

SAP HANA: Mehrwerte in IT und Fachbereiche durch technologische Innovation

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März 2013



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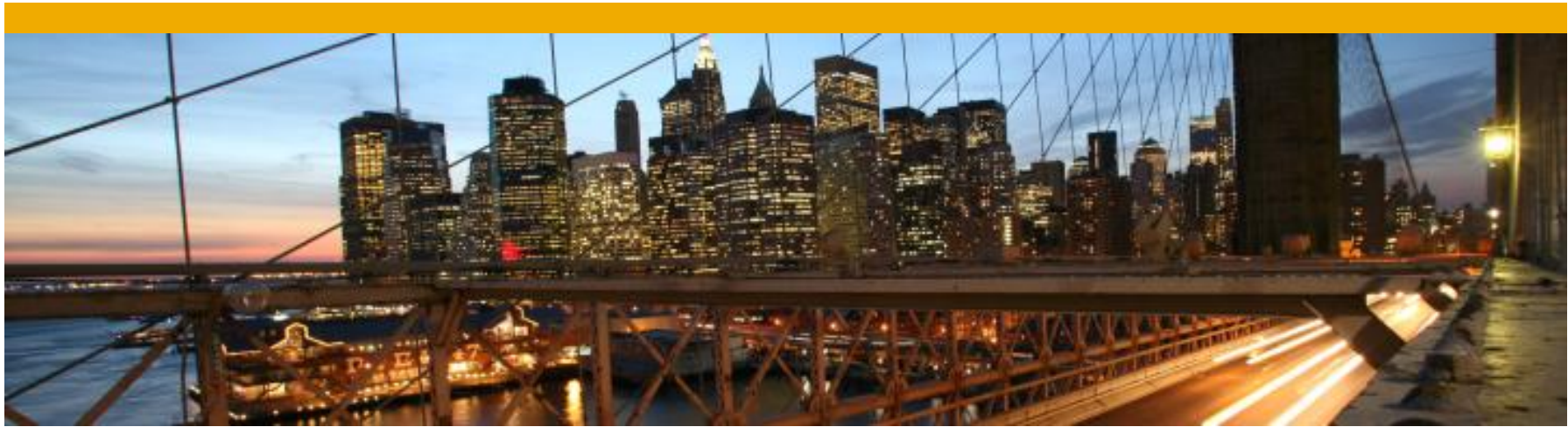
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Agenda

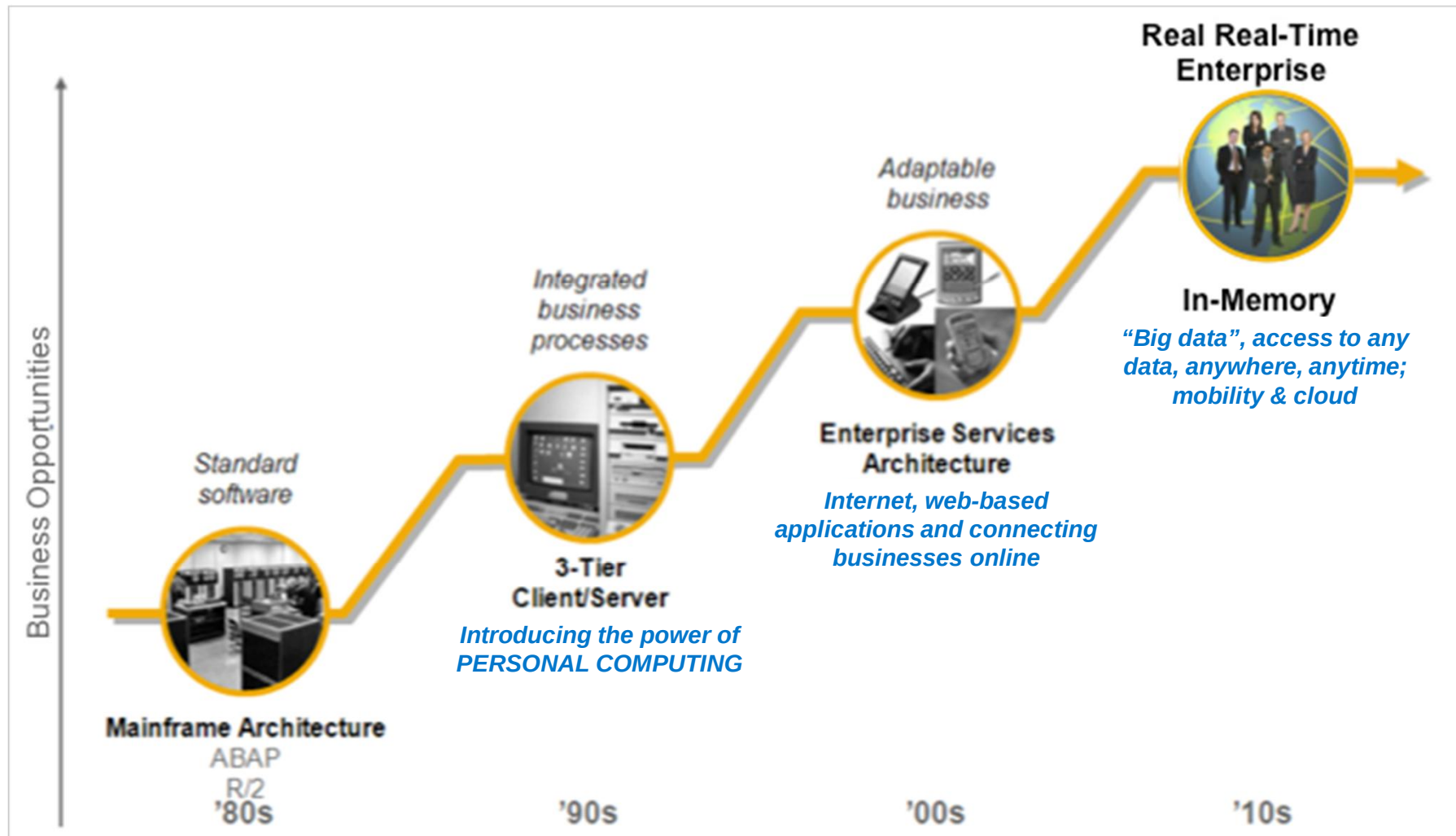
- **Motivation**
- **Überblick SAP HANA In-Memory Plattform**
- **Einsatzszenarien**



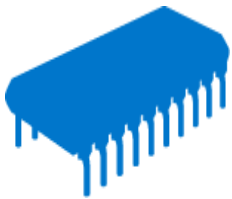


Motivation

Wesentliche Wendepunkte der IT-Technologie zur Revolution der Prozesse in Unternehmen



