

# Enterprise Data Warehousing with SAP NetWeaver BW

Data Aging Strategies on basis of the  
Nearline Storage  
Interface



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# Agenda



## 1. SAP's EDW Approach

### 2. The NLS Interface for BW Release 7.2

- 2.1 Embedding into the semantic Layer
- 2.2 NLS in accordance with the BW Accelerator
- 2.3 TCO Reduction by NLS
- 2.4 Optimizations in the latest Version

### 3. Outlook



**Integrated, scalable EDW platform delivering best practice EDW processes, including **business oriented modeling, reliable data acquisition, streamlined operations and life cycle management****

**Enterprise Data Warehousing**

### Business Oriented Modeling

**Fast, sustainable implementation through**

- Modeling Patterns
- Business Content

### Reliable Data Acquisition

**Openness and data quality through**

- Out-of-the box SAP ETL capabilities
- Integrated with SAP BusinessObjects Data Services (Data Integrator and Data Quality Management)

### Streamlined Operations

**Efficient data management through:**

- Management of data consistency Security:
- Authorization handling
- High availability

### Lifecycle Management

**Enable sophisticated lifecycle management at different levels:**

- System
- Meta Data
- Data (Nearline storage, archiving)

Proven success – > 10.000 Productive BW Systems  
 Across 25+ industries, from small to very large



**Enterprise Business Intelligence**

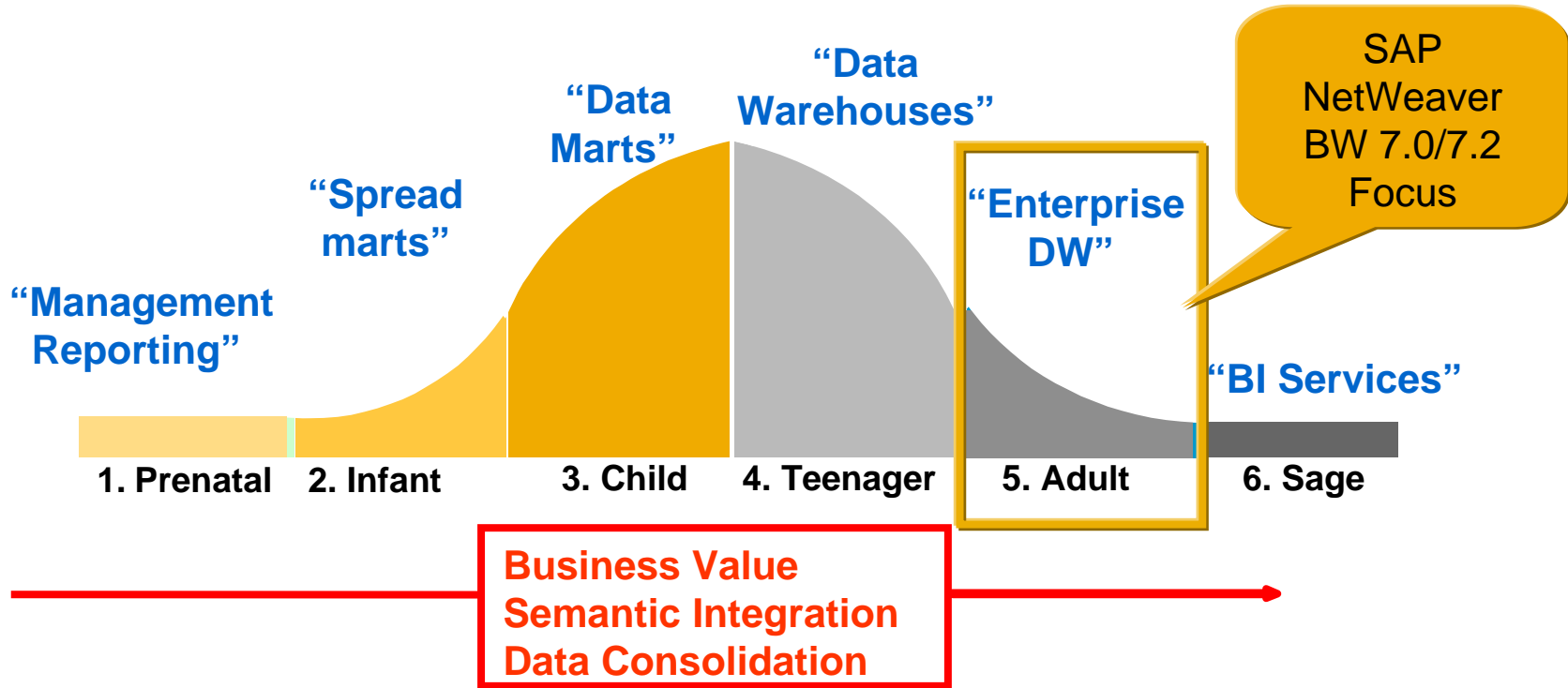


**Business Intelligence Accelerator**



**Business Planning**



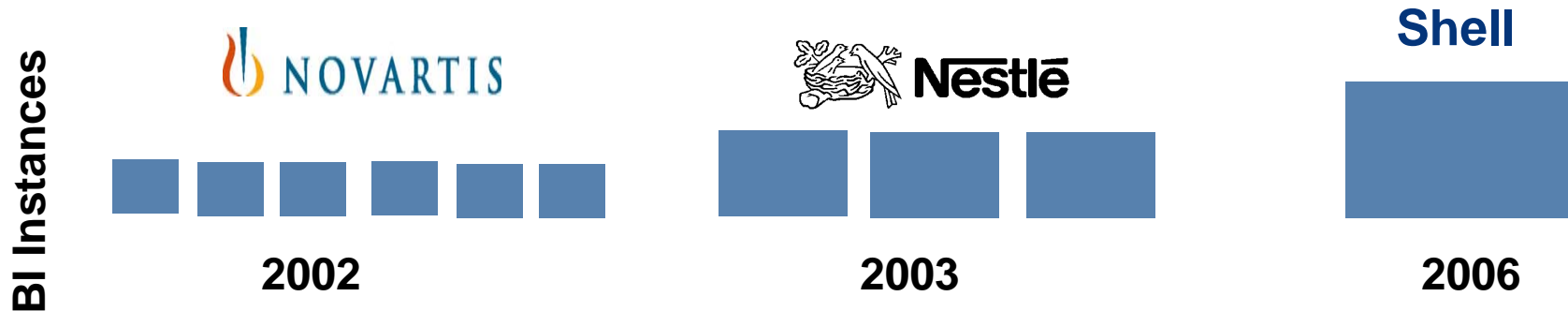


***The TDWI Maturity Model shows how many organizations evolve their BI solutions. The bell shaped curve represents the number of companies in each stage; and the labels above the bell curve represent the data structure dimension in the model.***

