HANA Administration: A Guide for Basis Administrators

Bob Simard: Director SAP Basis – Method360, Inc.
About This Presentation

- “HANA The Appliance”
  - Appliances Don’t Need Administration Right? - Incorrect
    - My Goal is to Show what needs to be done
    - Not HOW to do it (although “it’s in there” in many cases)
  
- This is NOT a TechEd Session
  - Minimal Technical Jargon
  - Not designed to be a “How-To’ for Basis Staff

- I Will Cover the “Why’s” and “What’s” of HANA
  - From My Perspective – Technical Infrastructure

- That Said – I Do consider Myself a “HANA Evangelist”
  - NOT a SAP Salesperson!
Agenda

HANA: Why Now?

HANA: What is it?

HANA: Basis Administration

BW on HANA: How Do You Get There?
What We’ll Cover

- HANA: Why Now?
  - Significant SAP ‘Technical Paradigm Shifts’
  - NetWeaver – Technology Issues: Impact on I.T. Agility

- HANA: What is it?
  - It is Not the Same Old NetWeaver!
  - BUT Many of its Technologies are Mature

- Hana Admin Responsibilities: Vendor - Basis
  - Hardware Vendor
  - Client’s Staff: “But it’s an appliance!”
    - Basis Team – Activities / Responsibilities

- HANA Example” BW on HANA
Agenda

HANA: Why Now?

HANA: What is it?

HANA: Basis Administration

BW on HANA: How Do You Get There?
HANA: Why Now? - Major Paradigm Shift

Mid 90s: Client – Server Computing
- Mainframe to Unix-based, distributed processing
  - Data ‘Optimized’ for disk retrieval
    - DB Optimizer - Indexes

Early 2000s: NetWeaver
- ‘Targeted Processing’
  - Same Base Code – NetWeaver Foundation

2011: HANA
- In-Memory Processing
  - Analytical Appliance
  - Database
HANA: Why Now? NW Problems → I.T. Issues

Client-Server Computing Lead to

- Application Sprawl
  - ERP, BW, CRM, SRM, PI, GTS, LMNOP

- Server Sprawl
  - From dozens to 100s

Leading to

- Ever-Increasing TCO
  - Higher Staffing
  - More Data Center Space

- Loss of Agility

- Over-all Dissatisfaction with I.T.
HANA: Why Now? OLTP Has Reached Its Limits

Performance Bottleneck: Memory and Disk

- More Memory: 64 – 512GBs lead to
  - ‘Partitioned’ Systems – VMware, LPar
  - Data ‘Optimized’ for disk retrieval
    - DB Optimizer - Indexes
    - Host Bus Adapters - Caching
    - Physical Storage Optimization - RAID

- OLTP design NOT optimized for Main Memory access
  - Even when loaded in RAM, we see a 40 - 60% stall rate between CPU Cache and memory
  - This due to OLTP’s inherent design
    - e.g. Leaf Page Scan – Index Pages
HANA: Reinventing Mass Data Processing

“Roads? We Don’t Need no Stinking Roads!”

Taking the Best of Existing technology and Adding to it

- In Memory Programming
  - Designed for rapid access

- In Memory Database
  - Supercharged Data Warehouse
    - Column store, compression, no more aggregation

- Instant Data Harmonization
  - ETL: SAP Landscape Transformation
    - Immediate Data Accessibility
HANA: Why Now?  HANA Leverages New Technology

Performance Bottleneck: CPU Cache
- Inexpensive Memory – 2 TB Systems
  - VERY Fast ‘Bottleneck’

HANA
- Optimized Analytical Programming
  - Designed to work in concert with in memory data
- In-Memory Database
  - Data Structured to reside in memory
    - Both Row and Column-based Access
    - Utilizing Data Warehouse Constructs
e.g. Aggregation built into the technology
HANA: Why Now?  Business Requires SPEED

Business Requires Agile I.T. Solutions

- IT as a Cost Center Must Provide
  - Lower TOC
  - Higher ROI

- Must have Rapid Role Out of Solutions
  - Robust, Inexpensive (RELATIVE!) Hardware
  - Able to Process Large Volumes of Data
    - Real-Time
    - Immediate Answers to “What If” Questions
    - “Google-type” Predictive Answers

- IT Can No Longer Act As A Barrier
HANA: Why Now? Value Proposition

Is It REALLY That Different?