Aktuelle Anforderungen an ein zeitgemäßes Data Management



Big Data



Analytics



Cloud



Mobile



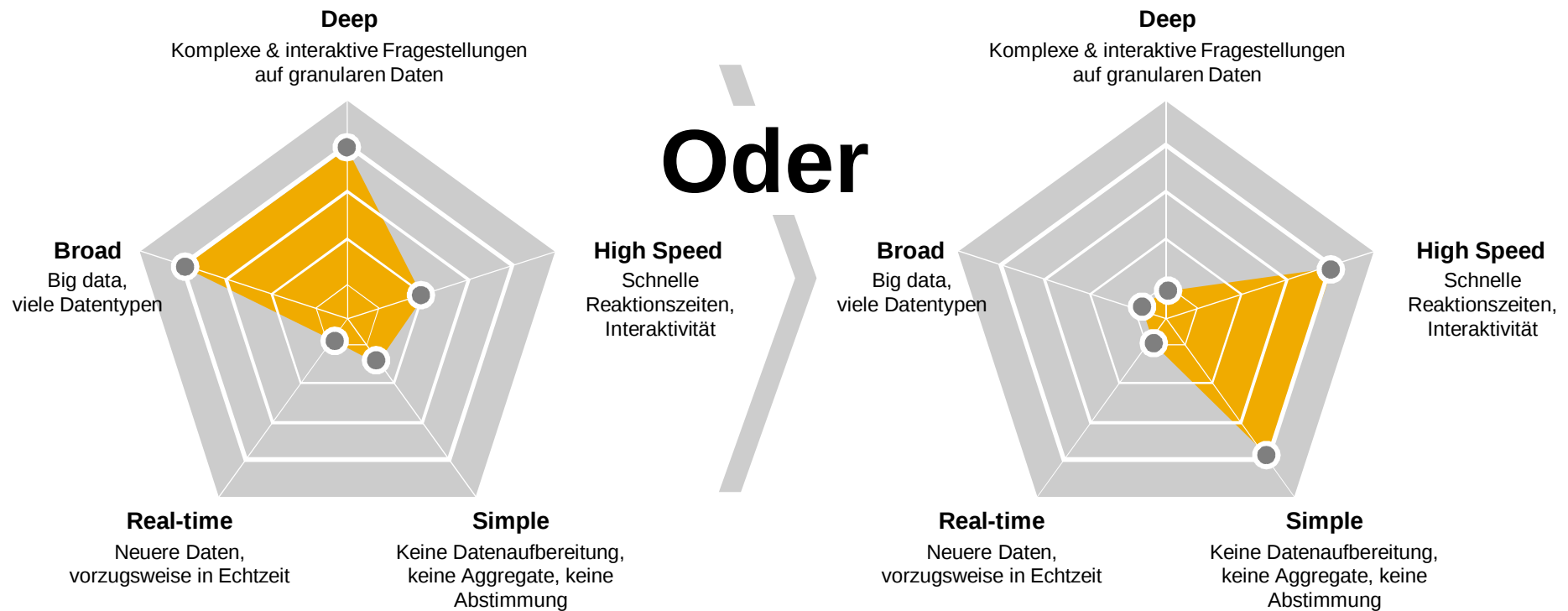
Social



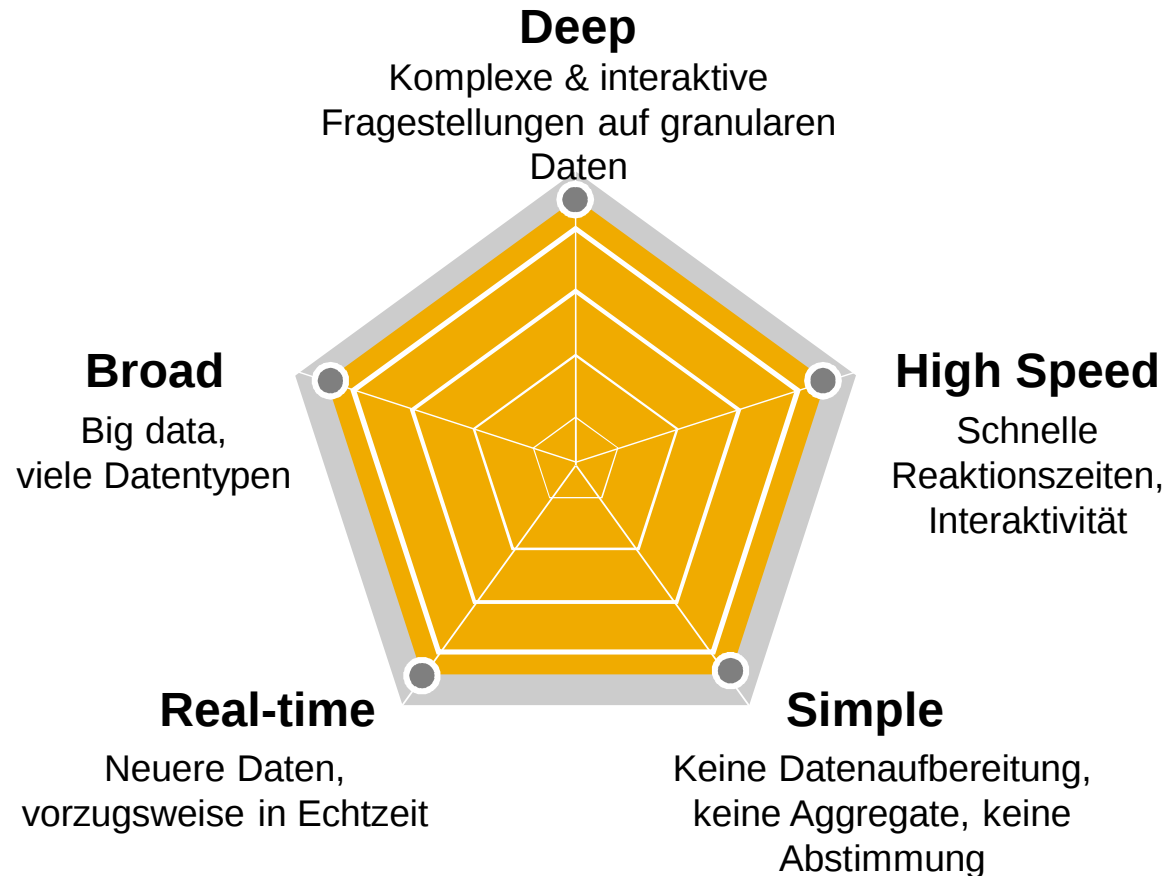
SAP Real-time Data Platform

Extreme capabilities to
transact | move | store | process | analyze

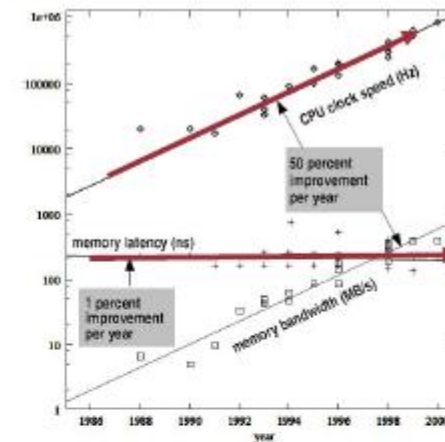
Welchen Anforderungen steht man gegenüber?



