase further opening up flexible deployment options

SAP HANA TDI Phase 1: Shared Enterprise Storage

- Allows customers to leverage their existing enterprise storage

- Customers can combine any supported HANA compute server (either from HANA on Intel Xeon E7 Appliances site or from HANA on Intel Xeon E5 Entry-level Systems site) with the storage solution shown on the Certified HANA Enterprise Storage site to maximize their IT landscape efficiency

SAP HANA TDI Phase 2: Shared Enterprise Networking

- Define requirements, reference architecture, and best practices for SAP HANA networking.

- Enables customers to leverage the existing networking infrastructure and network components in their data center, such as routers, bridges, and switches for HANA cluster inter-node and cross-site communication.

SAP HANA TDI Phase 3: Entry-level HANA E5 systems

- Announced with HANA 1 SPS09 provides the more price-sensitive customers with a new choice for HANA compute nodes based on Intel Xeon E5 commodity hardware

- Check the following site: HANA on Intel Xeon E5 Entry-level Systems for an up-to-date list of supported hardware vendors and configurations

SAP HANA TDI Phase 4: Support for IBM Power Systems

- Provides the customers who have standardized in their data centers on IBM Power Systems with an option to leverage existing infrastructure for an easier SAP HANA deployments

- SAP HANA on IBM POWER8 systems is available in General Availability. Refer to SAP Note 2188482 for an up-to-date list of system configurations supported with HANA on Power).

SAP HANA TDI Phase 5: Customer workload driven SAP HANA sizing on Intel Broadwell E7, Skylake SP, Cascade Lake and newer CPU generations, IBM Power Systems

- Supports work-load driven flexible SAP HANA system sizing to help customers optimally configure their systems for their workload generating new cost savings. TDI general support is now extended to all Intel Broadwell E7, Skylake SP, Cascade Lake and newer CPU generations with 8+ cores.

SAP HANA TDI Phase 6: Innovative new type of memory (Intel DC persistent memory) and Introducing Virtual PMEM (IBM Power 9)

- Support of PMEM for Cascade Lake servers enables the customer to extract more value from larger datasets than previously possible by using large DIMM sizes (128GB, 256GB and 512GB), while lowering TCO at the same time. Virtual PMEM on IBM Power Systems enables SAP HANA's built-in fast restart capabilities.

SAP HANA TDI - Phase 1

Introduction to Enterprise Storage

SAP HANA TDI Phase 1: Enterprise Storage
Preconditions

- With the introduction of TDI with Enterprise Storage, SAP supports hardware setups which comply with the three prerequisites below.

- Apart from that, no further approval by SAP is required.

1) Use certified hardware only
- Only servers out of the [list of certified compute servers](#) are supported
 – Same servers as for SAP HANA appliances

2) Use certified storage only
- Storages used for TDI setups must have successfully passed the SAP certification and listed on the [HANA HW Directory – Storage tab](#)
- Certificate states that the storage fulfills SAP HANA's requirements for data throughput and latency times
- 15+ storage partners with dozens of certified storage families (as of Sep, 2016)

3) Let only certified person(s) do the SAP HANA software installation
- Required exam: C_HANATEC_16 (*) - See [SAP Training and Certification Shop](#) for details
- The exam needs to be successfully passed for a person to perform SAP HANA SW installations
  – SAP HANA hardware partners and their employees do not need this certificate
  – Companies or their employees, who are sub-contractors of hardware partners must be certified to perform HANA SW installations

(*) Check the [Recent changes in the SAP HANA Technology certification program 2023](#) blog for the latest info about HANA installation training by SAP.

SAP HANA Server

Server (CPU, RAM)

Network

Enterprise Network

Enterprise Storage

Storage
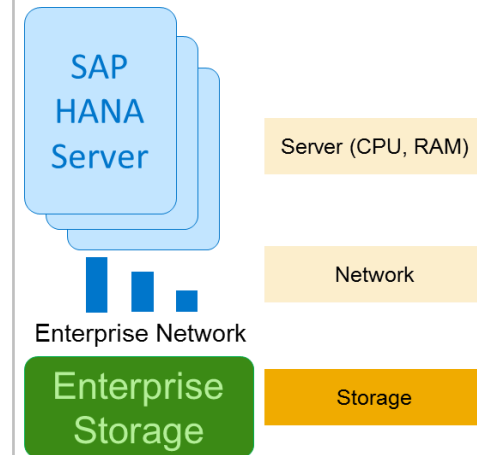
SAP HANA TDI - Phase 2

Introduction to Enterprise Networking

SAP HANA TDI with Enterprise Network
Preconditions

- With the introduction of TDI with Enterprise Network, SAP supports hardware setups which comply with the prerequisites below.

