Database migration as part of SUM:
DMO overview and tuning

Knowledge for you
Boris Rubarth, SAP SE, Software Logistics
January 2018

SAP **Run Simple**

Legal disclaimer

The information in this presentation is confidential and proprietary to SAP and may not be disclosed without the permission of SAP. This presentation is not subject to your license agreement or any other service or subscription agreement with SAP. SAP has no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation and SAP's strategy and possible future developments, products and or platforms directions and functionality are all subject to change and may be changed by SAP at any time for any reason without notice. The information in this document is not a commitment, promise or legal obligation to deliver any material, code or functionality. This document is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. This document is for informational purposes and may not be incorporated into a contract. SAP assumes no responsibility for errors or omissions in this document, except if such damages were caused by SAP´s willful misconduct or gross negligence.

All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

Knowledge Transfer Sessions on Software Update Manager (SUM)

✓ (delivered)   **"Software Update Manager: Overview and Scenarios"**

➢ (delivered)   **"SUM: downtime optimizations like nZDM, ZDO in detail"**

➢ **Today**   **"Database migration as part of SUM: DMO overview and tuning"**

➢ Wed 14.02.2018 1-2 pm   **"SUM: the tool for System Conversion to SAP S/4HANA"**

Disclaimer

This presentation outlines our general product direction and should not be relied on in making a purchase decision. This presentation is not subject to your license agreement or any other agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or to develop or release any functionality mentioned in this presentation. This presentation and SAP's strategy and possible future developments are subject to change and may be changed by SAP at any time for any reason without notice. This document is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. SAP assumes no responsibility for errors or omissions in this document, except if such damages were caused by SAP intentionally or grossly negligent.

Agenda Database Migration Option (DMO) with SUM

What is DMO?

- What use cases? Which kind of systems?

How does it work?

- Procedure details

How to tune and optimize downtime?

- Aspects for technical downtime of DMO procedure

DMO in a nutshell

Database Migration Option (DMO):

- **SUM use case** for AS ABAP based systems, using SUM 1.0 (target < 7.50) or SUM 2.0 (target ≥ 7.50)
- **Database Migration**: migrate a system to a different database type (heterogenous migration)
- **In-place procedure**: database (host) is switched, but Primary Application Server (PAS) host is kept
- **Initially only** target database type SAP HANA, now additional targets possible (see SAP note on DMO)
- **System Conversion** from SAP ERP to SAP S/4HANA uses DMO (if source database not yet SAP HANA)

DMO is alternative approach to classical migration (heterogenous system copy)

- System update, Unicode Conversion* and database migration combined in one tool, one downtime
- Migration steps are simplified: consultant certification not required
- Business Downtime is reduced
- SAP's recommendation for migration target SAP HANA database: use DMO, if possible
  (see https://blogs.sap.com/2017/11/22/comparing-sap-migration-procedures-to-sap-hana-database/)

* Only for target systems below BASIS 7.50

Comparison of migration options – example: SAP HANA database

Classical

SAP ECC 6.0 EHP7
AS ABAP 7.4 Kernel 7.4x
Source DB

Update/Upgrade [SUM]

Unicode Migration

Migrate [SWPM]

Source DB Update

SAP ECC 6.0 EHPx
AS ABAP 7.0x Kernel 7.x
Source DB

Unicode conversion + upgrade + DB migration

DMO of SUM

SAP ECC 6.0 EHP7
AS ABAP 7.4 Kernel 7.4x
SAP HANA
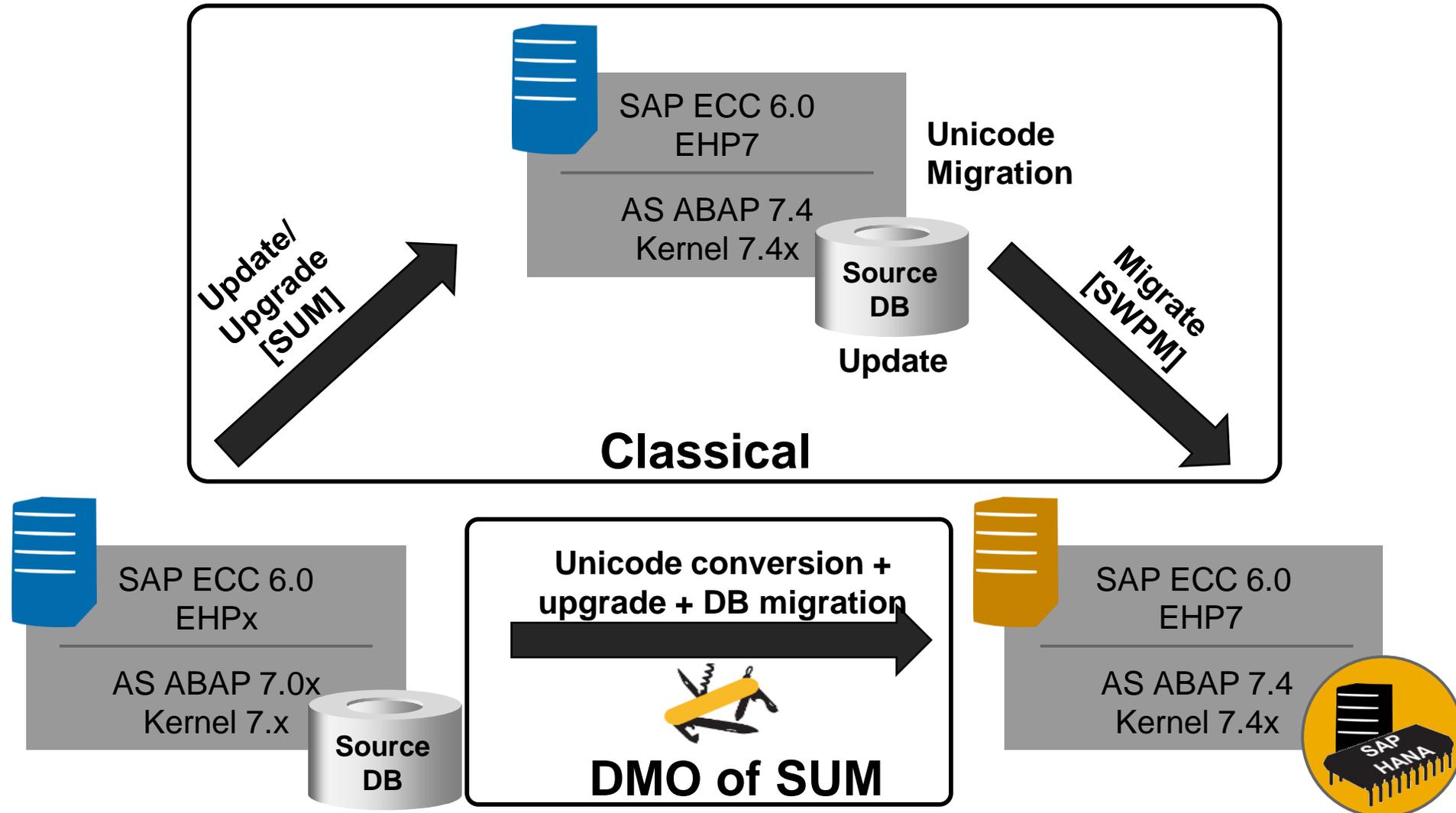
DMO: Business Case
Upgrade and migration in a combined procedure reduces TCO and risks

