

SAP HANA im Banking

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Agenda

Technology

In-Memory Computing in Banking

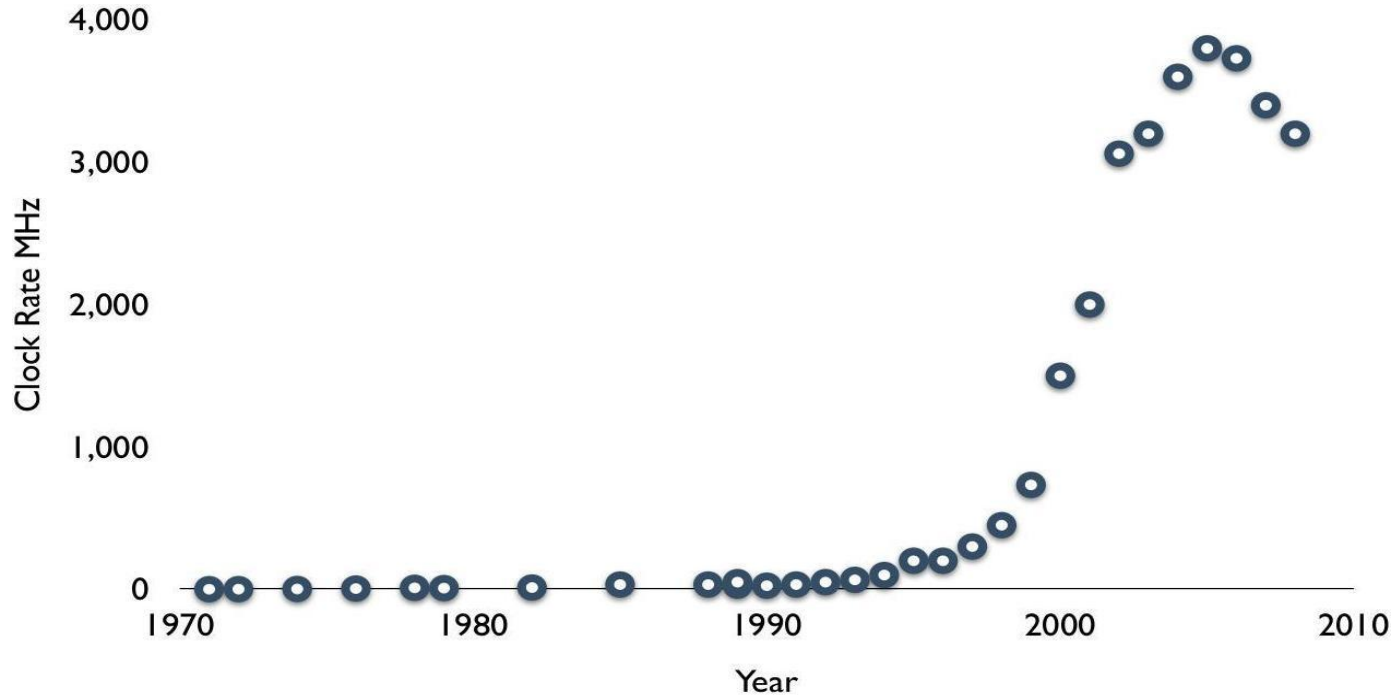


Technology

SAP In-Memory Computing



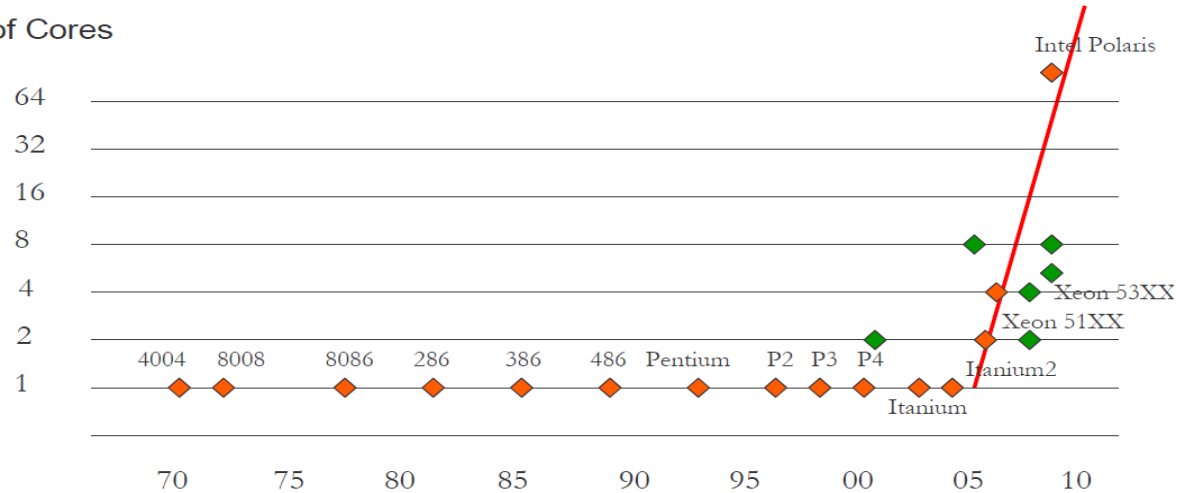
CPUs not getting faster any more



