

Time aspects in SAP Business Information Warehouse

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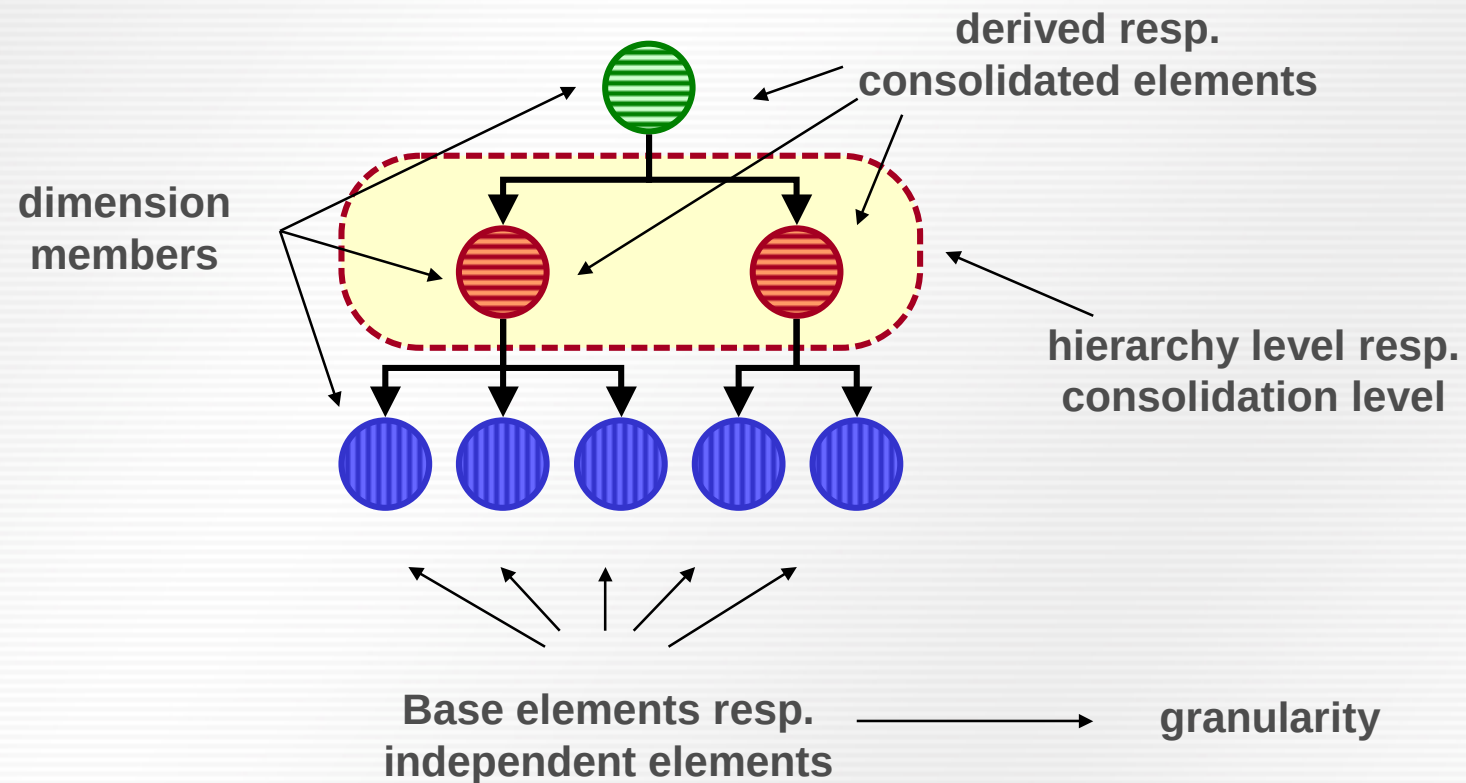
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- **Multidimensional data structures**
- **Time aspects in a Data Warehouse**
- **Business Information Warehouse**
- **Enhanced Star Schema of SAP**
- **Variants for modeling hierarchical structures in dimensions**
- **Slowly changing dimensions in BW**