**Beyond the Basics: Accelerating BI Maturity**  
Wayne W. Eckerson  
Director, TDWI Research  
The Data Warehousing Institute 2007

**Big, global positioned companies harmonize their operative processes from the very beginning**

- 👉 As a result they (will) have a small number of world-wide spread R/3 / ERP instances (clusters) – Template based
- 👉 This implies that we have in parallel a small number of SAP BW instances (or even just a single one), which tend to become very 'big' ones



👉 **BI landscape consolidation means higher volume has to be managed by a single BI instance what makes a proper data warehouse infrastructure (LSA) even more essential**

# DWH Consolidation - Centralization

## Tools, Architecture, Development, Organization ...

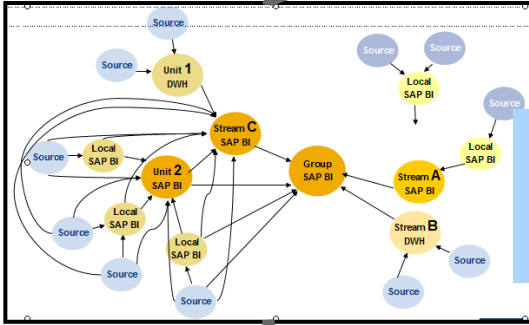


**“Data Warehouses”**

**Tools: SAP BW, BWA, NLS**

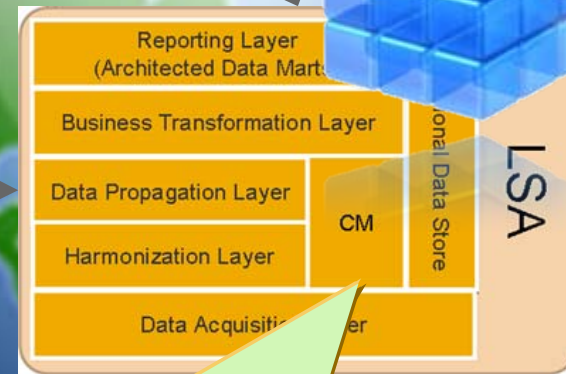
**Architecture & Landscape: Layers and Domains (BW LSA/ BW EDW)**

**“Enterprise DW”**



**Development: Central BW applications template**

**Organization: BI CC Processes**



**Volume-Performance,  
Load-Performance,  
Query-Performance,  
Administration- Performance**

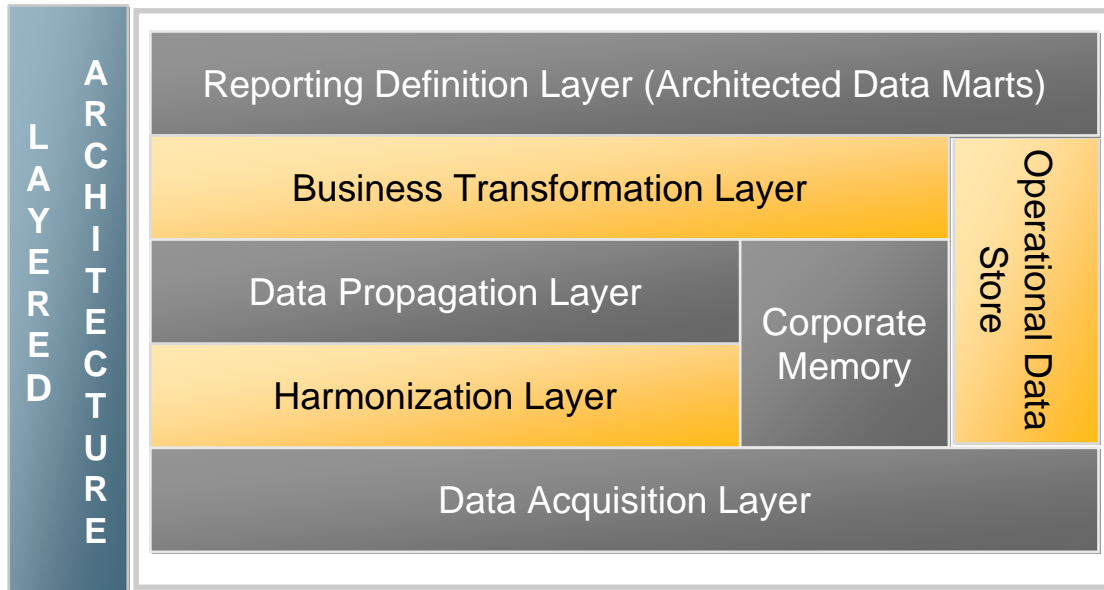
# Business oriented modeling – Improvements today

## Increased SAP Business Content value



### Integrated and enhanced content based on the scalable layered architecture in SAP NetWeaver BW

- Simplified and unified content definition, modeling, and extensions
  - Layered scalable architecture with predefined templates
  - Metrics/KPI and Extractors
- New content spanning across applications



SAP  
NetWeaver BW

# SAP NetWeaver Business Warehouse Release Strategy for BW 7.2 (RTC December 2009)



Integrated, robust EDW platform delivering best practice EDW processes and functionalities, to further enhance performance and Scalability with continued reduction of TCO, TCD

|                                |                       |                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance/<br>Scalability    | Semantic Partitioning | <ul style="list-style-type: none"> <li>■ Performance Enhancements DSOs</li> <li>■ Enhancements for RDA</li> <li>■ Enhancements BW Accelerator in terms of analytical functionalities</li> <li>■ BW Accelerator as a standalone analytical engine (Newton)</li> </ul>                                                                              |
| TCO                            |                       | <ul style="list-style-type: none"> <li>■ Enhanced DataLoad Options</li> <li>■ CTC Templates</li> <li>■ Enhancements ProcessChain (error)handling</li> </ul>                                                                                                                                                                                       |
| TCD                            |                       | <ul style="list-style-type: none"> <li>■ Data flow copy tool</li> <li>■ Data flow migration tool</li> <li>■ Integration SAP NetWeaver BW Metadata into SAP BOBJ Metadata Manager</li> </ul>                                                                                                                                                       |
| Additional new functionalities |                       | <ul style="list-style-type: none"> <li>■ Generic Delta capabilities for further DataSources (UDConnect, DBConnect, FlatFile...)</li> <li>■ Hierarchies integrated into SAP BW 7.0 data flow, DirectAccess for Hierarchies</li> <li>■ HybridProvider</li> <li>■ Transient Provider</li> <li>■ Nearline Storage Support of MultiProvider</li> </ul> |

