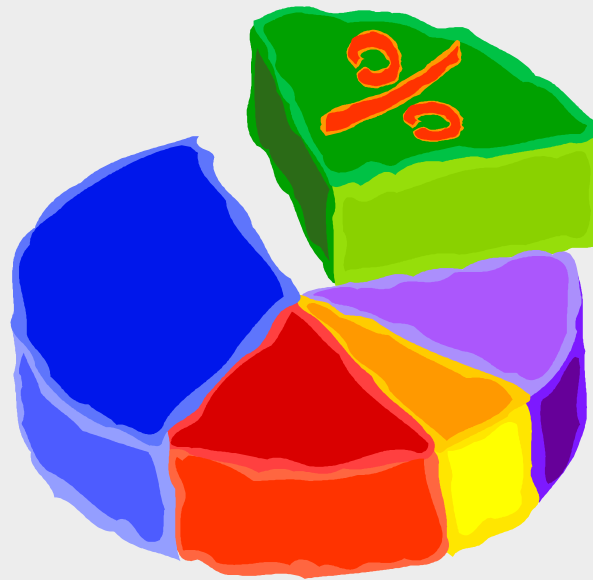


# SAP BW

Lesson 11 : Performance Tuning and Optimization

# BI Statistics



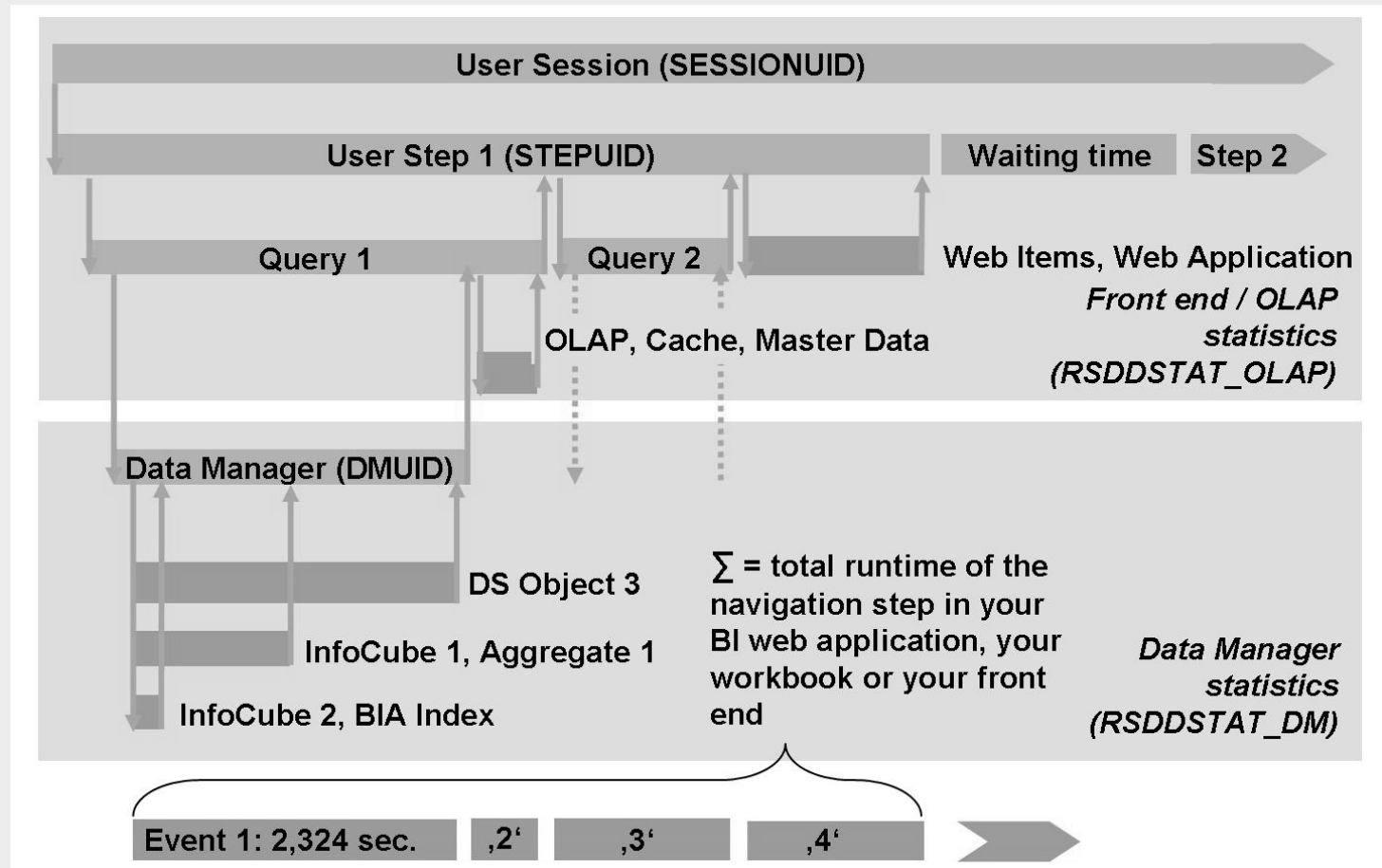


# BI Statistics

- BI statistics are delivered as part of technical content.
- Provides options to evaluate data from both the OLAP processor and warehouse management.
  - Get an overview of how InfoProviders, InfoObjects, InfoSources, Source systems, queries, and aggregates are used.
  - Determine the system performance and improve it.
  - Improve the way in which aggregates are selected and used and reduce the cost of updating them.



# BI Statistics: "Measuring Performance"





# BI Statistics: How to Capture after installing BI Content?

**Maintenance of Statistics Properties**

**Scheduled deletion of statistics data (on time basis) also: automatic deletion during delta load**

**For Queries, InfoProviders, Web Templates, Workbooks and DTPs**

**Switch Statistics data collection on or off**

Query Name	InfoProvider	Author	Last Changed	Statistics On/Off	OLAP Detail Level
ZCRM_IS02_Q0002_4	0CRM_IS02	STUEHLMMEYER	30.07.2005 18:1...	X	2
0CSRVMC05_Q0103	0CSRVM		2003 18:1...	D	
0CRM_IBCO_Q0103	0CRM_IB		2003 18:3...	D	
0QM_C06_Q001	0QM_C0		2003 16:2...	D	
0SAL_DS01_Q0003	0SAL_DS01	LINW	31.05.2005 15:3...	X	1
0MEMAMC11_Q0002	0MEMAMC11	LINW	13.03.2002 16:0...	D	
0MKTG_C01_Q0005	0MKTG_C01	SALESMAN	09.08.2005 05:1...	D	
0METL_C02_Q0003	0METL_C02	LINW	31.03.2004 17:0...	D	
0IPM_C01_Q0039			17:4...	D	

**Set the statistic detail level**  
,0' = Aggregated data only  
,1' = No detail on data manager  
,2' = Detail on all levels

...accessible from the Data Warehousing Workbench → Tools  
or using transaction RSDDSTAT



## Maintenance of Statistics Properties

Information
Delete Statistical Data

Query
InfoProvider
Web Template
Workbook

Replace Values
Settings: D Default
0 Aggregated Data

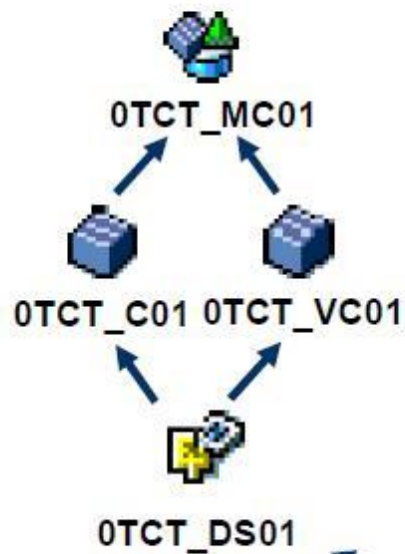
Icons: Save, Print, Copy, Paste, Undo, Redo, Find, Filter

InfoProvider	Object Type...	InfoArea	Author	Last Changed	Status...	OLA...	Chan...
Default Value	IPRO			00.00.0000 00:0...	D		<input type="checkbox"/>
ABCDEFGH	ODSO	ABCDEFGHJKLMNOPQR	IDADMIN	07.07.2011 08:1...	D		<input type="checkbox"/>
ARUN_ODS	ODSO	ARUN_IA	DEVELOPER	20.06.2011 13:5...	D		<input type="checkbox"/>
DSO_01	ODSO	IA_SHIVA	DEVELOPER	23.05.2011 14:0...	D		<input type="checkbox"/>
DSO_BP	ODSO	IA_BP	DEVELOPER	26.04.2011 08:2...	D		<input type="checkbox"/>
DSO_BP1	ODSO	IA_BP	IDADMIN	09.05.2011 08:5...	D		<input type="checkbox"/>
DSO_R3	ODSO	IA_BP	DEVELOPER	24.05.2011 11:3...	D		<input type="checkbox"/>
SOLDT0	ODSO	LEVITEST123	DEVELOPER	10.05.2011 12:3...	D		<input type="checkbox"/>
SOLDT02	ODSO	LEVITEST123	DEVELOPER	11.05.2011 14:2...	D		<input type="checkbox"/>
TEST_DSO	ODSO	IA_DEMO_KESKO	IDADMIN	13.06.2011 09:2...	D		<input type="checkbox"/>
TODS1	ODSO	PBTINFOAREA	DEVELOPER	26.04.2011 13:1...	D		<input type="checkbox"/>

# Query Runtime Statistics

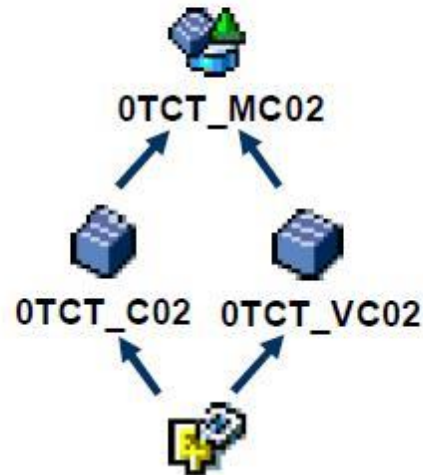


## Front-End and OLAP Statistics (Aggregated)



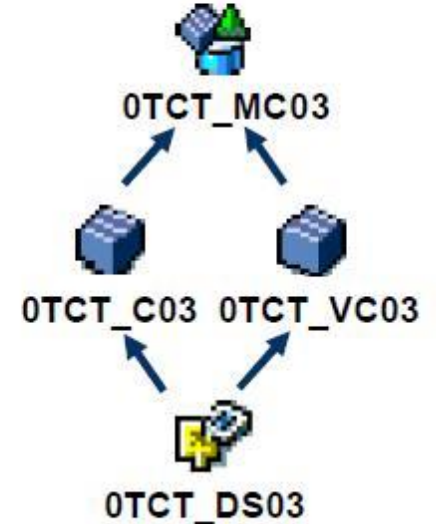
RSDDSTAT\_OLAP  
(database view)