Combined procedure needs only one maintenance phase (not two)

➤ Reduces business downtime (TCO), less regression tests necessary

In-place migration keeps application server and System-ID stable

➤ Low impact on system landscape: only database server is new

Original database is kept, can be reactivated as fallback

➤ Reduces risk, no restore required, more time for testing before cutover

No necessity for big export file share during migration

➤ Direct migration transfer without large dump files

DMO phases during the procedure

**Source DB** ← **SAP System** → **SAP HANA**

1 Upgrade "Prepare"

Setup SAP HANA specifics (client, schema …) ⎤ Uptime

2 Execute Upgrade (until downtime phase)

Enter **3** *downtime*

4 Migrate application data (incl. data conversion) ⎤ Downtime

5 Finalize Upgrade

6 Start SAP HANA-based system
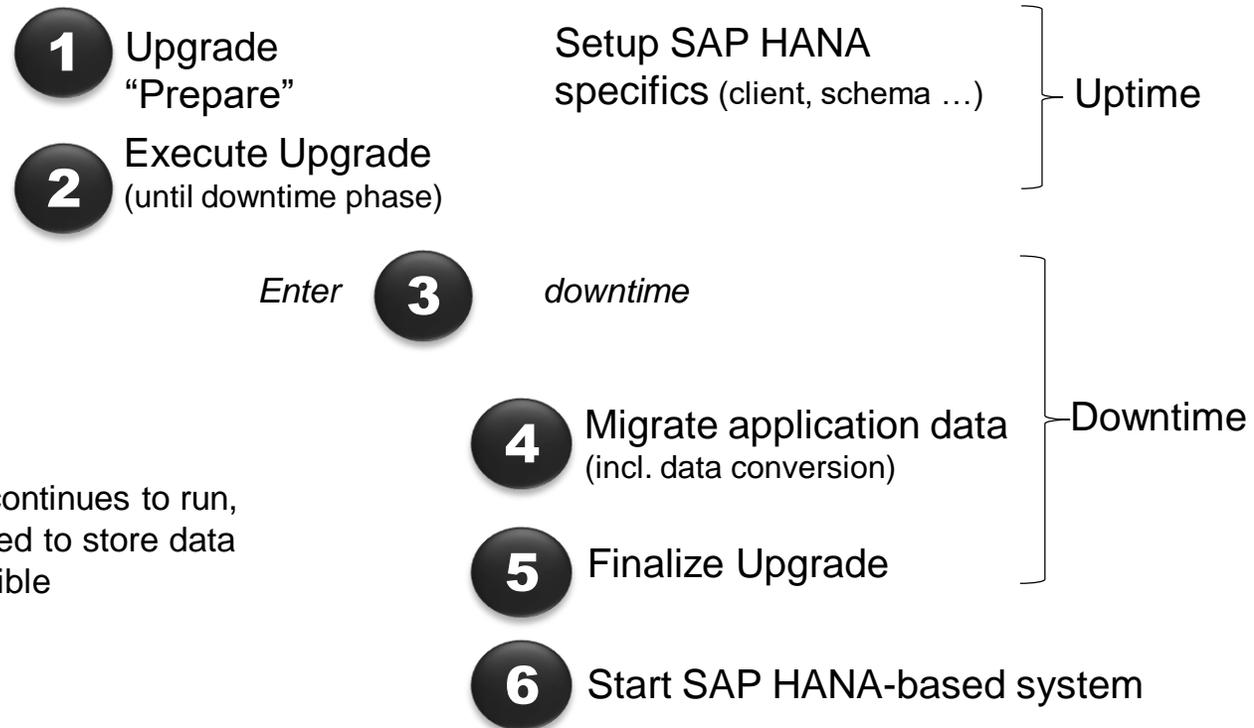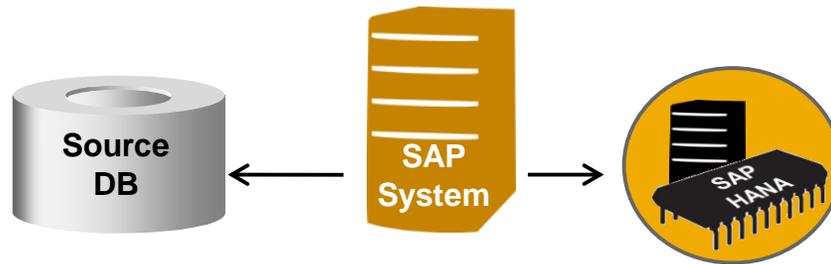
Note
Source database continues to run, but is no longer used to store data -> easy reset possible