- **Real-time Decision Making**
  - Current Data from ERP / BW reflected Immediately in Reports
- **Lower I.T. TOC**
  - “Appliance Model” – Decision is Small, Medium, Large
    - Versus Which Gear goes with what
  - Eliminate Database Licensing fees, administrative costs
  - Lower Landscape Costs
    - Uniform Administrative processes
    - Fewer vendors to manage
- **Accelerate Business Performance**
  - Planning, Forecasting, Pricing, etc based on immediacy of data from unlimited sources
  - Eliminate “I.T. Shadow”: Empower Business Self-service analytics
HANA: Why Now?  Section Take-Aways

SAP Processing Paradigm Shift

- Designed to Leverage Today’s low-cost Technology
- Must have Rapid Role Out of Solutions
  - “Appliance” Gear
  - Able to Process Large Volumes of Data
    - Real-Time
    - Immediate Answers to Immediate “What If” Questions
- The “Gear” is the “Gear”
  - Certified - Uniform
  - Robust, Inexpensive (RELATIVE!) Hardware
Agenda

HANA: Why Now?

HANA: What is it?

HANA: Basis Administration

BW on HANA: How Do You Get There?
HANA: What is it? Software as a Service

- Simple Component View:
  - HANA Studio
    - Development
    - Administration
  - HANA End User Clients
    - Data Presentation
  - Data Providers
    - Data Harmonization - Data EXPLOSION
  - HANA Appliance
    - Database
    - Software
HANA: What is it? Both an Appliance and Hardware

- Technical View (Real):
  - HANA and its Components
- Several Things to note
  - Solution Manager
    - SMD Agent
    - HANA App Data Collection
  - Central Management
    More on this in a minute
  - Software Update Manager (SUM)
    - Provides OSS Access
  - Multiple HANA Systems
    - HANA Scales Out!
      - HA: Provides Redundancy*

* Optional
HANA: What is it? Usage - Three Major Steps

- **Load:** From Existing Source(s)
  - SAP Landscape Transformation (SLT)
  - BOBJ Data Services
    - BOTH require Separate Server
- **Model:** SAP HANA Studio
  - Information Developer’s Console
- **Analyze:** SAP Tools – BW (BEx, BOBJ, Excel)
HANA: What is it? Three Major Steps: Load Data

- Loading Data: Technical Components
  - SAP Landscape Transformation (SLT)
  - BOBJ Data Services

Data Sources

ERP System
- SAP ERP
- Host Agent (7.20)
- Sybase Replication Agent

Non-SAP Data

Data Services 4.0
- DSS Job Server
- DSS Repository

SLT Server
- NW 7.02
- Add-on
- DMIS 2010_1_700

HANA Appliance
- HANA Database
- Load Controller
- Host Agent (7.20)
- Sybase Replication Server 15.5

SMD Agent *

Real-time Replication

* Integrated ETL Transfer Monitor
HANA: What is it? Three Major Steps: Modeling

- Model: SAP HANA Studio
  - Information Modeler
  - Column Based Access – FAST!
**HANA: What is it? Three Major Steps: Analyze**

- **Analyze:** SAP Tools
  - Native Support of Universes from
    - WEBI
    - Xcelsius (Dashboards)
HANA: What is it? New AND Mature Technology

- Advances in Hardware and Software
  - Coupled with Leveraging Proven BW technology
  - SAP’s Investment in technology – e.g. ETL using SAP LT

**HW Technology Innovations**

- Multi-Core Architecture (8 x 8 core CPU per blade)
- Massive parallel scaling with many blades
- 64bit address space – 2TB in current servers
- 100GB/s data throughput
- Dramatic decline in price/performance

