

Understanding Transitive Attributes

Applies to:

SAP Business Information Warehouse

Summary

This document helps understanding transitive attribute with few examples and elaborates on the need to model it differently. It also details out special care to be taken for various update modes - Full and Delta

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Introduction

A navigational attribute is any attribute of a characteristic which is treated in very similar way as we treat a characteristic i.e one can perform drilldowns, filters etc on the same.

A navigational attribute of a navigational attribute is called a '**Transitive Attribute**'. i.e. if A has B as a navigational attribute and further, B has C as it's navigational attribute then C is called a 'Transitive Attribute'.

The way the infocube is designed determines the ease of availability of navigational attributes in the query. If the infocube design includes both the characteristic and its navigational attribute (i.e for e.g. say both characteristics A and its navigational attribute B) then minimal or no efforts are needed to bring all the characteristics i.e A, B and C in the final report. However, if we have only characteristic A in the infocube design we need to do modeling of master data infocube, design of update rule etc in a different way to have better performance and database lookups.

This article details out the concept of the 'Transitive Attributes' in general and explains the reason for special modeling for cases when only the characteristic is included in the infocube design and not its navigational and transitive attribute. if only 'A' exists in the infocube, along with a example.

A lot of material also exists on the Internet and SAP help explaining transitive attributes, which could be referred for understanding this concept.

Scenario

Consider there exists a characteristic 'Employee' .It has 'Position' as its navigational attribute. 'Position' further has a navigational attribute 'Employee group'. Thus 'Employee group' is the transitive attribute. A drilldown is needed on both 'Position' and 'Employee group'.

To better understand this topic, two scenarios are explained

- Cube contains both 'Employee' and 'Position'
- Cube contains only 'Employee'

Scenario 1: Cube contains both 'Employee' and 'Position' characteristic

When we have both the characteristics (Employee and Position) in the cube definition, the navigational attributes are displayed and available correctly. The reason is the dim ids get properly linked to the sids which in turn are linked to the attributes correctly. 'Position' in this case can be updated in update rules as master data attribute of 'Employee' and hence gets the appropriate sids.

Scenario 2: Cube contains only 'Employee' characteristic

However, if cube has only one characteristic (Employee), we are not able to correctly see the further navigational attributes as the dimid cannot get the sid generated for the attribute (in this case for 'Position'). Neither are we able to update 'Position' via update rules, as it is not available in the cube design itself. As a result these attributes are not automatically available for navigation in the query. And this is the scenario, where we need to do special modeling.

To summarize:

If Cube contains both 'Employee' and 'Position'	If Cube contains only 'Employee'
Dimension table having both 'Employee' and 'Position' will have Dim ID, Sid of Employee, and Sid of Position. Since both the Sids exists reference of each navigational attribute is made correctly	Dimension table having only 'Employee' will have Dim ID, Sid of Employee. Since Sid for first level navigational attribute (Position) does not exists, reference to navigational attribute is not made correctly.

Modeling steps for scenario having just one characteristic in infocube

The special modeling is explained below in depth. This is a scenario wherein only infoobject 'Employee' exists in the infocube. We now need to establish a right relationship between all 3 concerned infoobjects ('Employee', 'Position' and 'Employee Group') especially, between 'Employee' and 'Employee Group' through 'Position'.

- To achieve this relationship, create a new characteristic say 'Employee_Trans' which has 'Employee Group' as its navigational attribute.
- Maintain the technical Settings of 'Employee_Trans' similar to that of 'Employee'.
- Add this new characteristic (Employee_Trans) in the infocube. Also switch on 'Employee Group' as navigation attribute in infocube.
- Create a new infosource with flexible update and map it to the datasource of 'Employee'. Being a flexible update for the infosource, final update to the infoobject takes place via update rules
- The update rules are defined while updating 'Employee' and 'Employee_Trans' using datasource of 'Employee'. The datasource for 'Employee' delivers 'Employee' and 'Position' and updates its master data table.
- The update rule for 'Employee_Trans' is defined in such a way that 'Employee_Trans' is updated from master data table of 'Employee'. Thus 'employee' and 'Employee_Trans' are same. 'Position' (from master data table of 'Employee') is used to determine Employee Group'. The 'Employee Group' is then further written to master data table of 'Employee_Trans' via a routine.
- To summarize, when 'Employee' gets updated from source system say R/3, transitive attribute 'Employee Group' is updated from master data table of 'Position' in update rule while updating master data table of 'Employee_Trans'

Assume source of Employee is a flat file and has following data

Employee	Position
1	POS1
2	POS2

It is very important that Infoobject 'Position' is updated first in the BW system and then the data loaded for infoobject 'Employee' is loaded. So lets assume the master data for 'Position' exists as follows already in the system.

Position	Employee Group
POS1	EG1
POS2	EG2

Now we load the flat file for 'Employee'. It has 2 update rules, one loading 'Employee' and other loading 'Employee_Trans'.

Update rule 1 loads master data table of 'Employee' as seen in flat file above with its respective update rules with one-to-one mapping (i.e Employee and Position from flat file mapped to Employee and Position respectively in BW communication structure).

Update rule 2 loads master data table of 'Employee_Trans' with following mapping:

'Employee' from flat file is mapped to 'Employee_Trans'. A update routine is written for updating 'Employee Group' in master data table of 'Employee_Trans'. This routine makes a lookup in the master data table of 'Employee' and gets the 'Position' for respective employee and further uses it to get 'Employee Group' from master data table of 'position', which is loaded, at the very beginning.

Further information on the same can be obtained from the SAP help site.

Care to be taken for this special modeling

- For full load enabled extractor of 'Employee', the introduction of 'Employee_Trans' in the cube and loading it in the way defined above is complete and full proof method for full updates of master data upload.
- However it can create problems for delta loads (i.e for delta enabled extractor of 'employee). To explain this assume below scenario. As discussed assume 'Position' is already loaded in system and following change takes place POS1→EG1 changes to POS1→EG3.

Position	Employee Group
POS1	EG1 EG3
POS2	EG2

Now assume 'Employee' extractor is delta enabled. As far as source is concerned data is as follows i.e there is no change in 'Employee'→'Position' mapping. So delta load will not bring any data.

Employee	Position
1	POS1
2	POS2

As a result, update rule 2 explained above would not have any effect. So, 1→POS1→EG3 relation would not take place even though POS1 is mapped to EG3 instead of EG1. 'Employee_Trans' master data table would still be as follows:

Employee_Trans	Employee Group
1	EG1
2	EG2

To overcome the above problem for delta enable extractors, we can introduce an ODS in between to get the delta changes and further load it from there to update mater data table of 'Employee_Trans' using same update rule and full update.

Related Content

1. [SAP Help on Transitive attributes](#)
2. [SDN Site](#)

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