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# Bill Inmon's Data-Aging Strategies

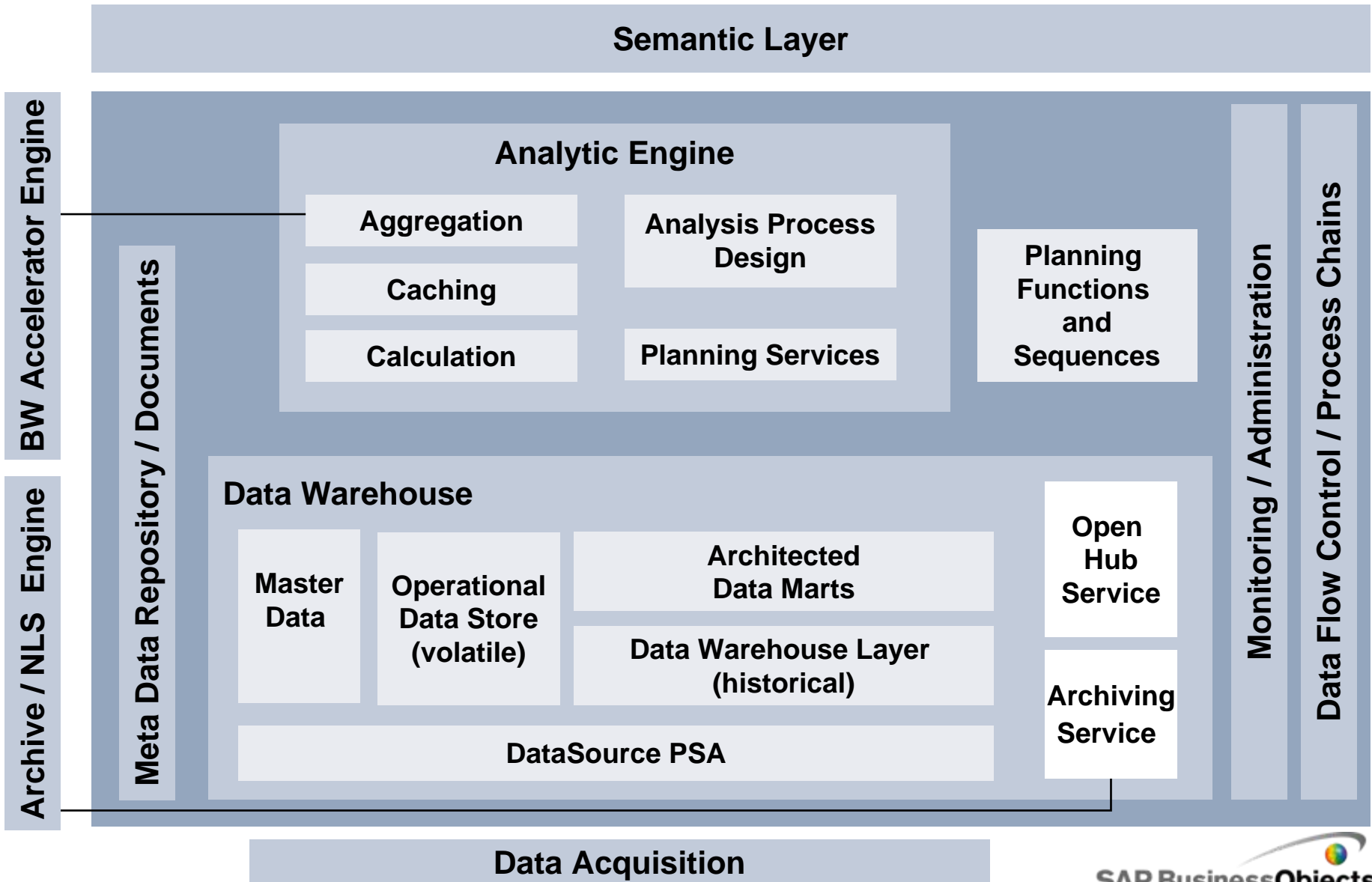
## Information Lifecycle according to Importance/Age



| Storage Type / Data Category            | Online Database | Nearline Storage (read only) | Classic Archive (read only) |
|-----------------------------------------|-----------------|------------------------------|-----------------------------|
| Frequently read / changed data (actual) | ✓               |                              |                             |
| Infrequently read data (mature)         | ✓               | ✓                            |                             |
| Very rarely read data (aged)            | ✓               | ✓                            | ✓                           |

### Nearline Storage (NLS)

- alternative storage types with direct access capabilities for reporting, loading, and look-ups
- extracted partitions are deleted in RDBMS (NLS storage and Online Storage together consistently reflect the BW data persistency of an InfoProvider)
- NLS storage is much more cheaper than DB storage
- NLS partitions of an InfoProvider are write-protected
- NLS is primarily partitioned by time/age