Kombination von Applikation und In-Memory-Technologie



Hardware Innovationen



+ Multi-Core

- Große Anzahl an Rechenkernen
- Massive Parallelverarbeitung
- Parallelisierung auf Thread-Ebene

+ Großer Hauptspeicher

- 64-Bit Adressraum
- Speicherchips mit hoher Dichte
- Starker Preisverfall

- Speicherlatenzzeit

- Kein CPU-Leerlauf aufgrund fehlender Daten
- Relevanz der Speicher-lokalität („RAM locality is king“)

Software Innovationen

Konzeptionelle Sicht

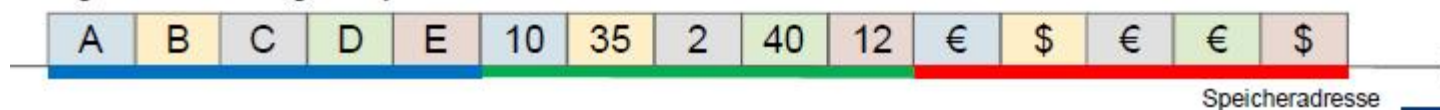
A	10	€
B	35	\$
C	2	€
D	40	€
E	12	\$

Zuordnung im Hauptspeicher

Organisation entlang der Zeile



Organisation entlang der Spalte



Nutzung der lokalisierten Datenablage

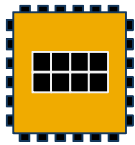
Optimiert für den Hauptspeicher

- vermeidet Datenverschiebung soweit möglich
- optimiert für höhere CPU-Cache Trefferraten
- vermeidet CPU Leerlaufzeiten wegen fehlender neuer Instruktionen oder Daten
- nutzt Hardware-Fähigkeiten aus

Effiziente Zusammenführung von Instruktionen und Daten auf der CPU

Jetzt ist die Zeit für die Umsetzung der In-Memory-Innovation.

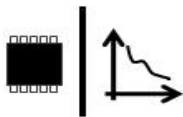
Hardware-Innovationen



Multi-Core Architektur
(8 x 8core CPU pro Server)

Massive Parallelskalierung durch
zahlreiche Knoten möglich

Verbesserung RAM-Lokalität



64bit-Adressraum – 2TB in
aktuellen Servern

100GB/s Datendurchsatz

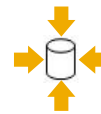
Starker Rückgang
Preis/Performance



SAP SW-Innovationen



Zeilen- und Spaltenablage



Komprimierung



Partitionierung



Keine zusätzlichen Aggregationen

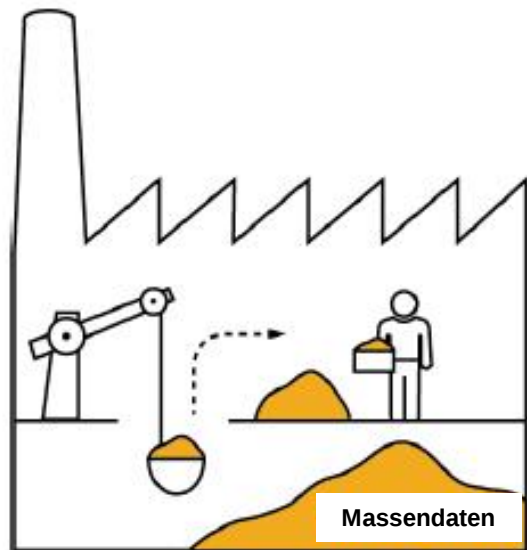


Nur Einfüge-Operationen

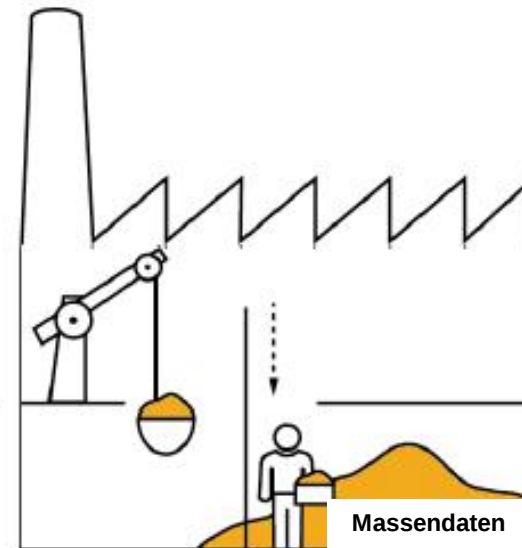
In-Memory Data Management ermöglicht die Verarbeitung sehr großer Datenmengen im Hauptspeicher. Ergebnisse aus Analysen und Transaktionen stehen dadurch in Echtzeit zur Verfügung.

Paradigmenwechsel – Welche Auswirkungen sehen wir für die Applikationen?

