

# Reporting and Planning on Comparable Stores in SAP BW and BPC

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## What is Comparable Stores?

Comparability is one of the key concepts in BI Analytics for Retailers. If certain shops are new, closing down, being remodeled or closed due to whatever reason they cannot be compared the same way as the shops that are performing in a “business as usual” mode. In business planning and forecasting it makes sense to use history only for comparable stores. In other words, **comparable stores** can refer to a retail company's same-store sales compared to the previous year, and **is used by analysts to make apples-to-apples comparisons from year to year.**

Even though this sounds like a relatively easy task from a technical point of view architects may face a number of challenges when implementing a performing comparable store solution.

For retailers that manage hundreds or thousands of stores it may be challenging to identify which stores are comparable at which point in time. Usually this relationship is maintained in a spreadsheet by analysts with a specific business knowledge. We may want to assign a comparability value by year to each store, such as: “Comparable”, “New”, “Closing down”, “Remodeled”, etc. Alternatively, in the case of a simplified approach Comparability attribute may be assigned “Yes” (comparable) or “No”. Comparability master data may be redefined and reuploaded several times during the year.

There is also a possibility to automate partially or in full store comparability assignments using algorithms that identify which store belongs to which category at which point in time by analyzing historical sales and budget data. However, it is becoming increasingly challenging when certain information cannot be easily derived, such as future store remodeling dates, information about new or closing stores.

Comparable store sales are important barometers used by  
company management and financial analysts as well as potential  
investors in the company.

In cases where comparability master data has been uploaded to a database (e.g. SAP BW) we may still

face a technical challenge on how to properly apply it in reporting and business planning. Below I review a few practical scenarios and architecture examples on how comparable master data can be used in analytics in a performing way within SAP BW on HANA (BW/4HANA) and/or SAP BPC Embedded.

## Comparability Master Data Upload

First of all, let us assume we have a model in SAP BW for uploading comparability master data via BW Workspaces (see the following white paper for more information on how this can be set up: [SAP BPC Embedded and BW Workspaces](#)).

The input file's structure for the master data upload may look as follows:

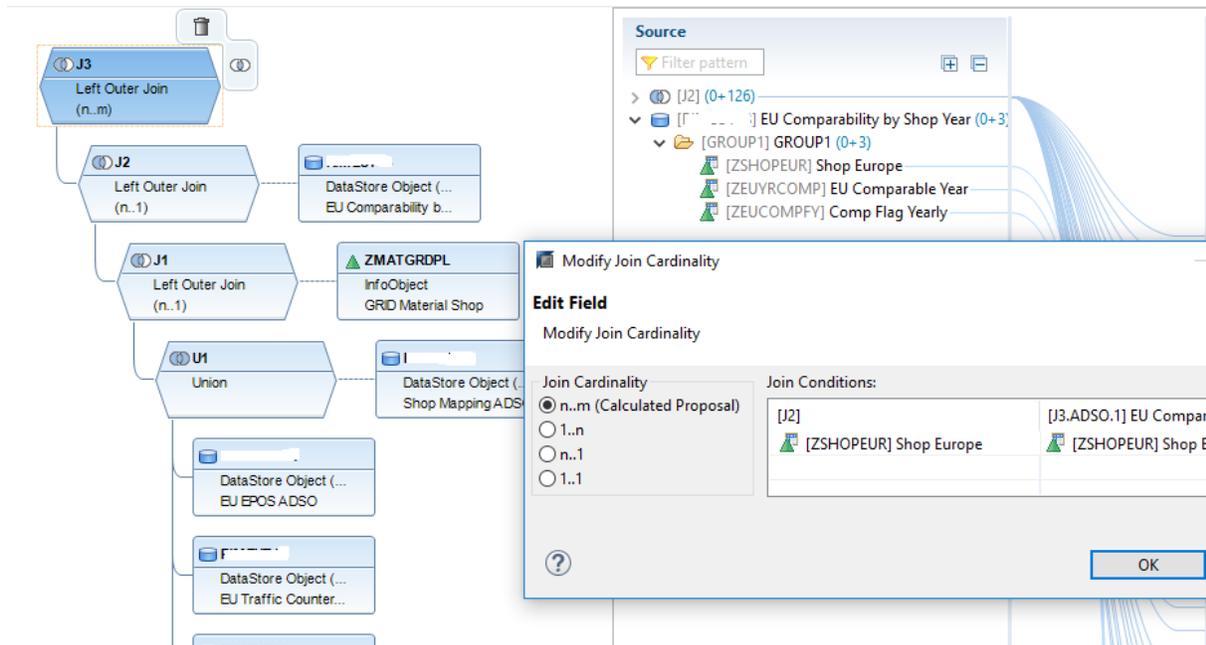
Site ID	Year	Comparability
S401	2016	No
S401	2017	No
S401	2018	Yes
S404	2016	No
S404	2017	No
S404	2018	Yes
S413	2016	No
S413	2017	Yes
S413	2018	Yes