Intel's highest clock rate released each year

of cores per CPU rising

Number of Cores

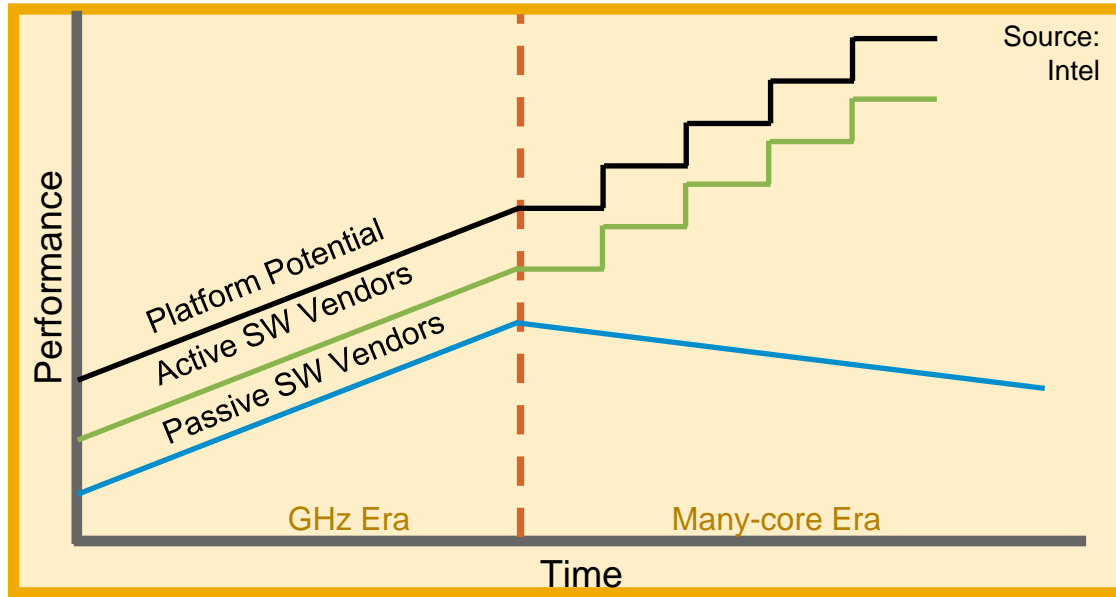


Source: Intel

That is 128x the computing power of a single CPU ... or over 400 billion CPU cycles per second on a single server blade.