Traditionell



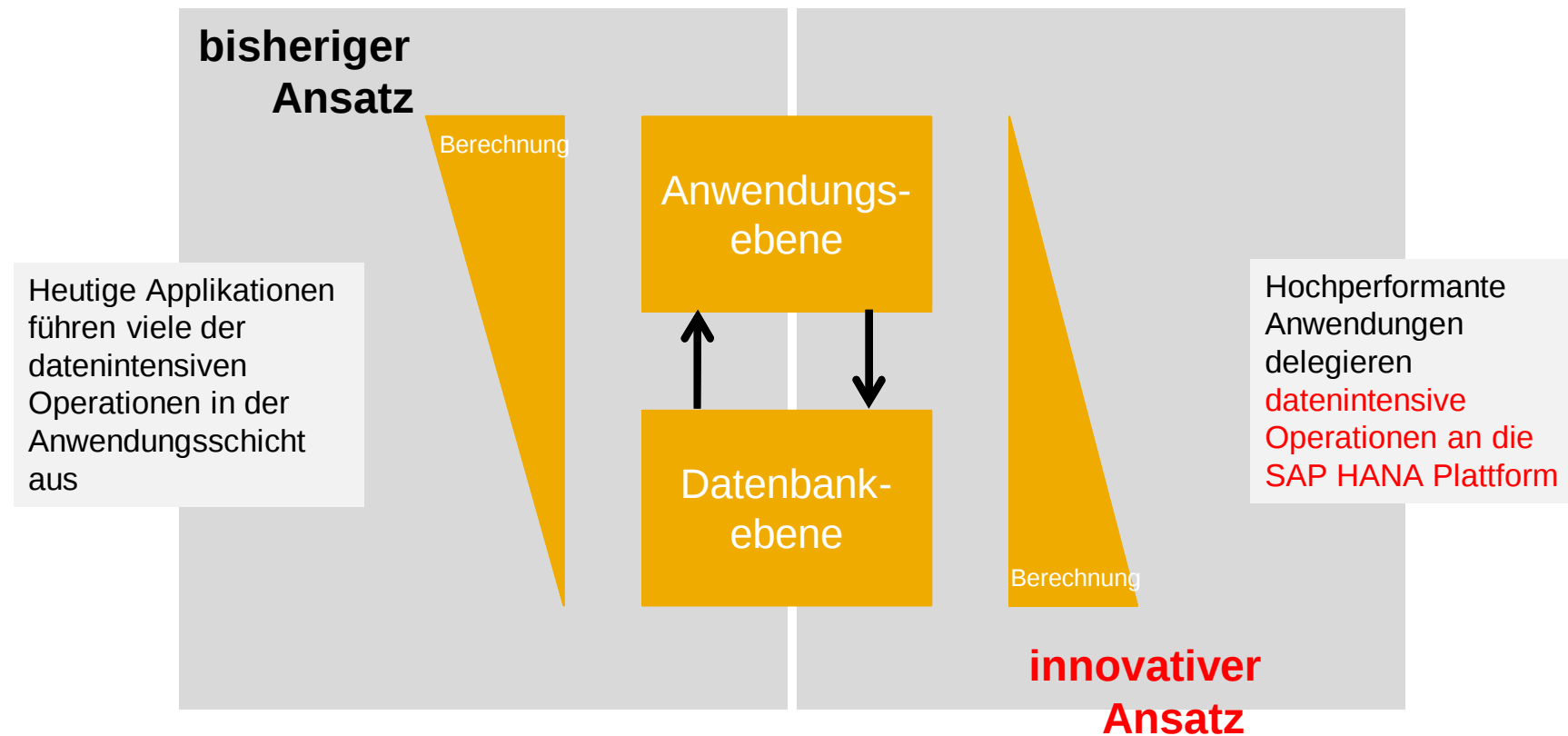
In-Memory-Computing



Applikation

Datenbank

Paradigmenwechsel in der Nutzung von IT-Anwendungen



In-Memory Computing: Mehrwerte

1. Echtzeit Entscheidungsfindung

- Schnelle und einfache Erstellung von Ad-hoc Berichten
- Zugang zu Echtzeit-Analysen



2. Beschleunigung der Business Performance

- Höhere Geschwindigkeit transaktionaler Informationsflüsse in Bereichen wie Planung, Vorhersagen, Pricing, Angebotserstellung...



3. Ermöglichen neuer Einsichten

- Abschaffung der Restriktionen hinsichtlich Analysen großer Datenvolumen, Trends, Data Mining, Predictive Analytics etc.
- Strukturierte und unstrukturierte Daten



4. Steigerung der Produktivität

- Individuell angepasste Analytic-Modelle
- Business Self-Service → Reduktion der Abhängigkeit von IT
- Konsum von Daten jeder Quelle



5. Erhöhung der IT Effizienz

- Management des steigenden Datenvolumens und der zunehmenden Komplexität
- Geringere Landschaftskosten





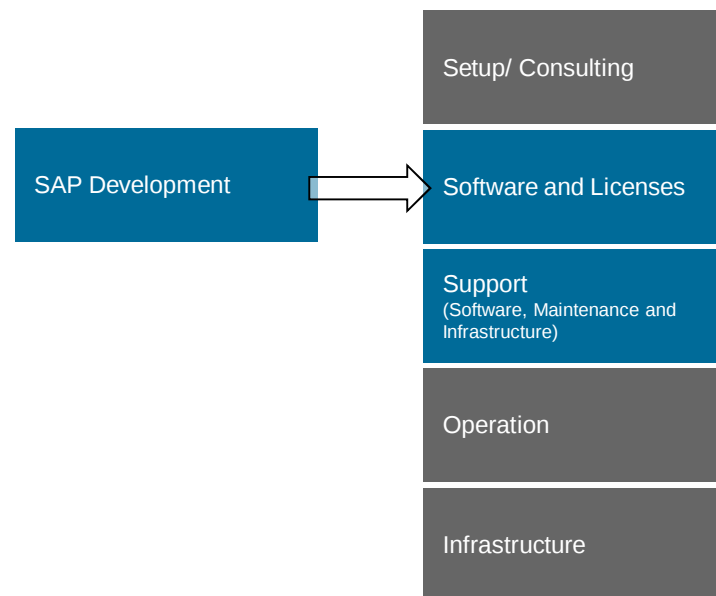
Überblick SAP HANA In-Memory Plattform



SAP HANA – Bereitstellung als sog. Appliance

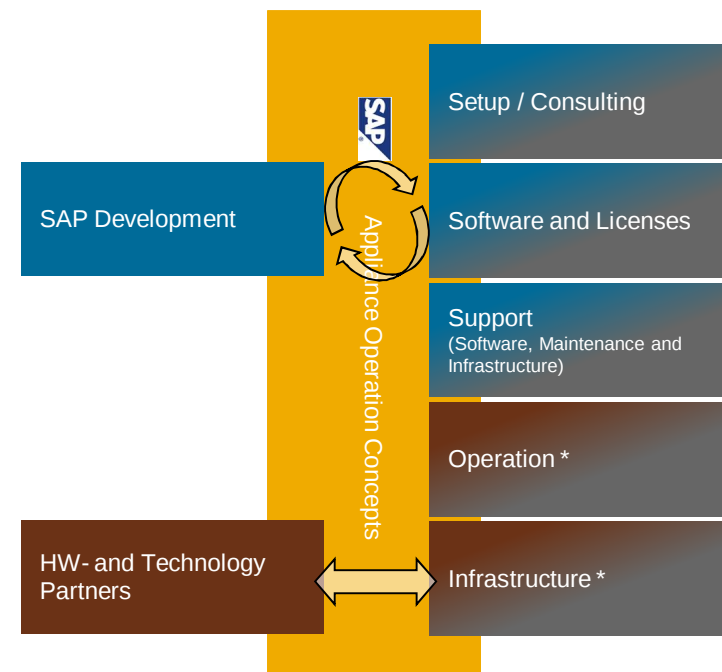
Classic software delivery on-premise solutions

- 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



Customer's
responsibility

SAP responsibility

Partners'
responsibility

** Might be outsourced or owned by customer*

SAP HANA Appliance

SAP HANA Technology Partners



SAP HANA Product Flavors

SAP HANA Platform Edition

SAP HANA Enterprise Edition
- incl data provisioning (SLT)

SAP HANA for BW
- BW database only

SAP HANA Hardware Partners



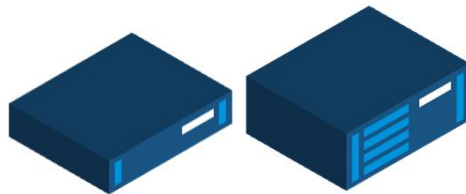
SAP HANA: HW Platforms Single Node

	• 2 x 10 core Westmere EX (Intel 2 socket system) • 128 GB Main memory • 160 GB PCIe-Flash / SSD for Log volume • 1 TB SAS / SSD for Data volume • 3 x 1 GB n/w or 1 x 10GB n/w (trunk), Redundant n/w infrastructure
	• 2 x 10 core Westmere EX (Intel 2 or 4 sockets system) • 256 GB Main memory • 320 GB PCIe-Flash / SSD for Log volume • 1 TB SAS / SSD for Data volume • 3 x 1 GB n/w or 1 x 10GB n/w (trunk), Redundant n/w infrastructure
	• 4 x 10 core Westmere EX (Intel 4 or 8 socket system) • 512 GB Main memory • 640 GB PCIe-Flash / SSD • 2 TB SAS / SSD for Data volume • 3 x 1 GB n/w or 1 x 10GB n/w (trunk), Redundant n/w infrastructure
	• 8 x 10 Westmere EX core Intel (Intel 8 socket system) • 1 TB Main memory • 1.2 TB PCIe-Flash / SSD • 4 TB SAS / SSD for Data volume • 3 x 1 GB n/w or 1 x 10GB n/w (trunk), Redundant n/w infrastructure