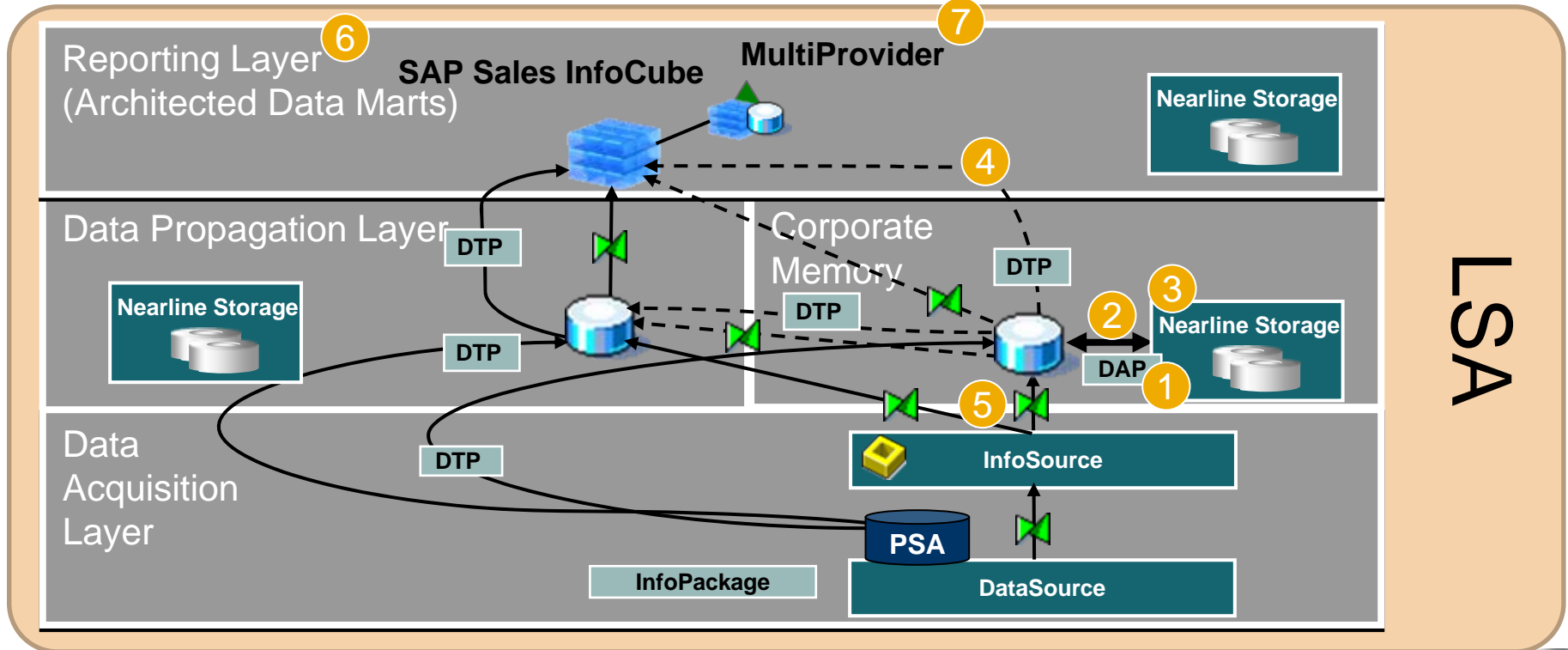


# Data Management with Nearline Storage

## Implementation Aspects



- 1 Create a Data Archiving Process
- 2 Create and schedule archiving requests
- 3 Restore archiving requests
- 4 Load data to subsequent Data Targets
- 5 Look-up during Transformation
- 6 Query Settings
- 7 MultiProvider Settings



# The Nearline Storage Solution for SAP NetWeaver BW



- Based on the Nearline Storage Interface Development Partners can implement their Solutions for Archiving and NLS into the SAP BW
- 3rd Party NLS Solutions
  - are implemented within the SAP BW ABAP Stack in partner specific namespaces
  - have to pass a certification process
  - can offer specific Application Area in the SAP Support Portal
  - have to be licensed in addition to SAP licenses

## Present development partners

(in alphabetical order of their products)

## Certified since SAP BW 7.0

- |                                                     |     |
|-----------------------------------------------------|-----|
| ■ CBW® – <b>PBS Software</b>                        | yes |
| ■ Dynamic Nearline Access® - <b>SAND Technology</b> | yes |
| ■ StorHouse® - <b>FileTek</b>                       | yes |

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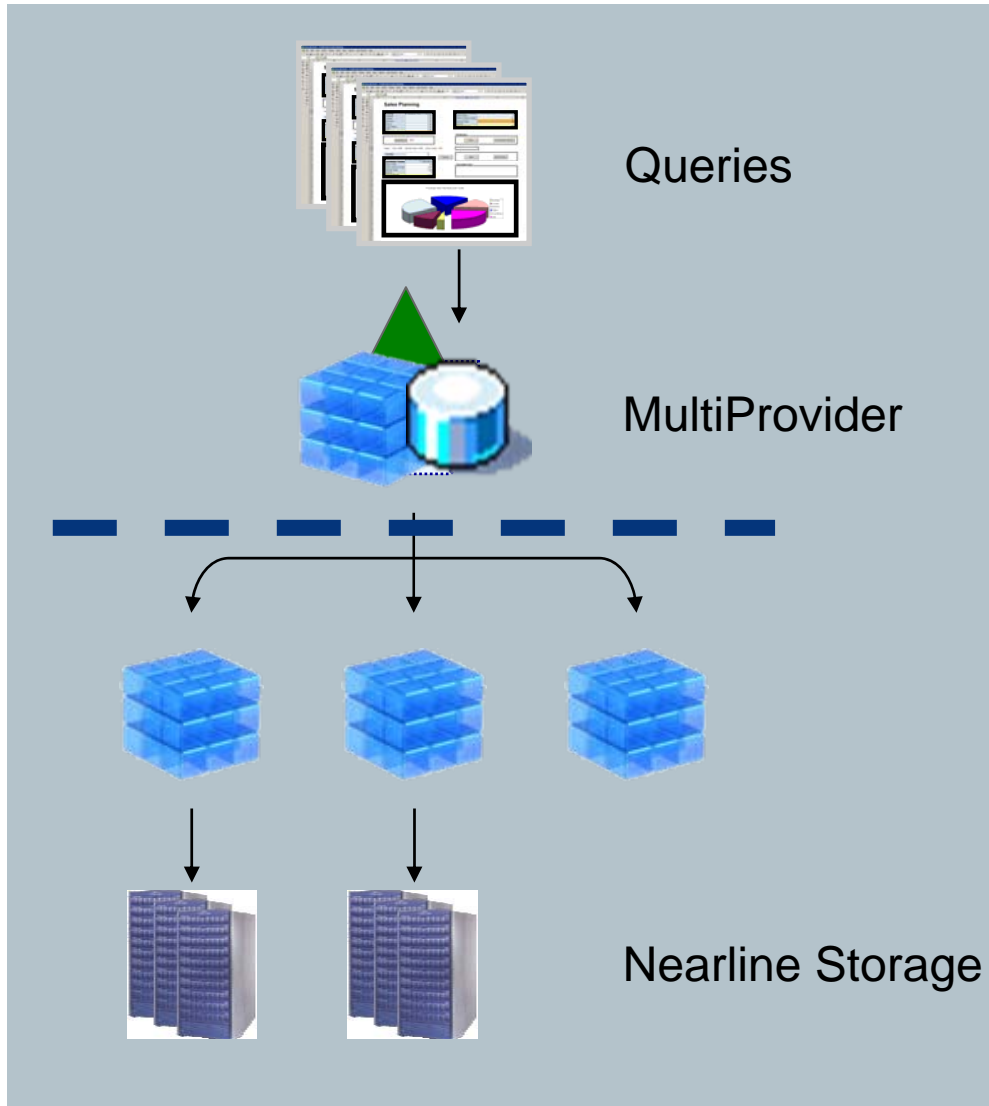
### 2.1 **Embedding into the semantic Layer**