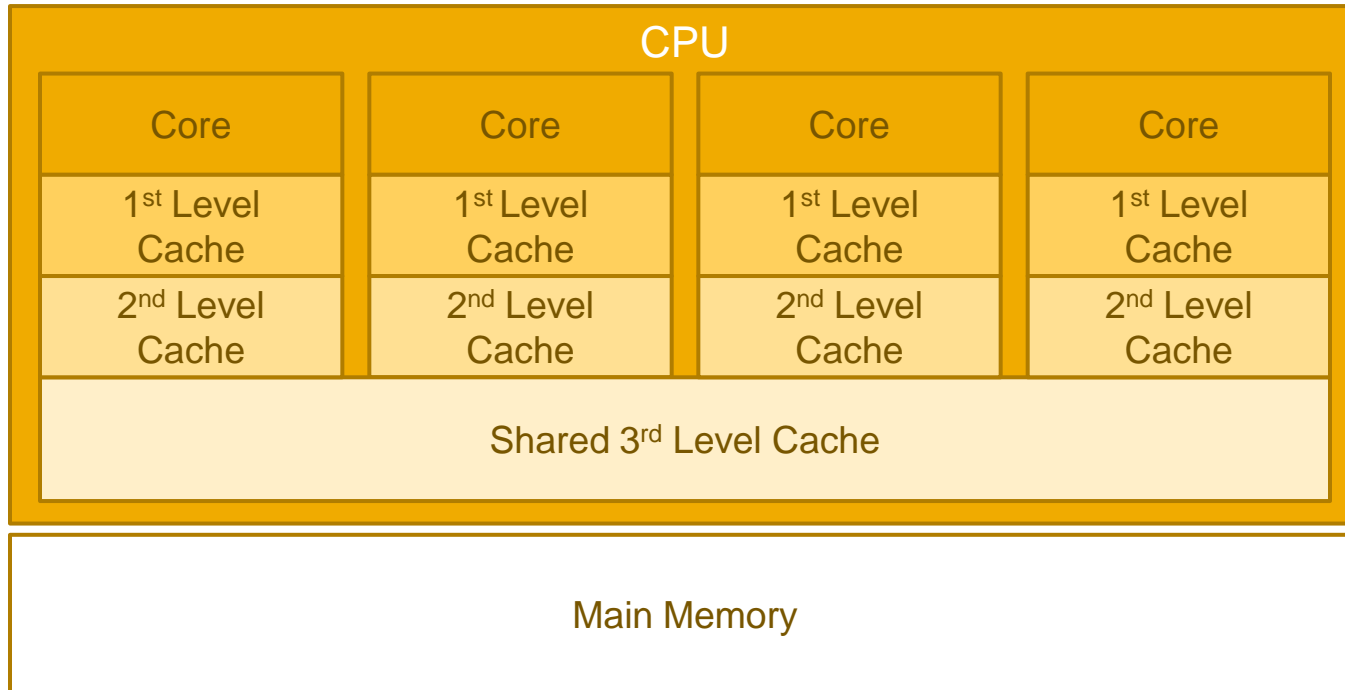
Increase cores vs frequency

Software needs to be ready to make use of multiple cores to achieve improvements in response time



Simplified memory hierarchy

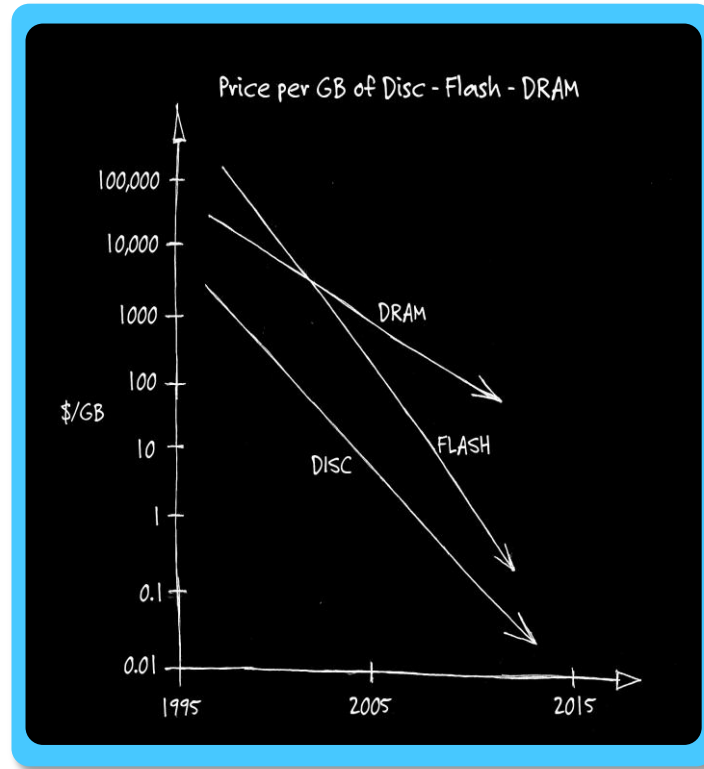
(based on Intel Nehalem)



Size	Latency
64KB	1-2 cycles
256KB	6-20 cycles
8MB	30-60 cycles
Several GBs up to TBs	100-400 cycles

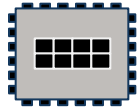
Flash – 5000 cycles
Disk seek – 10,000,000 cycles

Random Access Memory (RAM) prices falling



SAP In-Memory Computing

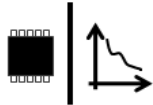
HW Technology Innovations



Multi-Core Architecture (8 x 8core CPU per blade)