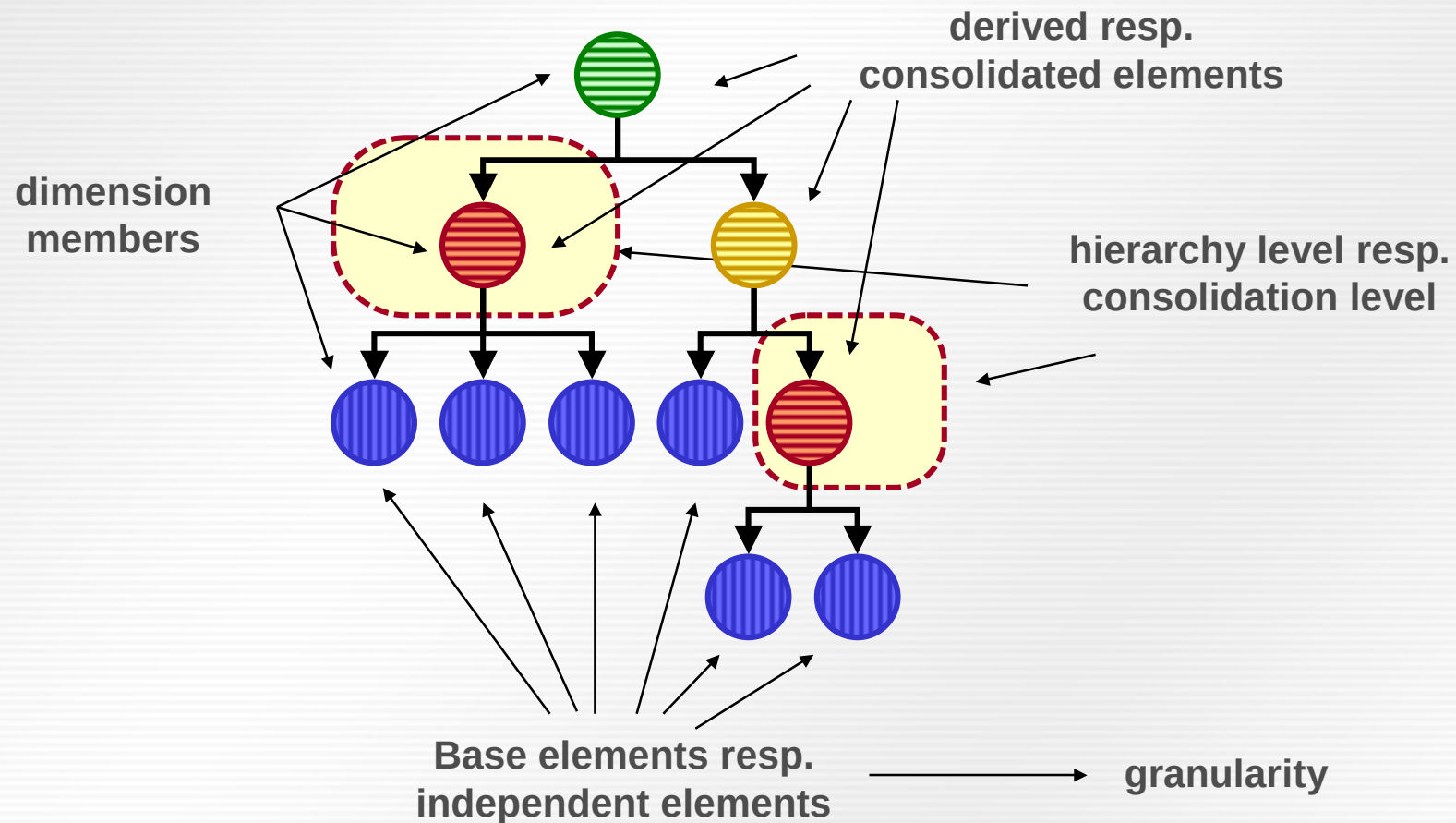
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dimensions and balanced hierarchical structures



unbalanced dimension structure



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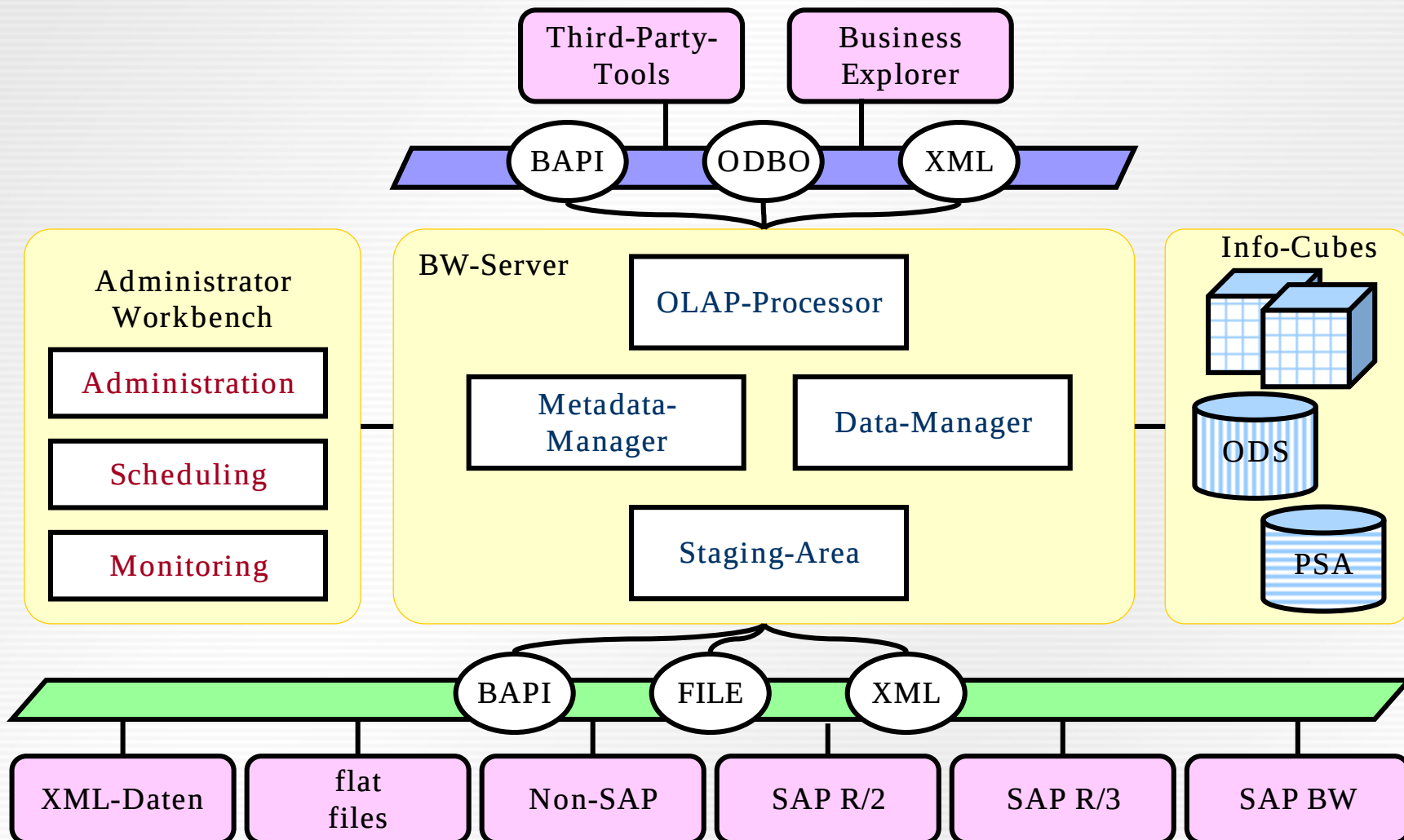
Solutions for structural changes in dimensions