- Apart from that, no further approval by SAP is required.

- SAP does not introduce any certification of network components for TDI setups. Customers should consider involving SAP Active Global Support to perform a HANA Go-Live Check prior to going productive.

1) For the SAP HANA computing nodes, use certified hardware only

- Same as with "TDI with Enterprise Storage"

2) In multi-node setups, check the bandwidth available between the computing nodes

- Make sure that the intra-node network of your SAP HANA scale-out solution fulfills the recommended minimum bandwidth requirements

- Conduct self-managed tests using the Network Test available with HCMT

- SAP does not introduce any additional certification of network components for TDI setups

3) Let only certified person(s) do the SAP HANA software installation

- Same as with "TDI with Enterprise Storage"

SAP HANA Server

Enterprise Network

Enterprise Storage

Server (CPU, RAM)

Network

Storage
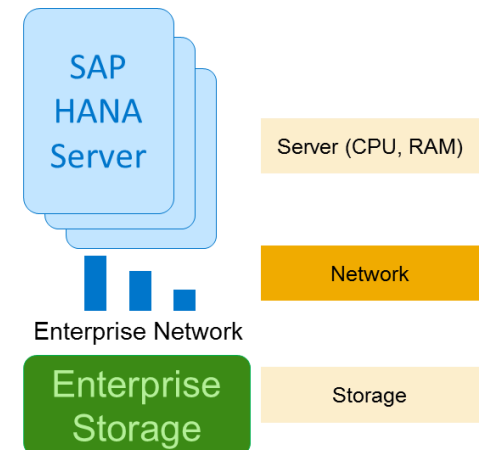
SAP HANA TDI with Enterprise Network
Important Documents and Tools

- Read SAP's Network Whitepaper.

- Make sure to run the SAP HANA Hardware and Cloud Measurement Tool (HCMT) to check your network KPIs every time you change your HANA cluster configuration.

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1) Network Whitepaper – Background Knowledge

- Helps you understand the impact of SAP's network recommendations on the daily operation of SAP HANA

- Introduction to SAP HANA's logical network zones: Client Zone, Internal Zone, Storage Zone

- Detailed description of the network traffic in typical situations of an application scenario
  - Which network zones are involved in situations like "data load", "reporting", "backup", "failover", "takeover"

- Technical requirements and recommendations for all network zones

- Available on SCN: HANA Network Requirements white paper

- Complements existing sources of information:

  - Network zones, ports and connections, host name resolution: SAP HANA Master Guide, chapter 3.3 "The SAP HANA Network"

  - Network and communication security: SAP HANA Security Guide, chapter 5

  - Network recommendations for SAP HANA System Replication: SCN How-To Guide

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2) SAP HANA Hardware and Cloud Measurement Tool

- Command-line tool for measurement, online analysis service provided by SAP

- Used by hardware vendors, SAP Support, and customers

- Measures the minimum bandwidth of the intra-node network i.e. the bandwidth available between the hosts that comprise a multi-node system
  - Does not require SAP HANA SW being installed beforehand

- Hosts are tested pair-wise. For each pair, two tests are available:
  - Unidirectional: Transfer test load from host 1 to host 2, measure bandwidth
  - Bidirectional: At the same time, transfer test load from host 1 to host 2 and vice versa; measure bandwidth

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SAP HANA TDI - Phase 3

Extended Support for Compute Servers with Intel Xeon E5 v2/v3

SAP HANA TDI Phase 3: Extended Support for Compute Servers with
Intel Xeon E5 v2/v3 CPU

With leveraging Intel's E5 technology for SAP HANA in production, SAP supports hardware setups which comply with the prerequisites below. Apart from that, no further approval by SAP is required.