Massive parallel scaling with many blades

One blade ~\$50.000 = 1 Enterprise Class Server

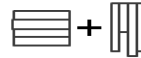


64bit address space – 2TB in current servers

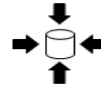
100GB/s data throughput

Dramatic decline in price/performance

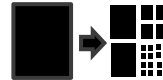
SAP SW Technology Innovations



Row and Column Store



Compression



Partitioning



No Aggregate Tables



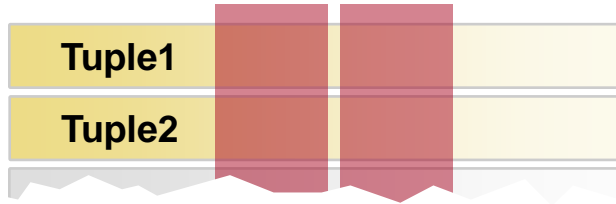
Insert Only on Delta



SW optimization for speed

Row wise

stores tables by row



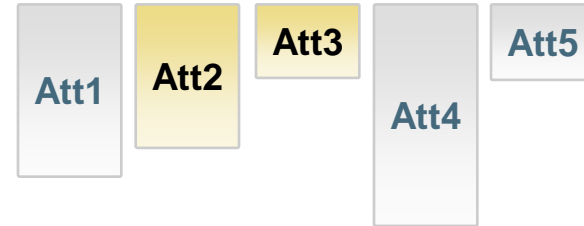
Data records are available as complete tuples in one read.

Compression is limited.

Accessing only few attributes for each tuple is an expensive operation.

Column wise

stores tables by column



Columns can be accessed in one read.

Columns contain only one data type, enabling very high compression (10x)

Accessing all attributes for one tuple (record) is an expensive operation.

Thinking In-Memory

Delegation of data intense operations to the in-memory computing

Today's applications execute many data intense operations in the application layer



