IBM i, SAP Core Data Services and SAP HANA

SAP on IBM Power Event
October 19, 2015

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Why there are more questions than ever?

What are my options for HANA?

What does the future look like for SAP on IBM i?

Did we have priorities before HANA?
How long can I keep using Business Suite?

"SAP is complementing its innovation commitment by prolonging mainstream maintenance until end of 2025 for SAP Business Suite 7 core application releases including the SAP ERP 6.0, SAP Customer Relationship Management 7.0, SAP Supply Chain Management 7.0 and SAP Supplier Relationship Management 7.0 applications...."

"SAP will continue to deliver innovations for the on-premise versions of SAP Business Suite 7 and SAP Business Suite powered by SAP HANA 2013. SAP Business Suite customers will benefit from state-of-the-art technologies and business processes..."

What will help SAP deliver innovations for both Business Suite and S/4HANA for the next 10 years?

Source: Systemkonsolidierungsoptionen für Kunden im Zeitalter von Cloud und HANA
Dr. Carol Gustav / P&I Services: Market Introduction: Product Management & Customer Services, Feb 2015 DSAG TT
In Memory Computing: Re-think Paradigms

CDS, not the DB, allows ABAP to shift more work to the DB layer.

In-Memory Computing Imperative: Avoid movement of detailed data. Calculate first, then move results.
Are Core Data Services for HANA only?

Core Data Services
Take-aways

1. Semantically Rich Data-Models
   Domain specific languages (DDL, QL, DCL)
   Declarative, close to conceptual thinking

2. CDS is completely based on SQL
   Any ‘Standard SQL’ features directly available like joins, unions, build-in functions, …

3. Fully Compatible with Any DB
   Generated and managed SQL Views
   Native integration in SAP HANA

4. Common Basis for Domain-Specific Frameworks e.g. UI, Analytics, Odata, BW,…
   @AnalyticsDetails.aggregationBehaviour: SUM

5. Associations
   Simplified definition of views on top of views
   Path expressions to navigate along relations

6. Extensible
   On model level thru extensions
   On meta-model level thru annotations

Source: Systemkonsolidierungsoptionen für Kunden im Zeitalter von Cloud und HANA
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What are ABAP Core Data Services?

ABAP Core Data Services extend the existing ABAP data abstraction layer:

- SQL-like Database Access Language
  - QL - Query Language
  - DML - Data Manipulation Language
  - ABAP Open SQL Extensions!
- Persistent, Reusable Data Model
  - DDL - Data Definition Language
  - DCL - Data Control Language
  - ABAP Data Dictionary Extensions!

CDS is Database Independent!
What is new with SAP Core Data Services?

- CDS view definition, and layered views
- Joining data sources
- SQL functions
- CASE statements
- SQL aggregates

Enhancements available with NW 7.4 SP05 pp.
Benefits
Less ABAP code
DB efficiency...
when used correctly

Where can I find more general CDS details?  Link to SAP SCN
How are ABAP Core Data Services available for IBM i?

CDS delivered with SAP NetWeaver 7.40 SPs

for new Open SQL features with SAP NetWeaver 7.40 SP05 resp. SP08

Refer to http://help.sap.com/abapdocu_740/en/index.htm?file=abencds.htm or more specifically
http://scn.sap.com/community/abap/blog/2014/10/10/abap-news-for-740-sp08--abap-core-data-services-cds
for ABAP CDS in ABAP Data Dictionary

CDS with SAP on IBM i info found in SAP Note 2075068

Are SAP Applications already using CDS enhancements on IBM i?

The first, "Rapid Replenishment Planning", became available with SAP ERP EHP7 SP08 for SAP on IBM i, see SAP Note 2051280 and SAP Note 2142186
What is special about SAP NetWeaver 7.5?

"SAP NetWeaver 7.5 is the compatible follow up release of SAP NetWeaver 7.4 and the on-premise foundation for SAP Business Suite (as of Enhancement Package 8 for SAP ERP) and for the on-premise edition of SAP S/4HANA."

Source: http://scn.sap.com/docs/DOC-67382
CDS and SAP NetWeaver 7.5

Are my business needs already covered by existing applications?

Are application changes necessary to take advantage of CDS?

Are application changes necessary to take advantage of HANA?

Can anyone create poor CDS ABAPs?

Can I start adapting ABAP to CDS constructs while remaining on i?

Will new SAP solutions be made available via CDS?

Do I need to go to 7.5 right away?
Does IBM i have long term plans too?

Steve Will @Steve_Will_IMi · Jun 9
Today: Worked on the plan for the systems AFTER POWER8.
#IBMPowerSystems #IBMi

SAP on IBM i @SAPonIBM · Jun 10
And I’m sure BOTH releases will have items for #SAP on #IBMi clients.