## Front-End and OLAP Statistics (Details)



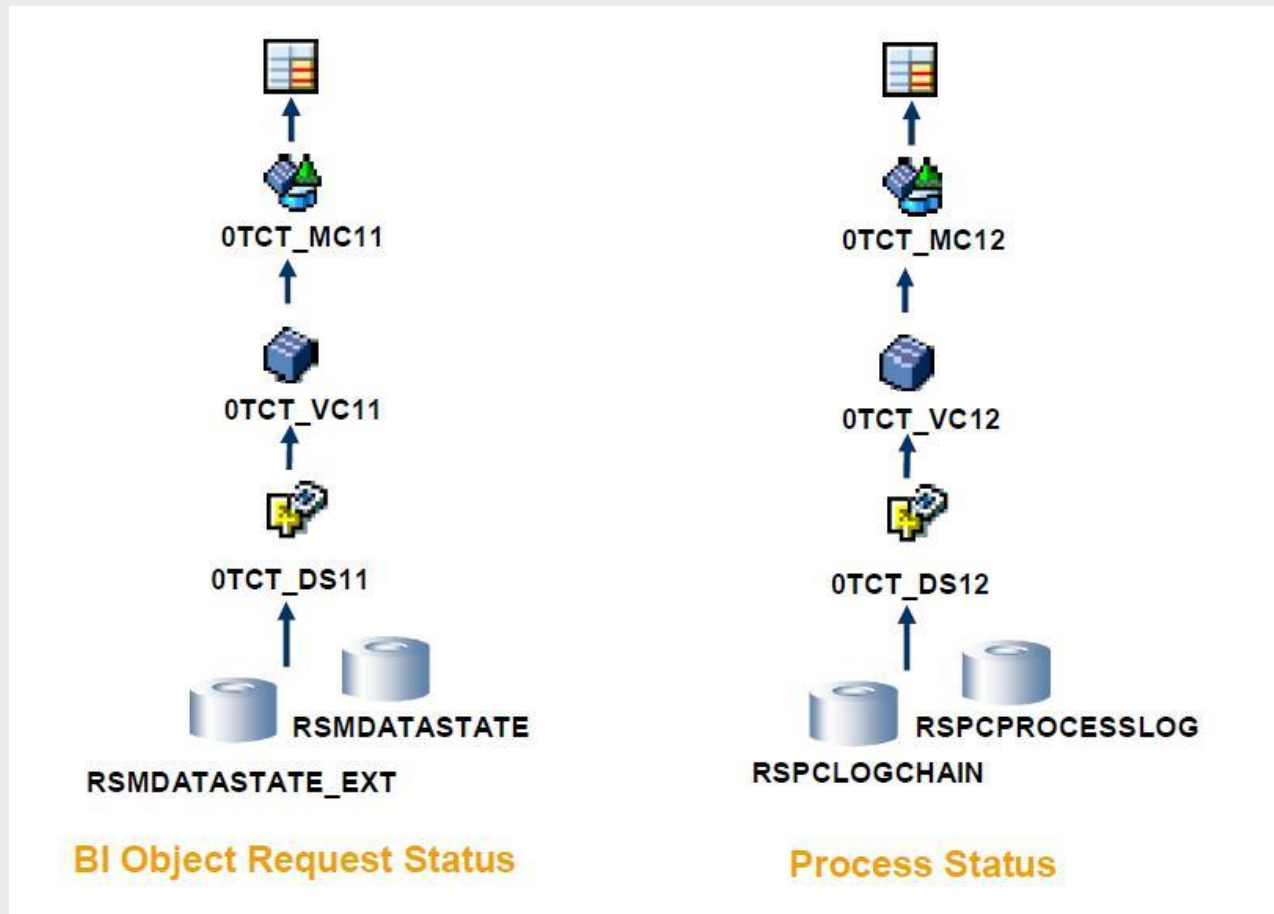
OTCT\_DS02

## Data Manager Statistics (Details)



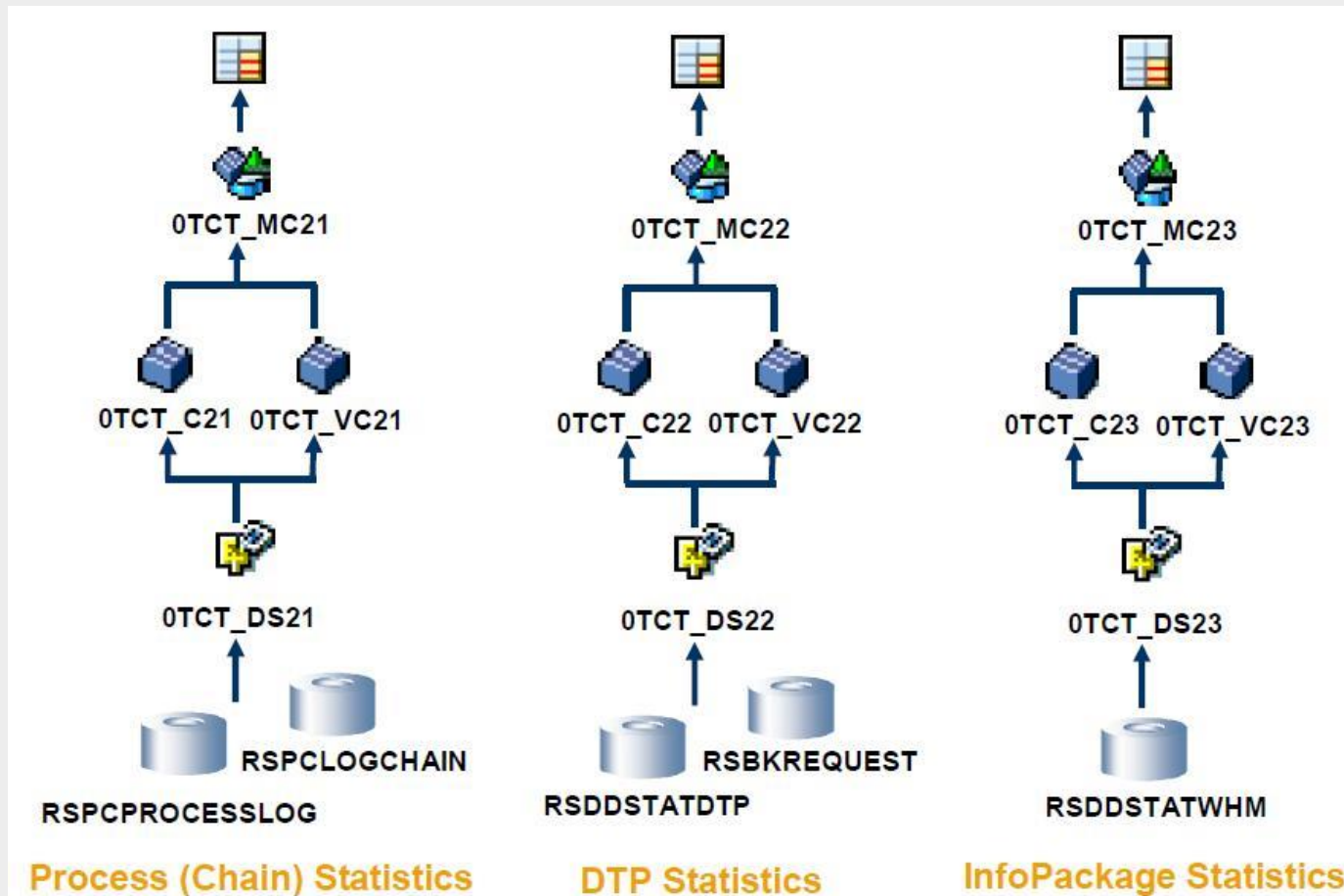
RSDDSTAT\_DM  
(database view)

# Data Load Status Statistics





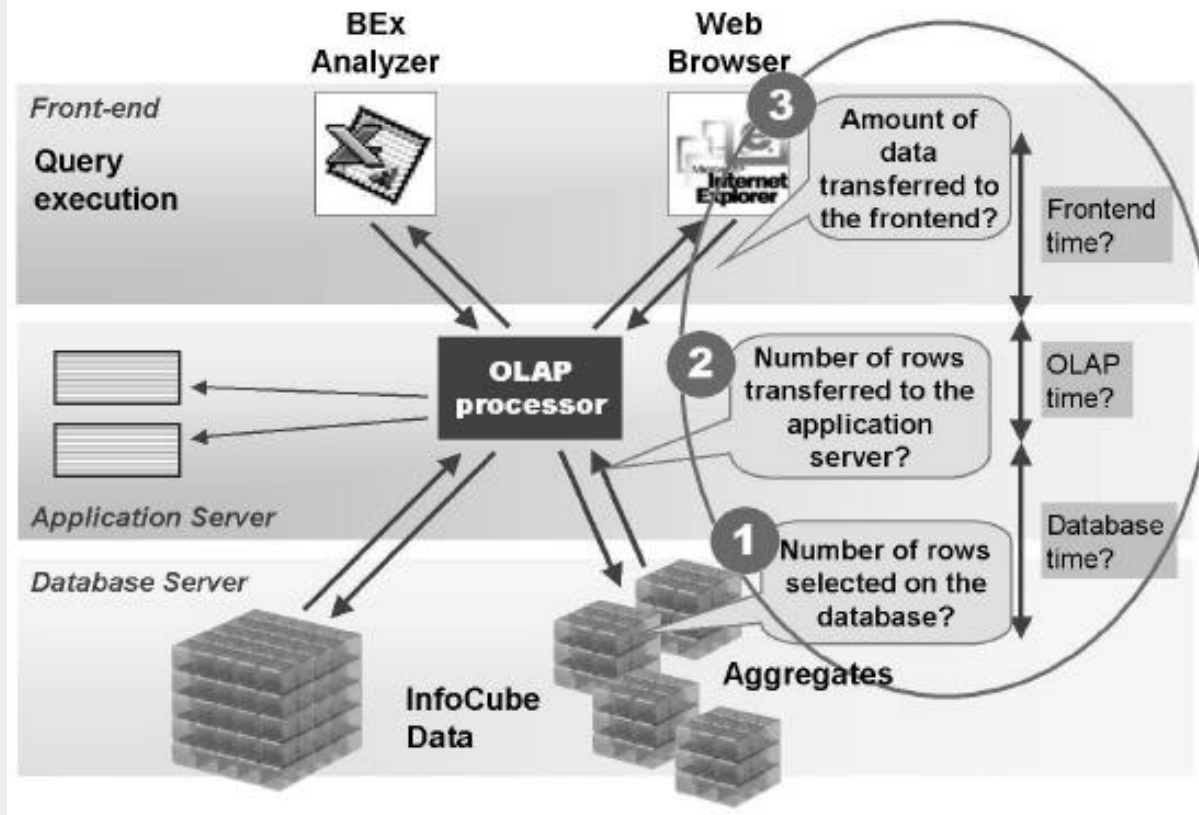
# Data Load Statistics



# BI Statistics: Example



## Statistics for Queries





# BI Statistics: Tables

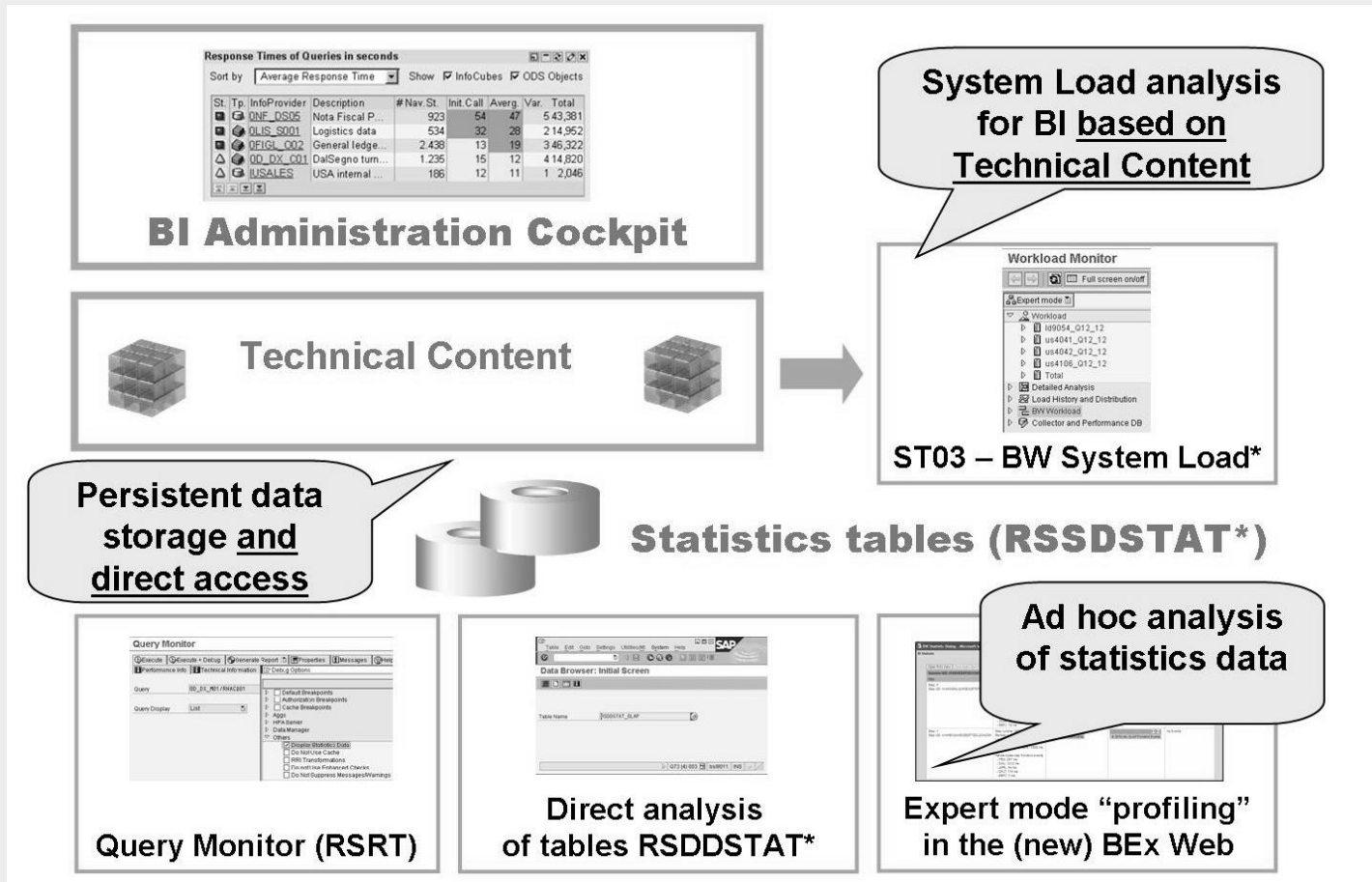
➤When query is executed, data related to query execution are stored in different RSDDSTAT tables. By using these statistical data we can analyze system performance.

➤These tables then become a source of data for technical content datatargets.