Application Layer

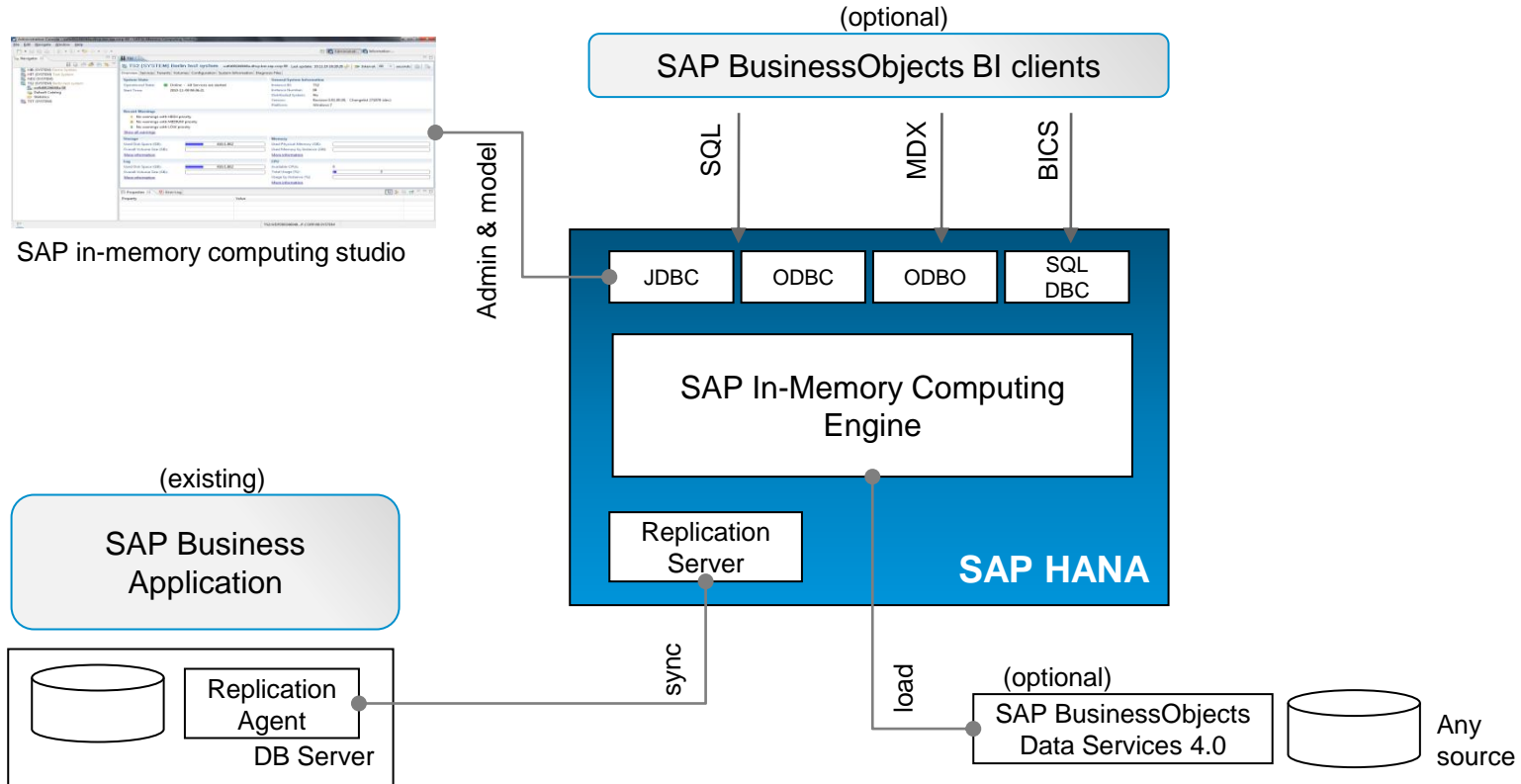
Data Layer



High performant apps delegate data intense operations to the in-memory computing

In-Memory Computing Imperative - Avoid movement of detailed data - calculate first, then move results

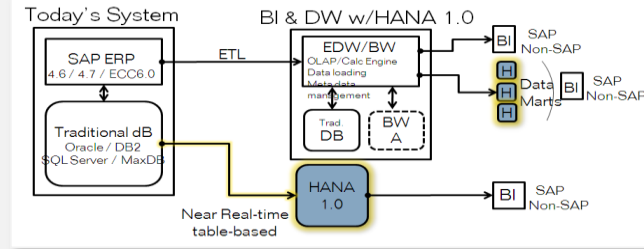
SAP High Performance Analytic Appliance 1.0



SAP In-Memory Computing evolution

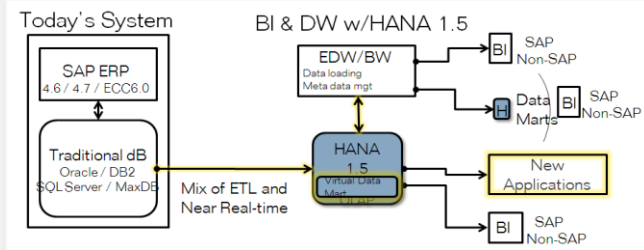
HANA 1.0

- Operational Data Mart
- Agile Data Mart



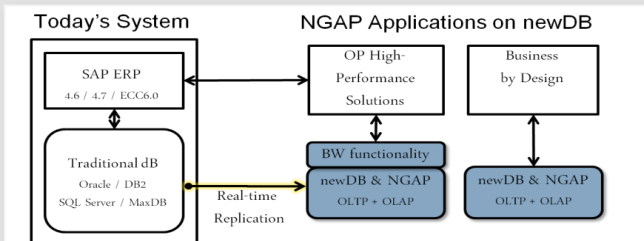
HANA 1.5

- Enterprise Data Warehouse & New Applications



In-memory Database & NGAP

- High Performance Solutions running side-by-side on the SAP In-Memory Database and NGAP



SAP In-Memory Computing Strategy

Product Strategy

Q4 2010
“Renovation”
HANA 1.0

2011-12
“Innovation”
HANA 1.5 → 2.0

2012+
“Transformation”
HANA 2+

In-Memory Analytics

Next generation apps

One Store for Data and Analytics

Capabilities

HANA 1.0 Real-time operational analytics with HANA 1.0

SAP BW fully running on HANA 1.5

SAP Business Suite optimized for In-Memory

Benefits

- Flexible real time analysis of operations at non-aggregated level
- Real-Time operational planning, simulation and forecasting: link to execution
- Reduced landscape complexity
- Value chain transformation

Erste Version BW 7.3x auf HANA

Vorteile

Geringerer TCO, Vereinfachte Administration, Reduziertes Sizing, Hervorragende Performance

- DB und SAP NetWeaver BWA in einer Instanz: veringertes TCO
- Vereinfachte Administration durch ein gemeinsames Set von Admin Werkzeugen z.B. für Data Recovery und High Availability
- Spaltenbasierte Speicherung mit hoher Komprimierungsrate und signifikant geringerer Datenhaltung
- Vereinfachte EDW Strukturen (LSA)
- Verbesserte Ladeperformance für DSOs
- Hervorragende Query Performance
- Kein zusätzlicher Aufwand für das schnelle Reporting auf DB Objekten
- In-Memory Planungsfunktionen
- DB Migration ohne Re-Implementierung



