POWER

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PRÄSENTIERT

SAP HANA on POWER

Überblick und aktuelle Entwicklungen

POWER

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EIN BEITRAG VON

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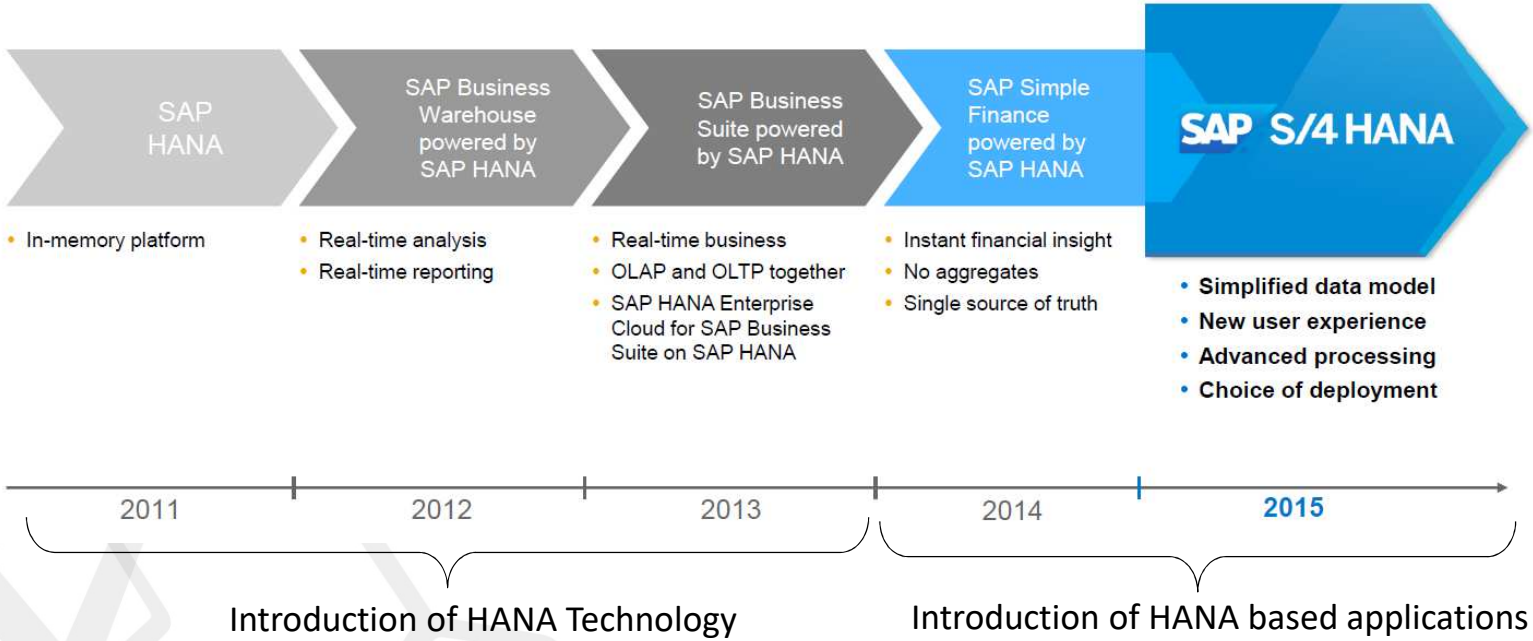
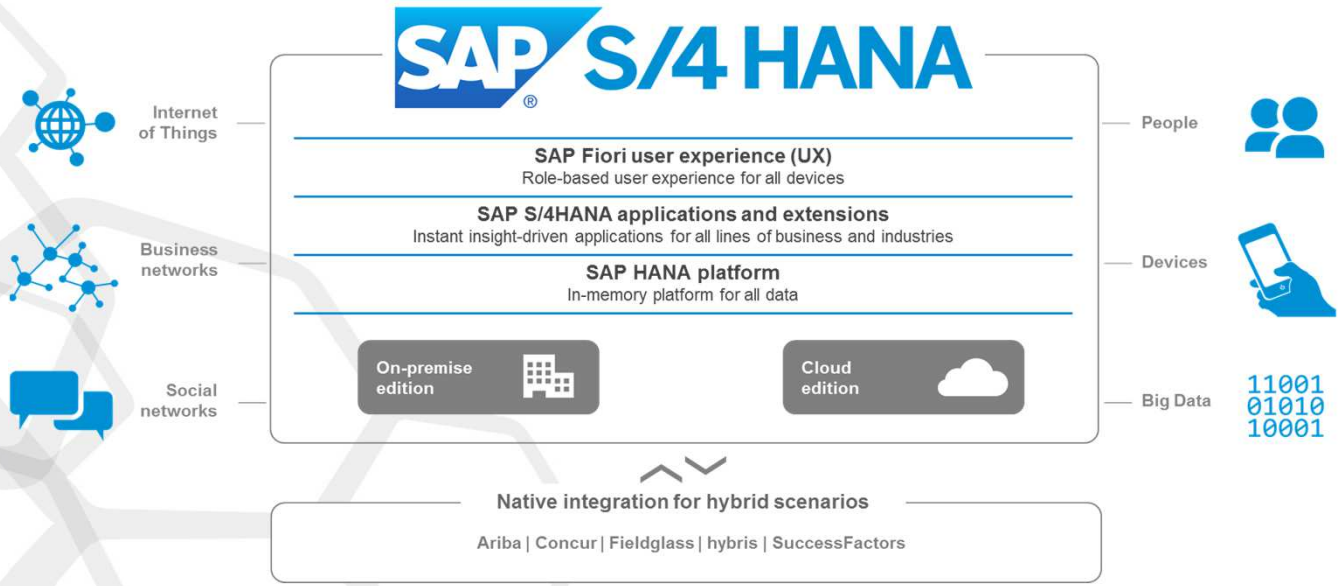
Produktstrategie – von der Datenbank zum integrierten System



Unterschiede zu „klassischem“ ERP

- Neue Architektur & neues – simplifiziertes - Datenmodell, keine aggregierten Daten mehr
- Anwendungen sind optimiert und funktional erweitert
- Einsatz von FIORI als neue UI Technologie flächendeckend
- Nutzung on-premise, in der Cloud oder als hybrides Szenario



Börsenabsturz von IT-Konzern

SAP-Chef verteidigt Strategie

Keine Aktie hat so viel Gewicht im Dax wie die von SAP. Und so haben aktuelle Zahlen bei dem IT-Konzern die Börse erschüttert. Konzernchef Klein hält die hohen Investitionen dennoch für richtig.