Table Name	Short text
RSDDSTST	Statistics data BW for aggregate selection
RSDDSTATAGGR	Statistics data BW for aggregate selection
RSDDSTATAGGRDEF	Statistics data OLAP: Navigation step / ag
RSDDSTATBCACT	BW Statistics: Activate Business Content
RSDDSTATCOND	BW Statistics: Data on Condensing Run Info
RSDDSTATDELE	BW Statistics: Data on Deletion of Data in
RSDDSTATEXTRACT	Extractor BW statistics: Time of last delt
RSDDSTATLOG	BW statistics – Sequense of events for DEB
RSDDSTATWHM	Statistics Data: BW for Warehouse Management



# Analysis of BI Stats using Tech. Content





# BI Admin Cockpit: Install/Customize/Use

RSTCC\_INST\_BIAC - Install  
RSTC\_CUST\_BIAC - Customize

Modeling

Administration

Process Chains

BI Administration Cockpit

Monitors

Central access to most important BI monitoring information

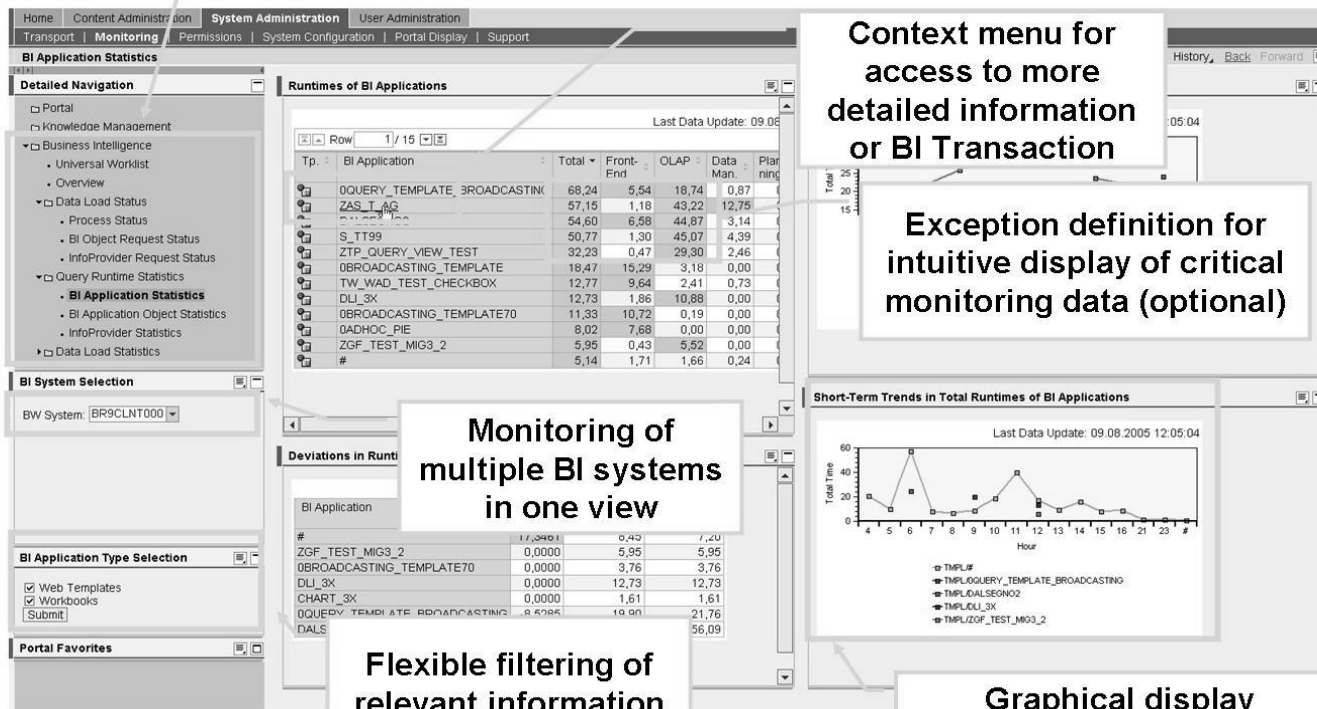
Context menu for access to more detailed information or BI Transaction

Exception definition for intuitive display of critical monitoring data (optional)

Monitoring of multiple BI systems in one view

Flexible filtering of relevant information

Graphical display





# “Trace” Tool: RSTT: log activity

- The trace tool, RSTT, Capabilities:
- Log and play back traces (trace Tool).
- Process automatic regression tests (Computer Aided Test Tool).
- Link to query Monitor , RSRT

# "Trace" Tool: RSTT: log activity



**RS Trace Tool User Activation**

Basic Settings | TRAIN06 Activate | Activate | Deactivate | RSRT

**Trace Tool**

- User Activation
- Traces
- Trace Collection
- Standard Packages
- Standard Jobs

**User Selection**

Trace User  
Restricted User

User

Trace User | Re:

**RS Trace Tool Wizard**

Basic Settings | Wizard

**Trace Tool**

CATTtool

- Wizard
- CATT Traces
- Test Packages
- Test Jobs

**Trace Selection**

Trace (ID) [Yellow Input Field]

Description

**History of Last Traces**

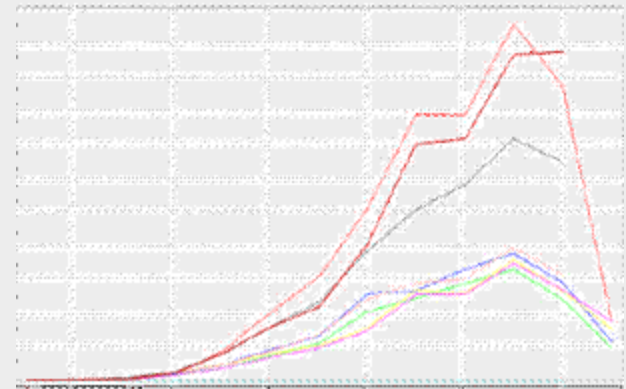
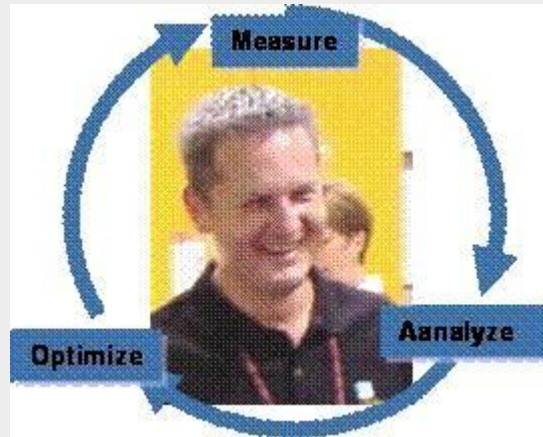
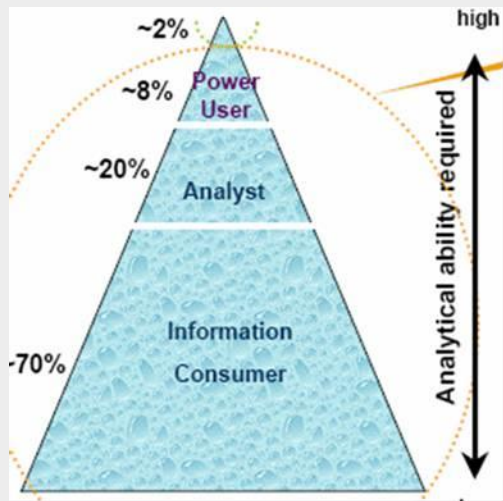
Trace (ID)	Description
------------	-------------



# Performance Tuning – part 1



# Performance Tuning – v1.0





# Purpose

- Performance management is the prime concern of any Data warehouse project, as system performance is directly related to degree of user acceptance of the solution, as well as the overall effectiveness of its analytical capabilities.
- System performance should be reviewed and measured at every level of project phase using the right quantitative tools.
- Proactive operational maintenance measures cycle should be considered as on going cycle.



➤Performance analysis allows you to evaluate various aspects to improve the efficiency of the existing BW system with respect to the following:

- Most frequently accessed data
- Identify the key BW users
- Response time of BW reports

➤Performance tuning helps to improve the efficiency of existing BW system with the help of various tools provided by SAP.

➤The Business content InfoCubes and queries enable easier and faster performance analysis.



# Challenges

- Selection between available options for improving system performance is critical.
- Critically test the new solution before implementing it in the 'live' system.
- Performance tuning may require upgrade of system hardware/software hence one needs to consider their financial implications.
- Performance tuning activities may require system downtime. Hence it is critical to time these activities in order minimize inconvenience to end-users.



# Performance Tuning

- Strategies for maintaining 'optimum system performance' must be developed, at every step, while implementing a BI solution as it is the most critical element of acceptance of the solution by the end-users.
  
- The four areas which could be targeted while implementing any performance tuning measure in a BW system are:
  - Data Model
  - Data Extraction
  - Data Loading
  - Reporting



# Golden Rules for Performance

➤The three golden rules of performance optimization at any level in a Data Warehouse are:

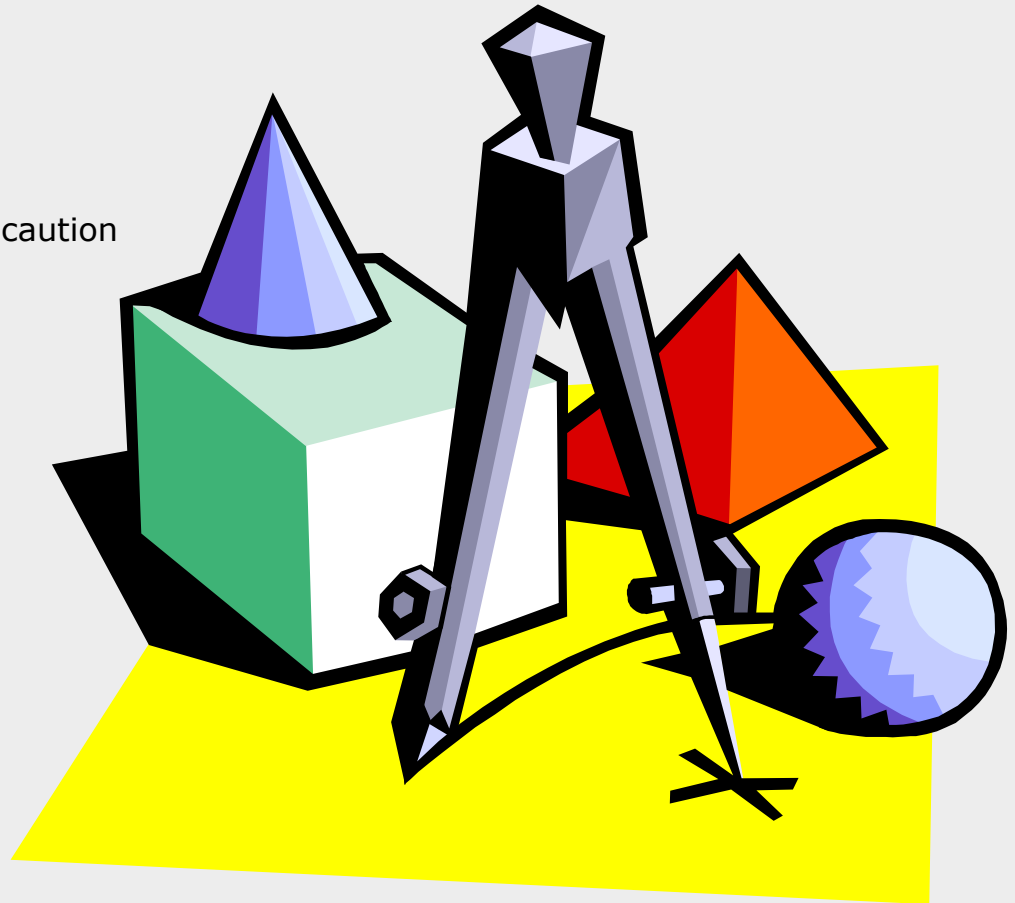
- Be economic: Eliminate all unnecessary process
- Keep it small: Reduce the data volume to be processed
- Do it parallel: Deploy parallelism on all available levels



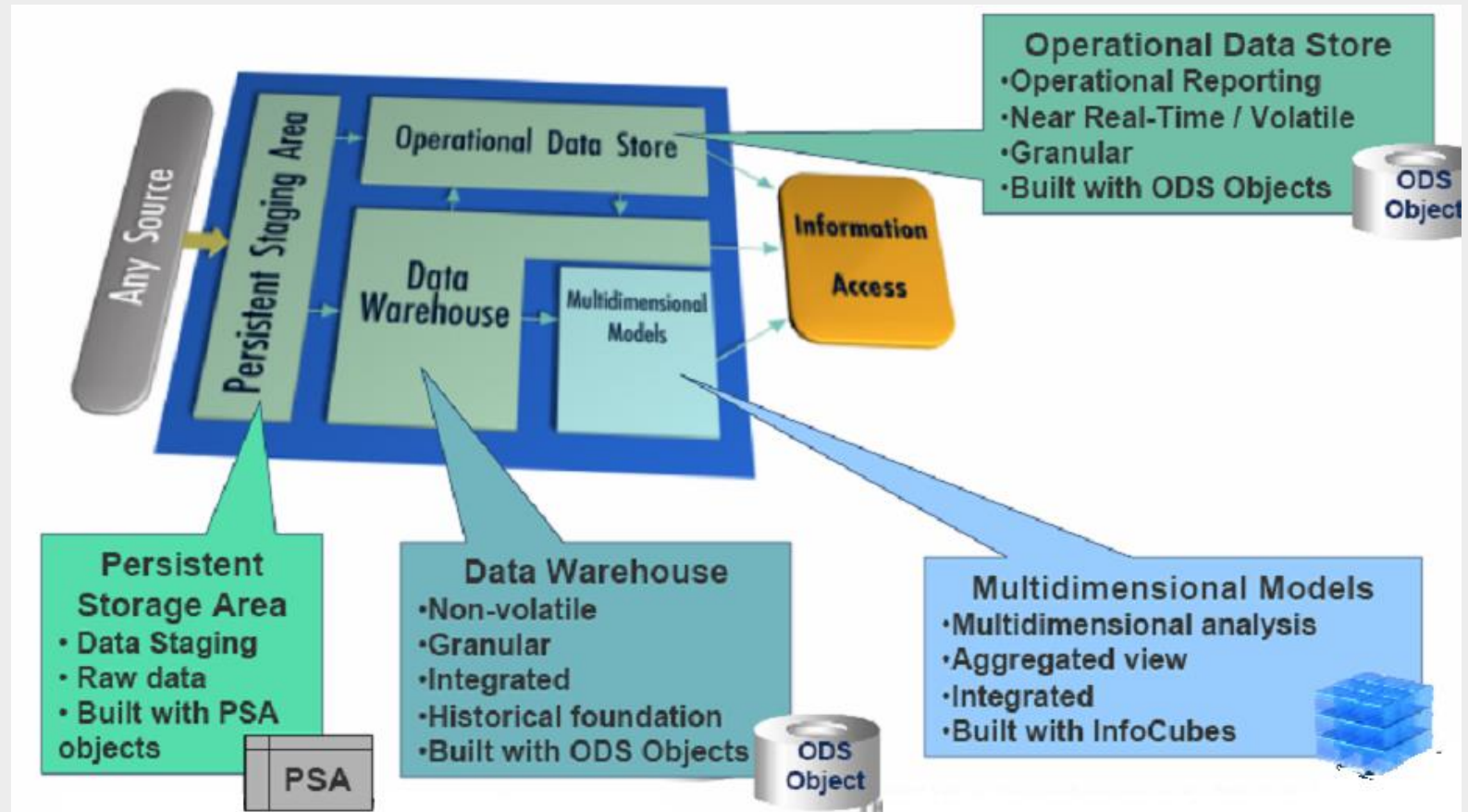
# Data Modeling

➤ When improving Performance in a Data Model target the following features of the model:

- Use ODS/ InfoCubes strategically
- Leverage line item dimensions
- Use MultiProvider (logical) partitioning
- Implement time-dependent master data with caution



# Strategic design of Data Model







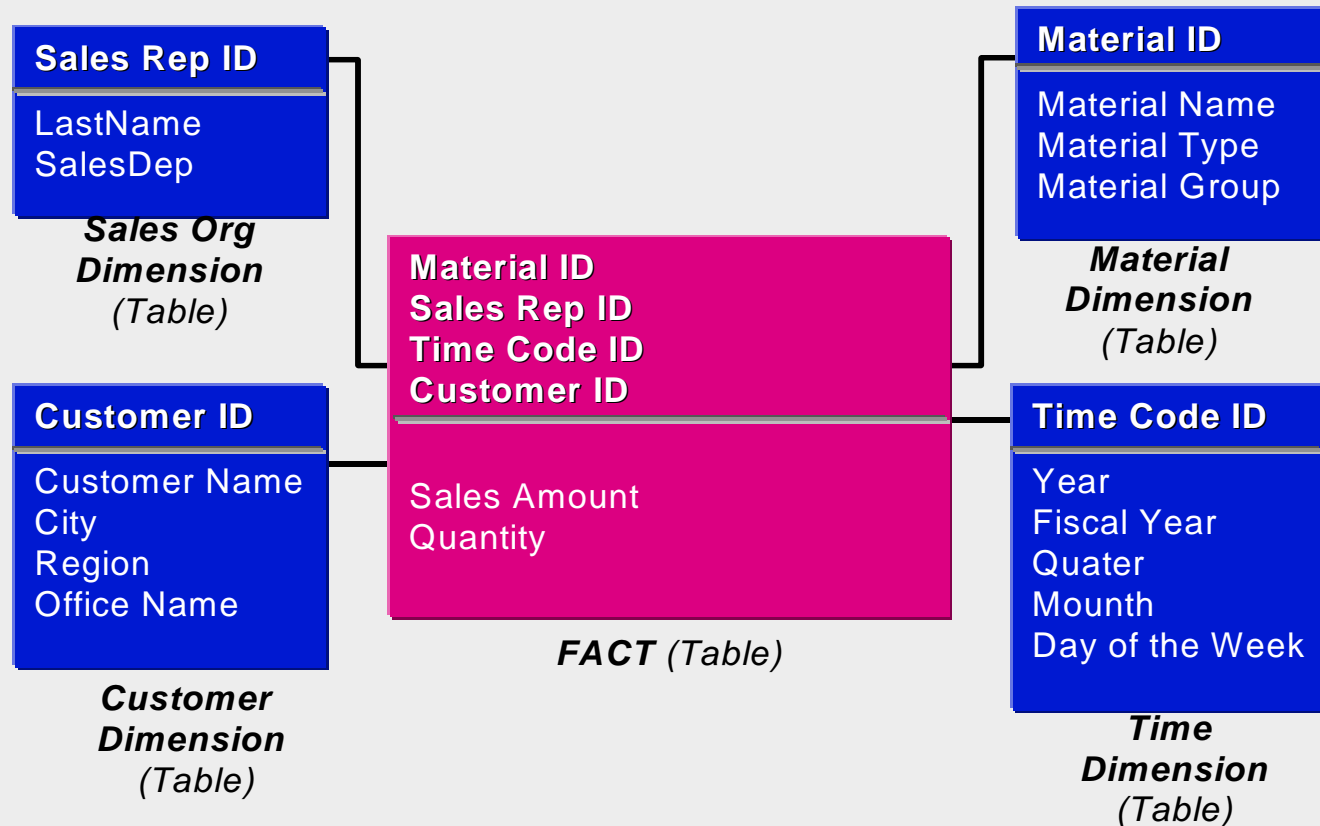
# Strategic design of Data Model

- Restrict the use of the different Data Modeling structures (ODS, InfoCube, MultiProviders etc) to the above guidelines to maximise their capabilities.
- Keep the entity and attributes having parent : child (1: n) relationship in same dimension.
- Entities with n:m relationship should not be modelled in the same dimension.
- Keep the dimensions as small as possible.
- Use line item dimension to store data at document level
- Use navigational attributes only if necessary.

# Strategic design of Data Model

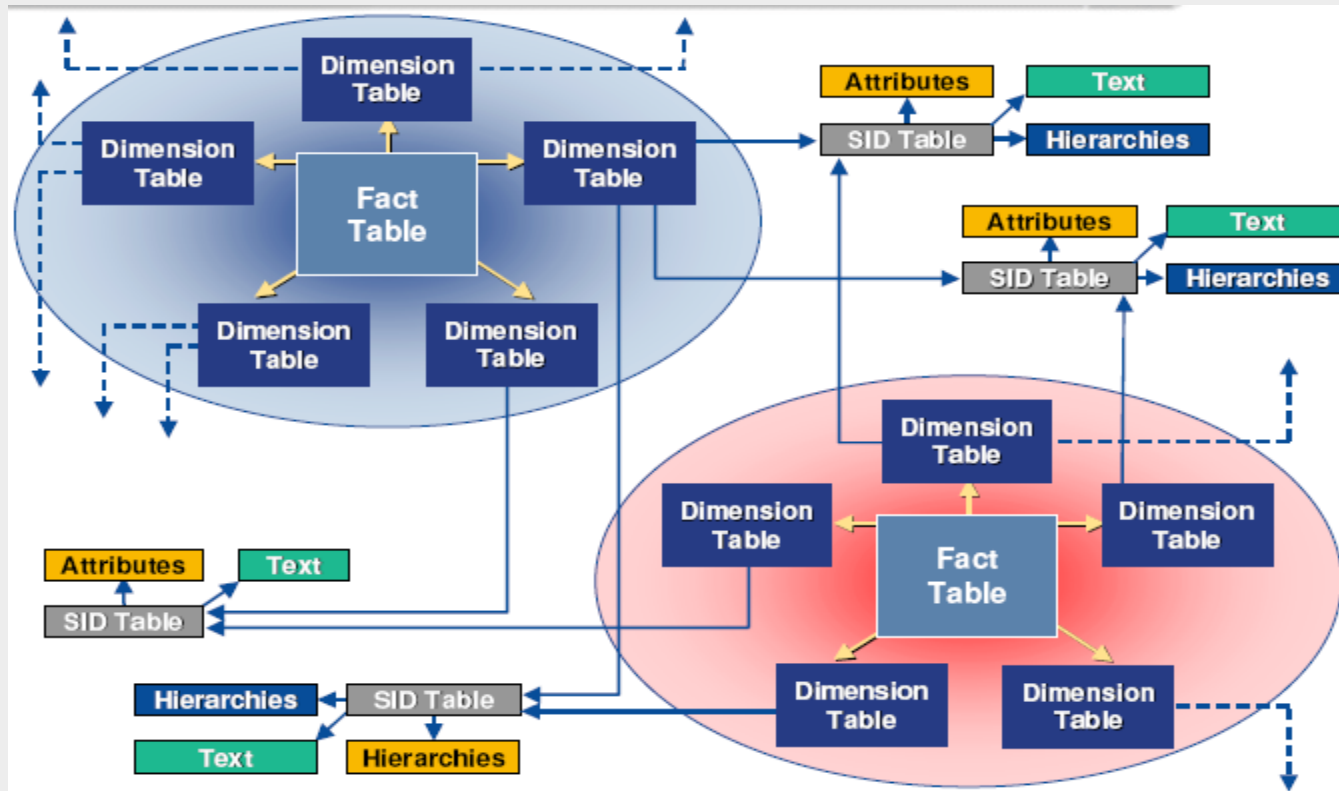


## Star Schema





# Extended Star Schema

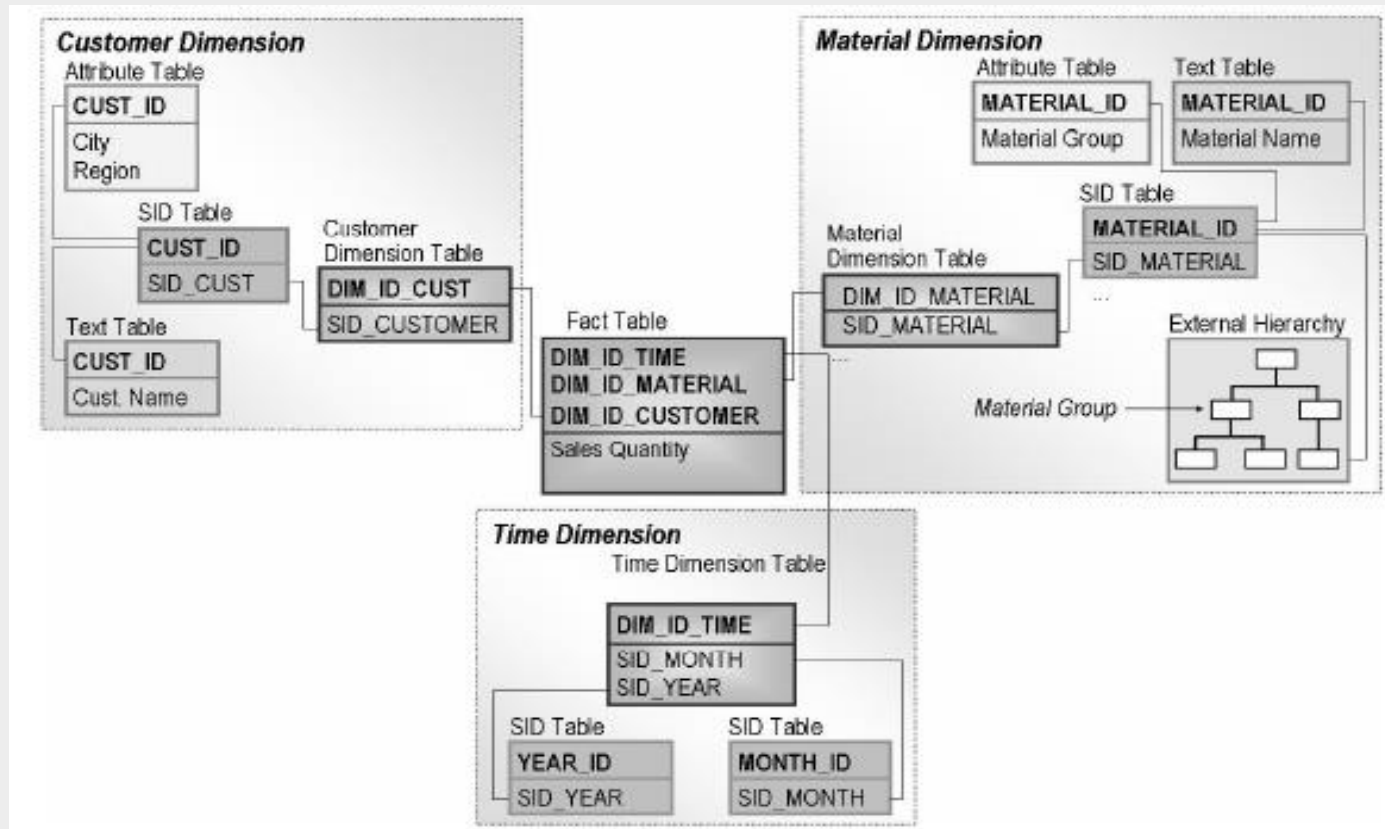


**InfoCube-Independent Use of Master Data**



# Extended Star Schema

- Each Dimension table has a system generated numeric 'primary key' called the Dimension key of DIM ID.
- The primary key of the Fact table is then made up of the combination of DIM IDs of various dimensions.