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## Decoupling of Reporting Layer from Persistency Layers

### ■ Recommendation:

Usage of MultiProviders

### ■ Solution with NW 7.2:

Prioritization

- Query Settings (Design time/ Run time)
- MultiProvider Settings
- Basic InfoProvider Settings

### ■ Availability:

Ramp-Up to customer (RTC) planned for Q4/2009

# NLS Related MultiProvider Settings

The screenshot shows the SAP MultiProvider configuration environment. The 'Extras' menu is open, and 'InfoProvider Properties' is selected, leading to the 'InfoProvider: Edit Properties' dialog. The 'Query / Cache' tab is active, showing various settings for the InfoProvider 'OSBOOK\_M'. The 'Near-line Readmode' dropdown is highlighted with a yellow circle, showing options: 'Near-line Access as set for InfoProviders', 'Near-line Access disabled (Default)', 'Near-line Access enabled', and 'Near-line Access as set for InfoProviders'. The 'Near-line Access as set for InfoProviders' option is selected.

| Property           | Value                                                   |
|--------------------|---------------------------------------------------------|
| InfoProvider       | OSBOOK_M                                                |
| Description        | OSBOOK_M                                                |
| Read Mode          | H Query to Read When You Navigate or Expand Hierarchies |
| Cache Mode         | 1 Main Memory Cache Without Swapping                    |
| Persistence Mode   | 0 Inactive                                              |
| Data Integrity     | <input type="checkbox"/>                                |
| Near-line Readmode | Near-line Access as set for InfoProviders               |
| Delta Cache        | <input checked="" type="checkbox"/>                     |
| Delta Cache Class  | ICL_RSD_DC_SUPPORT_CHANGE                               |

## Nearline Read Mode

- disabled at all
- enabled at all
- InfoProv settings

# NLS Related Query Designer Settings: Fixed value



**Fixed NLS Settings**

- read NLS
- do not read NLS
- see provider settings

**Eigenschaften**  
ABC Analyse - Lieferanten (Query)

Allgemein | Variablenreihenfolge | Darstellung | Zeilen/Spalten  
Wertdarstellung | Planung | Erweitert

**UID**  
4CIA54JMDA4QXLFQJL46HGY84

**Freigabe für OLE DB for OLAP**  
 Externen Zugriff auf diese Query zulassen

**Data actuality**

**Use Near Line Storage (NLS)**  
Nearline-Storage lesen  
Nearline-Storage lesen  
**Nearline-Storage gemäß Providereinstellung nutzen**  
Nearline-Storage nicht lesen

# NLS Related Query Designer Settings: Variable

**Eigenschaften**  
ABC Analyse - Lieferanten (Query)

Allgemein | Variablenreihenfolge | Darstellung | Zeilen/Spalten  
Wertedarstellung | Planung | Erweitert

**UID**  
4CIA54JMDA4QXLFQJL46HGY84

**Freigabe für OLE DB for OLAP**  
 Externen Zugriff auf diese Query zulassen

**Data actuality**

**Use Near Line Storage (NLS)**

**Werteingabe**  
Neue Variable  
Variable ändern...  
Entfernen

**Variable NLS Settings (Dialog)**

- read NLS
- do not read NLS
- see provider settings

**Variable ändern**

Währung/Einheit | Erweitert  
Allgemein | Ersetzungspfad | Details | Vorschlagswerte

**Beschreibung**  
NLS Zugriff  
 Standardtext benutzen

**Technischer Name**  
VAR\_NLS

**Globale Einstellungen**  
Variablentyp  
Merkmalswert  
Verarbeitung durch  
Manuelle Eingabe/Vorschlagswert  
Bezugsmerkmal  
NearLine Storage

Letzte Änderung  
Eigentümer: SCHLACHTERR  
Letzter Änderer: SCHLACHTERR  
Datum/Zeit: 6/16/2009 3:59:22 PM

OK Cancel

## Statistics Data for Query Runtime

Frontend/Calculation Layer    Aggregation Layer

| Step UID   | Ha... | Han... | Data Mana... | Acc... | InfoProvider | Basis Provi... | Aggregate    |
|------------|-------|--------|--------------|--------|--------------|----------------|--------------|
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   | 1      | 0SBOOK_M     | 0SBOOK_B       | 0SBOOK_B     |
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   | 2      | 0SBOOK_M     | 0SBOOK_B       | 0SBOOK_B     |
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   | 3      | 0SBOOK_M     | 0SBOOK_DS      | 0SBOOK_DS    |
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   | 4      | 0SBOOK_M     | 0SBOOK_...     | 0SBOOK_DS\$N |
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   | 5      | 0SBOOK_M     | 0SBOOK_B...    | 0SBOOK_B\$N  |
| 7KU36CW... | 4     | OLAP   | 7KU36CW...   |        | 0SBOOK_M     |                |              |