Basic idea: Leverage Intel's E5 technology for SAP HANA cost optimized entry-level system

- Intel Xeon 2 socket E5 26xx v2/v3 with minimum 8 cores per CPU are supported
  - For the SAP HANA computing nodes, use certified hardware only as listed in the HANA Hardware Directory
  - Homogenous symmetric assembly of DIMMs and maximum utilization of all available memory channels
- Single server systems – scale up only, with systems ranging in size from 128GB to 1.5TB
- Supported as SAP HANA tailored datacenter integrated system
- The sweet spot is around $10K (768GB system, populated with 32GB DIMM´s)
- Let only certified person(s) do the SAP HANA software installation
- Production support for proper sized systems which fulfil the data throughput and the latency KPI´s
- Relaxed HW Specifications for Non-Production system

Restrictions

- No support for Intel Xeon E5 4 socket systems
- No support for SAP HANA scale out solutions based on Intel Xeon E5 compute nodes

SAP
HANA
Server

Enterprise Network

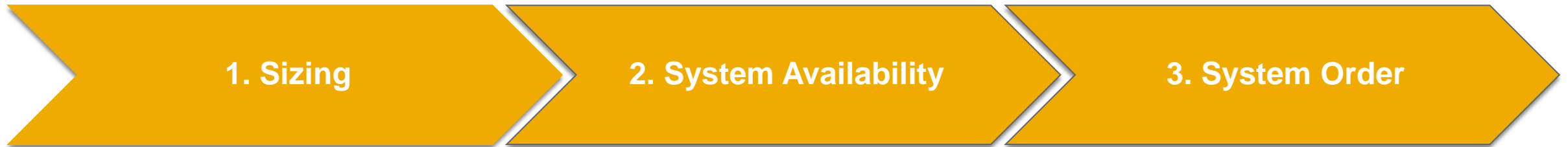Enterprise
Storage

Server (CPU, RAM)

Network

Storage
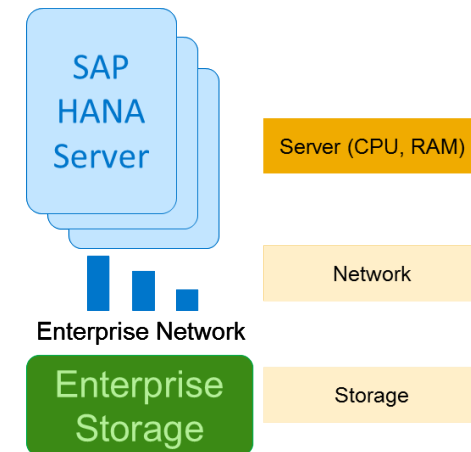
SAP HANA TDI Phase 3: HANA Entry-level Servers based on Intel Xeon E5
Streamlined customer procurement process

A Simple **3** step process to get SAP HANA hardware

(entry systems based on Intel Xeon E5 2 socket systems 26xx up to 1.5 TB)

1. Sizing	2. System Availability	3. System Order

- Customer or SAP business partner fill in all necessary information into the *NEW* SAP HANA quick sizer (http://service.sap.com/quicksizing).
- The results out of the SAP HANA sizing provide the SAPS (including CPU, RAM, I/O) requirements for production systems.

- Customer checks on the HANA HW Directory – Supported Intel Systems for solutions from their preferred hardware vendor.

- Customer gets in contact with the hardware vendor.
- The HW vendor translates HANA sizing results into the right hardware solution and recommends the system the customer should order.

Additional major advantage of this new option:

- Customers and the whole SAP ecosystem are very familiar with SAP sizing tools!

SAP HANA TDI Phase 3: HANA Entry-level Servers based on Intel Xeon E5
Overview of Quick Sizing Process

Preconditions
– Requires access to the SAP Service Marketplace using a valid SAP customer number

For an initial sizing recommendation, proceed as follows	
1	Call https://sap.com/sizing
2	Create a sizing project with the relevant information, such as number of users
3	Get an initial sizing result for CPU, disk, and memory
4	Possibly apply additional guidelines on top
5	Check for sample configurations at https://sap.com//benchmark
6	Provide hardware vendor with Quick Sizer project name and the information whether classic Quick Sizer or HANA Quick Sizer was used (and additional guidelines, if desired)