26.10.2020, 19.45 Uhr

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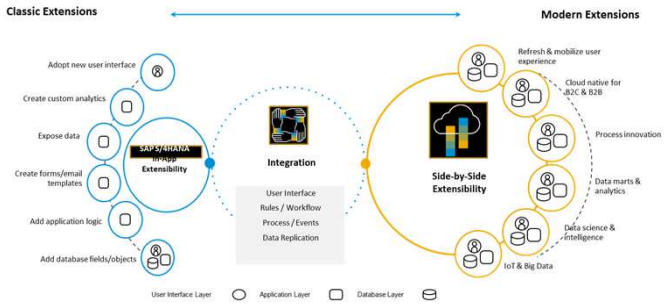
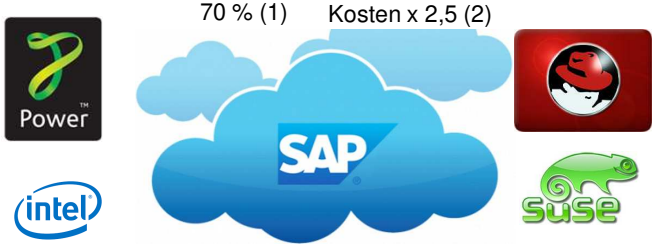
Evolution im SAP Umfeld

Releaseverlauf		
R/2	R/3	S/4
		digital transformation
Frontend		
Terminal	GUI	Fiori
		user experience
Anzahl Datenbanken		
eine	viele	eine
		single source of truth
Releasefähigkeit		
begrenzt	begrenzt	verbessert
		keep the core clean *OpenShift*
Datenbanken		
VSAM/DB2	**ORACLE**,DB2 etc.	HANA
Plattform		
Host	Client / Server	x86 / POWER
		make or buy
Betriebssystem		
MVS/VSE	UNIX/iOS/WINDOWS	SLES/RHEL



private cloud
70 % (1)

public cloud
Kosten x 2,5 (2)



(1) IDC-Untersuchung „Cloud Pulse 1Q20 Survey Findings“ 05/2020
(2) 451 Research “The cloud bandwith tax punishes those focused on the short term” 01/2019

Die Crux mit den Modifikationen

Einführung

Standard Software deckt viele benötigte Funktionen ab, aber nicht alle.
Mit Customizing kann viel angepasst werden.
Spezielle Bedürfnisse werden mit Zusatzentwicklungen bedient.
Bei SAP sind dies die Z-Objekte.

Betrieb

Immer wieder haben Fachabteilungen neue Wünsche und die Zahl der Z-Objekte steigt rasant

Neues Release

Alle Modifikationen müssen (zum Teil händisch) überprüft werden:

- Noch in Benutzung?
- Jetzt im Standard?
- Entwickler vorhanden?
- Dokumentation vorhanden?
- In neues Release überführbar?