Please check the SAP HANA product availability matrix for more information about the validated hardware platforms:
<https://service.sap.com/pam> (search for HANA)

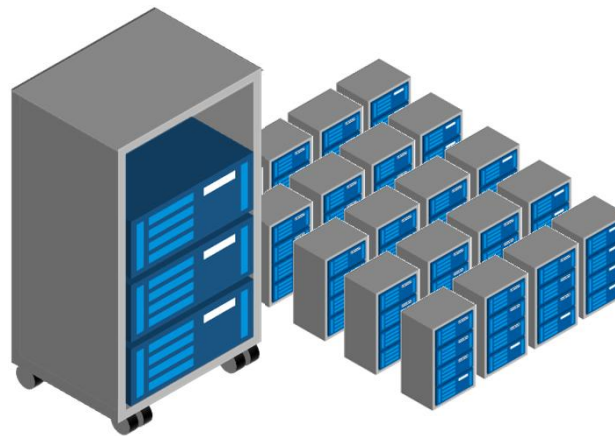
SAP HANA scalability

Scales from very small servers to very large clusters



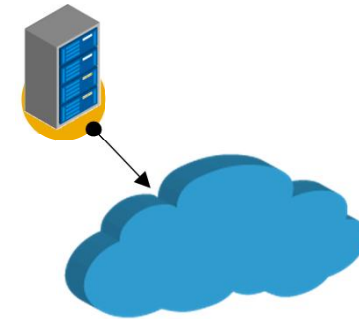
Single Server

- 2 CPU 128GB to 8 CPU 1TB
- Single SAP HANA deployments for data marts or accelerators
- Support for high availability and disaster recovery



Scale Out Cluster

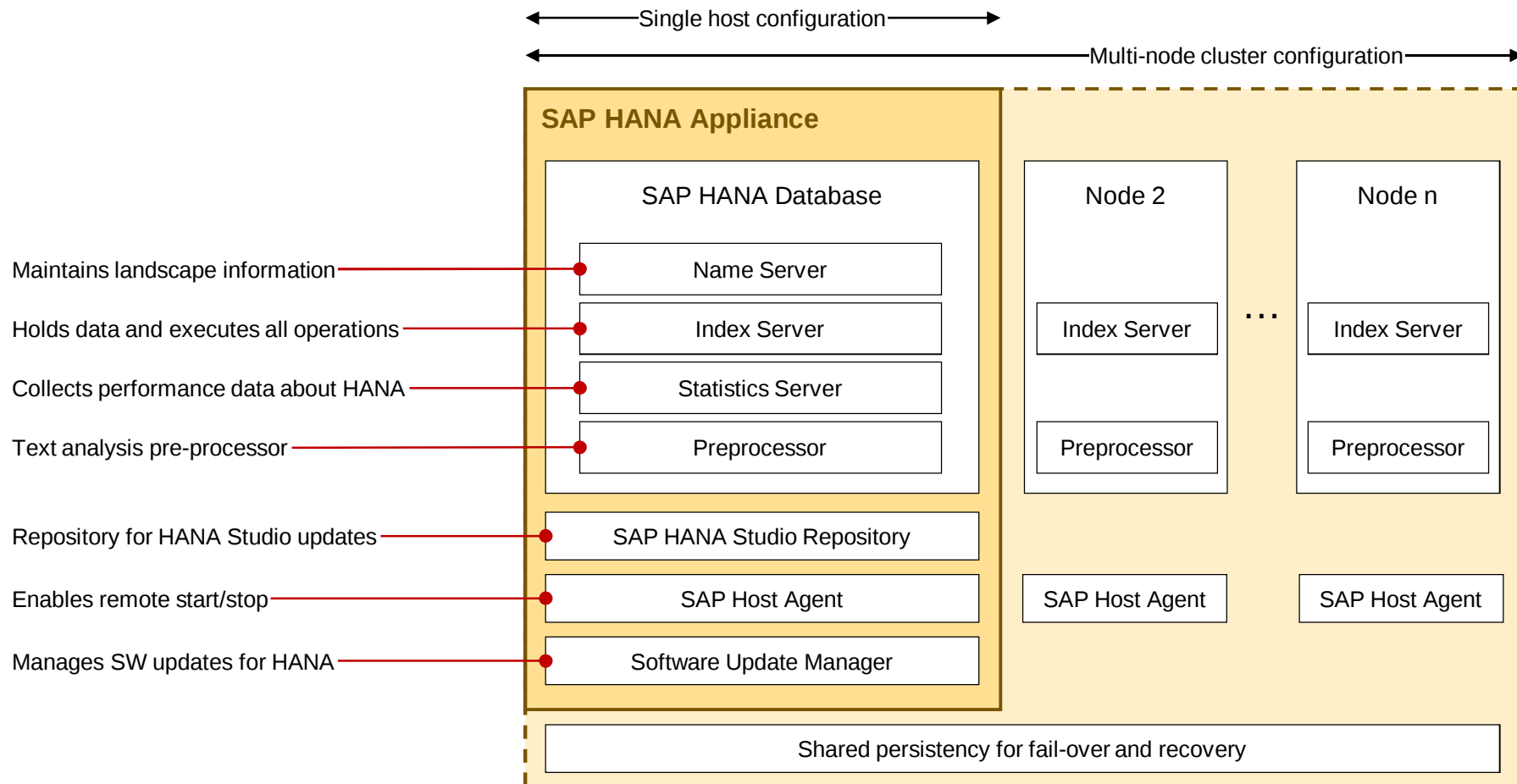
- 2 to n servers per cluster
- Each server is either 4 CPU/512GB or 8 CPU/1TB
- Largest certified configuration: 56 servers
- Largest tested configuration: 100+ servers
- Support for high availability and disaster recovery



Cloud Deployment

- Limited to developer license

SAP HANA Architecture



SAP HANA Persistence:

In-Memory Data Is Regularly Saved to Disk

Data:

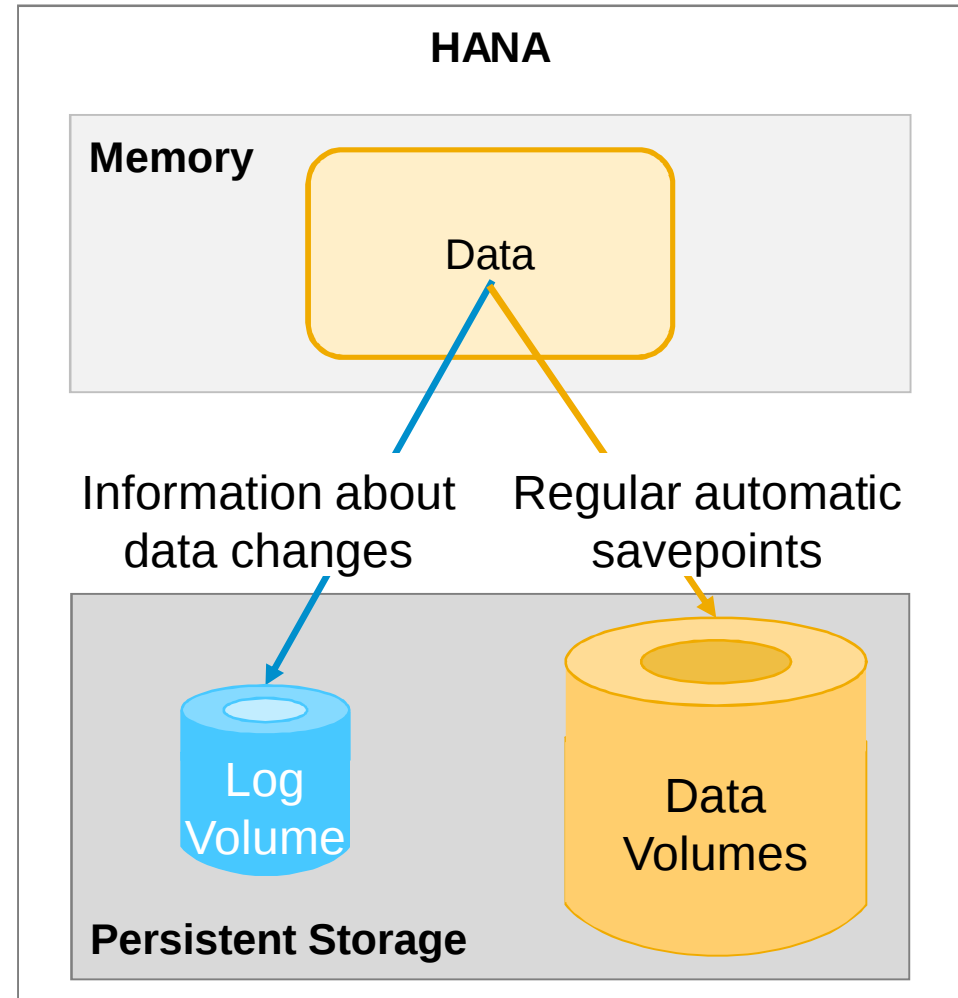
- SQL data and undo log information
- Additional HANA information, such as modeling data
- Kept in-memory to ensure maximum performance
- Write process is asynchronously

Log:

- Information about data changes (redo log)
- Directly saved to persistent storage when transaction is committed
- Cyclical overwrite (only after backup)

Savepoint:

- Changed data and undo log is written from memory to persistent storage
- Automatic
- At least every 5 minutes (customizable)



SAP HANA Persistence:

Regular Saving of In-Memory Data to Disk, Restart

In-memory computing is secure

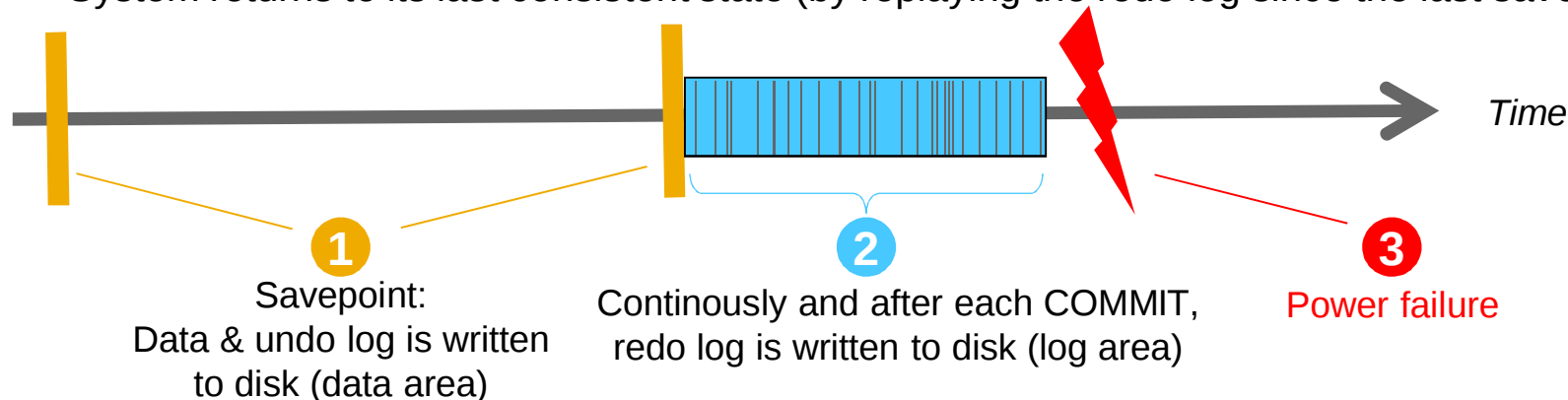
The SAP in-memory database holds the bulk of its data in memory for maximum performance, but still uses persistent storage to provide a fallback in case of failure. The log is capturing all changes by database transactions (redo logs)

Data and undo log information (part of data) are automatically saved to disk at regular savepoints

The log is also saved to disk continuously and synchronously after each COMMIT of a database transaction (waiting for end of disk write operation)

After a power failure, the database can be restarted like a disk-based database:

- System is normally restarted („lazy“ reloading of tables to keep the restart time short)
- System returns to its last consistent state (by replaying the redo log since the last savepoint)