SAP HANA TDI - Phase 4

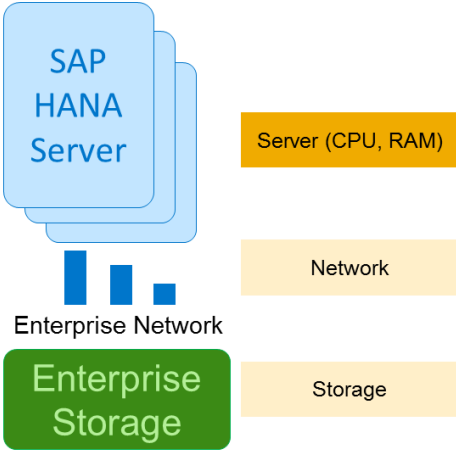Introduction to SAP HANA, version for IBM Power Systems

SAP HANA TDI Phase 4: Introduction of HANA on IBM Power Systems

Starting with SPS 11, customers can chose to run SAP HANA on IBM POWER8 (in production).

Compute server requirements

- See Table below for supported POWER8 System configurations (As of Feb, 2017 (*))

POWER8 Model	Minimal cores per LPAR	Maximal cores per LPAR
S822	8	20
S822L	8	24
S824	8	24
S824L	8	24
E850	8	32
E850C	8	48
E870, E870C	8	80
E880, E880C	8	96/144‡

SAP HANA Server

Server (CPU, RAM)

Network

Enterprise Network

Enterprise Storage

Storage

(*) See 2188482 - SAP HANA on IBM Power Systems: Allowed Hardware for an up-to-date list of supported POWER8 configurations, also

SAP Note 2230704 - SAP HANA on IBM Power Systems with multiple LPARs per physical host , and

SAP Note 2218464 - Supported products when running SAP HANA on IBM Power Systems

SAP HANA TDI Phase 4 – Introduction of HANA on IBM Power Systems
Requirements and restrictions

Enterprise storage requirements for SAP HANA on Power Systems

- Use certified storage only
  - Follow the best practices and storage recommendations described in the SAP HANA Enterprise Storage white paper
  - For an up-to-date list of supported storage vendors, see Certified HANA Enterprise Storage site.

Enterprise networking requirements for SAP HANA on Power Systems

- Follow the best practices and network recommendations described in the the SAP HANA Network Requirements white paper

Software installation requirements for SAP HANA on Power Systems

- Let only certified person(s) do the SAP HANA software installation
- SAP HANA SPS11 or later release is required.

Restrictions

- IBM Power 7+ systems are supported only in non-production (for test and development systems)
- For supported Operating Systems see SAP Note 2235581
- For LPAR Restrictions see SAP Note 2230704

SAP HANA Server

Enterprise Network

Enterprise Storage

Server (CPU, RAM)

Network

Storage
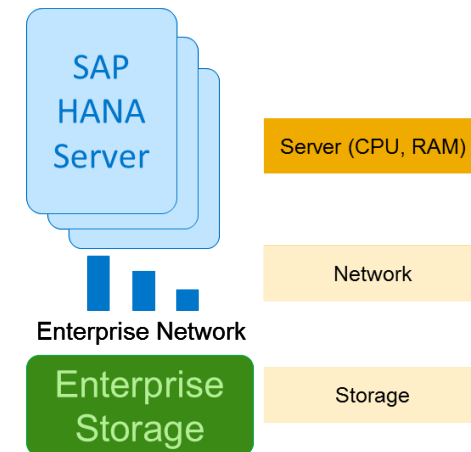
SAP HANA TDI: Phase 5

Introduces two important changes:

1. Customer workload-driven HANA system sizing

2. Extended Intel Xeon E7 CPU Support

SAP HANA TDI Phase 5 in a nutshell

In phase 5, SAP introduces two important changes to the HANA TDI deployment approach:

Change #1: Customer workload-driven sizing

BEFORE: The size of HANA memory determines the type and number of the processors required

- Disk size of source database results into HANA RAM (memory) size.

- Based on the HANA memory size – the processor type and size (number of cores) are determined.

- HANA hardware partners certify their systems using this pre-determined (fixed) core-to-memory ratio.
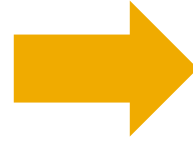
NOW: SAPS requirements for the specific customer workload are used to determine the type and number of the processors required

- SAP HANA quicksizer and SAP HANA sizing reports have been enhanced to provide separate CPU and RAM sizing results in SAPS.