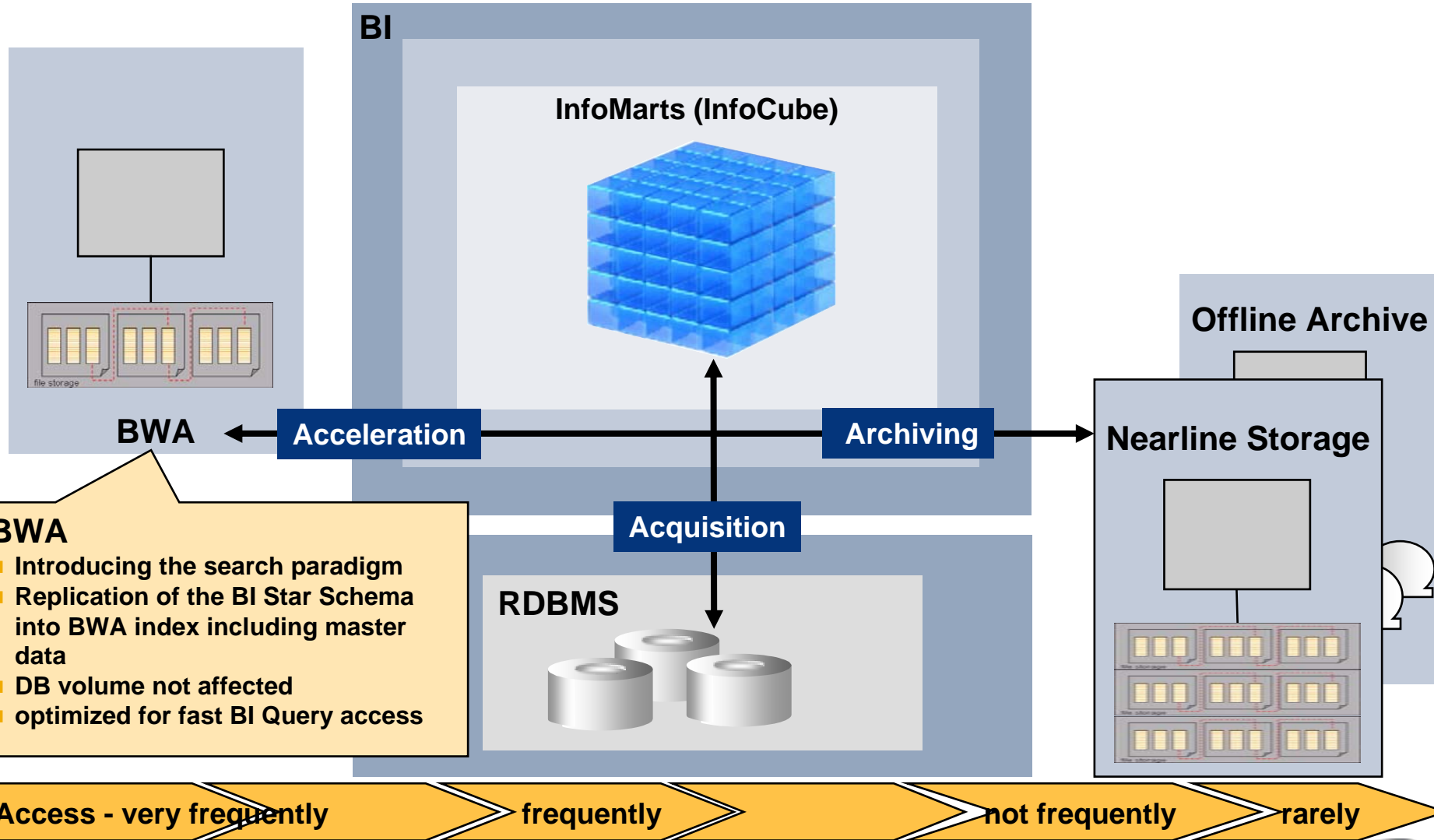
**Listing of Basis Providers and Aggregates used during Query execution**

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# Design Aspects – Nearline Storage vs. BW Accelerator



**BWA**

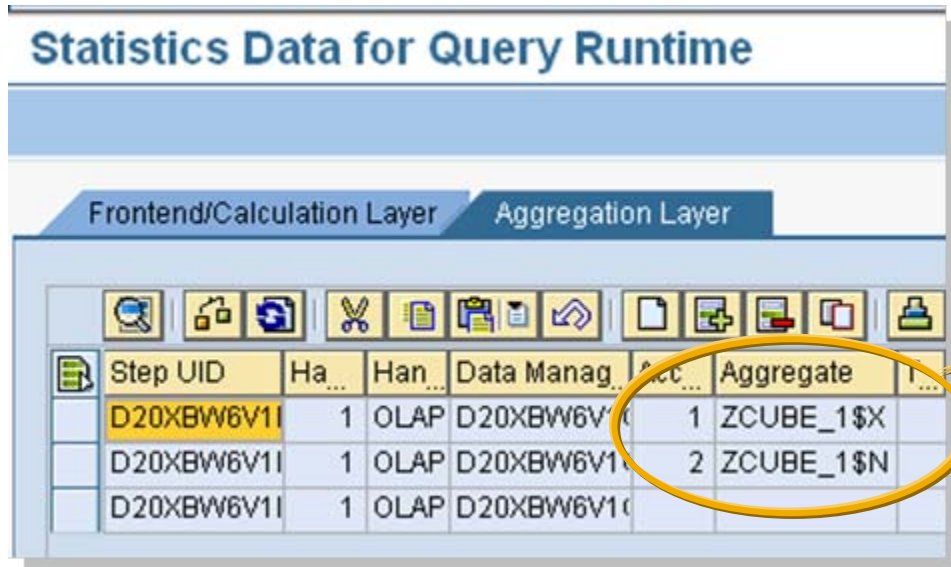
- Introducing the search paradigm
- Replication of the BI Star Schema into BWA index including master data
- DB volume not affected
- optimized for fast BI Query access

The Data Manager identifies the availability of alternative data storage of any kind at query runtime, such as

1. Data is in the InfoProvider in the database
2. Data is in a classical aggregate
3. Data is in the BW Accelerator Index
4. Data is in a NLS partition

### Statistics Data for Query Runtime

Frontend/Calculation Layer    Aggregation Layer



| Step UID   | Ha... | Han... | Data Manag... | Acc... | Aggregate  | I... |
|------------|-------|--------|---------------|--------|------------|------|
| D20XBW6V1I | 1     | OLAP   | D20XBW6V1I    | 1      | ZCUBE_1\$X |      |
| D20XBW6V1I | 1     | OLAP   | D20XBW6V1I    | 2      | ZCUBE_1\$N |      |
| D20XBW6V1I | 1     | OLAP   | D20XBW6V1I    |        |            |      |

## Aggregate Types

- BWA Index
- NLS Partition

During the delete phase of the archiving request the new setup of the BWA index is offered

The screenshot shows the 'Request verarbeiten' dialog box in SAP. The 'Aktion' section is expanded, showing several options. The option 'BWA-Index neu aufbauen' is checked and highlighted with a yellow circle. A yellow callout bubble points to this option with the text 'BWA consistence reflected during DAP processing'. Other options include 'Fortsetzen/wiederholen bis Zielstatus', 'Autom. Request-Invalidierung nach Fehler', 'Entsperren', 'Zurückladen', 'Auch nachfolgende Request... skladen', and 'Ungültig setzen'. The 'Jobname' field contains 'BI\_ARCH' and there is a 'Selektion' button. At the bottom, there are buttons for 'Auffrischen', 'Im Hint...', 'Im Dialog', and 'ADK Archivadministration'.