- **Modifying historical data to match new structures**
pros: small data sets; data structures remain clear
cons: old structures are lost even if users want to analyze data with old structures
- **Save historical data separately in addition to the complete data matching new structures**
pros: Old reports can be reproduced
cons: Higher volume of data; actualizing is complicated and costly if new data should be analyzed according to old structures; confusing for end-users
- **Build parallel hierarchies with old and new structure**
pros: All data can be analyzed with any structure
cons: dimension structure is very confusing
- **Temporal databases - time stamps**
pros: All data can be analyzed with any structure
cons: poor performance; concepts not fully developed

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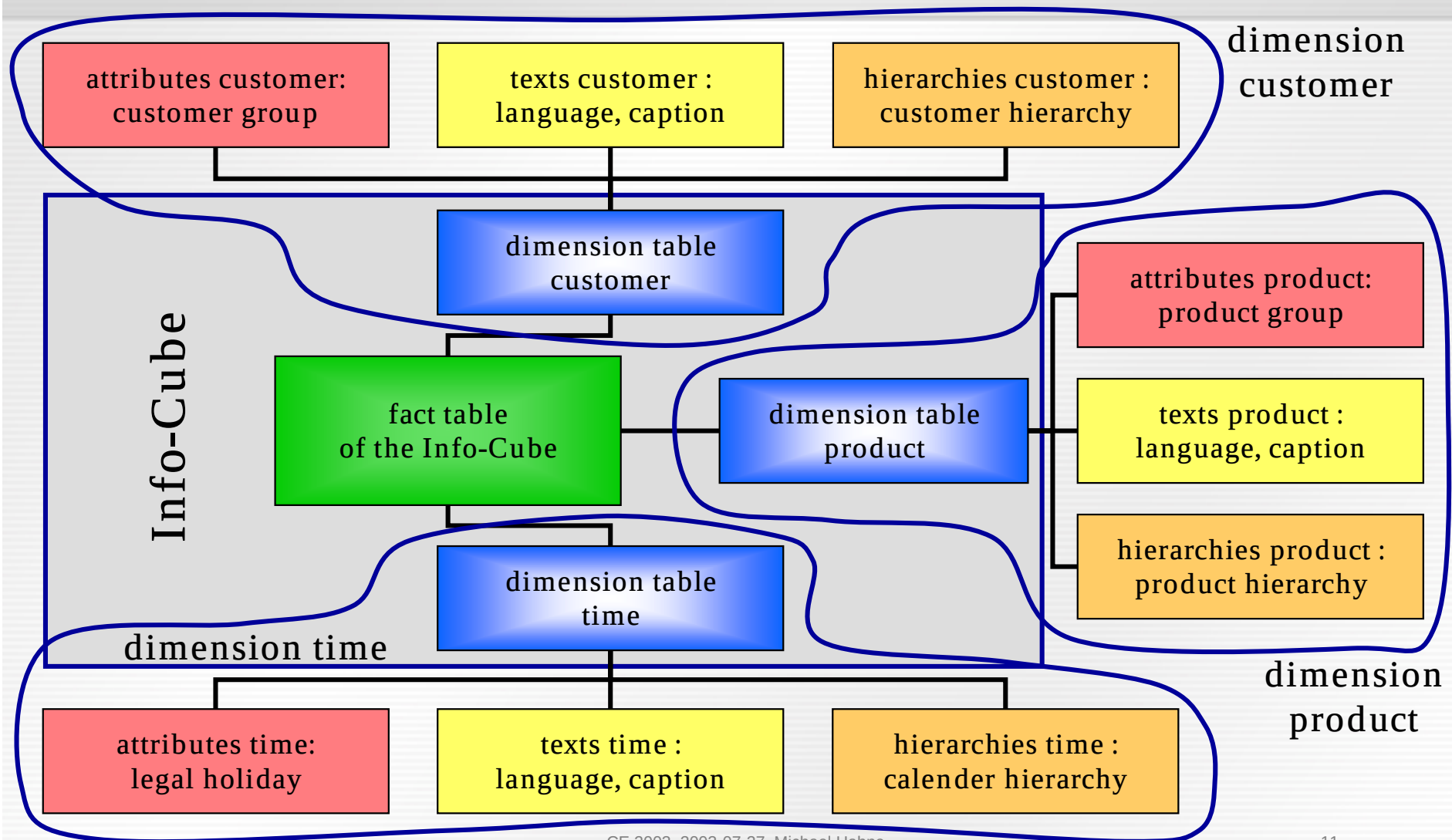
Architecture SAP BW 3.0