- Customers share the sizing results with their preferred hardware partner to jointly determine the processor type and optimal number of cores needed to run their specific application workload on SAP HANA.

Change #2: Extended support for Intel E7 CPU processors

BEFORE: Only two top-bin CPUs are supported

- Customers choice is limited to HANA systems with pre-determined processor types and a fixed number of cores and memory sizes

NOW: All Intel E7 Broadwell, Skylake and newer CPUs with 8+ cores are supported

- Customers have increased flexibility with the HANA system sizes, and the processor type and the number of cores used

SAP HANA TDI Phase 5: Workload-driven HANA system sizing
Increased flexibility, lower TCO

The newly enhanced sizing approach for SAP HANA enables workload-driven hardware configurations resulting in increased flexibility and new cost savings for customers

APPLIANCE DELIVERY MODEL

Pre-defined HW sizing

- T-Shirt Sizing with best in class performance
- Highly optimized hardware setup (only top-bin CPUs)

Low Implementation effort

- Pre-configured and pre-installed system setup

HANA TAILORED DATACENTER INTEGRATION (TDI) PHASE 5

Flexible HW sizing

(Applies only to newer processor types: Intel Xeon EX E7 Broadwell*, Intel Xeon-SP Skylake* and IBM POWER8, POWER9 and newer CPU generations.

- Tailored customer sizing: System memory and processor sizing are fine-tuned for the specific customer workload
- SAP HANA hardware partner translates the sizing results (SAPS, RAM, CPU, and disk I/O**) into customer- tailored system configurations using a wide range of CPUs (including lower-end CPUs, not only top–bin CPUs)

Only hardware is delivered – Sizing and installation remains the responsibility of customer and/or partner.

*Platinum, Gold, Silver with 8 or more cores

** TDI storage KPIs still need to be met but the I/O sizing takes a higher precedence: If the workload requires more I/O than the system has, then the configuration has to be adjusted to meet the higher I/O requirements coming from the sizing

SAP HANA TDI Phase 5: Extended Intel Xeon E7 CPU Support
More choices, more granular HANA system sizes, additional cost savings

Today

- Hardware configurations are based on a fixed core-to-memory ratio per CPU generation providing customers with optimized performance for generic OLAP and OLTP workloads.

Future with HANA TDI Phase 5

- SAP extends the support for Intel E7 CPUs to include all Intel Broadwell E7, Skylake-SP* and newer processors with 8+ cores/socket.

- Partners will now be able to build HANA systems using a wide range of CPUs that differ in frequency, processing power, and most importantly cost.

  As a result, supported HANA configurations will include more granular HANA system sizes and scalability – thus enabling customers to further lower their hardware infrastructure costs by buying only the processing power and memory required for their specific workload.

- SAP tools provides sizing projection and the hardware vendors translate results into actual configurations.

*Platinum, Gold, Silver with 8 or more cores per processor

SAP HANA TDI Phase 5: Key Benefits

Customer will benefit from changes introduced with phase 5 of the HANA TDI in several important ways:

Increased flexibility and lower TCO from ability to use compute nodes with less cores per processor:

- With TDI Phase 5 SAP supports the complete Broadwell E7 processor family as well as the Skylake Platinum, Gold and Silver processor family (8+ cores per processor), Cascade Lake and newer CPU generations and selected IBM POWER8 and POWER9 models (see SAP Note 2188482).

- This increased variety of CPU processors will give customers more flexibility when choosing their hardware, also allow them to cost-optimize their hardware for their specific workload requirements :

More choices, more granular system sizes, and additional cost savings from using the new, workload-driven sizing approach

- The shift to the workload-driven sizing approach for Intel E7 Broadwell, Skylake and newer CPU generations and IBM POWER8 & POWER9 based HANA systems will determine the maximum RAM capacity for the specific customer application. The resulting HANA TDI configurations will extend the choice of HANA system sizes; and customers with less CPU-intensive workloads may have bigger main memory capacity compared to SAP HANA appliance-based solutions using fixed core-to-memory sizing approach (that's more geared towards delivery of optimal performance for any type of workload).