brownfield

greenfield

Zeit

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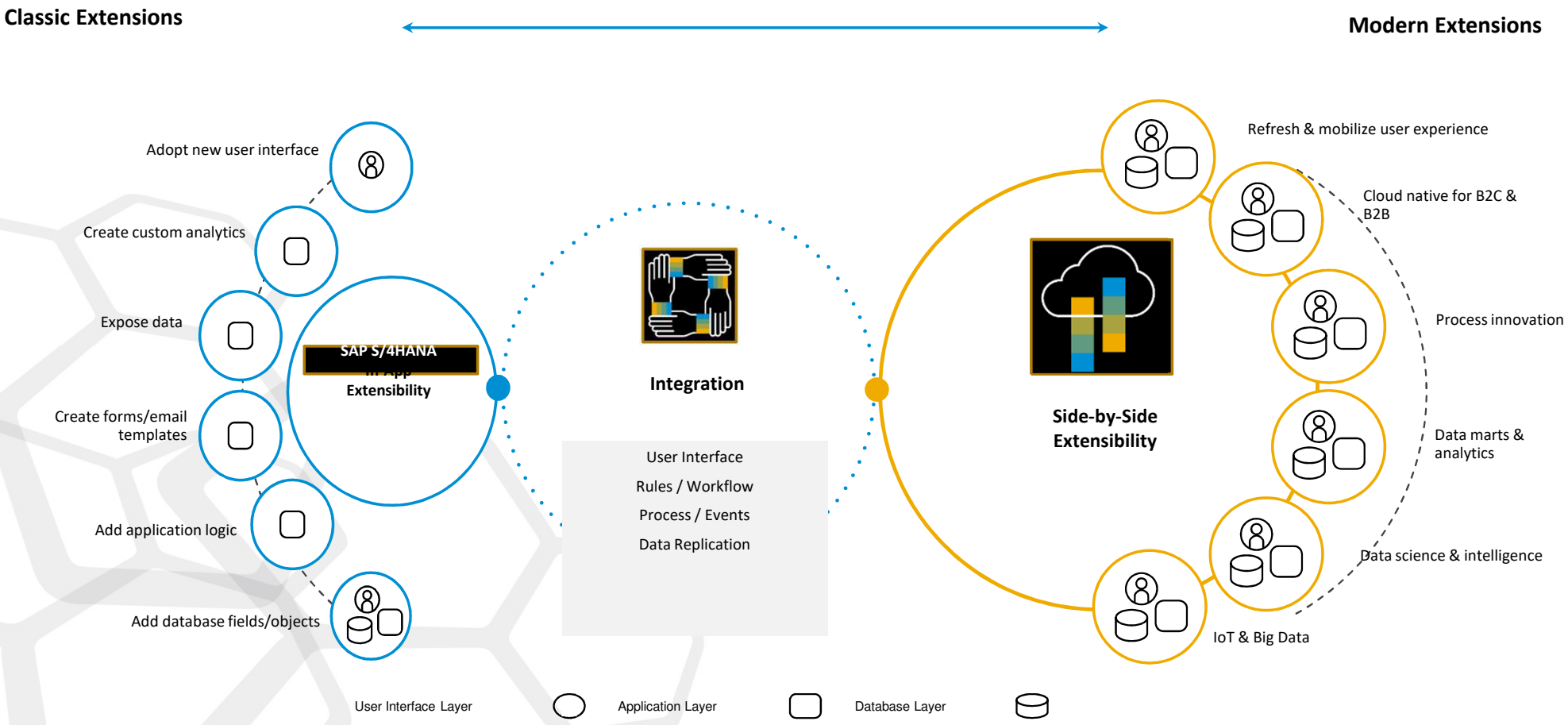
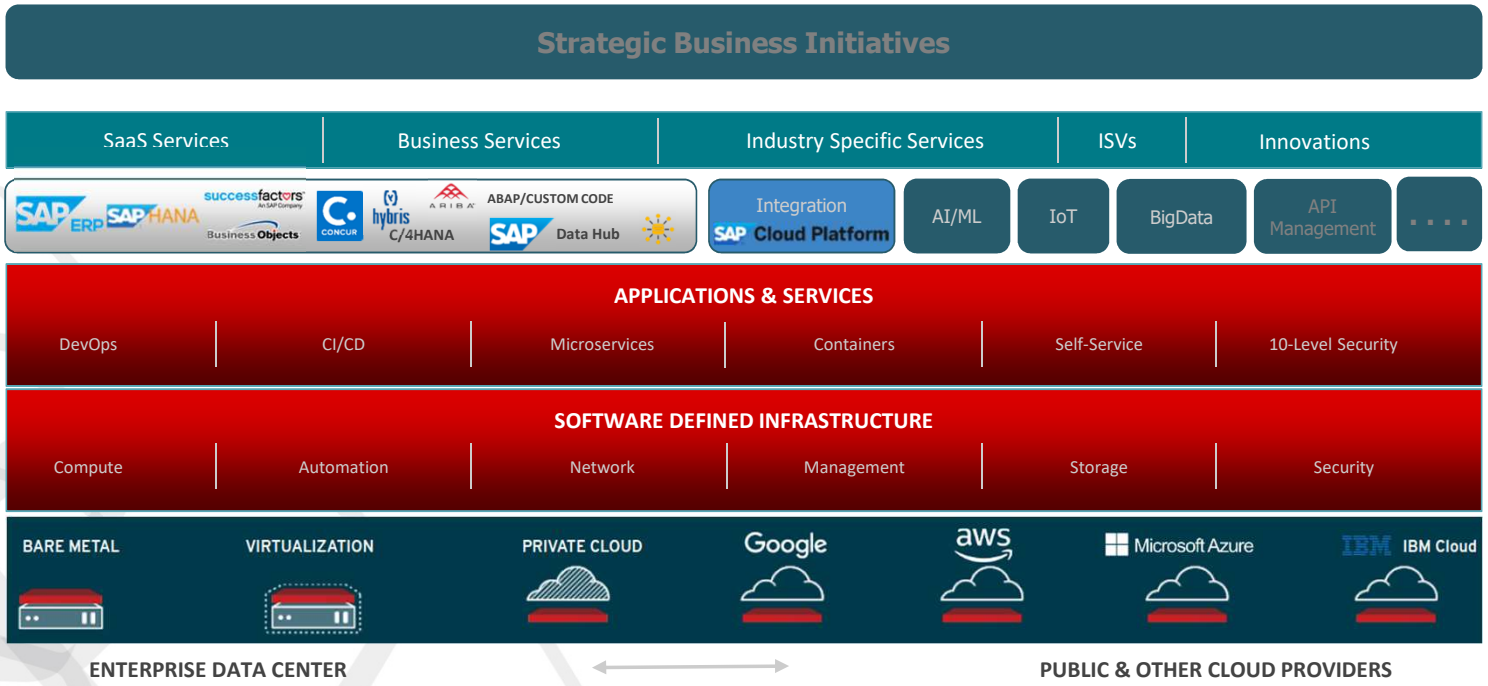
Keep the core clean!