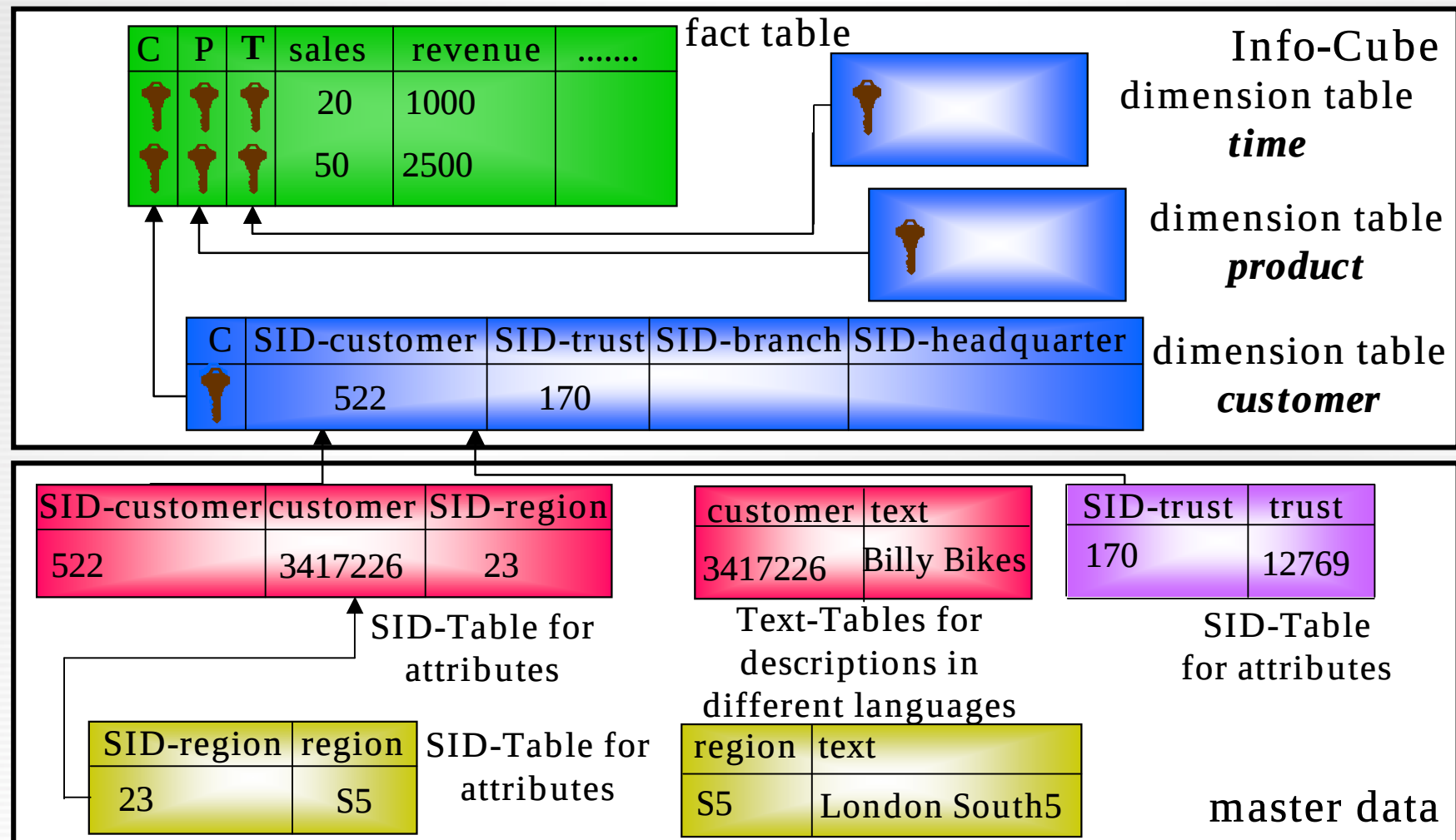
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Concept of master data in BW