NOTE: The SAP HANA appliance solutions & reference configurations will remain unchanged in support of the ongoing SAP commitment to deliver best in class solutions which are highly optimized, pre-configured and pre-installed.

Hardware Check Tools

SAP HANA 2.0: HCMT (Hardware & Cloud Measurement Tool) – HCMT replacing HWCCT

- Command-line tool, generally available for SAP HANA 2.0
- Used by storage vendors, SAP Support, and customers
- Measures the data throughput and latency times between the SAP HANA servers and the Enterprise Storage system
  - Does not require SAP HANA SW being installed beforehand
  - Uses the same libraries for file system access and the same IO patterns as SAP HANA does
- Download it from the Software Market Place and upload the results to the SAP One Support Portal
- Documented in the SAP HANA Administration Guide
  - Contains the latest KPIs
  - For latest document changes, see the documentation in the SAP Help Portal and the SAP Note 2493172

SAP HANA TDI: Phase 6

Introduces two important changes:

- Innovative new type of memory (Intel Optane DC persistent memory)
- Introducing virtual PMEM for IBM POWER9

SAP HANA TDI: Phase 6
Innovative new type of memory (Intel Optane DC persistent memory)

An Innovative, New Type of Memory

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

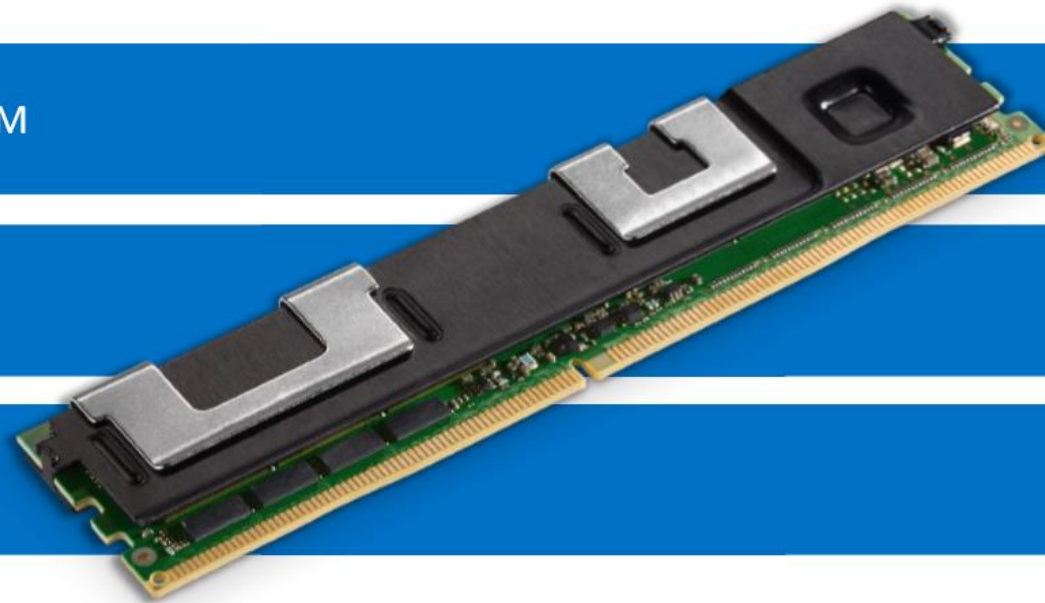|	
Performance close to DRAM	DIMM Form factor
Low total cost of ownership (TCO)	Available in much larger capacities than DRAM
Data persistency	Large DIMM SIZES 128 GB, 256 GB, 512 GB

SAP HANA Native Support for Persistent Memory
Officially Supported in SAP HANA 2.3 (April 2018)

Larger memory capacity with high performance (vs. DRAM & lower tier storage)

Lower TCO data storage hierarchy

Faster start time delivers less downtime

Co-innovation with Intel® leads to first fully optimized major DBMS platform

Early Adoption Program with key partners/customers ongoing

Persistent Memory non-volatile

Data Reliability faster starts

(intel) OPTANE™DC
PERSISTENT MEMORY

Higher Capacity than DRAM

Transforming the memory hierarchy

Intel® Optane™ DC persistent memory <u>available since 2nd April 2019</u>

Benefit

Process more data in real-time at a lower TCO with improved business continuity

> 4 TB
Increased total memory capacity per CPU

12.5x
Improvement in startup time*

"SAP HANA is The First Major DBMS Optimized for Intel Optane DC Persistent Memory."