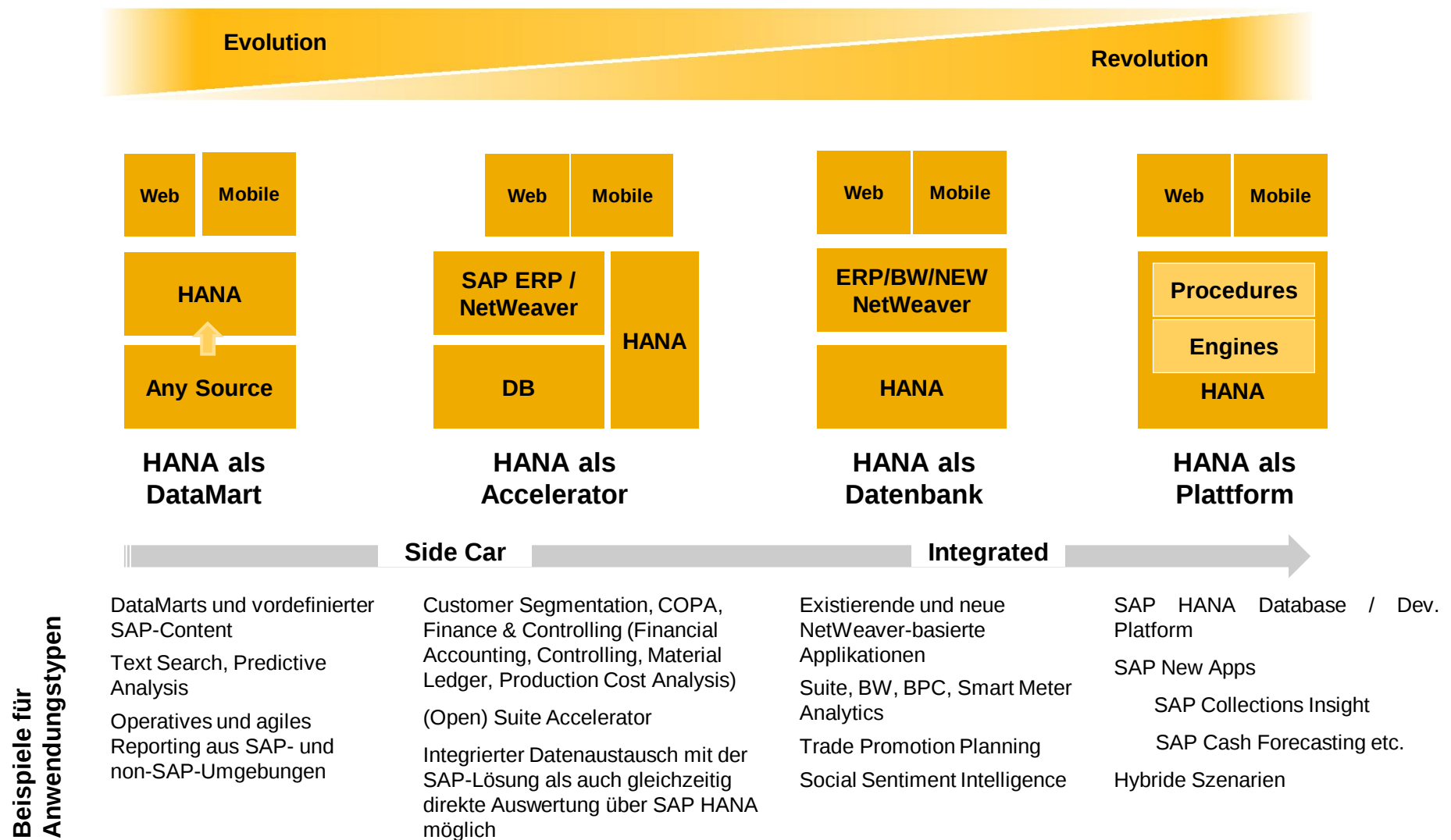




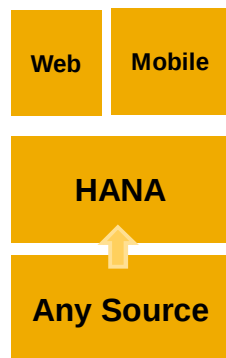
Anwendungsfälle und Szenarien

Technische Use Cases und deren Übertragung in konkrete Anwendungsfälle

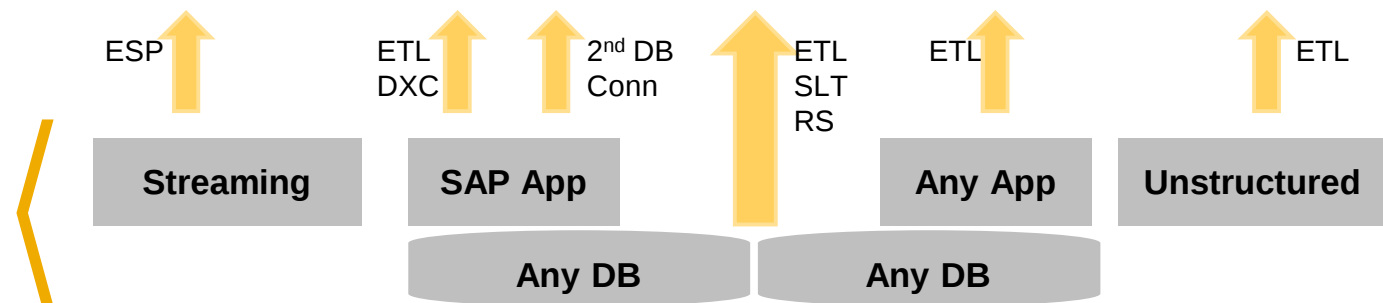
Technische Architekturausprägungen und -optionen



Data Provisioning



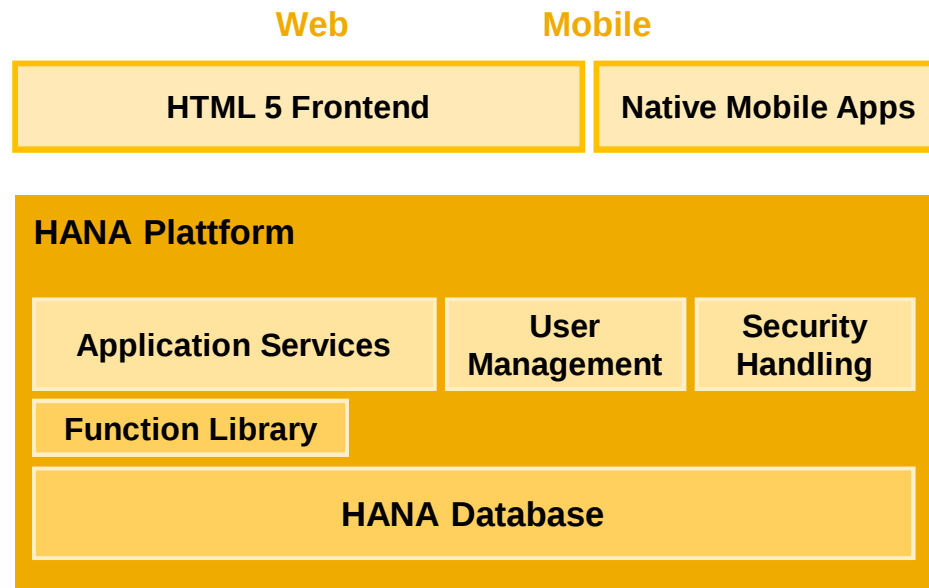
Was sind mögliche Quellen und wie kann man diese konnektieren?