Time

DMO use cases (1/2)

➢ **DMO** is the combination of update and migration, potentially with Unicode Conversion   (target < 7.50)

➢ **SUM runs on PAS** host ("inplace"), SUM starts R3load on that host

➢ **Running SUM on AAS** (Additional AS) is possible (restrictions apply, see SAP note on DMO), Benefit: run SUM on host with best resources

➢ „**DMO without Software Update**": use case to migrate only, no update of SAP software
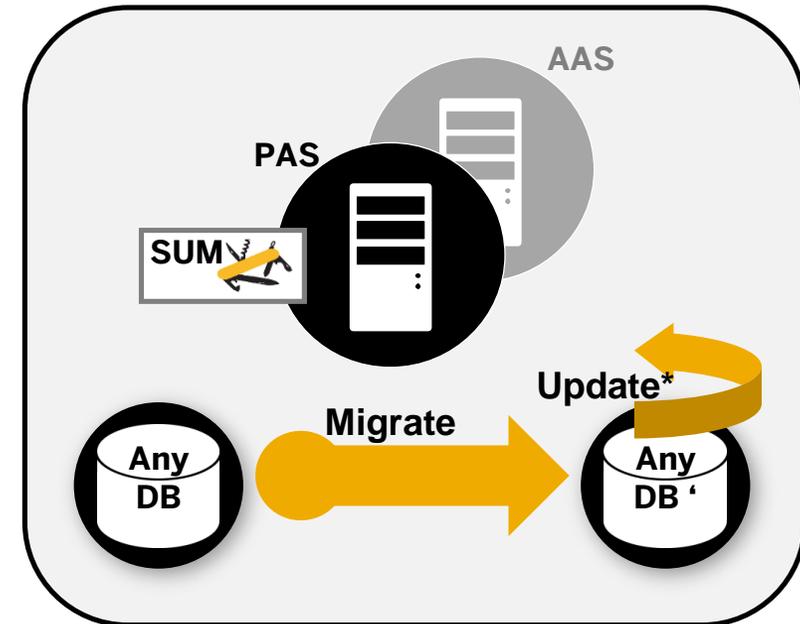
DMO use cases (2/2)

➢ DMO not supported for data center migration due to latency issues
(source & target database in separate data center)

➢ "**DMO with System Move**":
use case to move complete SAP system

   ➢ Allows to switch PAS host

   ➢ Allows to migrate across data centers

➢ Requirement: set up of target database and PAS

➢ Sequence:

   ➢ Start SUM in source, export happens

   ➢ Copy and start SUM on target, import happens

➢ Can be combined with "*DMO without Software Update*" and with "*SUM on AAS*"
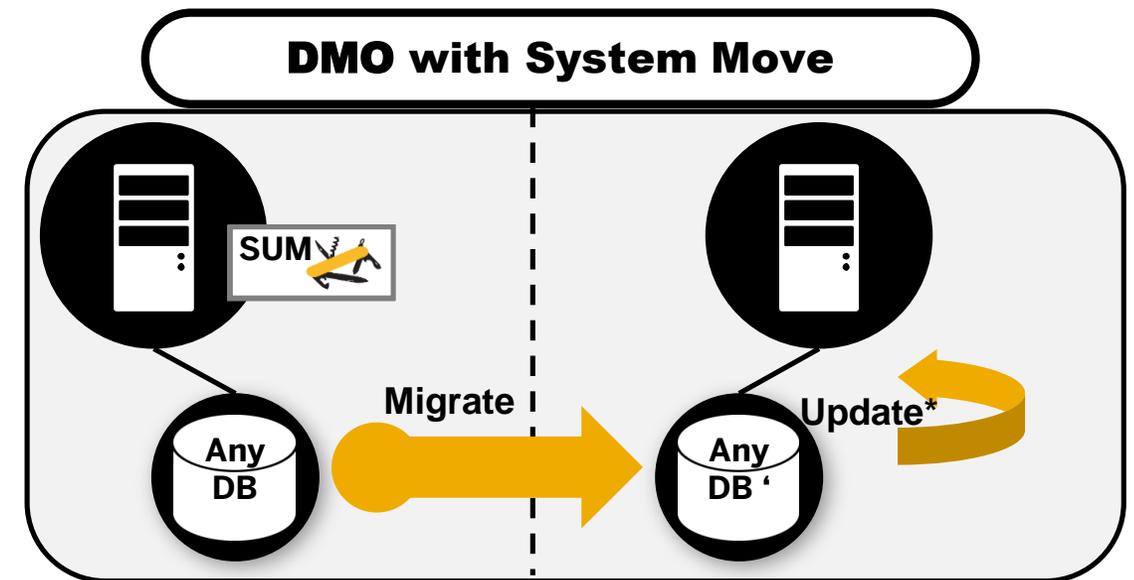
DMO with System Move

SUM

Migrate

Any DB

Update*

Any DB '

Agenda Database Migration Option (DMO) with SUM

What is DMO?

- What use cases? Which kind of systems?

How does it work?

- Procedure details

How to tune and optimize downtime?