S/4HANA Extensibility Through Modern Cloud-Enabled DevOps Solutions



ABSTRACTION LAYER FOR APPLICATION SERVICES & INFRASTRUCTURE



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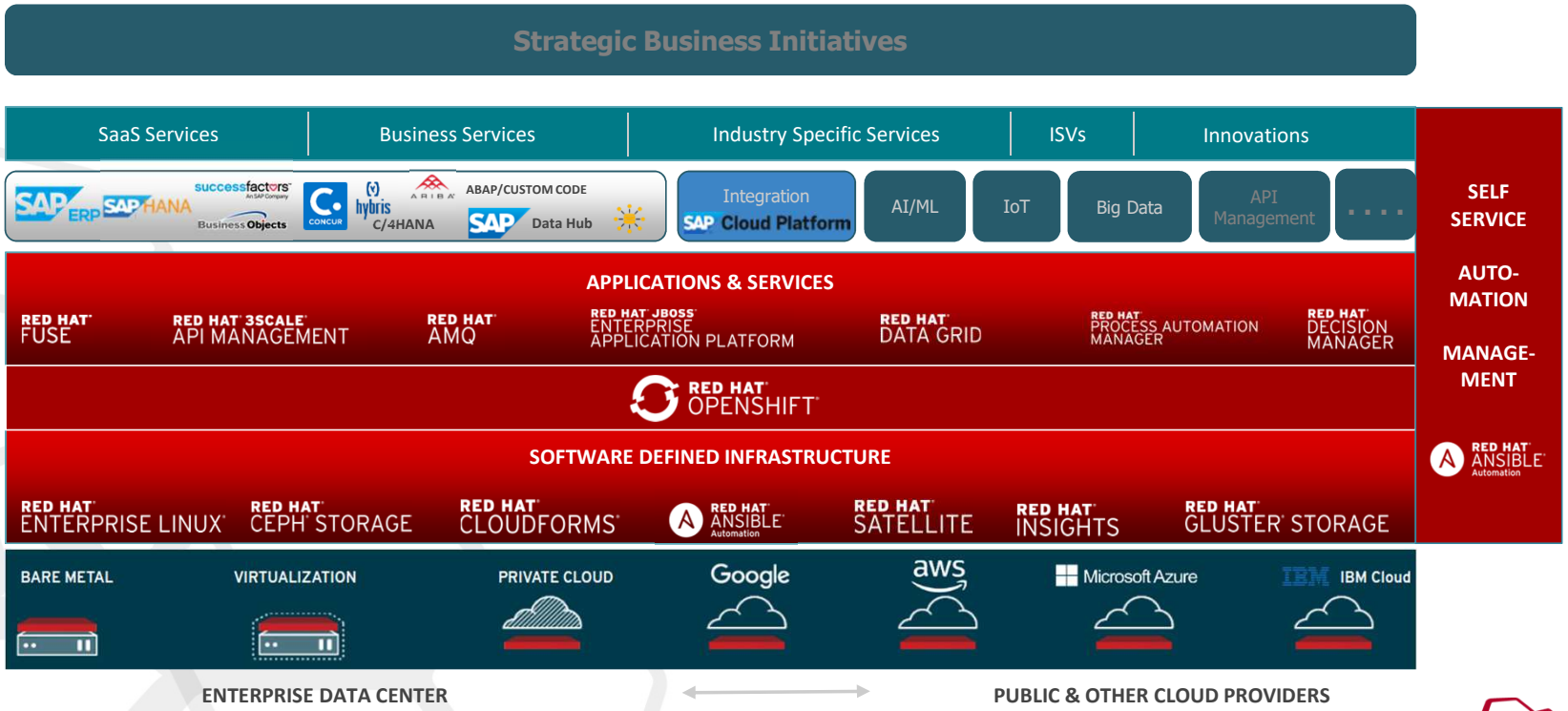
RED HAT OPEN HYBRID CLOUD INFRASTRUCTURE

SIMPLIFIED DEVELOPMENT - STRATEGIC FLEXIBILITY - DEVOPS READY



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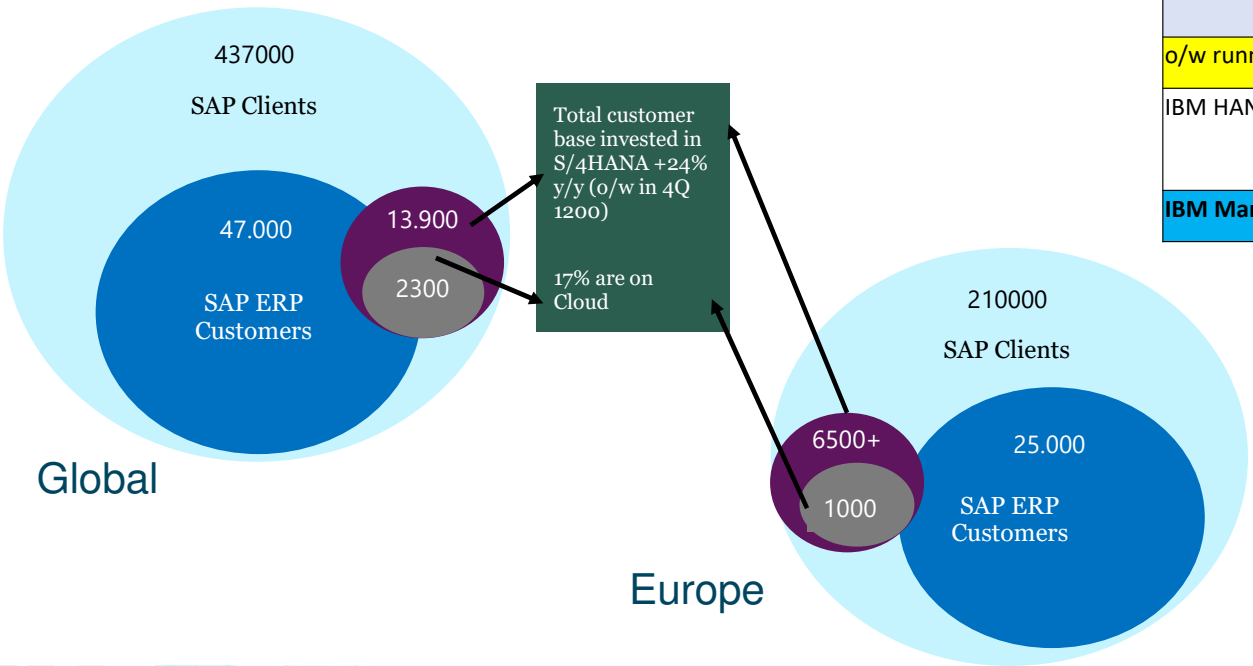
SAP Global versus European Footprint

- Slow progress of SAP HANA adoption measured against SAP's 10 year migration plan (recently prolonged)
- SAP HANA WW 2020 opportunity for Linux Servers = 1,776B$
  of which EU is ~ 45% => 800M$ growing 7% y/y
  (Source: MDI Systems Global with reference to IDC)
- > 50% of companies plan massive investments in 2020-2020 for this transition
- Presently 600 customers in EU versus a market opportunity for IBM Power of 24.400 customers in the ERP space alone