**SAP SW Technology Innovations**

- Row and Column Store
- Incredible Compression
- In Column Store
- Data Partitioning
- Regional vrs Relational
- No More Aggregation
- Real-Time Data Capture
- Insert Only on Delta
HANA: What is it? Section Take-Aways

- HANA is Gear
  - Highly Optimized
  - Vendor-Certified Top-Down

- HANA is Software
  - Optimized for In-Memory Computing
    - Both Database and Analytics
  - Much of this isn’t ‘New’ Technology
    - ETL: SAP Landscape Transformation – ‘Zero-Downtime Upgrades’

- HANA has Moving Many Parts
  - These Require Monitoring
    - e.g. ETL-SLT for Real-time Reporting
Agenda

HANA: Why Now?

HANA: What is it?

HANA: Basis Administration

BW on HANA: How Do You Get There?
Basis Administration: Responsibilities

- Vendor – Assemble Gear, Test, Image, Setup
  - Knowledge Transfer!
- Basis Tasks – Yes ‘Wrenches’ still Required!
  - Important OSS Notes: Basis Installation
  - The HANA Studio
    - Administrative Console
  - Backup and Recovery
  - Initial Monitoring Setup
    - SMS Alert Notification
    - KPIs: Memory, Disk, CPU
  - Solution Manager Integration – YES!
    - SolMan 7.1 SP04
- Life Cycle Management: SUM
  - Patching – HANA & Studio
## Basis Administration: Vendor Responsibilities

<table>
<thead>
<tr>
<th>Hardware Partner – At Factory</th>
<th>Hardware Partner – Onsite</th>
<th>Client Technical Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assemble Gear</td>
<td>Reassemble Gear</td>
<td>Basis Admin Tasks</td>
</tr>
<tr>
<td>Image System</td>
<td>Site-Specific Setup</td>
<td>Application Handoff</td>
</tr>
<tr>
<td>Burn In Gear</td>
<td>Onsite Burn-in - KT</td>
<td></td>
</tr>
</tbody>
</table>

- **Vendor Responsibilities: Assembly – Distribution Center**
  - Image Systems: OS, DB, HANA SW
    - Set Configuration
    - Burn In Gear – “Smoke Test”
    - Break Down, Ship

- **Vendor Responsibilities: Onsite**
  - On Raised Floor - Assemble Gear
  - Apply Site-Specific Configuration
    - Naming Specifications, Networking
  - Burn In systems again
  - Provide Knowledge Transfer to Basis Staff
Basis Administration: Pre-installation – Basis OSS Notes

- Basis Team: Download and Review Before Installer Arrives

  - 19466  
  - Downloading SAP Kernel patches

  - 517484  
  - Inactive services in the Internet Communication Framework

  - 1468391  
  - Installation and delta upgrade of DMIS 2010_1

  - 1597627  
  - HANA Connection

  - 1603660  
  - Individual release 7.20 kernel on MaxDB for HANA LT

  - 1605140  
  - SAP HANA: Central Note - SAP LT Replication Server

  - 1646371  
  - HANA replication fails for sender systems with release 4.6C

  - 1649910  
  - Applying SLT (DMIS_2010 SP05) with SAP HANA SPS03

  - 1655246  
  - HANA LTR SP5: General Corrections

  - 1656370  
  - HANA LTR SP5: General Corrections 2

  - 1662438  
  - HANA LTR SP5: General Corrections 3

  - 1664883  
  - HANA LTR SP5: General Corrections 4

  - 1663138  
  - HANA data replication fails due to incorrect DB triggers
Basis Administration: Basis Responsibilities

- **Basis Team**
  - Review OSS Notes
  - Review System setup *with Vendor Tech*
  - Understand Operational Concepts
    - E.g. High Availability Implementation
  - Implement Administrative Processes
    - Initial Setup: SMD Agent, OSS Connection (OSS Note 1058533)
    - Backup – Recovery Methodology
    - Monitoring: Performance and Availability
  - Solution Manager Integration
  - Application Team Handoff
Basis Administration: The HANA Studio