- Aspects for technical downtime of DMO procedure

DMO: SUM Start

PAS Host

PRD Instance

SAP Host Agent

SUM is started

PAS

Source
Kernel

▶

SUM

PRD REP

Application Data

Source DB Host

Target DB Host
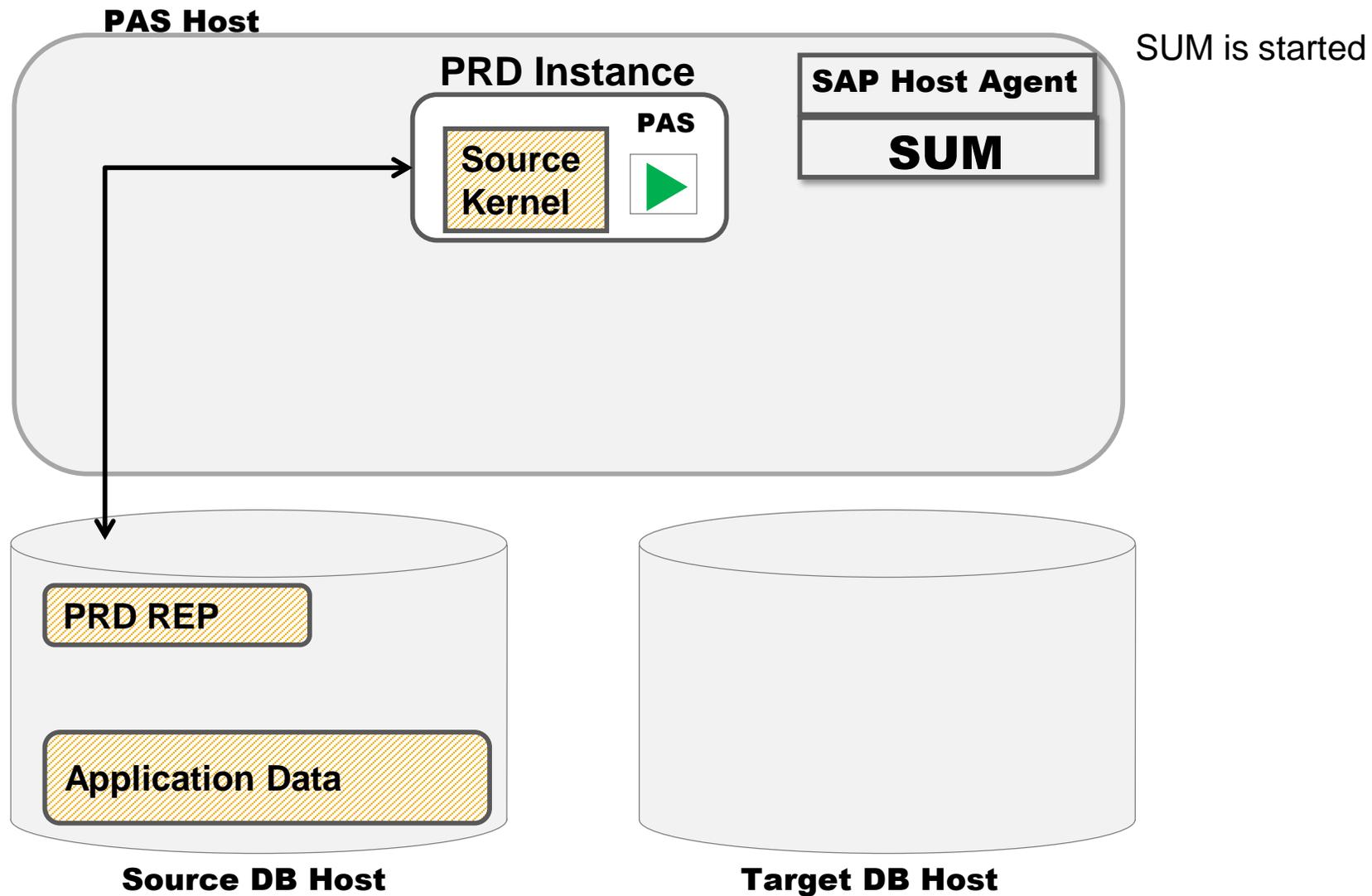
DMO: Shadow system created