# M:N Relationship :1 Dimension

/BI0/SMATERIAL	
MATERIAL	SID
	0
M-01	1
M-02	2
M-03	3
HD-10GB	4
HD-20GB	5

N:M

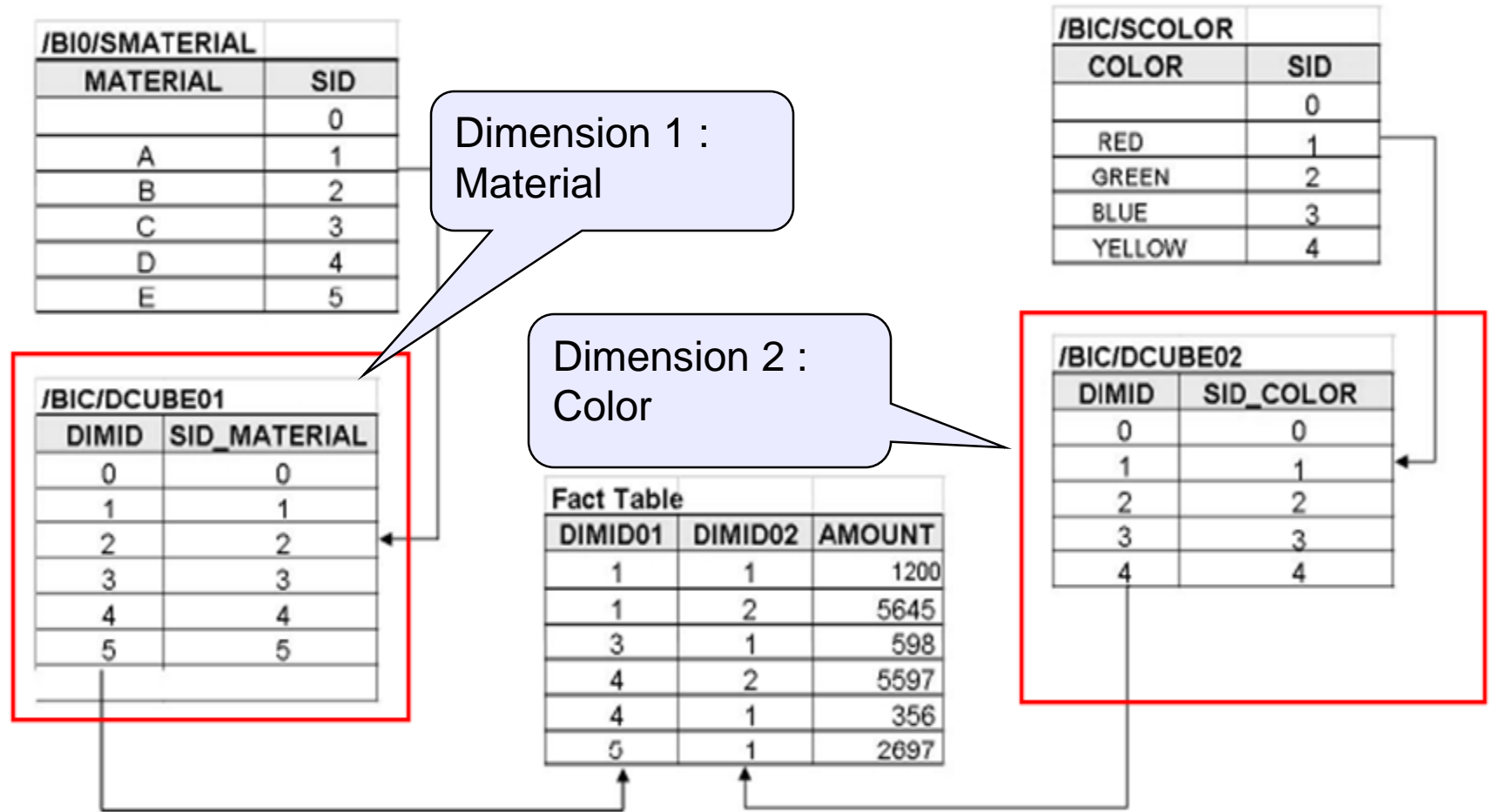
/BI0/SCUSTOMER	
CUSTOMER	SID
	0
1000	1
1001	2
1002	3
1003	4
1004	5
1005	6
1006	7
1007	8
1008	9
1009	10
1010	11

/BIC/DCUBE01		
DIMID	SID_MATERIAL	SID_CUSTOMER
0	0	0
1	1	1
2	1	2
3	1	3
4	1	4
5	1	5
6	1	6
7	1	7
8	1	8
9	1	9
10	1	10
11	1	11
12	2	1
53	5	9
54	5	10
55	5	11

Dimension Table :  
Material, Customer



# M:N Relationship : 2 Dimensions





# Leveraging Line-Item Dimensions

- When compared to a fact table, dimensions ideally have a small cardinality. However, there is an exception to this rule.
  - E.g. In case of an InfoCubes containing a characteristic "Document No.", almost every entry in the fact table is assigned to a different document.
    - This means that the dimension (or the associated dimension table) has almost as many entries as the fact table itself.
    - This is referred to as a *line-item dimension*.
- Multi-dimensional database systems have problems to efficiently process such dimensions.
- In order to execute optimization, flag the relevant dimension as a Line Item/ having High Cardinality, when creating dimensions in the InfoCube maintenance.



# Leveraging Line-Item Dimensions

- Flagging a dimension as a 'line-item' means that the dimension contains precisely one characteristic.
- This means that the system does not create a dimension table. Instead, the SID table of the characteristic takes on the role of dimension table.
- Removing the dimension table has the following advantages:
  - When loading transaction data, no IDs are generated for the entries in the dimension table.
  - A table having a very large cardinality- is removed from the star schema. As a result, the SQL-based queries are simpler.





# Leveraging Line Item Dimension

Transp. Table      /BIC/FZFI\_C01      Active

Short Description      Invoices

Attributes

Delivery and Maintenance

Fields

Entry help/check

Currency/Quantity Fields



Srch Help

Predefined Type

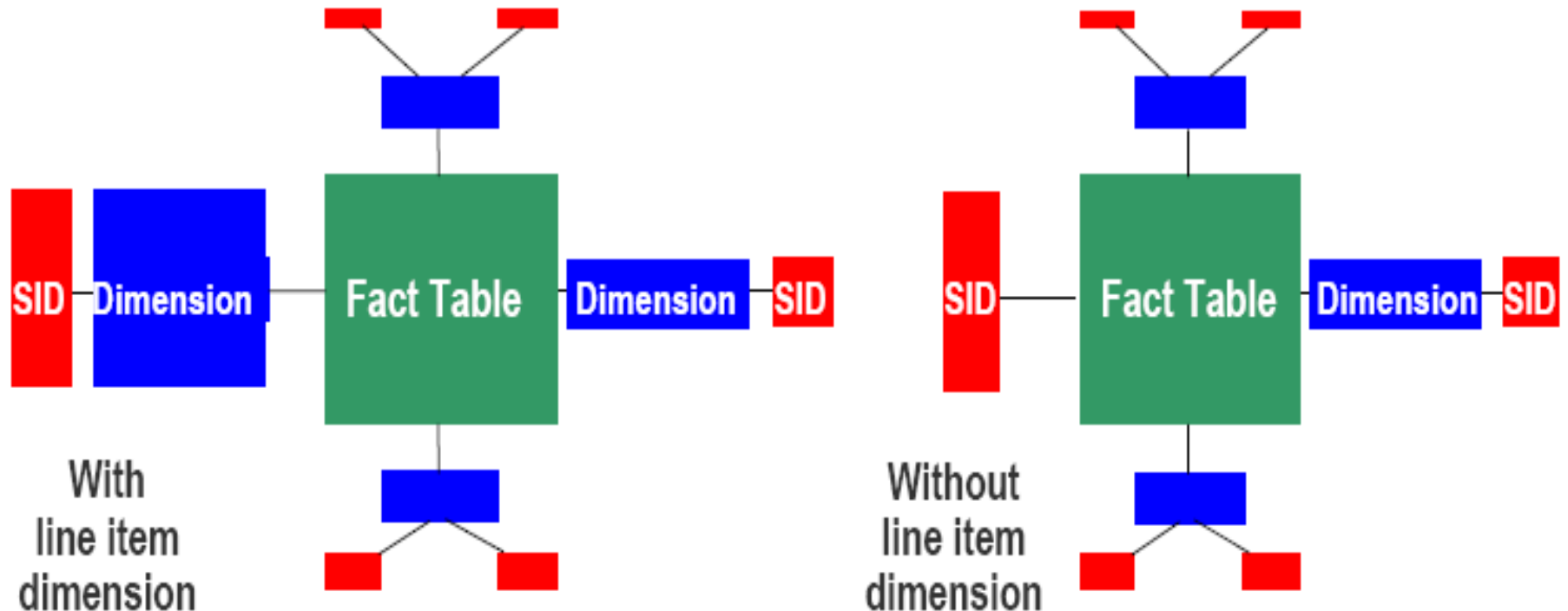
Field	Key	Initi...	Data element	Data Ty...	Length	Decim...	Short Description
KEY_ZFI_C01P	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C01T	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C01U	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C011	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C012	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C013	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C014	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C015	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C016	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C017	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C018	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C019	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C01A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSDIMID	INT4	10	0	Dimension Table Key
KEY_ZFI_C01B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSSID	INT4	10	0	Master data ID
KEY_ZFI_C01C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RSSID	INT4	10	0	Master data ID
CREDIT_DC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/BI0/OICREDIT_DC	CURR	17	2	Credit amount in foreign
CREDIT_LC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/BI0/OICREDIT_LC	CURR	17	2	Credit amount in local cu

Dimension Table Key  
replaced by SID



# Leveraging Line Item Dimension

- Characteristics that suggest a large dimensions are e.g. invoice number, order number. Large Material or Customer dimensions also are potential large dimensions.
- Use Line Item dimension if Dimensions/Fact table ratio is greater than 10:1.





# Leveraging Line Item Dimension

- Flagging a dimension as 'High Cardinality' means that the dimension is to have a large number of instances.
- A general rule is that a dimension has a high cardinality when the number of dimension entries is at least 20% of the fact table entries.
- Caution : Do not select a dimension having high cardinality, if unsure.
- F4 Help not possible on dimension values (only all master data values displayed)
- Only one characteristic is possible in a line item dimension

# Line Item Dimension



The screenshot displays the SAP BW software interface. On the left, the 'Edit Dimensions' dialog box is open, showing the dimension 'ZSD\_IC012' with the description 'CUSTOMER'. The 'Line Item Dimension' checkbox is checked, and the 'High Cardinality' checkbox is unchecked. A callout bubble points to this checkbox with the text: 'Check the 'Line Item' checkbox to flag a dimension as a line-item dimension.'

On the right, the 'InfoCube' table is visible, showing the technical name 'ZSD\_IC01' and the object information. The table lists various dimensions and their corresponding technical names:

InfoCube	Techn. name /
SD INFO CUBE TRANSACTIONAL	ZSD_IC01
Object Information	
Version	In Process
Save	Saved
Revised Version	Active Versi
Object Status	Active, exec
Settings	
Dimensions	
Data Package	ZSD_IC01P
Time	ZSD_IC01T
Calendar Year/Month	0CALMONTH
Calendar Year	0CALYEAR
Calendar Day	0CALDAY
Unit	ZSD_IC01U
MATERIAL	ZSD_IC011
MATERIAL ZTEST 01	ZMAT_01
CUSTOMER	ZSD_IC012
SALES	ZSD_IC013
SALES GEORAPHY	ZSD_IC014
PLANT	ZSD_IC015
Navigation Attributes	
Key Figures	



# MultiProvider (Logical Partitioning)

- Use of MultiProviders or logical partitioning can be used to divide large amount of data into smaller chunks without any physical storage.
- Single InfoProviders are smaller, less complex and less sparsely filled than one big InfoProvider
- Parallel Loading Processes
- Parallel Execution of subqueries
- Use characteristic 0INFOPROV in query definition to restrict data.



# MultiProvider (Logical Partitioning)

Parallel subqueries are deposited in the BasicCubes

**MultiProvider**



**Basic InfoCubes**



# 0INFOPROV in Query Definition



**InfoProvider**

**[ZFI\_M03] Multiprovider for Vendor Details Report**

- Key Figures**
  - Calculated Key Figure
  - Restricted Key Figures
  - [0DISC\_BASE] Discount Base
  - [ZREEWR] Invoice value
  - [1ROWCOUNT] Number of Rows
- Dimensions**
  - [ZFI\_M031] Creditor
  - [ZFI\_M032] Material Document
  - [ZFI\_M033] Accounting Doc
  - [ZFI\_M034] Date
  - [ZFI\_M035] Purchasing
  - [ZFI\_M03P] Data Package
    - [0INFOPROV] InfoProvider
    - [0REQUID] Request ID
  - [ZFI\_M03U] Unit

Filter on 0INFOPROV to restrict the data



# Time dependent Master Data

- Time-dependent master data is used to model a view of the data as it existed at a point in time.
  - e.g. Analysis of Sales history by Salesperson reflecting the territory assignments in 2001.
- Time dependency should only be modeled if requirements deem it a “must have,” not a “nice to have” since it limits tuning potential.
- Overuse or incorrect definition of time dependency for Master Data objects can adversely affect query performance.