ESP Sybase Event Stream Processor
ETL Extract Transform Load Tool
(i.e. SAP BusinessObjects Data Services)
DXC Direct Extractor Connection

2nd DB Conn Secondary Database Connection
SLT SAP Landscape Transformation
RS Sybase Replication Server

Native SAP HANA Applikationen



Cash Forecasting

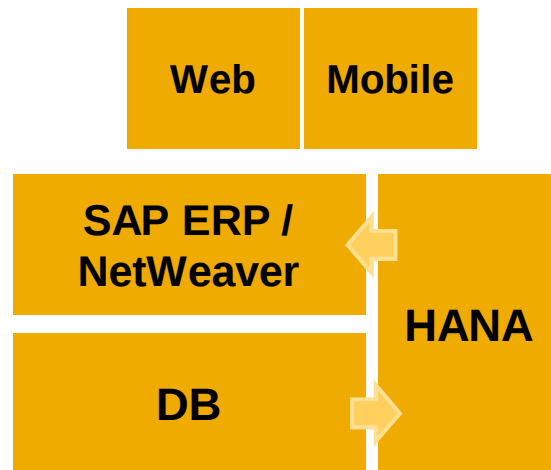
Collections Insight

Sales & Operations Planning

Recalls Plus

ChariTra

SAP HANA Accelerators



**HANA als
Accelerator**

CO-PA Accelerator

CRM Customer Segmentation

Financial Accounting

Product Cost Analysis

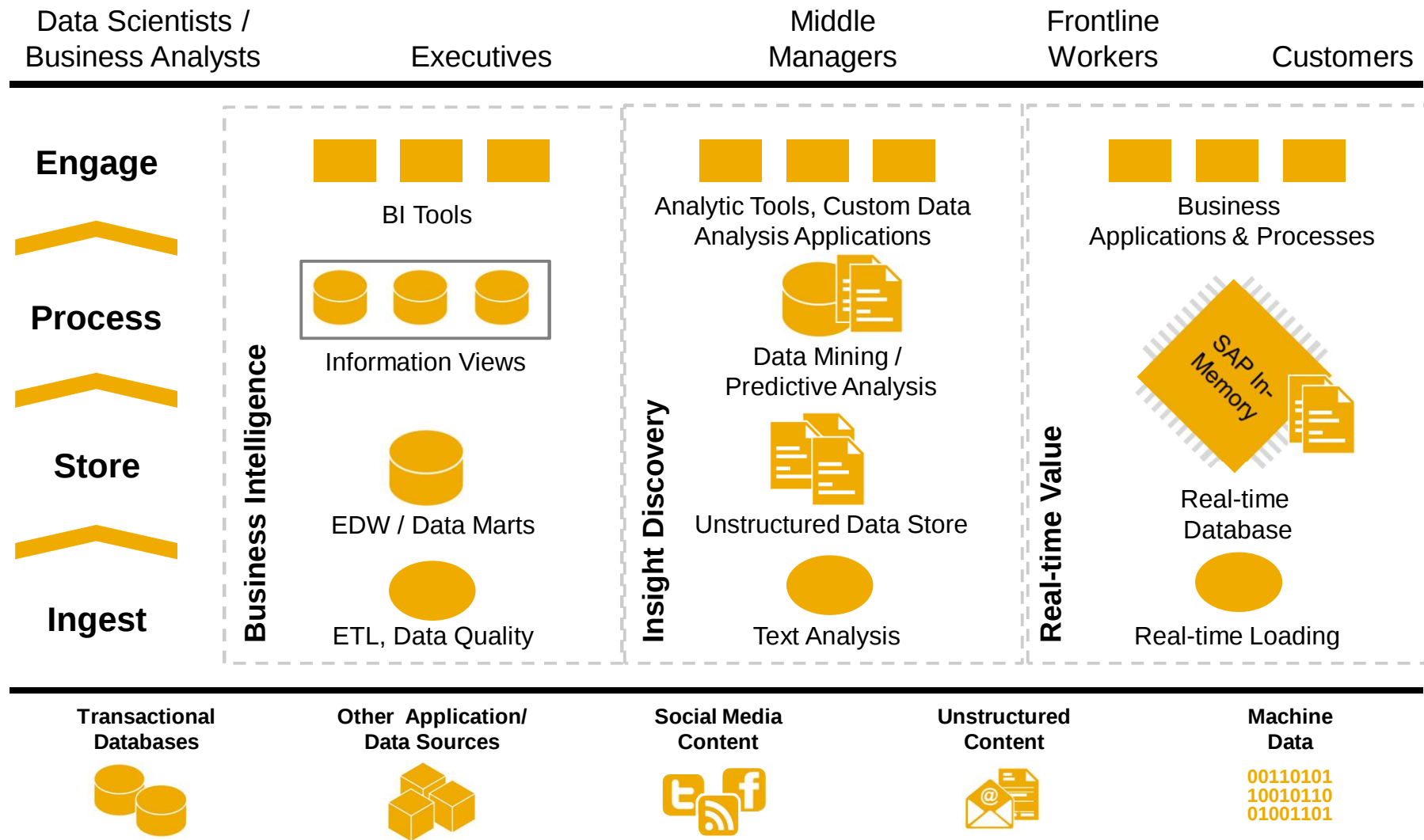
Material Ledger

Global Trade Services

Inventory Monitoring

Open Accelerator

Aufbau einer Landschaft im Big Data-Kontext





Vielen Dank!



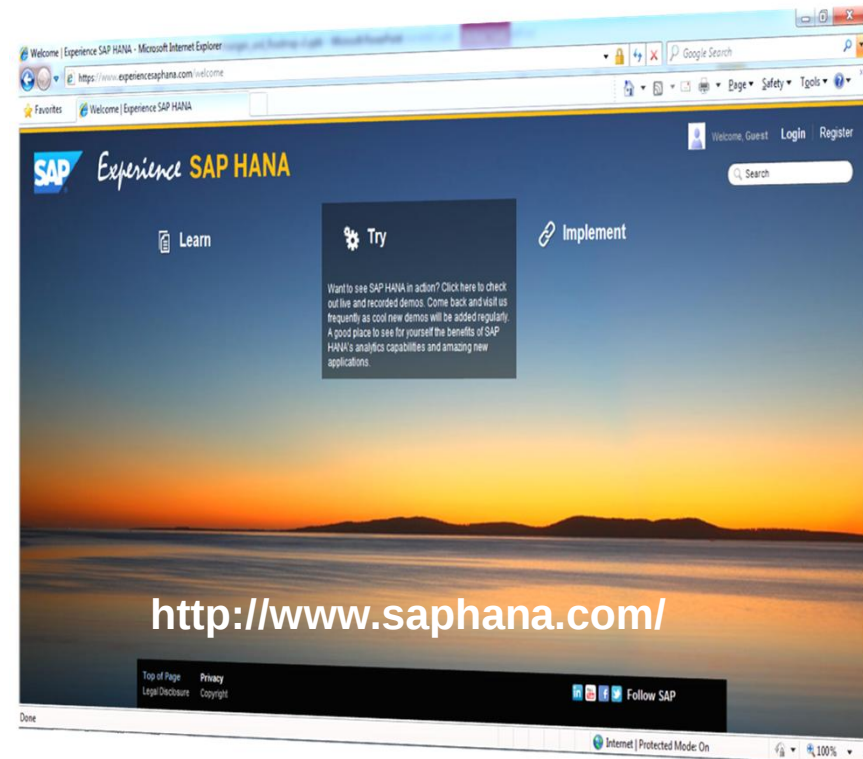
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