PAS Host

PRD Instance

Source Kernel ▶ **PAS**

SHD Instance ▶

SHD Kernel

SAP Host Agent

SUM

Uptime: Shadow system is created

PRD REP

SHD REP

Application Data

Source DB Host

Target DB Host

Legende

Target Release

Source Release
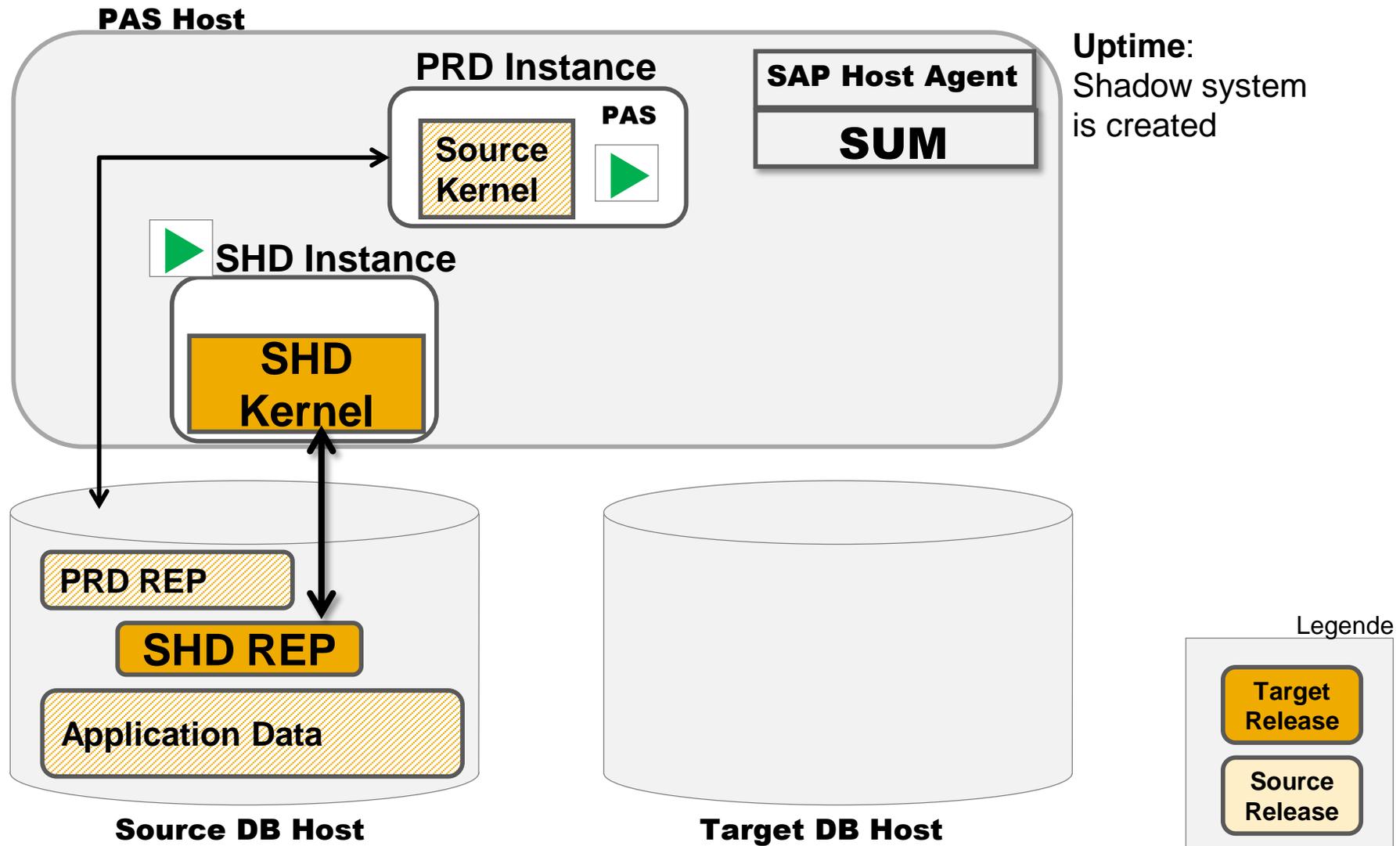
DMO: shadow repository migrated
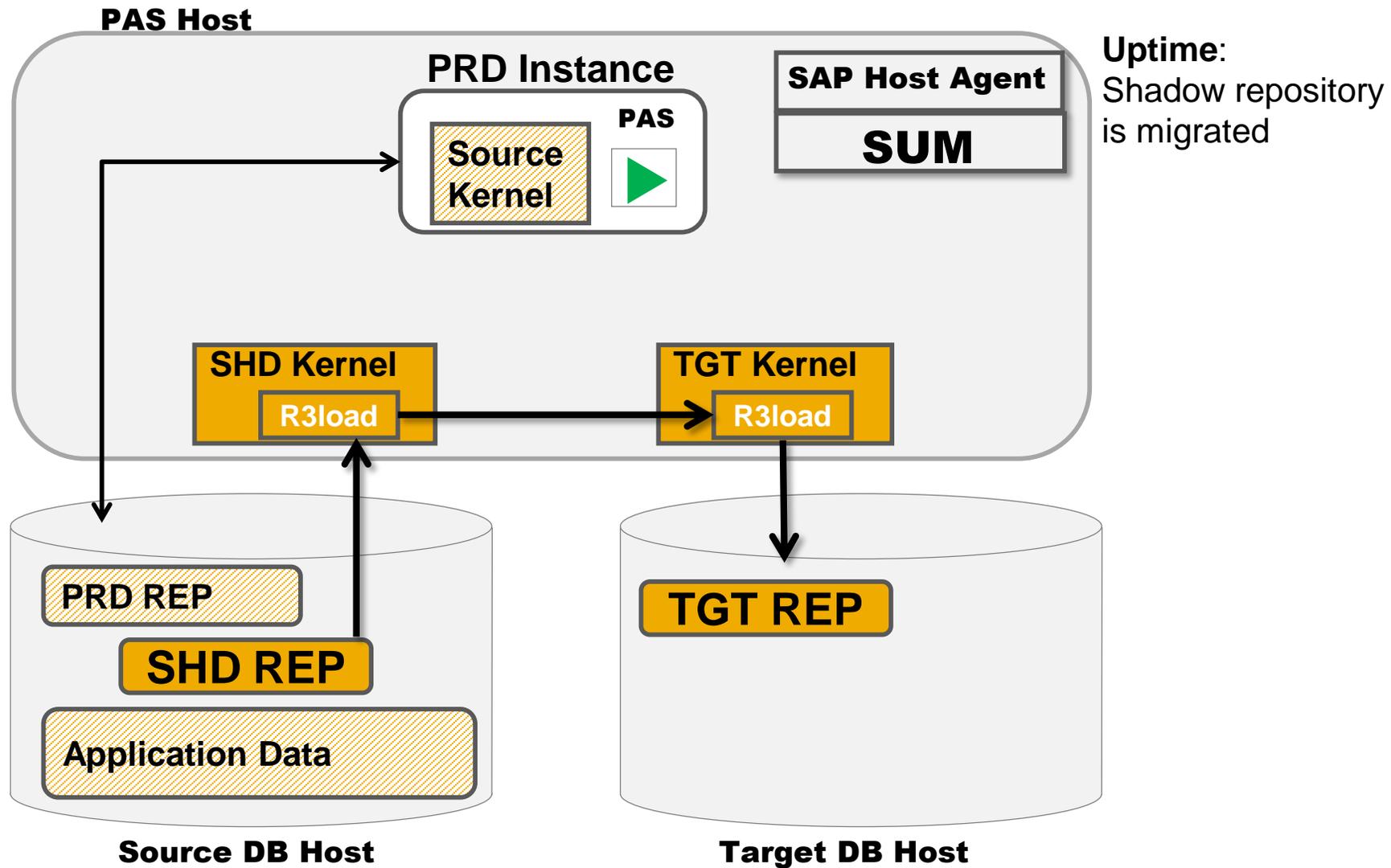