https://discover.sap.com/sap-hana-dc-persistent-memorynew/en-us/index.html

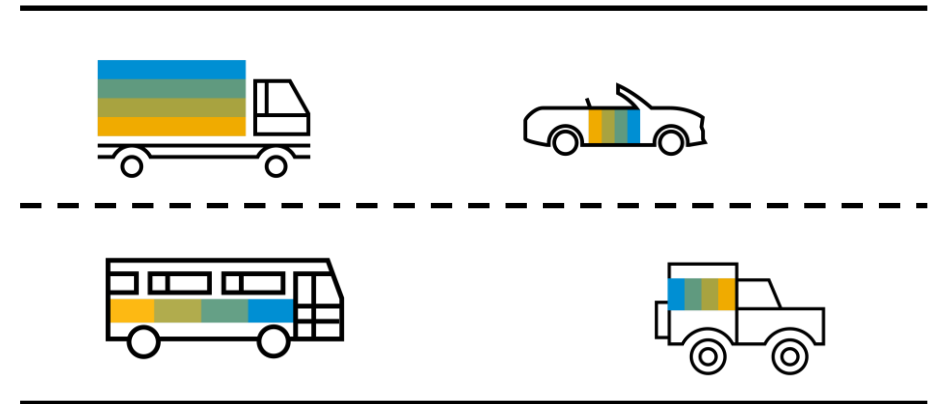*Internal Benchmark measured with a 6TB dataset in SAP HANA

SAP HANA Hardware Sizing

**Hardware sizing determines the hardware requirements of an SAP system.**

Example: **Renting a car**

- You need at least 5 seats if you are 5 people.

- You need a large trunk, if you have 3 large bags.

- You need a powerful engine, if you want to transport a heavy load.

SAP HANA Appliances

- Predetermined configurations, reflecting a wide range of use-cases.

- Listed in the SAP HANA Hardware Directory.

- Fixed ratios between CPU cores and main memory.
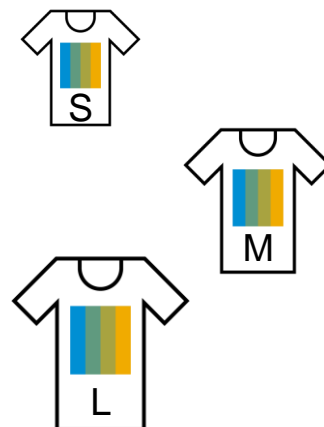
Tailored Datacenter Integration

- *TDI Phase 5* introduces workload-driven sizing to fine-tune configurations for specific workloads and use cases and is eligible for PMEM based use cases.

- Purchase systems with the optimal number of CPU cores and main memory.
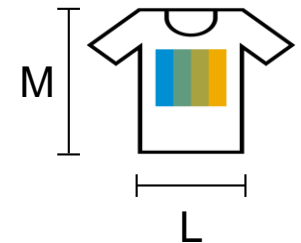
Additional Information Regarding Persistent Memory

Persistent Memory is only available with Tailored Data Center Integration (TDI).

Please see the following links for further information regarding Persistent Memory:

- SAP Note 2700084 FAQ: SAP HANA Persistent Memory

- SAP Note 2786237 - Sizing SAP HANA with Persistent Memory

- What's new in SAP HANA 2.0 SPS 04?

- SAP HANA is The First Major DBMS Optimized for Intel Optane DC Persistent Memory

SAP HANA TDI: Phase 6
Introducing virtual PMEM for IBM POWER9

- IBM offers Virtual Persistent Memory (vPMEM) on POWER9 based systems

- SAP supports vPMEM on POWER9 up to 8 socket the same way physical PMEM is supported.

- SAP HANA's built-in faster restart capabilities can be used also with virtual persistent memory.

- Virtual PMEM does not cover hardware outage, because it uses volatile DRAM.

- Reduces downtime for planned downtime (e.g. OS patch)

- Please see SAP Note 2055470 for details IBM "Virtual Persistent Memory" (vPMEM)

- Please see the IBM blog following link for further information regarding Persistent Memory related enhancements on IBM Power Systems

Thank you.