Steve Will @Steve_Will_IMi
Today: Worked on the release AFTER the release AFTER #IBMi 7.2

SAP on IBM i @SAPonIBM · Jun 9
IBM i Large Users Group meeting is in Rochester this week. About 10% of members are using #SAP on #IBMi.
IBM i Support Roadmap

Arrows indicate general timeframes, not specific dates.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Possible IBM i & HANA Configurations

1. IBM i w/ DB2 only
   - Best TCO, good performance
   - Optimization options as needed

2. IBM i w/ DB2 & HANA Sidecar* (e.g. COPA)
   - Subset of data shadowed to HANA
   - HANA handles some queries

3. IBM i w/ DB2 for all except BW
   - Reliable & performant ERP system on IBM i
   - HANA used for BW DB, with i app server

4. HANA DB for all applications*
   - IBM i app server and/or legacy apps
   - Or use Linux app server

Prerequisite: SAP NetWeaver 7.40 SP03 or higher
IBM i only scenario

Why i?
DB2 and IBM i integration, subsystems. Good performance with minimal effort.

CDS provides future enhancement options from SAP. Customized ABAP adaption to CDS concepts can begin on i.

Fast storage is required for HANA. Is it also helpful to my i?
DB parallelism is central to HANA. Have I tried DB2 SMP on i?
IBM i with HANA Sidecar for selected ERP functions

Have I customized away from SAP standard transactions?
How much rework on the standard SAP sidecar scripts must be done?

What are SAP's long term plans regarding the sidecar solution?

2. IBM i w/ DB2 & HANA Sidecar* (e.g. COPA)
- Subset of data shadowed to HANA
- HANA handles some queries

* when available for HoP
Power 8 upgrade
Core ERP data still safe on i

Did SAP change the data model for BW on HANA?
Is SAP changing it for BW on i?
Columnar database capabilities for BW already exist with DB2 EVIs
Is OLTP a HANA strength?

Can ABAP run unmodified on HANA?
What about my customized ABAP?
Will it perform as well without modification?

What would I give up going to HANA?
Why is there an S/4HANA?
Given CDS, why do SAP and partners promote HANA so much?
Power - HANA Landscape

Applications

- SAP
- SAP HANA®

High Availability
SAP HANA Auto Host-standby & System Replication, SUSE HA Ext, RH HA Plugin\(^1\), Symantec HA\(^1\), Tivoli SA

File System
GPFS\(^2\), XFS

Monitoring
Backup
Sys Mgmt

OS
Linux Enterprise Server
Priority Support for SAP applications

Server Hardware
POWER7+ (non-prod) or POWER8
Standalone or shared/PVM virtualized

Storage Hardware
Customer choice

Power Landscape example

- ECC
- BW HA
- ECC App
- CRM
- BW QA
- CRM QA
- BW App

- BW
- ECC HA
- ECC App
- ECC QA
- ECC HA QA
- ECC, BW, SM App Sbx
- BW HA QA

2 and 3 tier mix
Multiple partitions
VIOS & external storage

1) Not currently supported with Linux on Power. Contact RedHat for product plans.
2) GPFS is currently supported for Linux on Power by IBM. Contact SAP for plans for certification with HANA on Power.
Equivalent landscape – on IBM i

Applications

- DB2 for i®
- High Availability
  - Power HA or Logical Replication
- File System
  - IFS
- OS
- Server Hardware
  - POWER7+(non-prod) or POWER8
    - Standalone or shared/PVM virtualized
- Storage Hardware
  - Customer choice

Power Landscape example

- ECC, CRM
- BW HA

- BW QA

- BW
- ECC HA

- ECC QA, CRM QA

- ECC, BW, SM App Sbx

Simple 2 tier
Fewer partitions
Internal or External Storage

IBM Power Systems

IBM
S/4 HANA Migration Scenarios

1. Greenfield/re-implementation
   Start from scratch

2. Upgrade and migrate
   2-step – may need different weekends
   HANAtization of relevant custom code

3. Migrate only
   HANAtization of relevant custom code

4. "Suite on HANA" to S/4HANA
   Industry Solution restrictions (non-CDS)

5. Split finance from the rest of your ECC DB
What does the future look like for SAP on IBM i?

SAP and IBM i development are still working closely together
  CDS and NW7.5 are hot topics
  IBM i 7.3 coming too

IBM i is delivering features for SAP with each TR

IBM i TCO is still there – fewer footprints and less administration than any other OS/DB platform combination

What are some highlights?
SQL package handling optimization with IBM i 7.1+

New default size maximum for SQL packages
Doubled to 1024 MB to reduce overflow cases
  IBM i 7.1: DB group PTF 33 (SF99701, Level 33)
  IBM i 7.2: DB group PTF 4 (SF99702, Level 4)