	Global	Europe**
SAP Customers *	437.000	210.00
o/w SAP ERP Customers *	47.000	25.000
o/w customers with S/4 HANA licenses*	(~30%) 13.900	(~26%) 6.500
o/w S/4 HANA customers in production*	3.000	1.400
o/w running on cloud	(~17%) 2.300	(~17%) 1.000
IBM HANA on Power customers	3.800	600
IBM Market Opportunity	43.200	24.400



* Numbers based on SAP's FKOM presentations Jan. 2020
** European revenue estimation is ~50%, means about 45% of the customers are located in Europe (more Enterprise)

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82 External Reference Assets for SAP HANA on Power across 6 GEOs

Asahi Kasei Group, Japan
Promos, Germany
CTAC & AG Real Estate, Netherlands
TUM Proteomics Project, Germany, Education
Itelligence, Poland, Computer Services
Latin American Insurer (anonym.), Brazil, Insurance
I-D Foods, Canada, Consumer Products
Construction Materials Supplier (anonym.), France
Granules, India, Pharmaceuticals
Itambé, Brazil, Consumer Products
WMF Group, Germany, Retail
UOL Group, Singapore, Real Estate
Aryzta, Switzerland
Itelligence Denmark, Denmark
Ryerson, United States

Centria, Peru, Computer Services
Freudenberg IT FIT, USA, Computer Services
International Textile Limited, Pakistan, Fabrication & Assembly
CenturyLink, USA, Telecommunications
Danish Defence, Denmark, Defence
Würth Group, Germany, Retail
Química Amparo, Brazil, Consumer Products
Boydak Holding, Turkey, Industrial Products
D.FI, France, Computer Services
Vishal Mega Mart, India, Retail
Papel San Francisco, Mexico
Colgate Palmolive Pakistan, Pakistan
Itelligence Malaysia, Malaysia
Sensor Manufacturer, Germany

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Selected IBM SAP HANA References and examples using IBM Enterprise POWER technology

US Pharma Company
E880

KENNAMETAL US
E870

Italian US-american Automotive Company
Power Enterprise Server E880

German Automotive Company
E880 / E980 / E950

BOSCH
E880 / E980

Bosch Youtube Video: http://ibm.biz/BoschHoPRefVideo

KAINDL
E850

mondi
BALLUFF
E870

MSPs / IT Service Providers

DEDAGROUP seidor

FIT E880C E850C S824

PROMOS
S824

http://ibm.biz/FITHoPReferenceVideo

PT. Diamond Cold Storage, Indonesia, Consumer Products

ECOGAS Argentina
E870

itambé

coop
E880 / E980
(CAR, BW, CRM)

GRANULES

KNAUF
E880

D.FI
E850C

itelligence
Poland, Denmark, Malaysia

Danish Defence
E880C

COOP Youtube Video: http://ibm.biz/COOPHoPVideo201705

South Shore Furniture, Canada

Australian Government Department of Human Services Australia
Power Server

WINDMÖLLER & HÖLSCHER
E880C

WÜRTH
E880 and E870
http://ibm.biz/WuerthHoPRefVideo

United Breweries Ltd India
S824

YPE (Química Amparo) Brazil

VEKA
E870 (BW)

SIFI

Entegris

INDUS MOTOR COMPANY
Pakistan, Automotive<

CSN
CSN (Companhia Siderurgica Nacional), Brazil

CHR HANSEN
E850

WMF

創美藥業 CH'MEI CHUANGMEI MEDICINE
Chuangmei Medicine, China, Pharmaceutical

Foodstuffs NZ

ARYZTA

Boydak HOLDING E870

Technische Universität München

S822 for HANA

TUM Youtube Video:
http://ibm.biz/TUMHoPRefVideo

In case of interest to contact mentioned on other Power HANA customers, contacts to be provided by IBM sales team per request.

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SAP HANA Fast Restart Option

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Fast Restart

Painpoint:

Planned maintenance requires restart of HANA.
For multi terabyte databases the restart and initial data load time contributes significantly to the downtime.

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1. **SAP Fast Restart Option**
   - Available with SAP HANA SPS04
   - Based on *tmpfs* Linux filesystem

2. **Fast Restart with Virtual Persistent Memory**
   - Available with new POWER9 firmware 940 and current SLES4SAP 15 SP1+
   - Based on Virtual PMEM device provided by PowerVM
   - Adds the capability to support fast restart even after OS maintenance, LPAR restart

   → Therefore the vast majority of maintenance tasks will keep the ability for a fast restart

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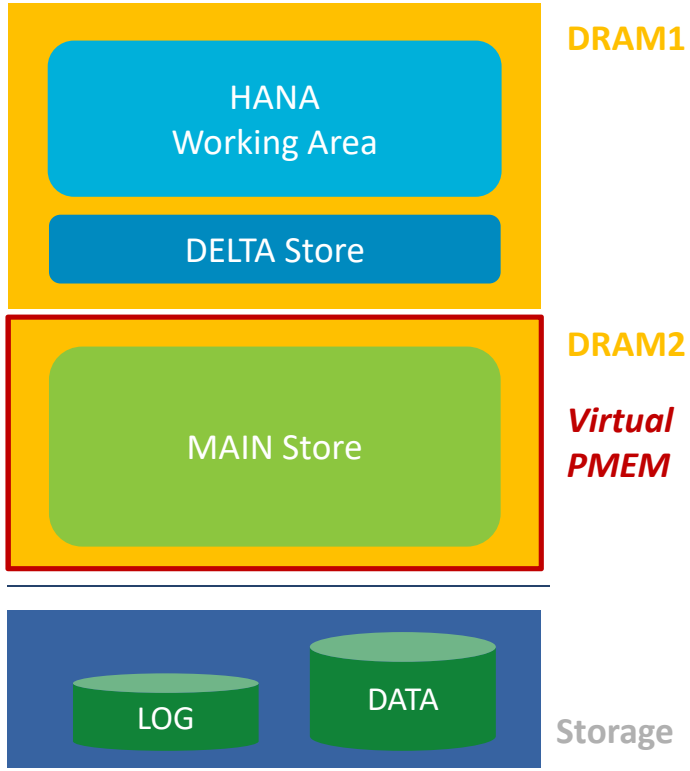
SAP HANA with Virtual PMEM on IBM POWER Systems