SID-tables connecting the master data tables



different master data tables

K	SID-cust.	SID-trust	SID-branch	SID- headq.
	522	170		

Dimension Table
customer

S

SID-cust	customer
522	3417226

SID-Table BIC/SKunde
Standard SID-Table

P

customer	Customer name
3417226	Lampen Müller

Master Data Table BIC/PKunde
for not time-dependant
Display Attributes

Q

customer	DateFrom	DateTo	region
3417226	...	...	S5

Master Data Table BIC/QKunde
for time-dependant
Display Attributes

X

SID-cust	customer	SID-region
522	3417226	23

SID-Table BIC/XKunde
for not time-dependant
Navigational Attributes

Y

SID-cust	customer	DateFrom	DateTo	SID-class
522	3417226	...	...	12

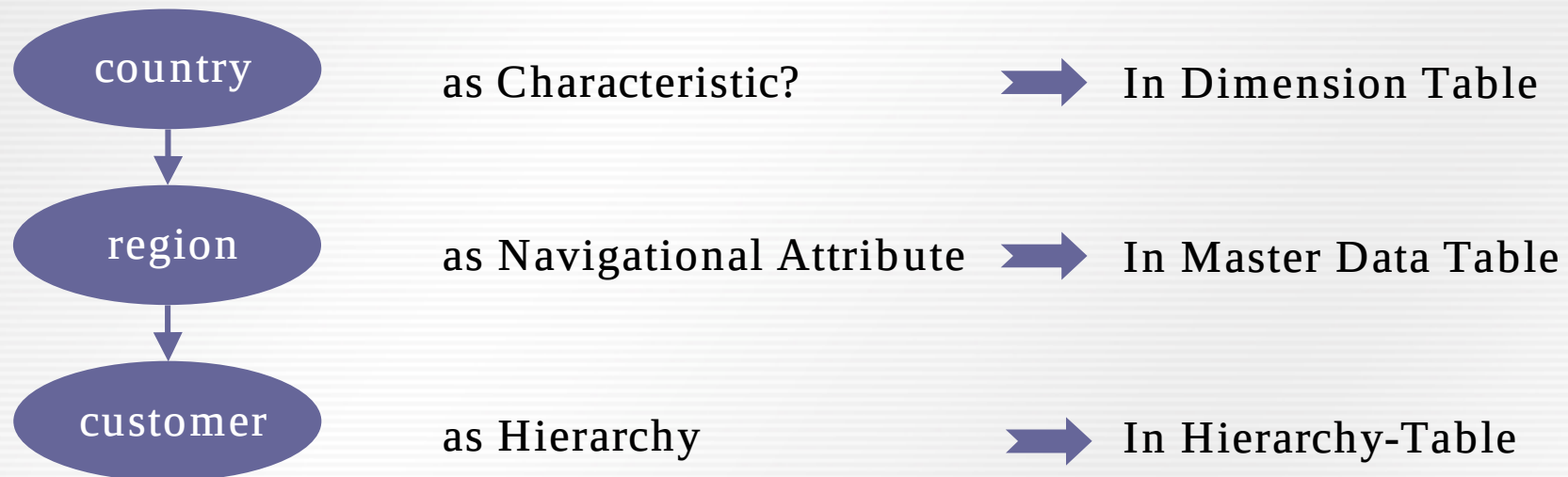
SID-Table BIC/YKunde
for time-dependant
Navigational Attributes