DMO: application tables are migrated
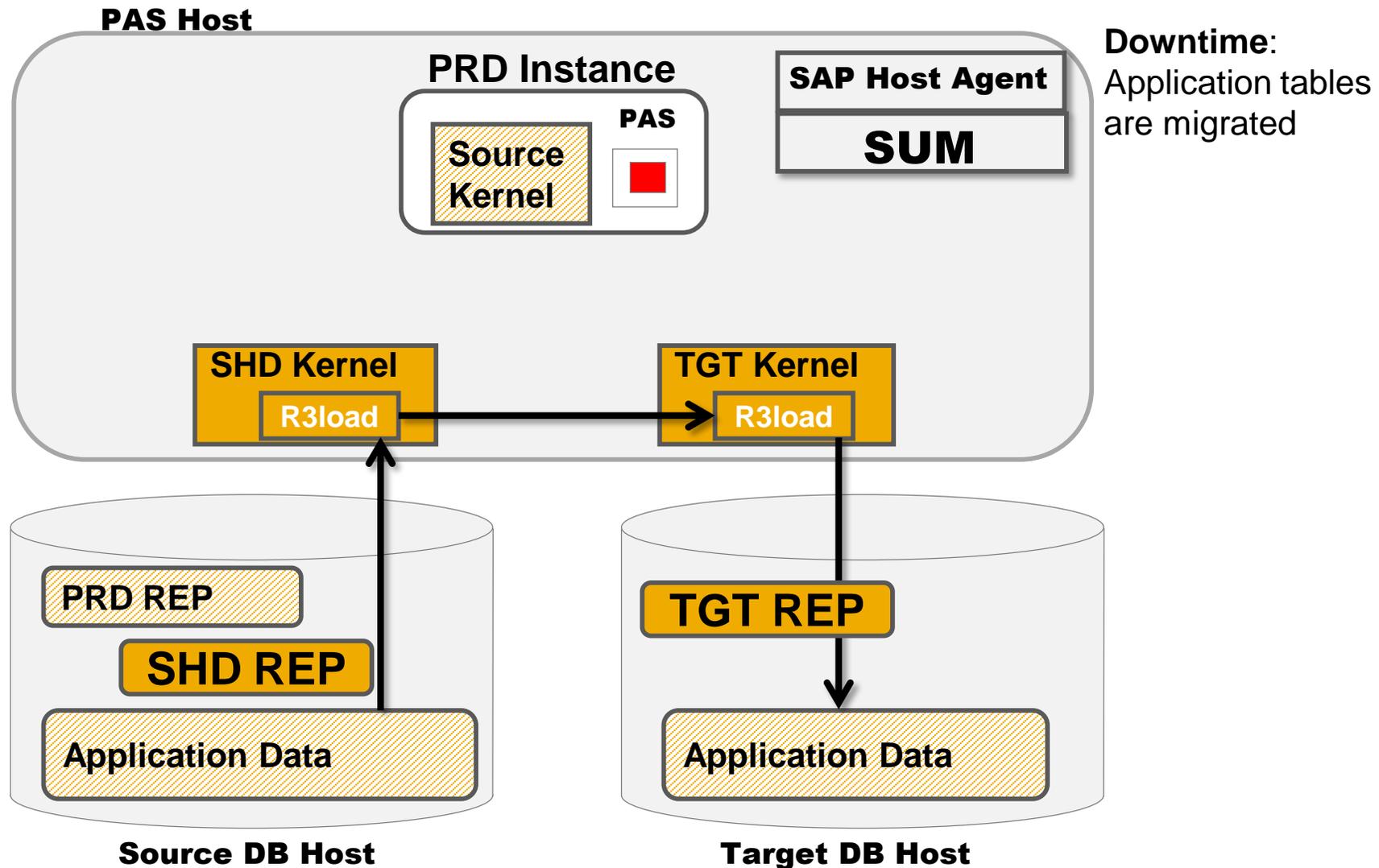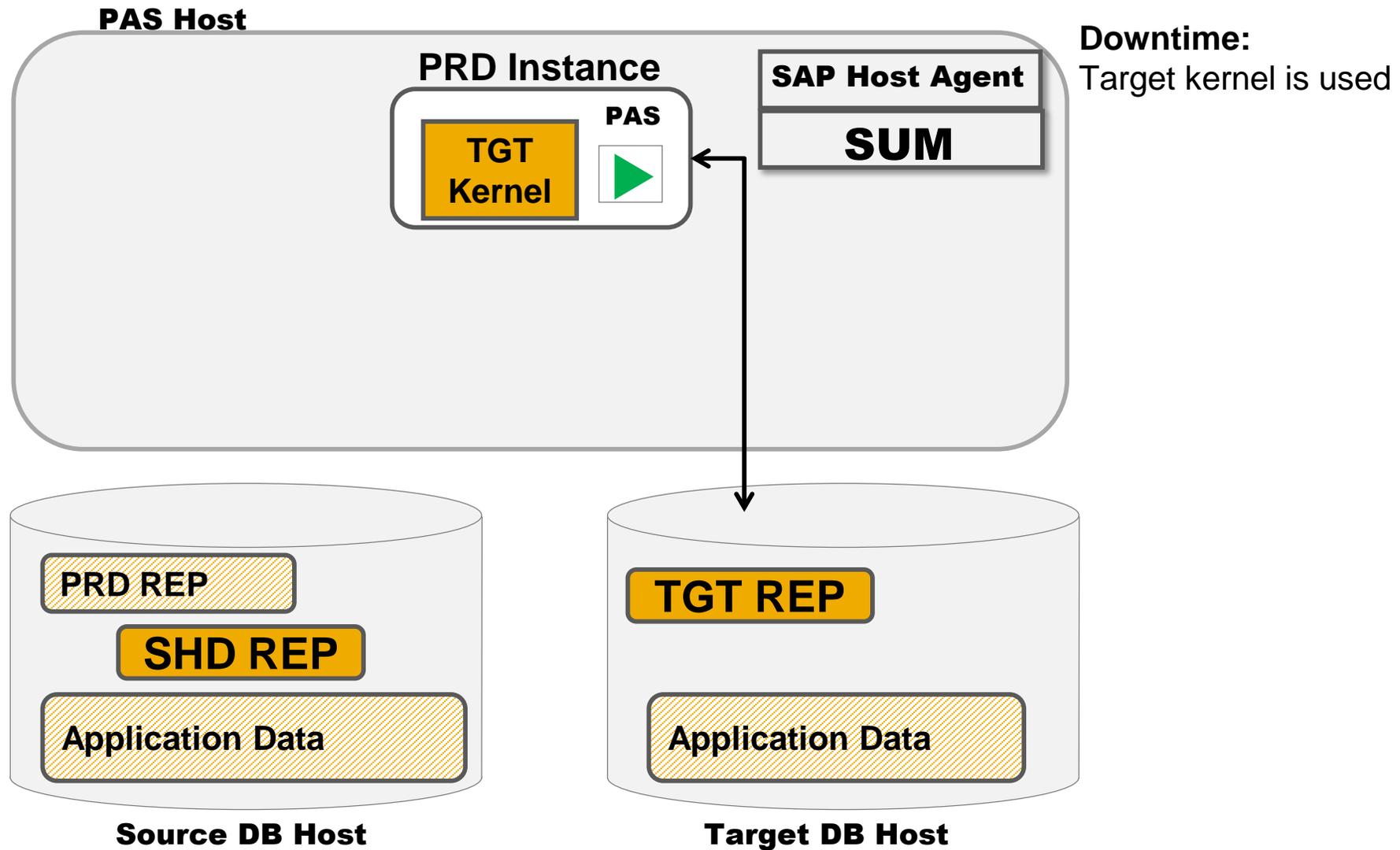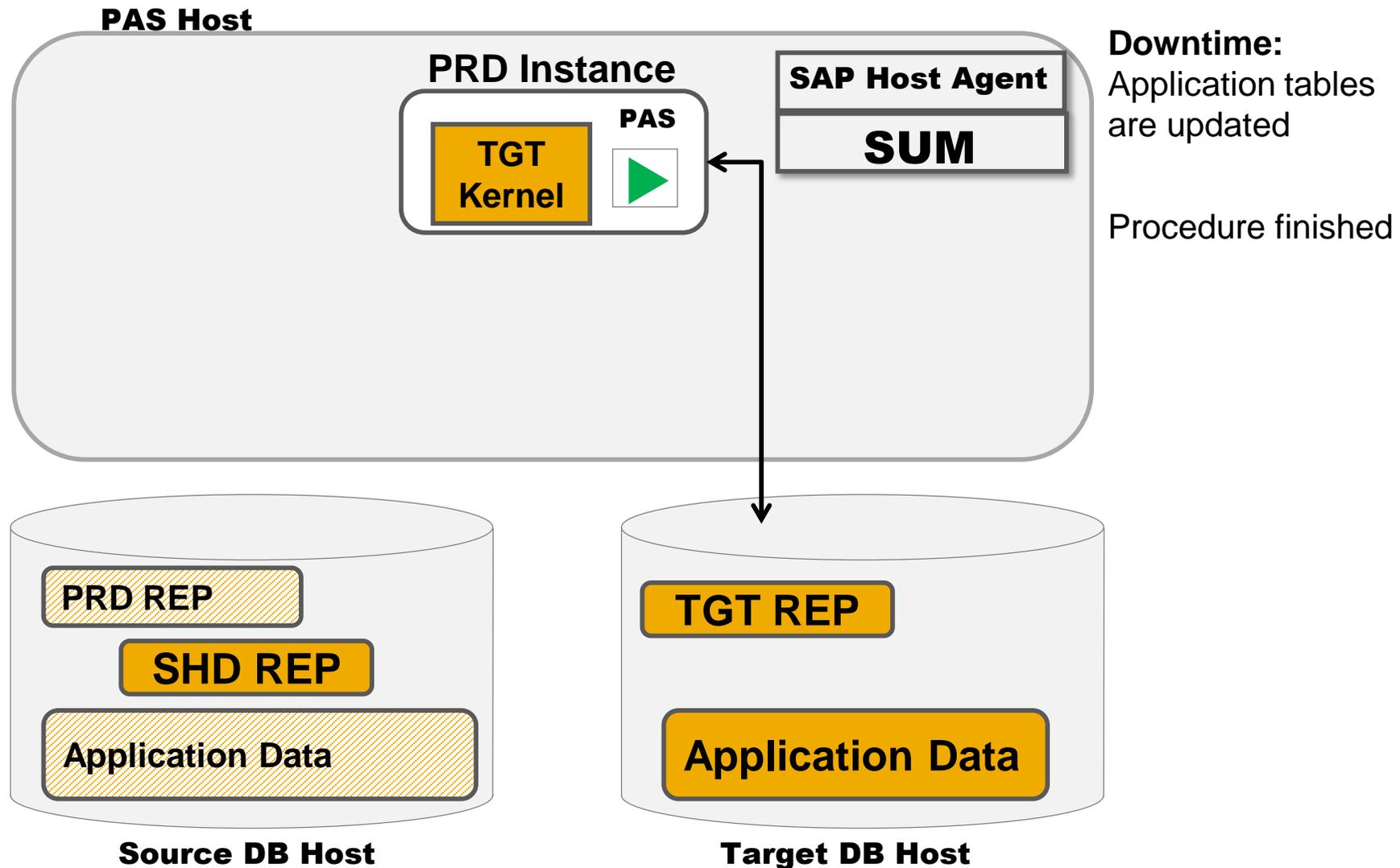
PAS Host