Region	Valid From	Valid To	Sales Person
1010	01.01.2000	01.06.2000	A
1010	02.06.2000	01.10.2000	B





# Time dependent Master Data

- Aggregates can be built for time-dependent master data, but are limited to specific key date
  - Limits the effectiveness of aggregates
    - During a single query execution only ONE characteristic value – time dependent attribute value constellation can be addressed via Query key date
  - Could increase the number of aggregates
  - When key date changes, special aggregate change run is required

# Time dependent Master Data



**Display Characteristic 0COSTCENTER: Details**

Navigation: Back, Forward, Home, Search, Maintain, Logs..., Metadata, Maintain Conversion Object

Version Comparison | BI Content

Characteristic: 0COSTCENTER  
Long Description: Cost Center  
Short Description: Cost Center  
Version: ☒ Active

General | Business Explorer | Master Data/Texts | Hierarchy | Attributes | Compounding

☐ Delete Master Data with Recordmode

Navigation Attribute Info | Assigned DataSource Attributes

Attributes: Detail/Navigation Attributes

Attribute	V...	Long Description	Ty.	Time-D...	...	N...	A...	T...	Navigation Att. Descr...	Nav. Attr...	Navigation Attrib...
0BUS_AREA		Business area	DIS	<input checked="" type="checkbox"/>		1					
0COMP_CODE		Company code	DIS	<input checked="" type="checkbox"/>		2					
0LOGSYS		Source System	DIS	<input type="checkbox"/>		3					
0OBJ_CURR		Object Currency for CO ...	DIS	<input checked="" type="checkbox"/>		4					
0PROFIT_CTR		Profit Center	NAV	<input checked="" type="checkbox"/>		5			Profit Center	Profit Center	0COSTCENTER__0F
0RESP_PERS		Person Responsible	DIS	<input checked="" type="checkbox"/>		6					
0RT_LOCATIO		Retail location	NAV	<input checked="" type="checkbox"/>		0			Test	Test	0COSTCENTER__0F
0RESP_USER		Person Responsible	DIS	<input type="checkbox"/>		0					
ZBUDHOLD		Budget Holder	NAV	<input type="checkbox"/>		0			Budget Holder	Budget Hold...	0COSTCENTER__ZE
ZBUDMGR		Budget Manager	NAV	<input type="checkbox"/>		0			Budget Manager	Budget Man...	0COSTCENTER__ZE

Switch ON the 'Time Dependent' checkbox to make an attribute time-dependent.

Version Comparison | BI Content

Characteristic: 0COSTCENTER  
Long Description: Cost Center  
Short Description: Cost Center  
Version: ☒ Active

Object Status: Active, executable

General | Business Explorer | Master Data/Texts | Hierarchy | Attributes | Compounding

☒ With Master Data ☐ Supports XXL Attributes ☒ With Texts

Master Data Tables		Text Table Properties	
Master Data View	/BIO/MCOSTCENTER	Text Table	/BIO/TCOSTCENTER
Master Data Table	/BIO/PCOSTCENTER	<input checked="" type="checkbox"/> Short Text	
Attribute SID Table	/BIO/XCOSTCENTER	<input checked="" type="checkbox"/> Medium Text	
XXL Attribute Table		<input type="checkbox"/> Long Text	<input type="checkbox"/> Long text is XL
Time-Dep. Master Data Table	/BIO/QCOSTCENTER	<input checked="" type="checkbox"/> Language-Dep. Text	
Time-Dep. Attribute SID Table	/BIO/YCOSTCENTER	<input checked="" type="checkbox"/> Time-Dependent Text	

Master Data InfoSource / Data Target / InfoProvider

Application Component: CO-QM-CCA-IO

☒ InfoSource with Direct Update

InfoArea: Z\_CCA\_MASTER



# Data Extraction





# Data Extraction

➤SAP provides mechanisms for retrieving data (master and transaction data) from various sources. Tuning of extraction process in respect to receptor and source system is significant when retrieving the high data volume very frequently.

➤Following factors should be considered for performance tuning at extraction level.

- Use of multiple servers
- Package Size and Indices
- Custom enhancements and generic extractors

➤Use of Multiple Servers

- Enables parallel processing and avoids memory / CPU bottlenecks.

➤Package Size

- Package size determines the growth of the internal table before data package is sent.
- In general, small data package sizes are good for resource-constrained systems and big sizes are good for large systems. Default setting is 10,000 kByte and 1 Info IDOC for each data packet.
- Large package sizes can be a special problem if network traffic is a concern. In these cases a small package size is preferable.



# Data Extraction

## ➤Indices

- If you define selection criteria in your Infopackage and the selection of the data is very slow, consider building indices on the Datasource tables in the source system.
- Do not create too many indices because every additional index slows down the inserts into the table (in this case the collector job, if available; depending on the particular application area for the Data source).

## ➤Custom enhancements and generic extractors

- ABAP coding in Exits should be optimized by avoiding unnecessary loops and access to large tables.
- Database tables should be buffered and accessed via Internal tables



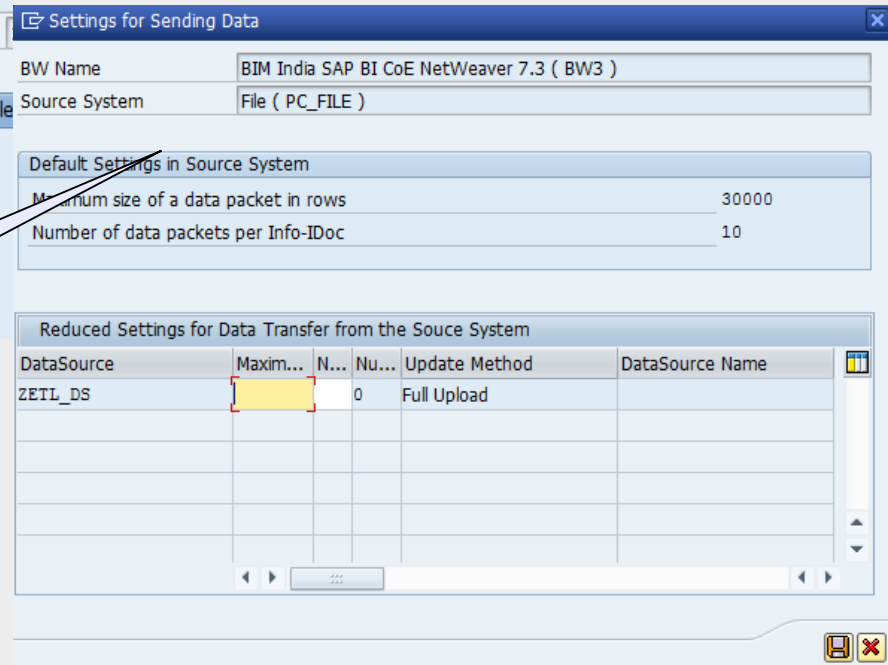
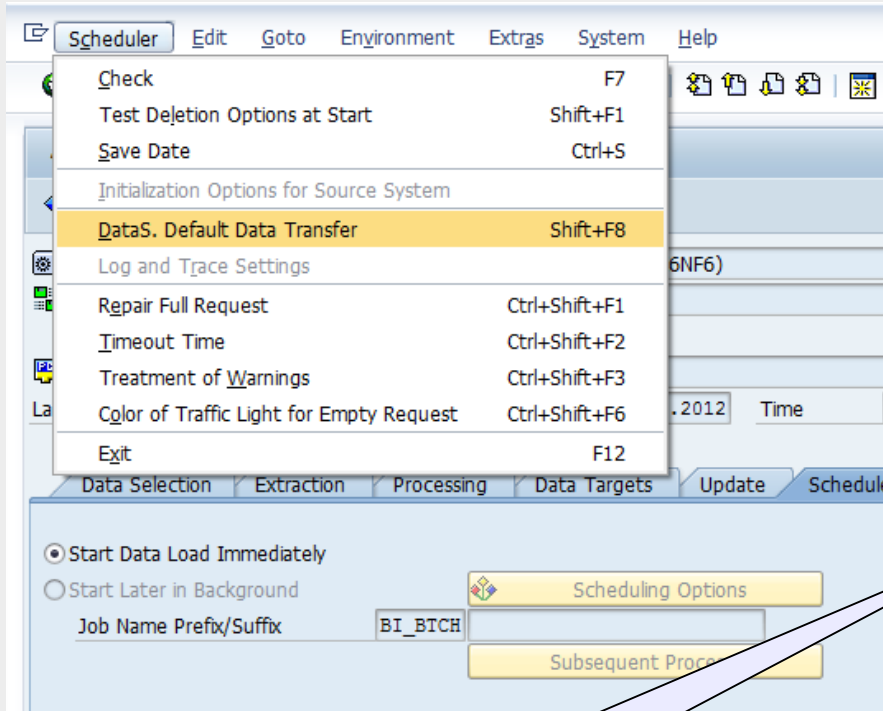
# Data Extraction

➤ Use transaction SM51 to monitor the load on the various application servers setup for the BW system. Performance can be checked on number of processes running at a time and identifying the delayed processes in transaction SM50.

List Edit Goto Settings System Help			
SAP Servers			
Release Notes			
Server Name	Host Name	Message Types	Server Status
dbciPB1_PB1_50	dbciPB1	Dialog Batch Update Upd2 Spool ICM	Active
wwcsap04_PB1_52	wwcsap04	Dialog Batch Update Upd2 Spool ICM	Active
wwcsap04_PB1_54	wwcsap04	Dialog Batch Update Upd2 Spool ICM	Active

16	UPD	28558	Waiting	Yes							
17	UPD	28559	Waiting	Yes							
18	BGD	28082	Running	Yes	14		1885	SAPLRSSM	500	RFC_USER	
19	BGD	4667	On Hold	RFC	Yes	5	4506	SAPLRSM2	500	JMAGID	
20	BGD	28602	Running	Yes	1		5	GP44X10XF7	500	RFC_USER	
21	BGD	20378	Waiting	Yes	2						
22	BGD	21372	Waiting	Yes							
23	SPO	28570	Waiting	Yes							
24	SPO	28571	Waiting	Yes							
25	UPD	28572	Waiting	Yes							

# Data Extraction









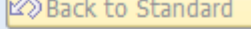









View the packet size details in any Infopackage



# Data Extraction

Use transaction RSODSO\_SETTINGS to change the packet size

Settings	Parameters	System Setting
▼ <b>Generic Settings</b>		
•  Package Size Activation	20000	
•  Wait Time Activation	300	
•  Package Size SID Creation	20000	
•  Wait Time SID Creation	600	
•  Wait Time Rollback	600	
▼ <b>Process Settings</b>		
▼  <b>Activation</b>		
•  Parallel Processing	Background	
•  Server Group	None	
•  Number of Processes	3	
▼  <b>Rollback</b>		
•  Parallel Processing	Background	
•  Server Group	None	

number of records to  
be sent in single  
package

Number of packages  
to be processed at a  
time





# Data Extraction

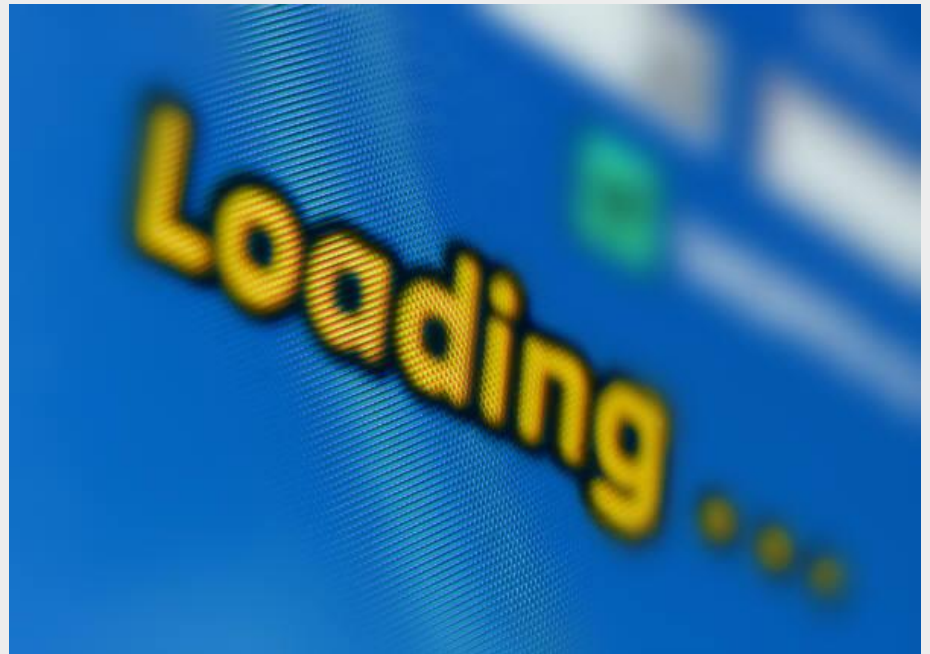
Use transaction SE30 to analyze high ABAP program run time

Analyze and identify expensive ABAP statements that degrade program performance

The screenshot shows the 'ABAP Runtime Analysis: Initial Screen' in SAP. The interface includes a menu bar (Runtime analysis, Edit, Goto, Utilities, Settings, System, Help) and a toolbar. The main area is divided into several sections: 'Tips & Tricks', 'Measurement' (with 'Comment' and 'In current session' tabs), 'Restrictions' (with 'Variant' and 'Standard variant' tabs), and 'Performance file' (with 'Application', 'Short description', 'Measurement date', and 'File size in KB' fields). The 'Performance file' section shows 'Application: SAPLTHFB', 'Short description: REMOTE', 'Measurement date: 08/22/2001 11:49:20', and 'File size in KB: 0'. At the bottom, there are buttons for 'Analyze', 'Other file...', 'File info...', and 'Delete...'. The status bar at the very bottom indicates 'SE30 twphi083 INS'.



# Data Load Tuning





# Data Load Tuning

## ➤General Recommendations

- The master data load creates all SIDs and populates the master data tables (attributes and/or texts). If the SIDs do not exist when transaction data is loaded, these tables have to be populated during the transaction data load, which slows down the overall process.
- If you want to replace existing data in the Data Target completely, first delete the data (in PSA and/or Data Target) and load afterwards.
- Loading from the same or different datasource (s) with different selection criteria simultaneously.