New system catalogs to help identifying large SQL packages:
QSYS2.SYSPACKAGESTAT filling degree and utilization information of SQL packages
QSYS2.SYSPACKAGESTMTSTAT execution statistics for SQL stmts in SQL packages
  IBM i 7.1 TR8, DB group PTF 29 (SF99701, Level 29) + PTF SI55753
  IBM i 7.2: PTF SI55754

For additional information please refer to:
SAP on IBM i Blog in SCN,
cw14/2015: "Enhancements for SQL Package Handling"
DB2 for i - Analytics enhancement for SAP BW

IBM i 7.2 TR1 Announcement, October 6, 2014

Statement of direction

DB2 for i Query performance
IBM intends to enhance its DB2 for i database to provide an enhanced in-memory oriented access capability to its database EVI (Encoded Vector Index) technology to facilitate enhanced aggregate query performance.

EVIs - DB2 for i Columnar capability since V5R2

Remember HANA structures?  ➔

Data vectors
Dictionary = Symbol Table
EVIs and HANA tables are similar

But…the row store structure of i eliminates the need for Delta merges
**EVI Only Access (EOA)**

EVIs can now be used for projection of column values w/o table access. Typical BW benchmark queries improved by ~20% over current EVI use. 7.2 TR3 delivery in 4Q2015.

Example performance benefit:

```
SELECT COUNT(DISTINCT(fld1)) WHERE fld2 < 'value'
```
Flat InfoCubes

Classic InfoCube

"Flat" InfoCube

Taken from HANA, coming to IBM i in SAP NW 7.40 SP 13

Faster data loads – no DIMIDs
Simpler modeling and faster structural changes
Processes, Queries and MultiProviders remain unchanged

SAP note 2073519 will have details when it is released
Flat InfoCube – load performance…BEFORE

Data load for standard InfoCubes by load steps

EML data load time - standard infocubes

- Delete PSA
- Load PSA
- Load DSO
- Load Infocube
Flat info cube – load performance… AFTER

Data load for flat InfoCubes (note: DSO load time is transparent)
Summary

SAP support for Business Suite continues through 2025

IBM and SAP continue to invest in new SAP on i development:
   CDS foundations,
   Flat Info Cube,
   EVI Only Access… and more not mentioned here

SAP on i continues to be a solid, competitive solution

Power offers an alternative to x86 platforms for HANA requirements
Questions? — Thank You!

Contact:
rschmerb@us.ibm.com

See our blog and discuss with us at http://scn.sap.com/community/ibm-i
Additional observations
Remember the ASUG 2014 survey re: HANA adoption?

Why Not?

What’s Holding You Back?

NOTE: 189 RESPONSES

Source: https://www.asug.com/HANA-webcast-series
What new responses were added in the 2015 ASUG Survey?

"We are staying on the Business Suite through 2025"

"We are planning to move off SAP rather than make the change to HANA"

Source: ASUG’s SAP HANA Adoption Survey—The Sequel
Why not move to HANA?

Why is SAP still releasing new versions of SAP ASE Database? Why is it used for SD benchmarks instead of SAP HANA? Why is there no measurement of transactional performance on S/4?

Have any SAP BW-EML benchmarks been published without HANA?

Does my company have the right skills to consider moving to HANA? If not, do I give up control and put HANA in the cloud?

Am I concerned about security risks?
Growth brings some unwanted attention

"Most of these newly discovered vulnerabilities allow attacks to severely alter sensitive business data, or to render the systems completely unusable."

"As SAP applications continue to move to a hybrid cloud model the attack surface is rapidly expanding."

HANA Delta Store

- **Delta Tables**
  - Index / Dictionary structure
  - Dictionary is not sorted, but in sequence of timely elements appended
  - Thus Updates/Replacements of a vector element are transformed to insert-only transactions
  - Maintained in “delta store” segments

- Data representation is maintained not in sorted linear, but in B+-Tree-like format
  - well suited for fast modifications and merging with main store data (memory, disk)
  - Support range operators

- **Delta Manager** – moves rows to column format
  - Asynchronous process which handles version management of main and delta data
  - Background merge of delta data into new main store column representation

- **Reorg of column may be necessary for optimal performance if the data changes**

- **Some tables in HANA are ONLY row based because they change frequently**
HANA’s Persistence – Yes, it needs Disk!

- SAP HANA requires on-disk storage for data persistence
  - Without disk storage, in-memory data would be lost if HANA stopped or crashed
  - On-disk logging is required to maintain data consistency and recoverability
  - On-disk backups of the data volumes are required for crash recovery
  - Manual log copies are recommended to prevent data loss from outages

- Disk Sizing for HANA:
  - \( \text{DISK(Data)} = 4 \times \text{RAM(total)} \)
  - \( \text{DISK(logs)} = \text{RAM(total)} \)

- Data
  - SQL Data and undo log information
  - Write process is asynchronous

- Log
  - Information about data changes
  - Synchronous write during commit