|                                                                |                                                   |                                           |
|----------------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| Datenarchivierungsprozeß                                       | 0EPM_C02                                          | Abgeschlossene Bestellungen (NW Demo EPM) |
| Request-Typ                                                    | ARCH                                              | Archivierungsrequest                      |
| Request                                                        | 48.522                                            |                                           |
| Aktueller Request-Status                                       | 40 Schreibphase erfolgreich beendet               |                                           |
| <b>Aktion</b>                                                  |                                                   |                                           |
| <input type="radio"/> Fortsetzen/wiederholen bis Zielstatus    | 70 Löschphase bestätigt und Request abgeschlossen |                                           |
| <input type="radio"/> Autom. Request-Invalidierung nach Fehler | Keine                                             |                                           |
| <input checked="" type="checkbox"/> BWA-Index neu aufbauen     |                                                   |                                           |
| <input type="radio"/> Entsperren                               |                                                   |                                           |
| <input type="radio"/> Zurückladen                              |                                                   |                                           |
| <input type="checkbox"/> Auch nachfolgende Request... skladen  |                                                   |                                           |
| <input type="radio"/> Ungültig setzen                          |                                                   |                                           |
| Jobname                                                        | BI_ARCH                                           | Selektion                                 |
| <input checked="" type="checkbox"/> Auffrischen                | <input type="checkbox"/> Im Hint...               | <input type="checkbox"/> Im Dialog        |
| ADK Archivadministration                                       |                                                   |                                           |

**BWA consistence  
reflected during  
DAP processing**

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Integrated, robust EDW platform delivering best practice EDW processes and functionalities, to further enhance performance and Scalability with continued reduction of TCO, TCD

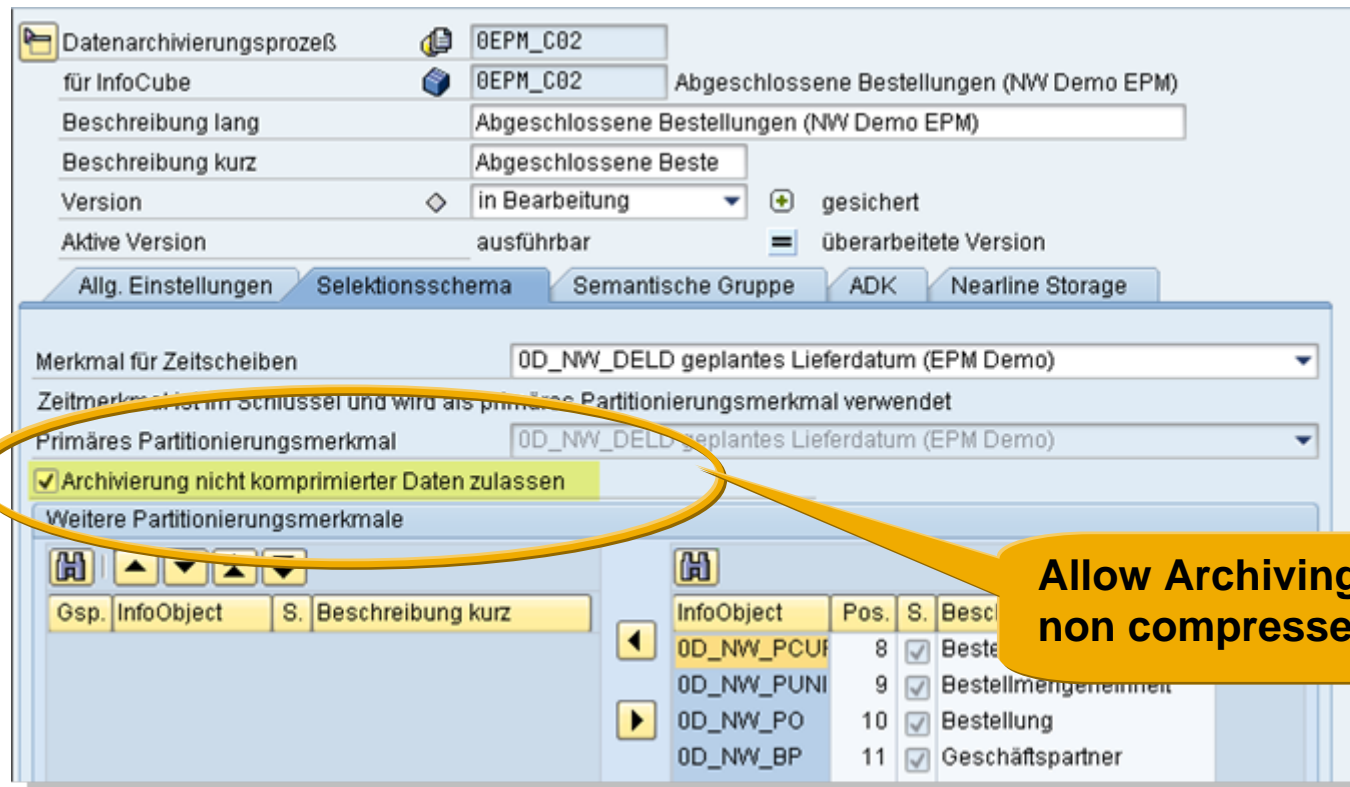
## Total Cost of Ownership

### Nearline Storage Aspects

- License costs for NLS less than total costs for DB storage (est. 100.000 €per TB and year)
- Allow archiving for non compressed InfoCube data
  - Scenario specific demand for archiving of non compressed data
  - Platform specific demand (problems with mass deletion during compression)

### Central Setting in Data Archiving Process (DAP)

- Valid for all archiving requests and DAP variants
- Can be changed during operation
- Prerequisite: only already processed requests (aggregates, delta DTP)



Datenarchivierungsprozeß

für InfoCube  Abgeschlossene Bestellungen (NW Demo EPM)

Beschreibung lang

Beschreibung kurz

Version

Aktive Version ausführbar

Allg. Einstellungen Selektionsschema Semantische Gruppe ADK Nearline Storage

Merkmal für Zeitscheiben

Zeitmerkmal ist im Schlüssel und wird als primäres Partitionierungsmerkmal verwendet