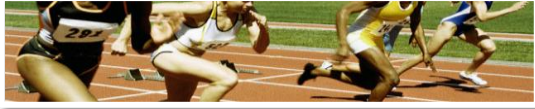
In-Memory Computing in Banking

Vision, Roadmap and Use Cases



SAP In-Memory Computing is a game changer for Banking

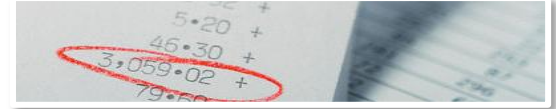
The Opportunity



Make Better Decisions
Faster

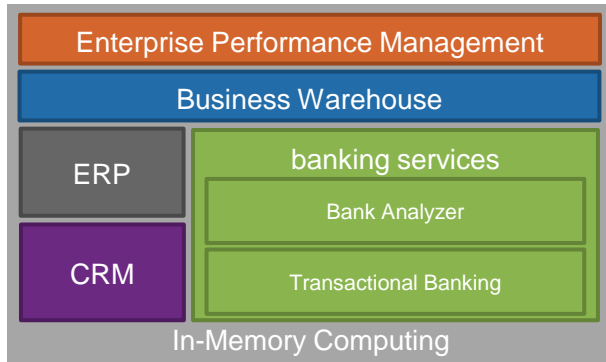


Enable Innovative New
Applications



Reduce TCO while
accelerating business
performance

The SAP for Banking Vision



SAP strives for the vision of In-Memory Computing across all layers of the SAP Banking solution.

- High-Performance **Analytics** with market-leading BI tools - based on real time data
- High-Performance Analytical and Operational **Processing** ('Closed Loop') - based on real time data
- One consistent set of data, **free of replication**

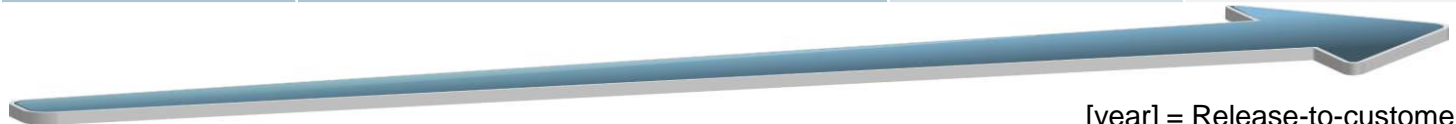
SAP In-Memory Computing in Banking

Road map and next steps for 2011

Stepwise approach to In-Memory Computing and reduction of redundancies

- starting with the SAP High Performance Analytic Appliance (HANA)
- followed by further applications using In-memory Computing (IMC)

	Step 1 [2010]	Step 2 [2011 / 2012]	Step 3 [>2013]	Step 4 [...]
		<i>Apply IMC for high business value asap ...</i>		<i>... significant TCO reduction (replication free world)</i>
Business Warehouse (BW)	BW +	BW plus Banking Content		
Bank Analyzer (BA)	BA +	BA +	BA +	
Transactional Banking (TB)	TB +	TB +	TB +	
Candidates, e.g.		<ul style="list-style-type: none"> • 360° view on customer • Financial Reporting (Subledger) 	<ul style="list-style-type: none"> • Accounting for Retail Products 	



[year] = Release-to-customer

SAP HANA in Banking

Overview



	1 Human Resources	2 Corporate Services & Procurement	3 Finance & Risk	4 Transactional Banking	5 Sales, Service & Marketing
SAP HANA content	<ul style="list-style-type: none">• Workforce planning	<ul style="list-style-type: none">• Purchasing	<ul style="list-style-type: none">• Financial reporting• Accounting• SAP Cash and Liquidity Management application	<ul style="list-style-type: none">• Transaction history• Order (service) to cash• Generic master data package	<ul style="list-style-type: none">• Sales KPI analysis• Sales package• Sales and Operations Planning
Custom use case examples		<ul style="list-style-type: none">• Invoice analysis	<ul style="list-style-type: none">• Business unit profitability reporting• Profitability analysis	<ul style="list-style-type: none">• Loan portfolio reporting	<ul style="list-style-type: none">• Customer insight