PRD Instance

PAS

Source Kernel

SAP Host Agent

SUM

SHD Kernel

R3load

TGT Kernel

R3load

Downtime: Application tables are migrated

PRD REP

SHD REP

Application Data

Source DB Host

TGT REP

Application Data

Target DB Host

DMO: update part

PAS Host

PRD Instance

Downtime:
Target kernel is used

PAS

| TGT Kernel | ▶ |

SAP Host Agent

SUM

PRD REP

SHD REP

Application Data

Source DB Host

TGT REP

Application Data

Target DB Host

DMO: procedure finished

PAS Host

PRD Instance

SAP Host Agent

PAS

TGT
Kernel

▶

SUM

Downtime:
Application tables
are updated

Procedure finished

PRD REP

SHD REP

Application Data

TGT REP

Application Data

Source DB Host

Target DB Host

Agenda Database Migration Option (DMO) with SUM

What is DMO?

- What use cases? Which kind of systems?

How does it work?

- Procedure details

How to tune and optimize downtime?

- Aspects for technical downtime of DMO procedure

Tune and optimize downtime

➢ **Downtime** is dominated by migration part

➢ **Migration** is influenced by

    ➢ Number of R3loads configured for downtime

    ➢ Network bandwidth: 10 Gbit/s network card, no firewall

➢ Rule of thumb: migration rate of ~ 300 GB/hours should be possible in standard set up
with an estimated additional 8 hours for the update part, technical downtime can be estimated

⇒ **Task is to optimize number of R3load processes**

➢ Table split calculated by SUM automatically, based on table *size*

    ➢ Keep source database statistic up to date

⇒ **Optimize table split calculation** by providing table *duration files* from previous run

Downtime optimization: overview

➢ **Use Benchmarking** before the DMO run: quick test
Benchmarking focuses on migration (no shadow system)

➢ **Adjust number of R3load processes**
during Benchmarking, and during DMO procedure

➢ **Use the Test Cycle Option**
this allows a fast repetition of only the downtime migration for a test run, no need to start from scratch

➢ **Provide the migration duration** file from previous run:
it lists measured table migration duration, SUM will use this for optimized table split

➢ **Consider downtime optimized techniques:**
  ➢ Downtime-optimized DMO: moves migration partly to uptime
  (for SAP Business Suite systems, currently in pilot phase, SAP Note 2442926)
  ➢ Delta queue cloning (for SAP BW systems)
  ➢ NZDT Service approach (SAP Note 693168)
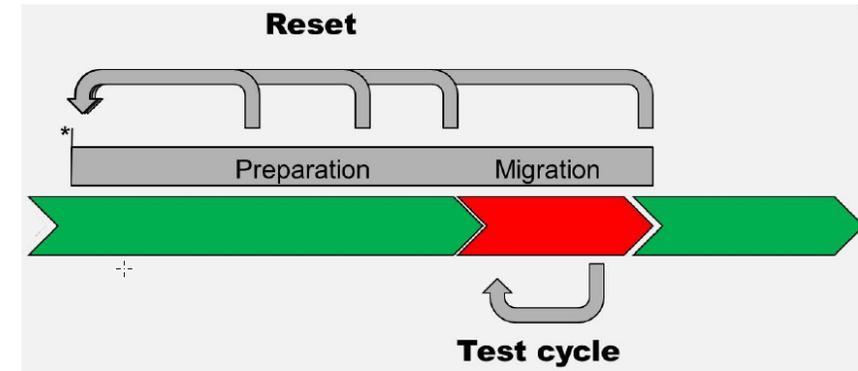
Recommended Procedure

➢ Start with the Benchmarking tool

   ➢ *Export only* mode with 100 % of all tables: log file shows total database size to be migrated

   ➢ *Export only* mode with 10 % of all tables: shows potential bottleneck in source database

   ➢ *Export & Import* mode with 10 % of all tables: first impression on migration rate

   ➢ Vary number of R3loads to find optimum, use migration repetition option (test cycle) for fast repeat

➢ **Continue with DMO**, reuse duration file from benchmarking run, use migration repetition option

➢ See following information source on this:
SCN blog: http://scn.sap.com/community/it-management/alm/software-logistics/blog/2015/12/15/optimizing-dmo-performance

Further Information for DMO of SUM

DMO Guide

- Use the quicklink http://support.sap.com/sltoolset and navigate to the Maintenance section
- SAP First Guidance – Migration BW on HANA using the DMO option in SUM

Blogs on DMO

- Migration to SAP HANA: Overview Video of Database Migration Option DMO
- DMO: introducing the new UI
- DMO: technical background
- DMO: background on table split mechanism
- DMO without software change
- Optimizing DMO Performance
- DMO: optimizing system downtime …
- DMO: table comparison and migration tools
- DMO: Handling table comparison checksum errors
- DMO: introducing the benchmarking tool
- DMO: comparing pipe and file mode for R3load
- DMO: downtime optimization by migrating app tables during uptime (preview)
- Phases behind DMO R3load parallel export/import during UPTIME and DOWNTIME to target HANA DB
- Short history of DMO

Blogs on related topics

- Migration of SAP Systems to SAP HANA
- A better way to migrate your SAP NetWeaver BW from any database to SAP HANA
- Decision Matrix to Choose Best Migration Option of ABAP Systems to SAP HANA
- Software Update Manager (SUM): introducing the tool for software maintenance
- Best Practice Guide – Classical Migration of SAP NetWeaver AS ABAP to SAP HANA
- http://wiki.scn.sap.com/wiki/display/SLGB/Strategy+beyond+SAP+Business+Suite+7+Innovations +2011

Central Release Note
Software Logistics Toolset 1.0 – 1563579

http://service.sap.com/sap/support/notes/1563579

DMO with SUM 1.0 SP 21
https://launchpad.support.sap.com/#/notes/2426315

DMO with SUM 2.0 SP 01
https://launchpad.support.sap.com/#/notes/2532577

SAP Support Portal
quick link: /sltoolset

http://support.sap.com/sltoolset

SAP Community blog on DMO
https://blogs.sap.com/?p=349580

© 2018 SAP SE or an SAP affiliate company. All rights reserved.