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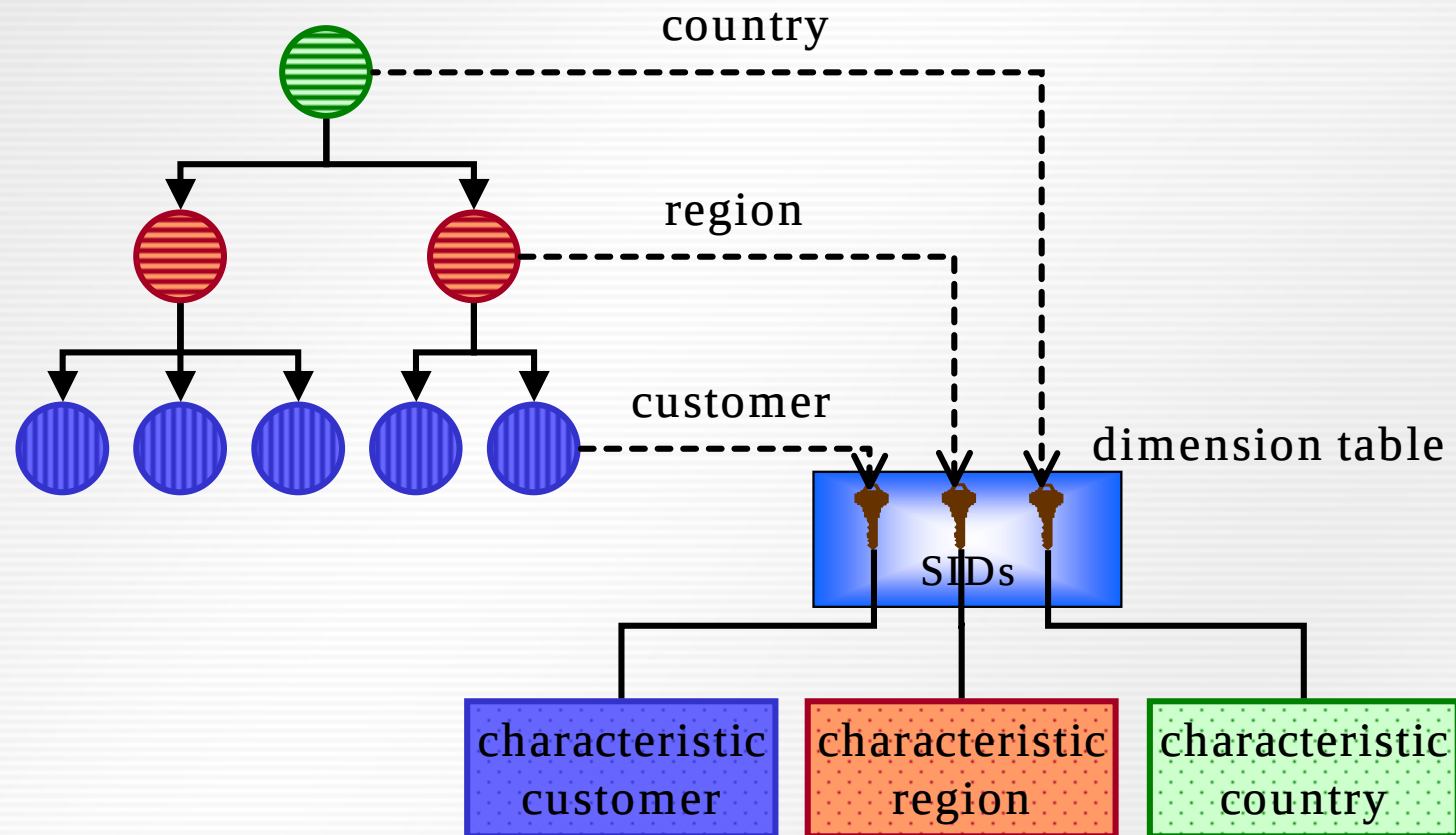
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Modeling Hierarchical structures in BW