Customer Insight



Business Scenario

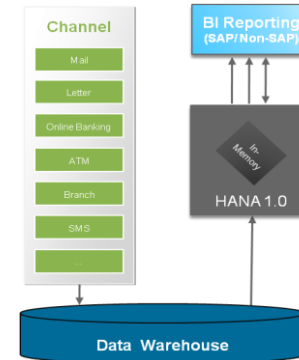
To manage communication with customers via different channels (ATM, online banking, mail, branch, ...) the data warehouse infrastructure is setup to collect and provide data around customers and customer interaction history. Based on historical data, HANA enables different scenarios, e.g.:

- Cross-selling: proposals of "next best product" per customer
- Churn management: prevent loss of customers
- Data analysis: ad-hoc reports or analysis tasks to discover patterns in interaction history, which can be used to increase revenues

Customer Profile

- Global bank - \$ 2.4 trillion in assets
- 10 mn customers
- 1,000 key figures per customer record

Process Flow



Value Proposition

Support continuous learning to better understand customer behavior and discover new business opportunities

Analyze information in real-time at unprecedented speeds on large volumes of non-aggregated data

- Speeds up query performance by a factor of more than 500 – e.g. from 45min down to 5 sec
- Data compression by a factor of 6 – from 40GB to <7GB

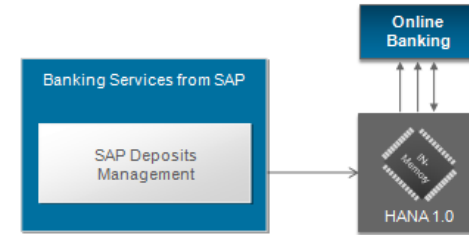
HANA Content – Transaction history



Business Scenario

- Provide current account holders ad-hoc access to their payment transaction history, e.g. to for tax filing purposes
- Enable account holders to comfortably analyze their long term spending patterns with predefined reports
- Enables fast and real time access to multi-year payment transaction histories for the bank's customer services employees, investment advisors and central marketing departments

Process Flow



Target Customer Profile

- Retail Banks with
- Millions of current accounts (e.g. 20 – 40 million)
- Billions of payment transactions per year (e.g. 200 – 300 transactions per current account and year)
- SAP Deposits Management customers (primarily) and companies using non-SAP account management system

Value Proposition

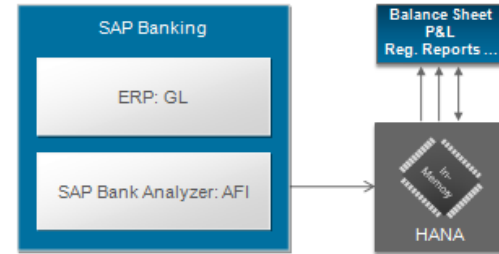
- Increase customer retention with enhanced online banking service offering
- Improved customer servicing through enabling customers to analyze historic payment transactions online by themselves
- Opportunity for tailored up- and cross selling offerings. Ability for fast and ad-hoc analysis of long term payment transaction histories delivers valuable decision support for sales department.

HANA Content – Financial reporting

Business Scenario

- Allow CFO to focus the attention quickly on important areas and make faster business decisions to improve future performance via daily online sub ledger reporting and adhoc reporting for additional bank-internal financial purposes
- Support a streamlined reporting process to save time in terms of manual intervention, error reconciliation, variance analysis, and data processing