# Data Load Tuning

## ➤ODS Data Load

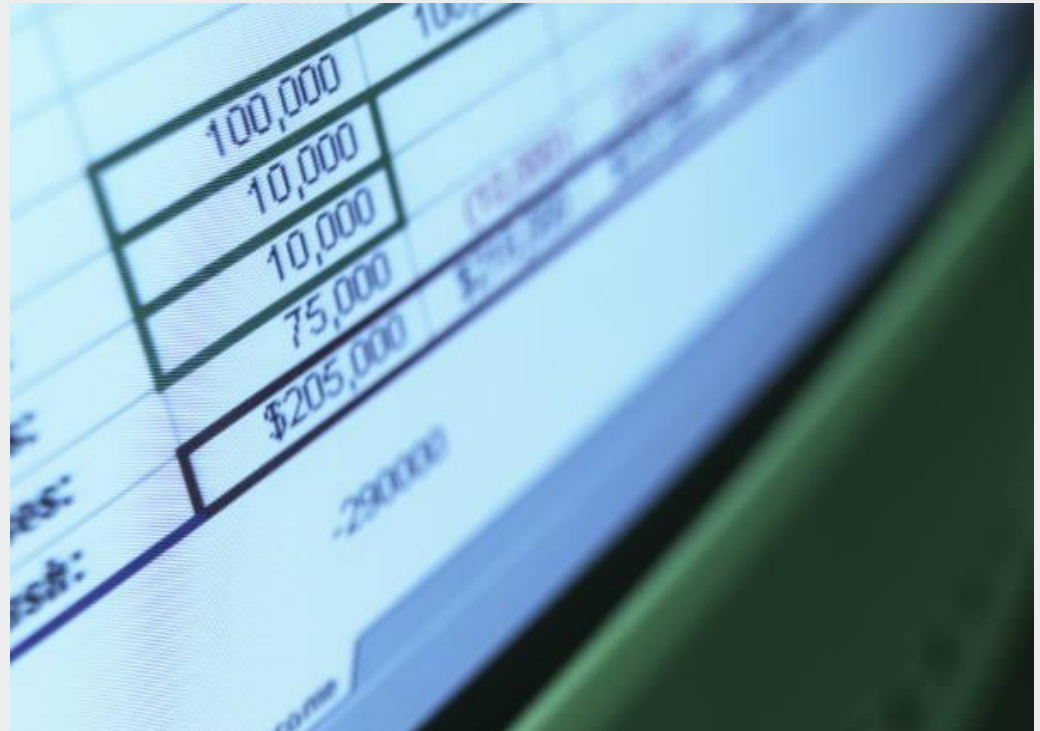
- Data Activation can be processed in parallel.
- Do not select check box enabling ODS for reporting if no reports are based on ODS. This helps to improve loading performance as system need not to find SID of those records.
- Avoid to use index if ODS is no longer use for querying.

## ➤InfoCube Data Load

- If your F-table is small, drop indices before loading. In this case, it is faster to rebuild the index at the end of the load process instead of updating the index for each record loaded.



# Query Performance





# Query Performance

➤The factors to be considered for query performance are:

- Query definition and Selection conditions
- Query Read mode
- Navigational attributes
- Indices and DB statistics
- Aggregates
- Partitioning InfoCubes
- Compression
- Other Important points



# Query Definition

- Avoid fetching line item level data unless absolutely necessary.
- Avoid including too many characteristics as rows. Keep them as free characteristic.
- Define high level filter where ever is possible to limit the data being fetched (e.g. company code, fiscal year variant, controlling area).
- Restricted and calculated key figures are executed on the data that is fetched by the OLAP processor. Try and limit the fetch from the DB.
- Virtual key figures and characteristics also deteriorates the query performance.



# Query Read Mode

- The volume of data fetched from the infoprovder by the OLAP processor is directly dependent on the read mode of the query.
  
- Different query read modes are as follows.
  - Query to be read when you navigate or expand hierarchies (H)
  - Query to read data during navigation (X)
  - Query to read all data at once (A)





# Query Read Mode

## ➤ Query to read all data at once (A)

- There is only one read process in this mode. When you execute the query in the Business Explorer, all data in the main memory area of the OLAP processor that is needed for all possible navigational steps of this query is read.

## ➤ Query to read data during navigation (X)

- The OLAP processor only requests data that is needed for each navigational status of the query in the Business Explorer. The data that is needed is read for each step in the navigation.

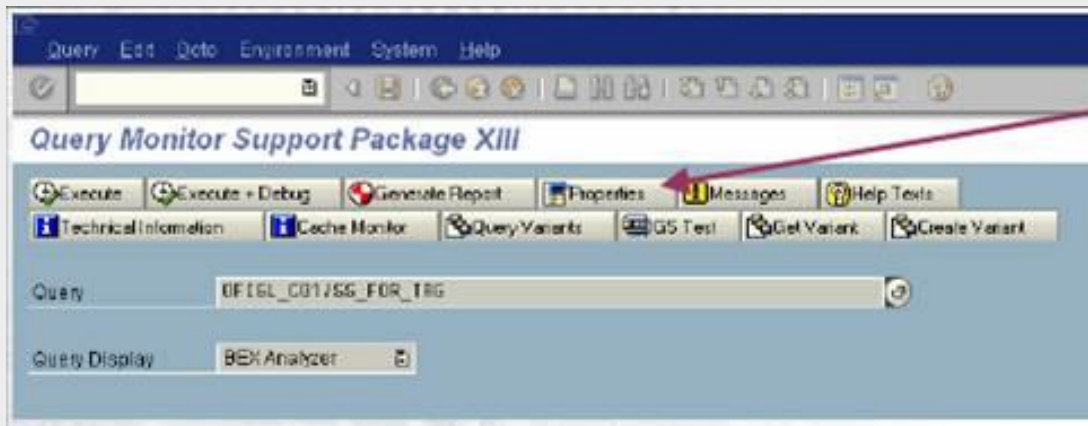
## ➤ Query to be read when you navigate or expand hierarchies (H)

- The amount of data transferred from the database to the OLAP processor is the smallest in this mode. However, it has the highest number of read processes.

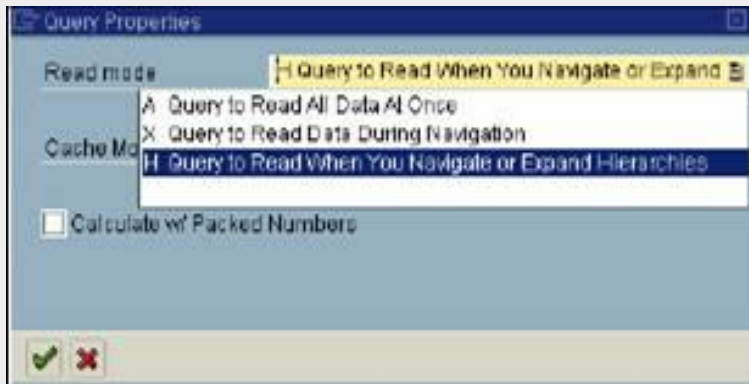


# Query Read Mode

➤ In most cases, it is recommended to use read mode 'Query to be read when you navigate or expand hierarchies (H)'.



Click on “Properties” for read mode of the query



Select read from 3 options:

1. Read all data at once
2. Read data according to the navigation
3. Read data per hierarchy navigation

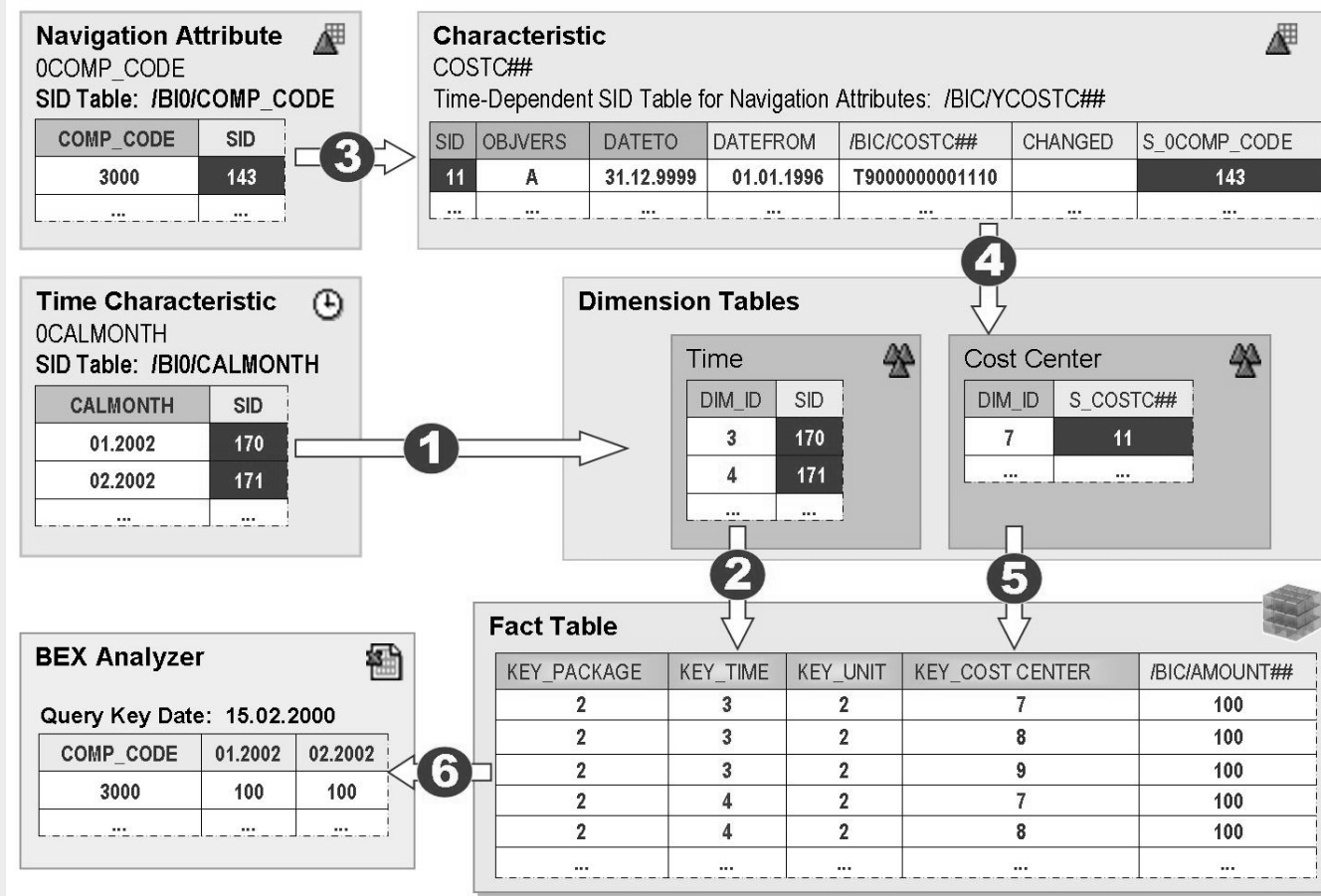


# Navigational Attributes

➤ One should model an object on a characteristic rather than on a navigation attribute. The reasons for this are as follows:

- In the extended star schema of an InfoCube, navigation attributes lie one join further out than characteristics.
  - This means that a query with a navigation attribute has to run an additional join (compared with a query with the same object as a characteristic) in order to arrive at the values.
- If a navigation attribute is used in an aggregate, the aggregate has to be adjusted using a change run as soon as new values are loaded for the navigational attribute

# Navigational Attributes



# Navigational Attributes



**Edit Characteristic OCOSTCENTER: Details**

Navigation icons: Back, Forward, Home, Search, etc. | Maintain | Logs... | Metadata | Maintain Conversion Object

Version Comparison | BI Content

Characteristic: OCOSTCENTER  
Long Description: Cost Center  
Short Description: Cost Center  
Version: Active (Saved) | Object Status: Active, executable

General | Business Explorer | Master Data/Texts | Hierarchy | **Attributes** | Compounding

☐ Delete Master Data with Recordmode | Navigation Attribute InfoProvider | Assigned Display Attributes

Attributes: Detail/Navigation Attributes

Attribute	V...	Long Description	Ty.	Time-D...	I...	O...	N...	A...	T...	Navigation	Att. Descrip...	Nav. Attri...	Navigation Attrib. I
OBUS_AREA		Business area	DIS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1		<input type="checkbox"/>	<input type="checkbox"/>				
OCOMP_CODE		Company code	DIS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2		<input type="checkbox"/>	<input type="checkbox"/>				
OLOGSYS		Source System	DIS	<input type="checkbox"/>	<input type="checkbox"/>	3		<input type="checkbox"/>	<input type="checkbox"/>				
OOBJ_CURR		Object Currency for CO ...	DIS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4		<input type="checkbox"/>	<input type="checkbox"/>				
OPROFIT_CTR		Profit Center	NAV	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5		<input type="checkbox"/>	<input type="checkbox"/>	Profit Center		Profit Center	OCOSTCENTER__OF
ORESP_PERS		Person Responsible	DIS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6		<input type="checkbox"/>	<input type="checkbox"/>				
ORT_LOCATIO		Retail location	NAV	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0		<input type="checkbox"/>	<input type="checkbox"/>	Test		Test	OCOSTCENTER__OF
ORESP_USER		Person Responsible	DIS	<input type="checkbox"/>	<input type="checkbox"/>	0		<input type="checkbox"/>	<input type="checkbox"/>				
ZBUDHOLD		Budget Holder	NAV	<input type="checkbox"/>	<input type="checkbox"/>	0		<input type="checkbox"/>	<input type="checkbox"/>	Budget Holder		Budget Hold...	OCOSTCENTER__ZE
ZBUDMGR		Budget Manager	NAV	<input type="checkbox"/>	<input type="checkbox"/>	0		<input type="checkbox"/>	<input type="checkbox"/>	Budget Manager		Budget Man...	OCOSTCENTER__ZE

Check the pencil icon to convert an display attribute to a navigational attribute.