The Administrative Console: Overview Dashboard

- Tab-Based Access – Similar Look to SolMan Work Centers
  - Overview
  - Landscape
  - Alerts
  - Performance

- Volumes
- Configuration
- System Information
- Diagnostic files
Basis Administration: The HANA Studio

Example: ‘Studying the System’ – Click-Thru Technology

- **Landscape Tab**
  - Example: How much CPU does the indexserver normally burn

<table>
<thead>
<tr>
<th>Services</th>
<th>Configuration</th>
<th>Host:</th>
<th>Service</th>
<th>Detail</th>
<th>Process ID</th>
<th>CPU</th>
<th>Memory</th>
<th>Start Time</th>
<th>SQL Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>coe-he-40</td>
<td>indexserver</td>
<td>30103</td>
<td>master</td>
<td>204986</td>
<td></td>
<td></td>
<td></td>
<td>Aug 2, 2011 7:22:45 PM</td>
<td>30115</td>
</tr>
<tr>
<td>coe-he-40</td>
<td>nameserver</td>
<td>30101</td>
<td>master</td>
<td>204923</td>
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<td></td>
<td></td>
<td>Aug 2, 2011 7:22:39 PM</td>
<td></td>
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<tr>
<td>coe-he-40</td>
<td>preprocessor</td>
<td>30102</td>
<td></td>
<td>204969</td>
<td></td>
<td></td>
<td></td>
<td>Aug 2, 2011 7:22:44 PM</td>
<td></td>
</tr>
<tr>
<td>coe-he-40</td>
<td>statisticsserver</td>
<td>30105</td>
<td>master</td>
<td>204993</td>
<td></td>
<td></td>
<td></td>
<td>Aug 2, 2011 7:22:46 PM</td>
<td>30117</td>
</tr>
</tbody>
</table>

- **Landscape Tab - Configuration**
  - Provides more granular detail about the name & index servers
Basis Administration: Backup and Recovery

- HANA Operational Data Protection
  - Bulk of Data held in memory
  - Persistent Storage (DASD) still used
  - Data – changes captured in logs
    - Logs same as OLTP – ‘history’ for roll forward recovery
  - Data and Logs and Automatically Saved – savepoints
    - Also after each commit
- i.e. Point-in-Time Recovery
Basis Administration: Backup and Recovery

- HANA - Operational Concepts
  - New Constructs
    - Currently only backups to Disk supported
      i.e. backup to pipes (Tape) not available
    - Only Online (Hot) Backups
      See SAP Note 1645183
  - First Recovery Point SSD Storage → DASD
    - Versus Offline Storage
    - Restart equals Initial Recovery
  - Restart - ‘Lazy’ Reload: On Demand
    - Data loaded by query: i.e. each ‘1st user’ takes a performance hit
    - Shortens restart time – from $N$ minutes to seconds
  - “Preload” Option
    - Column store tables loaded at startup
  - System returns to last consistent state
Basis Administration: Initial Monitoring Setup

- Configure SMS Alerts – Process: Administrative Console
  “Basis Admin – Manual Monitoring 1st to Understand ‘Normal’”
- Setup Procedure: Understand important components
  - Decide ‘who’ should be notified - E.g. an ‘On-Call’ group

Solution Manager Has Much of This – BUT UNDERUTILIZED!
Basis Administration: Initial Monitoring Setup

- Configure Alerts for ‘Important’ Components
  - Set Thresholds appropriately
    - Document response process (immediate login) and timing (within 5)
Basis Administration: Initial Monitoring Setup

- Areas to consider: Important HANA Key Areas (KPIs)
  - Disk Space
    - Volumes – Logs storage
  - Physical Memory
    - Utilization Numbers
  - Virtual Memory – Paging
  - CPU
    - Utilization thresholds
  - Console Monitoring Areas
    - Overall Landscape
    - Performance
    - Storage
    - Alerts
    - Log – Trace Files