Process Flow



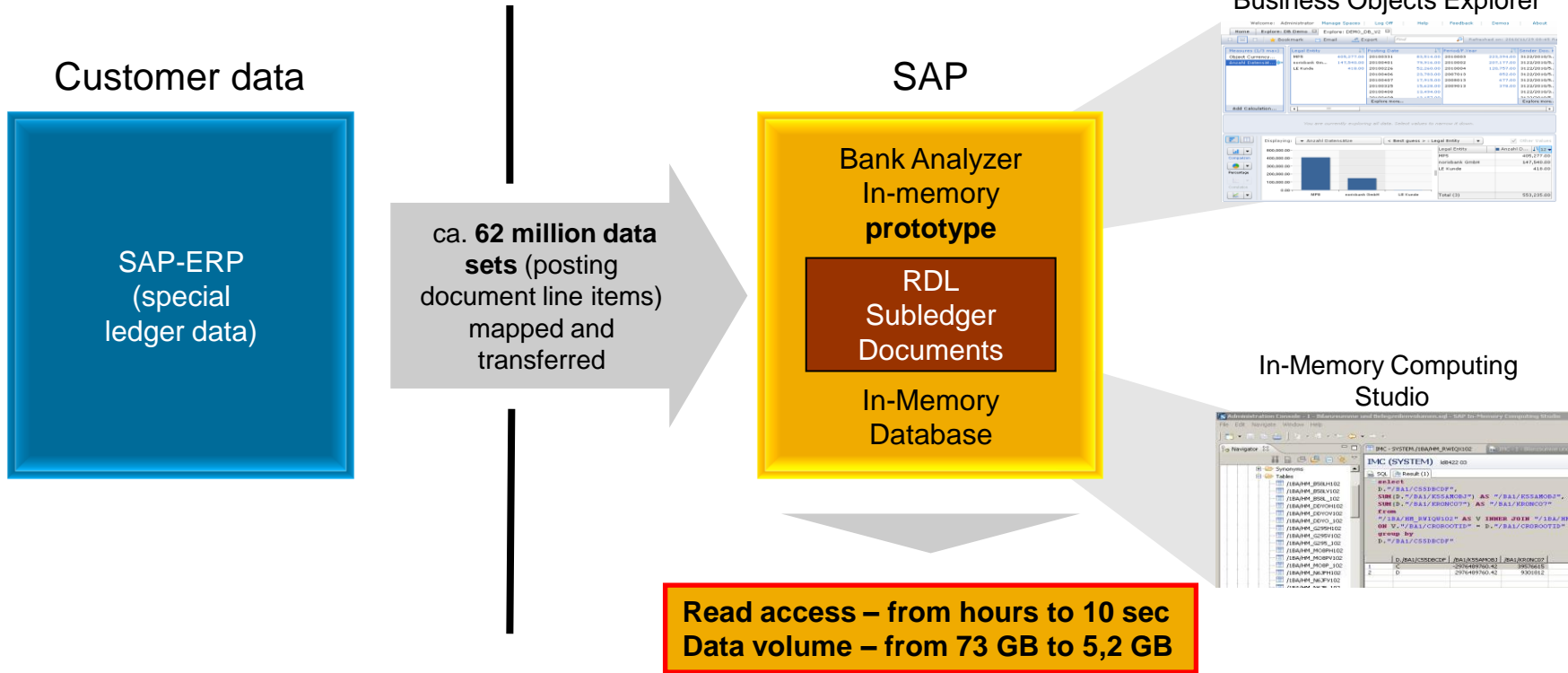
Target Customer Profile

- Large tier 1 and 2 Banks with
- Millions of (financial) transactions
- Millions of postings
- SAP Bank Analyzer (primarily) and non-SAP customers

Value Proposition

- Provision of daily balance sheet, profit & loss statement, notes reports and reconciliation of changes of equity, cash and impairment
- Support Fast Close
- Transparency into massive amounts of data on most detailed level (posting document)
- Fast Reconciliation

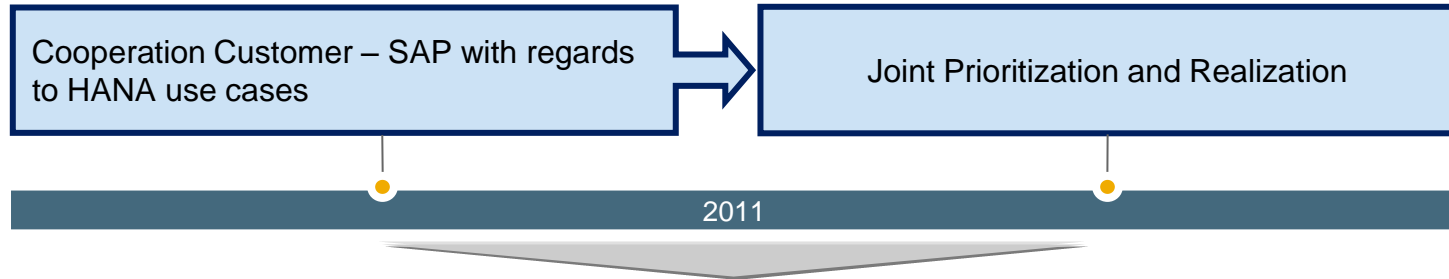
SAP In-Memory Computing dramatically boosts performance and reduces data volume



Next steps

Potential collaboration with SAP

Banking is a strategic industry for SAP in respect to In-Memory Computing



HANA Detailworkshop & Discussion of potential candidates/ use cases

- Meeting of experts of Banks and SAP
- Specification of relevant roles and processes
- Specification of Data (Modelling requirements, Volumes, etc.)
- Specification of System landscape/ architecture
- Specification of additional requirements (e.g. security, authorizations, # of users, etc.)
- Discuss “Fit“ and Value Added (RoI)



Vielen Dank!

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