How it will work

- DRAM is split into two regions DRAM1 & DRAM2
- Data in DRAM2 are preserved across HANA, OS, and LPAR restarts, i.e. it is is *virtually persistent*.
- DRAM2 is advertised as PMEM device (standard Linux i/f exploited by HANA)
- DRAM2 region is initialized with Main region when used for the first time
- Restart of HANA or Linux do **not** require main region to be re- loaded from storage into memory
- Storage is used for data persistency; changes to database continuously logged to LOG volume



Client Value

- Fast Restart of SAP HANA environment in case of planned and unplanned downtime
- Applicable to >90 % of maintenance scenarios*
- Provided as PowerVM update for existing Power9 systems
- No additional cost
- No impact on runtime performance or latency

- according to survey
- with large POWER customers

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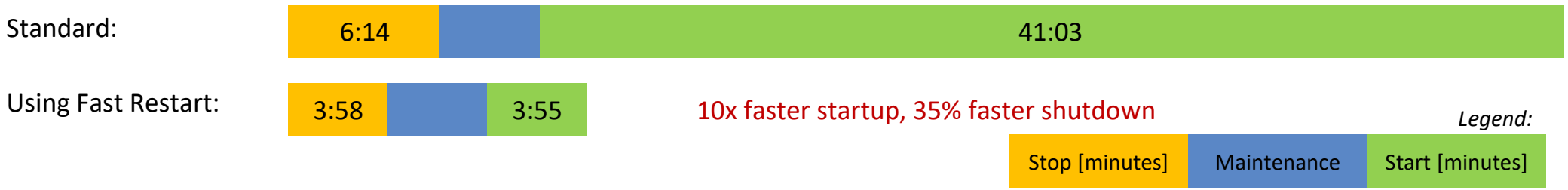
SAP HANA Fast Restart Option - Measurements

- SAP HANA moves large parts of the memory content to memory areas which retain the content after process restart and other events
- SAP HANA checks at startup if retained memory content is consistent and can be re-used instead of loading from disk

Measuring a restart cycle of a large database with 8TB content (16 TB HANA system) until fully loaded to memory:



Comment: The mapping and un-mapping of very large memory areas into process address spaces benefits significantly from the 64K page size on Power

Other – (03/2020) - test results - same results, with vPMEM or with tmpfs:

- IBM Lab - on a E950 Server with fast restart:
  - Shutdown 1:10 min, Startup 1:45 measured
- Customer test results:
  – 17 TB HANA LPAR - Standard approx 120 minutes – using fast restart: approx. 4 minutes
  – 8 TB HANA LPAR – using fast restart: approx. 2 minutes

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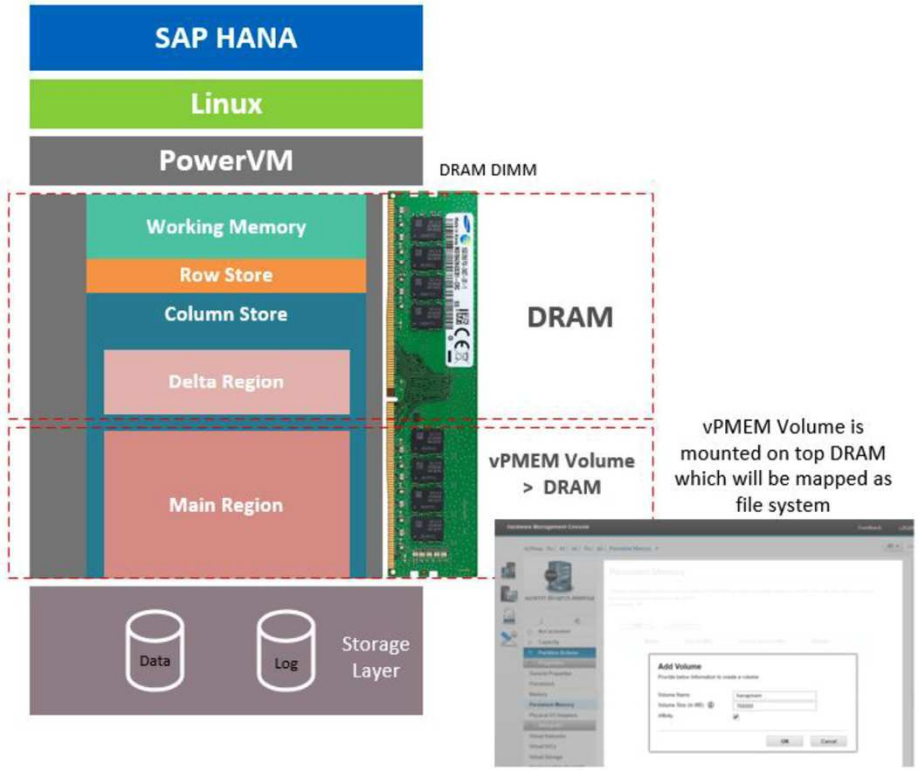
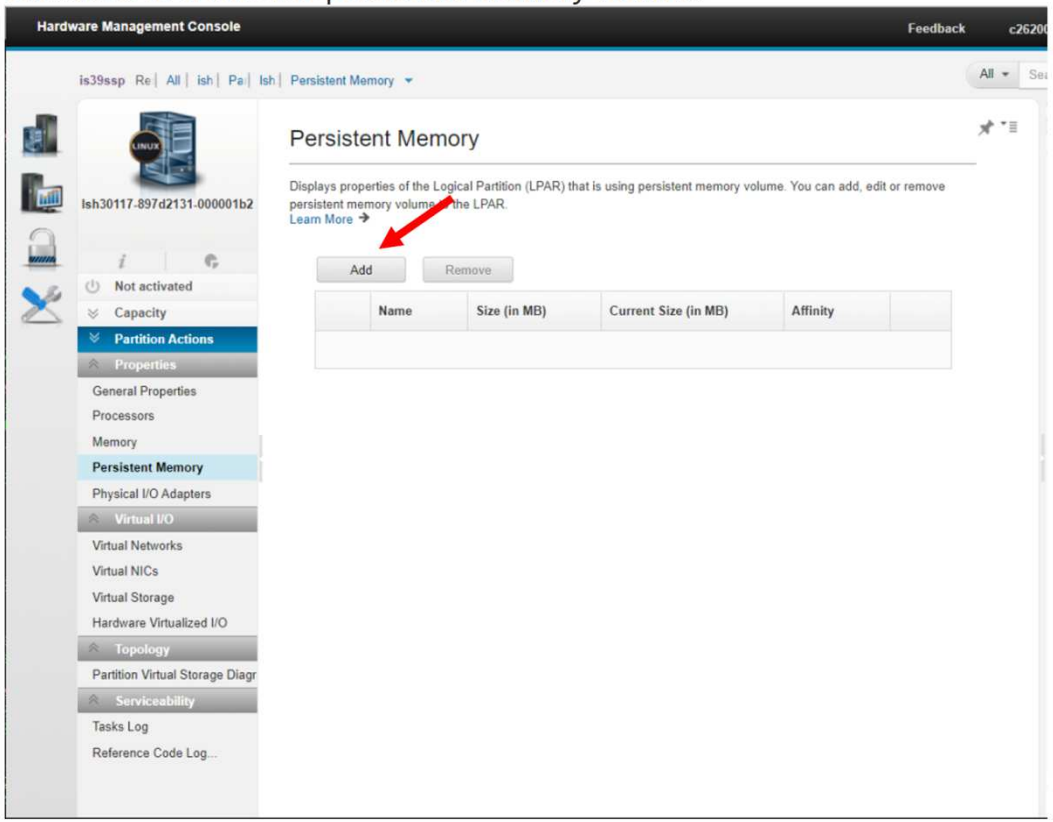
Virtual PMEM for SAP HANA on IBM Power Systems