# Indices and DB Statistics

- Indexes directly impact the query performance because they are used by the OLAP processor when data is fetched from the tables.
- The absence of indexes significantly increases query run time.
- If you select on navigational attributes, be sure that an appropriate index is available.
- The presence of DB statistics can dramatically improve execution time.



# Partitioning InfoCube

- By using partitioning one can split up the whole dataset for an InfoCube into several, smaller, physically independent and redundancy-free units.
- Partitioning helps in improving query performance, as it leads faster access of database by deploying the parallel processing.
- Partitioning also helps in faster deletion of data from InfoCube.
- One can only partition a dataset using one of the two partitioning criteria 'Calendar month' (0CALMONTH) or 'fiscal year/period' (0FISCPER). At least one of the two InfoObjects must be contained in the InfoCube.



# Compression

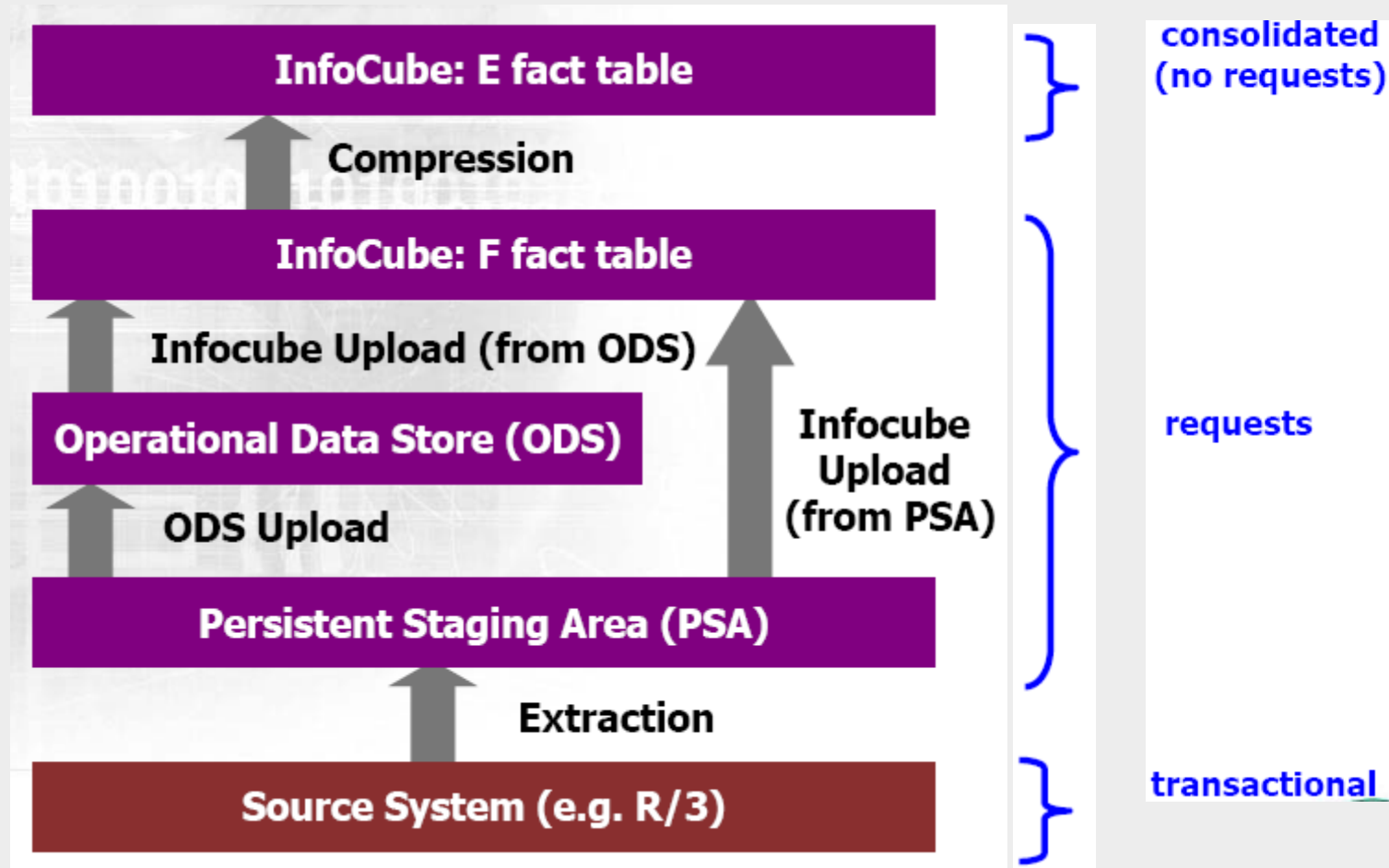
- When you load data into the InfoCube, entire requests can be inserted at the same time. Each of these requests has its own request ID, which is included in the fact table in the packet dimension. This makes it possible to identify individual requests and one can subsequently delete requests from the InfoCube.
- However, the request ID concept can also cause the same data record (all characteristics agree, with the exception of the request ID) to appear more than once in the fact table. This unnecessarily increases the volume of data, and reduces performance in reporting, as the system has to perform aggregation using the request ID every time you execute a query.
- Using compressing, you can eliminate these disadvantages, and bring data from different requests together into one single request (request ID 0).





# Compression

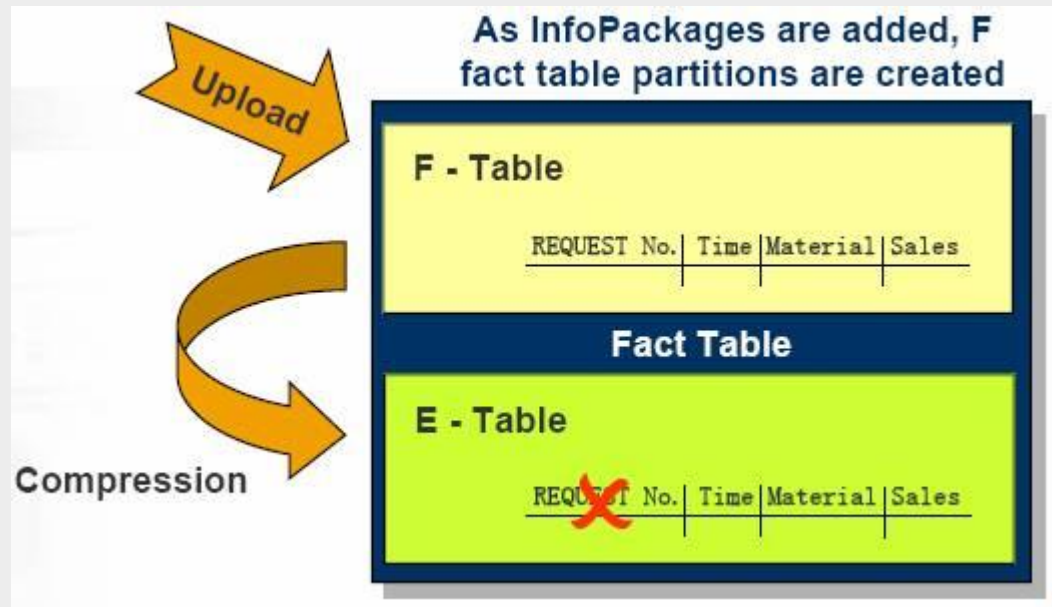
➤ Flow of data during compression





# Compression

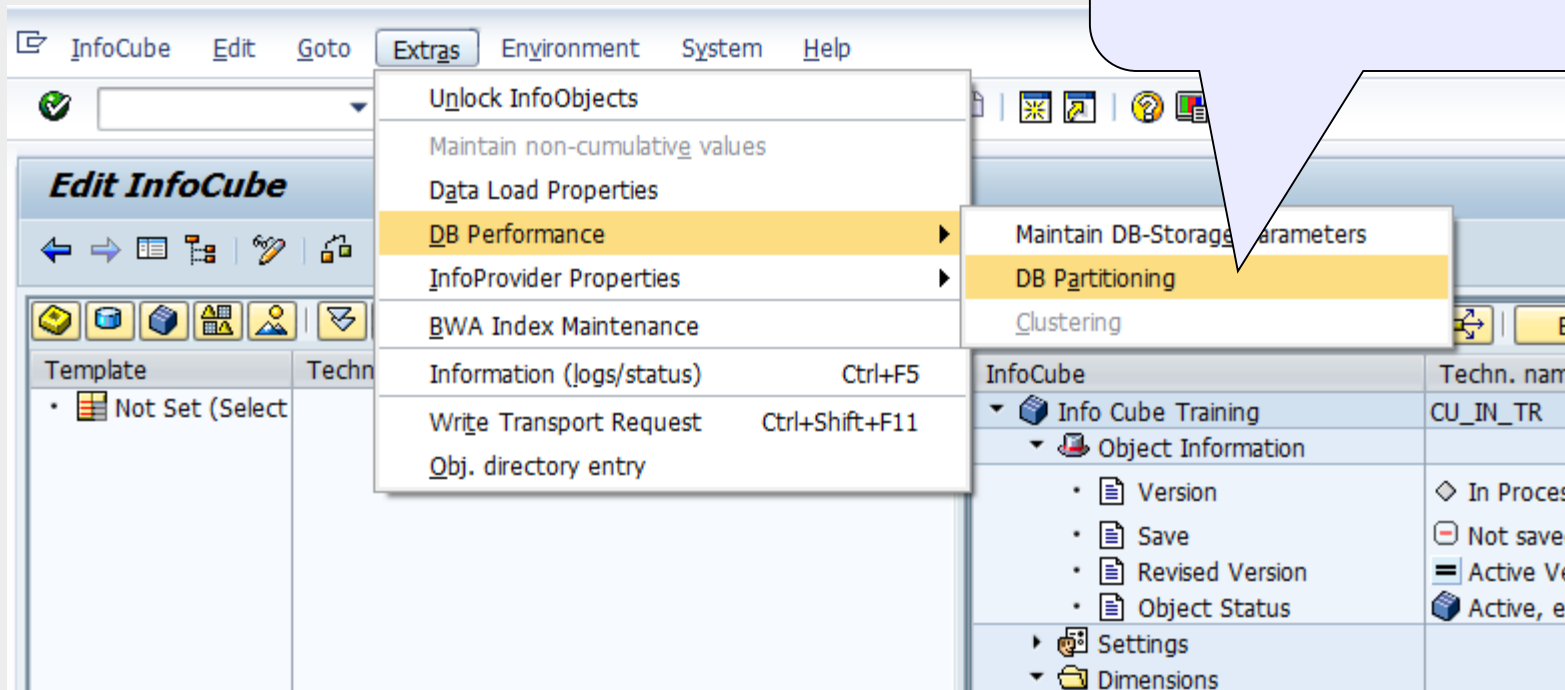
- Once the selected requests are compressed, data is moved from F fact table to E fact table.
- Compression is critical, as the compressed data can no longer be deleted from the InfoCube using its request ID. One must be absolutely certain that the data loaded into the InfoCube is correct.



# InfoCube Partition



1. To partition an InfoCube, go to InfoCube maintenance. In 'Extras' menu, choose DB Performance -> 'DB Partitioning'.



2. Select the partitioning parameter

# InfoCube Partition



**Edit InfoCube**

← → [Icons]

Template: • [Icon] Not Set (Select)

Techn. name / val... F... O. App... Dat... L K..

**Value Range (Partitioning Condition)**

Calendar year/month

From [ ] To [ ]

Options

Max. no. partitions [ ]

[Check] [Help] [Close]

Version Comparison

InfoCube

- Revis
- Objec
- Settings
- Dimension
- Data I
- Time
  - Ca
  - Ca
- Unit
- Produ
- Custo
- Navigation
- Key Figur

3. Give the date range and max no. partitions

# InfoCube Compression



**Manage InfoProvider**

Navigation icons: Back, Forward, List, Table, Contents, Application Log, Settings

Selectable Data Targets			
Name	D...	Technical Name	Table Type
Info Cube Training		CU_IN_TR	InfoCube

Contents Performance Requests Rollup **Collapse** Reconstruction

Compression of InfoCube:Info Cube Training(CU\_IN\_TR)

Selection Subsequent Proc. Process Chain Maint.

Job Name BI\_COMP

Collapse

☒ Request ID

☐ Calculated request ID

☐ With Zero Elimination

Release Stop Job Log

To compress requests in an InfoCube, goto InfoCube -> Manage -> Collapse tab. Enter the request number below which you want to compress requests. Specify job name and click 'Release'.

# Indices and DB Statistics



**Manage InfoProvider**

← → 📄 🗑️ Contents 🗑️ Application Log ⚙️

Selectable Data Targets

Name	D...	Technical Name
Info Cube Training		CU_IN_TR

Contents Performance Requests Rollup Collapse Reconstruction

InfoCube:Info Cube Training(CU\_IN\_TR)

**DB Indexes**

. Check DB Indexes  
 Delete DB Indexes (Now)  
 Repair DB Indexes (Now)  
Create DB Index (Btch) Delete DB Index (Batch)

. Check Aggr. DB Indexes  
 Delete Aggr. DB Indexes  
 Repair Aggr. DB Indexes

**DB Statistics**

. Check Statistics Refresh Statistics  
Create Statistics (Btch)

010 Percentage of IC Data Used to Create Statistics

To build InfoCube indices and DB Statistics, goto InfoCube -> Manage -> Performance tab. Use 'Create Index (batch)' and 'Create Statistics (Btch)' for this purpose.



Thank You.