<table>
<thead>
<tr>
<th>System ID</th>
<th>Operational State</th>
<th>Alerts</th>
<th>Data Disk (GB)</th>
<th>Log Disk (GB)</th>
<th>Trace Disk (GB)</th>
<th>Physical Memory (GB)</th>
<th>Virtual Memory (GB)</th>
<th>CPU (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS1</td>
<td>All Services are started</td>
<td></td>
<td>407.50 / 409.23</td>
<td>407.50 / 409.23</td>
<td>407.50 / 409.23</td>
<td>4.20 / 11.74</td>
<td>4.20 / 61.74</td>
<td>0</td>
</tr>
<tr>
<td>AL3</td>
<td>All Services are started</td>
<td></td>
<td>96.47 / 436.77</td>
<td>96.47 / 436.77</td>
<td>96.47 / 436.77</td>
<td>7.12 / 11.74</td>
<td>7.29 / 13.75</td>
<td>16</td>
</tr>
<tr>
<td>MIL</td>
<td>All Services are started</td>
<td>3 alerts with LOW priority</td>
<td>90.50 / 465.76</td>
<td>90.50 / 465.76</td>
<td>90.50 / 465.76</td>
<td>11.99 / 23.98</td>
<td>19.43 / 47.97</td>
<td>3</td>
</tr>
<tr>
<td>UV1</td>
<td>All Services are started</td>
<td></td>
<td>165.12 / 931.52</td>
<td>165.12 / 931.52</td>
<td>165.12 / 931.52</td>
<td>6.82 / 13.98</td>
<td>8.23 / 23.97</td>
<td>3</td>
</tr>
<tr>
<td>HA5</td>
<td>All Services are started</td>
<td></td>
<td>61.26 / 400.26</td>
<td>61.26 / 400.26</td>
<td>61.26 / 400.26</td>
<td>7.13 / 43.13</td>
<td>7.13 / 49.14</td>
<td>0</td>
</tr>
<tr>
<td>SUP</td>
<td>Some Services are not started</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST2</td>
<td>Some Services are not started</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Basis Administration: Troubleshooting Capabilities

- Monitoring Logs Through the Admin Console
  - Log Files
  - Traces – Setting and Reviewing
    - Database, Performance, SQL
Basis Administration:  Solution Manager Integration

- DBACockpit
- Performance Warehouse
- Alert Infrastructure

See OSS Note 1640741 for user configuration

Dashboard Example
Basis Administration: Solution Manager Integration

DBA Cockpit – DBA Toolset

- DBA Planning Calendar
  - Backup Database
- Audit Logging
  - Changes to DB
- System Information

- Current Status
  - Processes, Threads
- Storage Utilization
- Diagnostics – Tables, Files
  - DB Traces

DB Audit Logs

DB Traces
Basis Administration: Solution Manager Integration

Performance Warehouse - Work Centers

- Root Cause Analysis
  - Storage Analysis: Tables
  - Events: What? When?
  - CPU: Memory Usage

SolMan Work Centers

Table Growth Trends
Basis Administration: Solution Manager Integration

Alert Infrastructure

- Availability – all HANA Services
- Performance Thresholds

See OSS Note 1625203:
Installing SAPHostagent
Basis Administration: Lifecycle Management

SAP Software Update Manager (SUM)

- Similar Process as Before
  - Solution Manager Dependent
    - Landscape Configuration
  - Maintenance Optimizer Usage
    - MOPZ Transaction
    - HANA Landscape Defined in SMSY
- Process
  - OSS: Build Download Basket
  - Create SP Stack config file(XML)
  - Download Patch Queue
    - SolMan ver. 7.0 SP23
    - Landscape Verification 1.0 SP1

![Software Update Manager (v1.0, SP4, PL0) Process Report](image)
Basis Administration: Lifecycle Management

SAP HANA Studio Update

- Automated – Similar Methodology to Windows

(Remember – HANA Studio is a Desktop Tool)

- Enable/Disable
- Check - Frequency
- Notify before applying
- Fully Configurable
Basis Administration: Section Take-Aways

- **Vendor**
  - Has Specific Responsibilities
    - Define Deliverables - KT

- **Basis Staff**
  - Responsibilities
    - Performance and Availability of HANA
    - Using New Tools: HANA Studio
  - Solution Manager 7.1 SP04
    - Your Staff **must, Must, MUST** utilize this application
    - The days of “we don’t have time” and “it doesn’t work” are over

- **HANA Administration Tool Suite**
  - New Tools, Interfaces to learn
  - Appliance? Still Requires “Care and Feeding”
    - Get your technical staff ‘edju-mah-cated” sooner rather than later

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Real Experience. Real Advantage.
Agenda

HANA: Why Now?