Click **Add** to create the persistent memory volume.



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Virtual PMEM advantages

Faster SAP HANA restart	Improves shutdown time	**Maximize uptime**
Preserves runtime performance	NUMA aware PMEM	**Continue to get faster insights**
Virtualization enabled	Change PMEM allocation on demand	**Improved flexibility**

Available at no additional cost on all existing POWER9 based systems!!!

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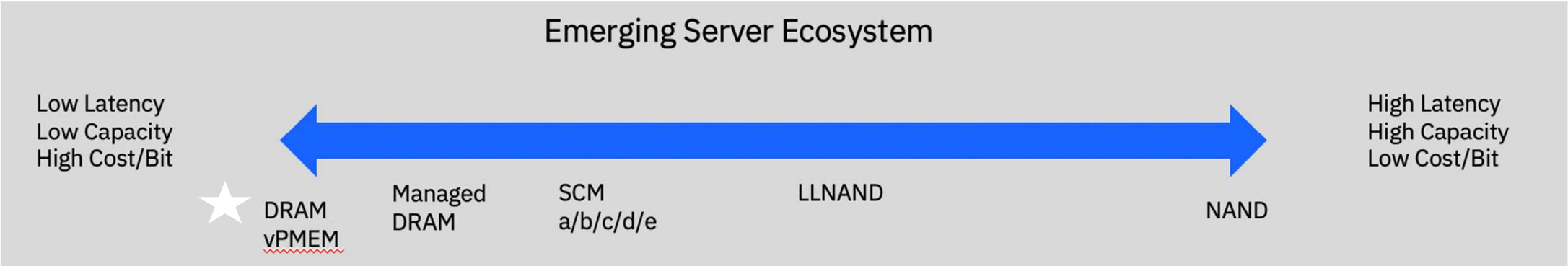
Intel Optane versus IBM Virtual PMEM – Major Differences

Intel Optane DC Persistent Memory (DCPMM)	IBM Virtual Persistent Memory (vPMEM)
Separate DCPMM modules need to be purchased	Additional hardware is not required
Available only on Intel's Cascade lake architecture	All existing POWER9 Servers with PowerVM support Virtual PMEM
Different modules used which have higher latency as compared to DRAM.	Preserves the same run-time performance
SAP HANA is not yet supported by SAP on x86 VMWare vSphere with persistent memory	Built using Virtualization, virtualization with same granularity supported for SAP HANA
Data is preserved even when power is off.	Virtual PMEM does not preserve memory across server power down. But it will preserve the data if you restart your HANA instance or reboot Linux OS or LPAR
Specific deployment ratio needs to be followed between DRAM and PMEM when configuring HANA database. (SAP Note 2786237)	No ratio restriction applies using Virtual PMEM

Emerging Memory Enhancement in the Industry



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Persistent Memory Roadmap – Future… HMS & OMI

https://ibmsystemsmag.com/Power-Systems/8/2019/Future-Memory-Enhancements

Future Memory Enhancements on IBM Power Systems

Source: https://ibmsystemsmag.com/Power-Systems/8/2019/Future-Memory-Enhancements

AIX / IBM i / Linux on POWER / Article / Data management / Storage

Asim Mustafa Khan details IBM's future plans for Persistent Memory Enhancements.