Primäres Partitionierungsmerkmal

Archivierung nicht komprimierter Daten zulassen

Weitere Partitionierungsmerkmale

| Gsp. | InfoObject | S.   | Beschreibung kurz                   |                      |
|------|------------|------|-------------------------------------|----------------------|
|      | InfoObject | Pos. | S.                                  | Beschreibung kurz    |
|      | 0D_NW_PCUF | 8    | <input checked="" type="checkbox"/> | Beste                |
|      | 0D_NW_PUNI | 9    | <input checked="" type="checkbox"/> | Bestellmengenmerkmal |
|      | 0D_NW_PO   | 10   | <input checked="" type="checkbox"/> | Bestellung           |
|      | 0D_NW_BP   | 11   | <input checked="" type="checkbox"/> | Geschäftspartner     |

**Allow Archiving for non compressed data**

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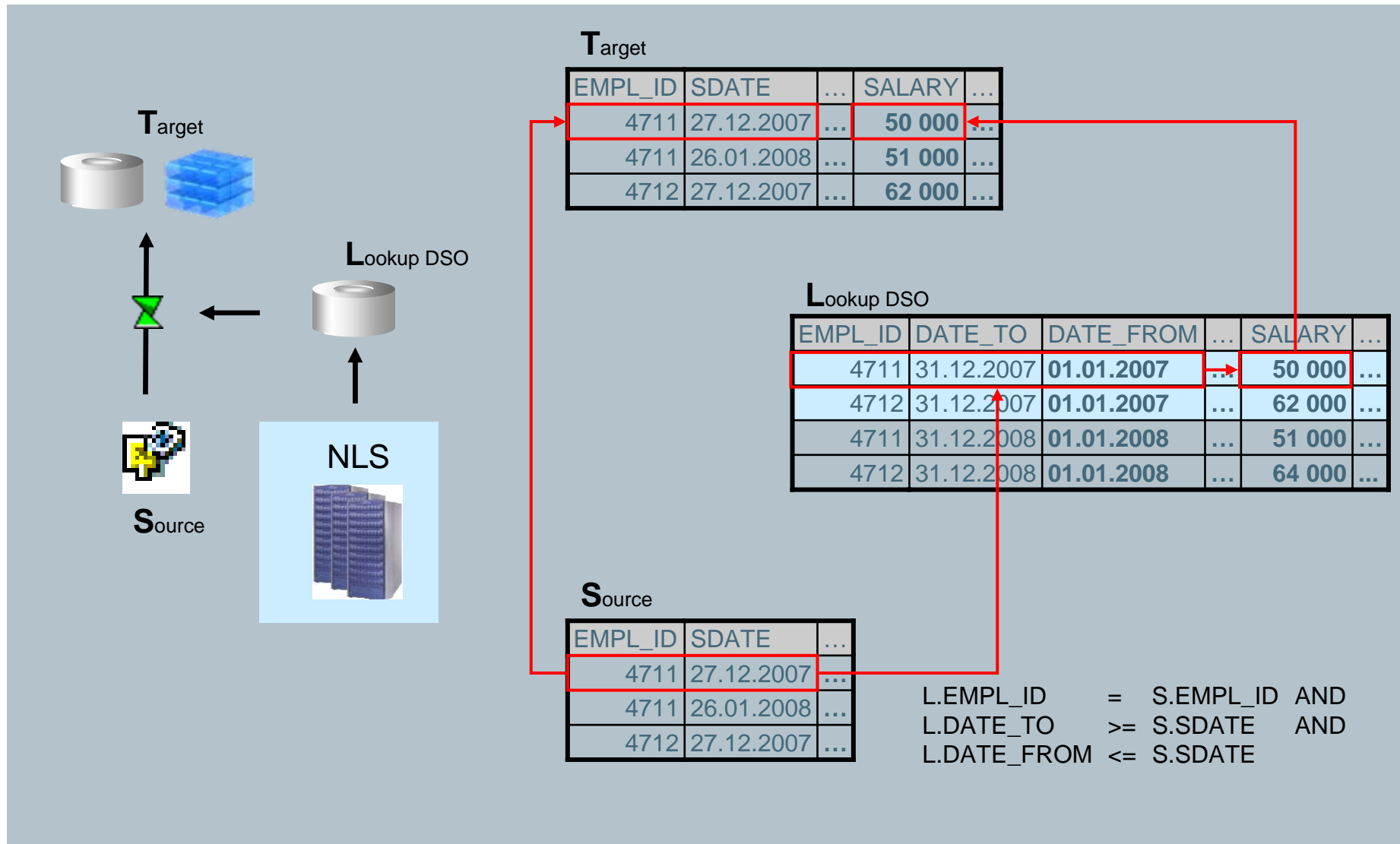
## Enhanced Look-Up API

- Available with SAP NetWeaver BW 7.0 Support Package 10  
See SAP note 985609 and related notes for details
- Performance optimized temporal Look-Up (e.g. key date selection for time-dependant Data Store Objects (DSO))  
See SAP notes 1154026/1167489/1167490  
Available with SAP NetWeaver BW 7.0 Support Package 21
- Partner Solution has to be adapted in order to make the optimization effective
- Optimization effects only the SAP/Partner interface and is transparent for the API call

## Optimized Support for Navigational Attributes during Query processing on NLS

- Navigational attributes can be used to navigate/filter in queries without any problems
- Available with SAP NetWeaver BW 7.2

# Temporal Look-Up of Nearline Data



## Optimized Support for navigational attributes during Query processing on NLS

- Navigational attributes are master data attributes that can be used to navigate/filter in queries. Master data attributes are located outside the InfoCube persistence in the extended star schema and thus are not a component of the NLS data stock.
- Previous solution:
  - Selections for navigational attributes were not transferred to NLS as selections...
  - The attribute values were assigned subsequently and filtered in the result set
  - Performance problems for highly selective attribute values
- Improvement:
  - Selections for navigational attributes are converted first to a selection for the characteristic bearing attributes (max. 100 characteristic values)
  - The attribute selection is replaced by this characteristic selection in the query selection.

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## Medium term

- Combined DTP extraction from online and archive partition of an InfoCube (BW 7.3)
- End of life scenario for NLS data ('destroy')

## Long term

- Archiving of InfoCubes with non-cumulative key figures
- Archiving of master data and hierarchies
- NLS support for InfoSets
- ...

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