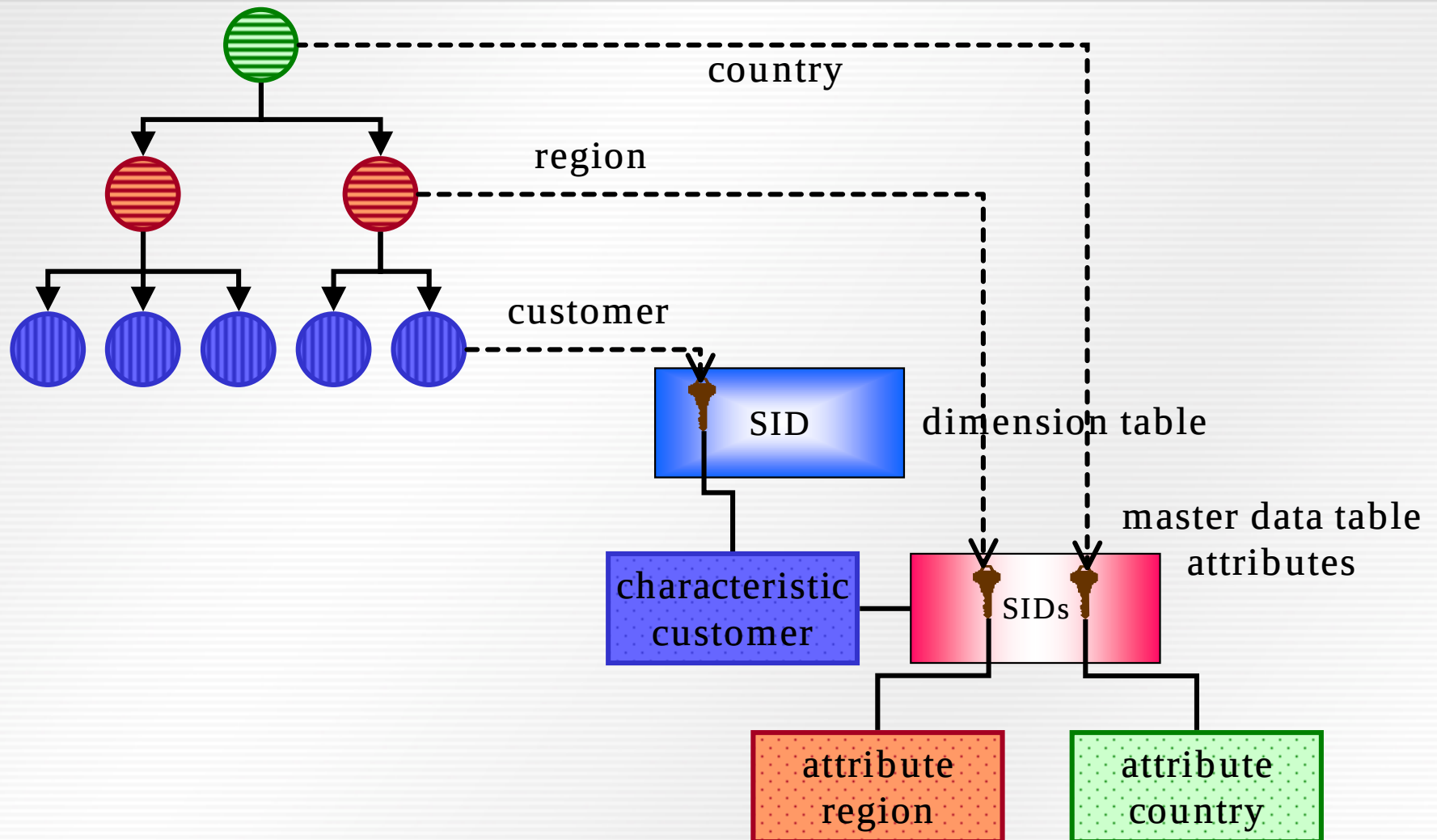
Model region and country



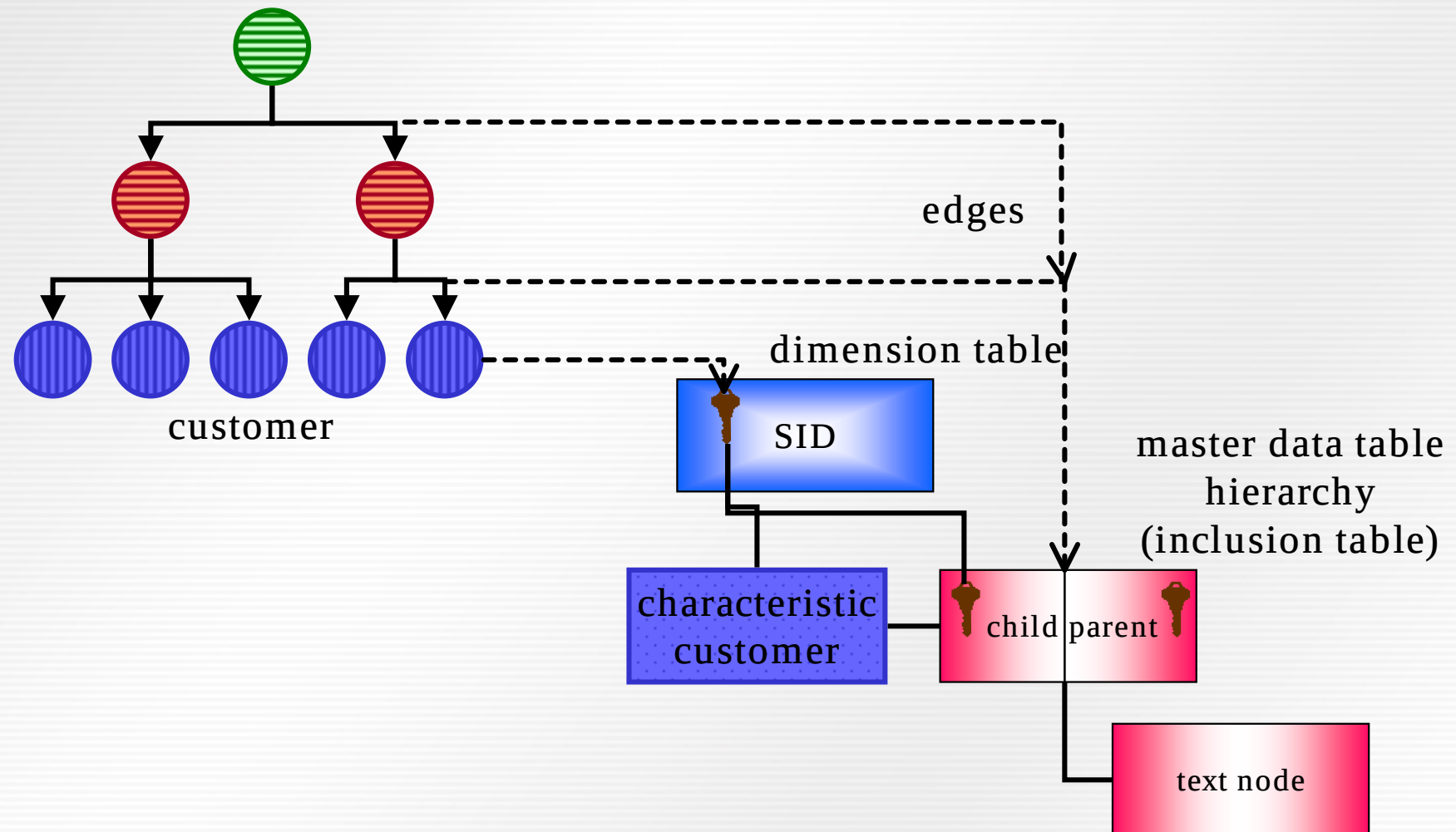
Hierarchical structures between characteristics