By Asim Mustafa Khan

07/23/2019

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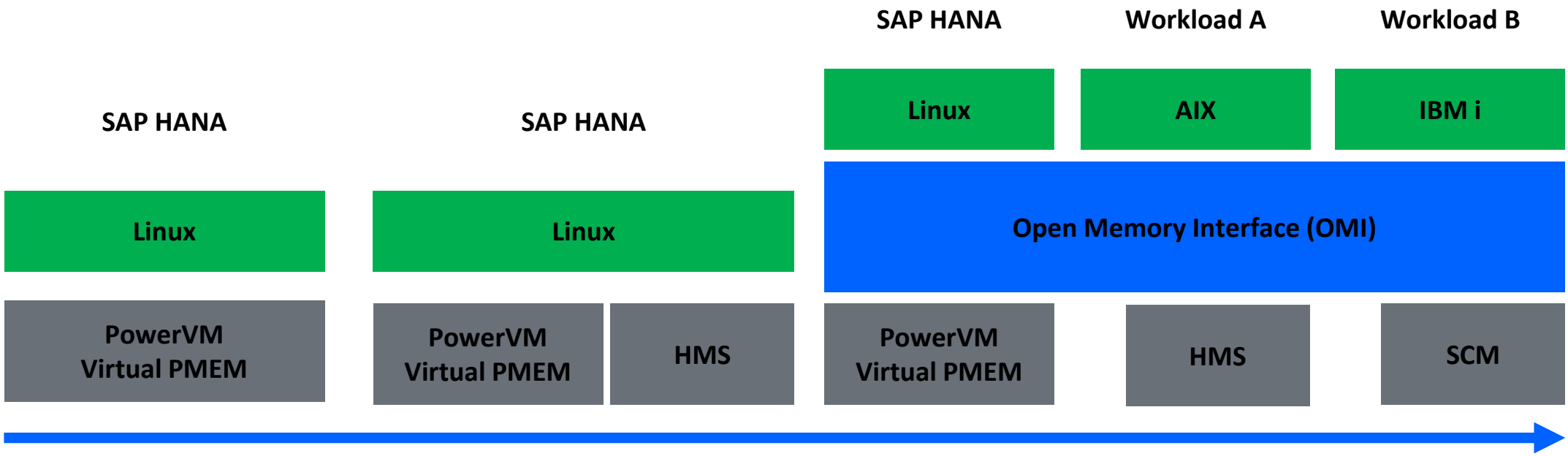
Persistent Memory Roadmap on IBM Power Systems

Fast restart of workloads with PowerVM Virtual PMEM

Hybrid memory with DRAM and Low Latency NAND

Open Memory Interface (OMI) supporting emerging memory technologies



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POWER9 Servers – usable for SAP HANA

ScaleOut
2 Socket Server
S922 / S924
L922 (Linux only)
H922* / H924*

- **Up to 24 Cores**
- **4, 8, 10, 11, 12 Cores processor types**

Up to 4 TB of Memory

Enterprise
4 Socket Server
E950

- **Up to 48 Cores**
- **8, 10, 11, 12 Cores processor types**

Up to 16 TB of Memory

Enterprise
4 – 16 Socket Server
E980

- **Up to 192 Cores**
- **6, 8, 10, 11, 12 Cores processor types**

Up to 64 TB of Memory

*H-models: AIX and IBM i (if supported) can be chosen as secondary operating systems (besides Linux for SAP HANA usage), with a maximum of 25% of total cores activated across both.

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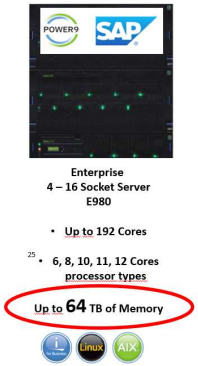
Vorteile HANA on POWER

Hochverfügbarkeit

Designed for RAS

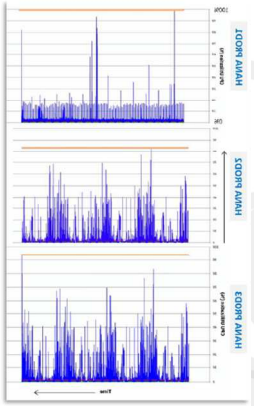
- Reliability (z.B. instruction retry)
- Availability (z.B. n-1 Prozessoren)
- Serviceability (z.B. First Failure Data Capture)

Skalierbarkeit



- aktuell bis 32 TB je LPAR
  - dadurch kein bare metal für große Prod Systeme
  - oder gar scale-out …..
- 2,6 faches Memory pro socket als x86

Flexibilität



- Integrierte Virtualisierung auf firmware level
- Shared processor pool
- Overcommitment für automatischen Lastausgleich
- Keine (halb-)Socket Abhängigkeiten

Performance

- 2 x höhere SAPS Leistung je core
  - dadurch speziell schnellere Batch Bearbeitung
  - plus weniger sockets (Lizenzen)
- 1,8 fache Memory Bandbreite als x86

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Vergleichende Bewertung S/4 HANA Plattformen

Kriterium
Flexibilität (kurz & mittel)
Flexibilität (langfristig)
Performance
Skalierbarkeit
Stabilität
Betreuungsaufwand
Administrierbarkeit
Umweltfreundlichkeit
Marketshare
Support
Zukunfssicherheit
Sicherheit
Datenschutz
Cloud Service Zugang
Investitionssicherheit
On-Premise Präferenz
Cloud Präferenz
Verfügbarkeit
Monitoring & Reporting
Overcommitment
Desaster Recovery
Standort
Abrechnungsmodell
Portabilität
Nutzung von Investitionen
Leistungsabhängige Infrastrukturkosten
Investitionsplanung

- Für eine Kundenstudie haben wir verschiedene S/4 Plattformen verglichen.
- Betrachtet wurden IBM POWER, x86 und Cloud (Basis x86).
- Für zahlreiche Kriterien wurde die relative Relevanz für den Kunden ermittelt.
- Für jedes Szenario und jedes Kriterium wurde dann gemeinsam mit dem Kunden ein Punktewert vergeben.
- Bei jedem Einzelwert wurde eine möglichst objektive Begründung festgehalten.
- Die Kriterien wurden auch relativ zueinander gewichtet.

Ausmultipliziert ergibt sich ein eindeutiges Ergebnis:

Szenario	Punkte	Rang	Punkte	Empfehlung
IBM POWER	604	1	604	X
Intel X86	485	2	485	
IaaS Cloud	476	3	476	

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ENDE/PAUSE

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