HANA: What is it?

HANA: Basis Administration

BW on HANA: How Do You Get There?
BW on HANA: Mechanics of Migrating

System Migration Required (Heterogeneous System Copy)

- What *platform* are you running BW on today?
- HANA Platform:
  - SUSE Linux (SLES) 11 SP1
  - HANA Database
- Moving to HANA
  - ‘Source System’
    - Prepare for Migration
    - Export Database
  - Target System - HANA
    - Import Tables: Parallel
- Requires a SAP-Certified Migration Specialist
  - Much Planning, Tuning
HANA on BW: Major Basis Preparation Activities

Prepare Source System for Migration

- Export Process Optimization
  - Export Large Tables in Parallel
  - ‘Break up’ Logical Units of Work
  - Tune Tune Tune

- Complex Process – requires multiple iterations

<table>
<thead>
<tr>
<th>R3load Export and Import Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run SAPINST to export the database, select system copy-&gt; Source system -&gt; ABAP System -&gt; Oracle for UNIX and WINDOWS -&gt; Non Unicode -&gt; ABAP Database Content Export</td>
</tr>
<tr>
<td>Verify R3szchk, R3load, R3ta, R3ldctl</td>
</tr>
<tr>
<td>Use latest MIGMON.SAR</td>
</tr>
<tr>
<td>Verify &lt;sid&gt;adm and ora&lt;sid&gt; environment</td>
</tr>
<tr>
<td>split packages create 428 load files</td>
</tr>
<tr>
<td>Start Migmom ususe 12 R3load processes</td>
</tr>
<tr>
<td>split table /BIC/B0000907000</td>
</tr>
<tr>
<td>Export to /oracle/SCB/export/export.new</td>
</tr>
<tr>
<td>Validate DBSIZE.XML and DDLORA.TPL</td>
</tr>
<tr>
<td>Check for err in any of the *.log files</td>
</tr>
</tbody>
</table>
HANA on BW: Putting It All Together

Business Users
- Data Input into ERP
- SLT Server Updates HANA
- BW Analytics Immediately Reflect Changes
- Reports – Dashboards Reflect Change Immediately

Basis
- Determines ‘Important’ Areas
- Establishes Monitoring Protocols
  - SolMan
HANA on BW: Section Take-Aways

- Business Benefits
  - Real-Time Data Access – Real-Time Decision Making
  - Simulate – Project – What-if Analysis: Immediate Results
    - Immediate Decisions
  - BWA-Level Reporting Performance ON ALL BW Reports

- I.T. Benefits
  - Superior Load Performance
    - Configurable Monitoring – Alert Notification
  - Lower TCO
    - Certified Gear
      - From CPU to Disk = No Decisions
    - Minimal Administrative Overhead
  - Minimal Database Administration
  - No more third party database licensing costs
Session Take-Aways

HANA: Why Now? SAP Processing Paradigm Shift
- Designed to Leverage Today’s low-cost Technology
- Must have Rapid Role Out of Solutions

HANA: What is It?
- HANA is Gear – Certified, Uniform, Highly Optimized
- HANA is Software - Optimized for In-Memory Computing

HANA: Requires Basis Administration!
- Basis Staff - Responsibilities
  - New Tools: Performance and Availability of HANA
  - Solution Manager - Your Staff MUST utilize this application

BW on HANA
- Run Better  Run Smarter  Run Faster Run
  - Run your BW Database on HANA!
Thank you for participating.

Please remember to complete and return your evaluation form following this session.

For ongoing education on this area of focus, visit the Year-Round Community page at www.asug.com/yrc