Hierarchical structures based upon navigational attributes



Hierarchies in BW



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Slowly Changing Dimensions - Example

Product dimension in 2003-04

Product	Product Group
P A	PG X
P B	PG X
P C	PG Y
P D	PG Y

Product dimension in 2003-05

Product	Product Group
P A	PG X
P B	PG Y (changed)
P C	PG Y
P D	PG Y
P E	PG Y (new)

Fact Table

Product	Time	Revenue
P A	2003-04	100
P B	2003-04	100
P C	2003-04	100
P D	2003-04	100
P A	2003-05	100
P B	2003-05	100
P C	2003-05	100
P D	2003-05	100
P E	2003-05	100

time scenarios – possible reporting demands

Report using today's constellation

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	100	100
PG Y	300	400

Report using constellation of 2003-04

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	200	200
PG Y	200	200

Reporting historical truth

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	200	100
PG Y	200	400

Reporting comparable results

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	100	100
PG Y	200	200

Scenario I : report data with today's constellation

Product dimension in 2003-05

Product	Product Group
P A	PG X
P B	PG Y (changed)
P C	PG Y
P D	PG Y
P E	PG Y (new)

Fact Table

Product	Time	Revenue
P A	2003-04	100
P B	2003-04	100
P C	2003-04	100
P D	2003-04	100
P A	2003-05	100
P B	2003-05	100
P C	2003-05	100
P D	2003-05	100
P E	2003-05	100

Report using today's constellation

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	100	100
PG Y	300	400

Scenario I : Solutions in BW

- Product Group as Navigational Attribute of the Characteristic Product
join from Product Group SID-Table to Product Attribute SID-Table
to Dimension Table to Fact Table
- Modelling the relation Product Group -> Product in an External Hierarchy
join from Product Hierarchy Table to Dimension Table to Fact Table

Scenario II : report data with yesterday's constellation

Product dimension in 2003-04

Product Product Group

P A	PG X
P B	PG X
P C	PG Y
P D	PG Y

Missing Product P E

Fact Table

Product	Time	Revenue
P A	2003-04	100
P B	2003-04	100
P C	2003-04	100
P D	2003-04	100
P A	2003-05	100
P B	2003-05	100
P C	2003-05	100
P D	2003-05	100
P E	2003-05	100

Report using constellation of 2003-04

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	200	200
PG Y	200	200

Scenario II : Solutions in BW

- Product Group as time-dependant Navigational Attribute of the Characteristic Product
join from Product Group SID-Table to Product time-dependant Attribute SID-Table with Query-Keydate to Dimension Table to Fact Table
- Modelling the relation Product Group -> Product in an External Hierarchy with versioning, time-dependant hierarchy or even time-dependant structure
join from Product Hierarchy Table with Query Keydate to Dimension Table to Fact Table

Scenario III : Reporting historical truth

Product dimension in 2003-04

Product	Product Group
P A	PG X
P B	PG X
P C	PG Y
P D	PG Y

Product dimension in 2003-05

Product	Product Group
P A	PG X
P B	PG Y (changed)
P C	PG Y
P D	PG Y
P E	PG Y (new)

Fact Table

Product	Time	Revenue
P A	2003-04	100
P B	2003-04	100
P C	2003-04	100
P D	2003-04	100
P A	2003-05	100
P B	2003-05	100
P C	2003-05	100
P D	2003-05	100
P E	2003-05	100

Reporting historical truth

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	200	100
PG Y	200	400

Scenario III : Solution in BW

- Model Product Group and Product as Characteristics in the same dimension
join from Product Group SID-Table to Dimension Table to Fact Table

Scenario IV: reporting comparable results

Product dimension in 2003-04

Product Product Group

P A	PG X
P B	PG X
P C	PG Y
P D	PG Y

Product dimension in 2003-05

Product Product Group

P A	PG X
P B	PG Y (changed)
P C	PG Y
P D	PG Y
P E	PG Y (new)

Fact Table

Product Time Revenue

P A	2003-04	100
P B	2003-04	100
P C	2003-04	100
P D	2003-04	100
P A	2003-05	100
P B	2003-05	100
P C	2003-05	100
P D	2003-05	100
P E	2003-05	100

Reporting comparable results

Product Group	Revenue 2003-04	Revenue 2003-05
PG X	100	100
PG Y	200	200

Scenario IV : Solution in BW

- Product Group as time-dependant Navigational Attribute of the Characteristic Product with additional time-dependant attributes

join from Product Group SID-Table to Product time-dependant Attribute SID-Table with Query-Keydate to Dimension Table to Fact Table

to ensure the validity of structure in all reported periods we need additional time-dependant attributes FROM and TO, because the system attributes can't be used in a query to filter

Query with Keydate in the reported time interval, FROM le lower bound of reported period, TO ge upper bound of reported period

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