Usually comparability concept is applied versus a prior year. Therefore, it is important to ensure that the input file with comparability master data is prepared and maintained by comparing store's situation year by year.

## Query Performance on Composite Providers with n..m Join Cardinality

A straight forward approach towards designing a model around comparability would be to set up a Composite Provider that would join transactional data (possibly a union of several transactional datasets) together with an ADSO with the uploaded comparability master data. The join may be done via a Store (shop) infoobject as comparable year may be applied to multiple transactional years.

Here is an example of a composite provider that may be used in this case:



In this scenario BW proposes an n..m cardinality join as each line on the left side of the join may have multiple corresponding lines on the right side of the join. In cases of relatively small data volumes and simple composite providers this approach may be workable. However, in cases of large data volumes combining datasets of different nature (e.g. sales + stock data) and complex composite providers with multiple joins query performance may become an issue.

For example, in the scenario outlined above a simple query execution for one comparable year may take 5-10 minutes or longer. (This has been tested on 50M+ records stock dataset and 20M+ records sales dataset). In most business scenarios such poor query performance is unacceptable.

SAP does not recommend using joins with n..m cardinality as it leads to poor query performance. Here are a couple useful notes related to addressing performance on SAP HANA Composite Providers (HCPs):

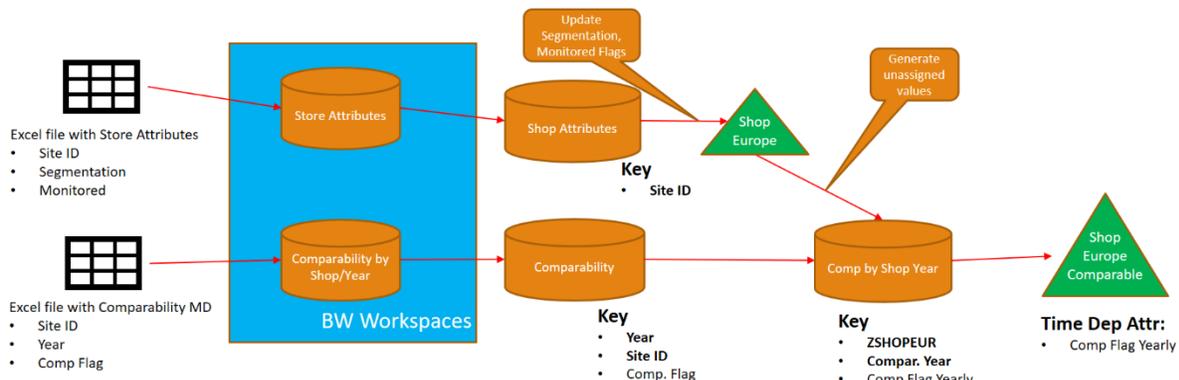
- Note 2271658 - [Design Considerations for Composite Provider](#)
- Note 2103032 - [Long runtimes in query on CompositeProvider](#)

## Use Time Dependent Attributes Instead

To address query performance issues for store comparability analytics we may want to use infoobject's time-dependent attributes instead of composite providers with n..m cardinality joins. This means that one report or dashboard can be executed for one comparable year (key date) at one point in time. This assumption is reasonable as comparability by store for multiple years does not really make sense in one report, usually we analyze stores comparable in each year independently.

The following is a sample data flow that can be used for uploading comparability values as time

dependent attributes by store:



In the infoobject's transformation for generating time-dependent attributes we would have to assign first and last day of the comparable year to the 'date from' and 'date to'.

Pos	Key	InfoObject	Ico	Descript.	Data t	Length
1	ZSHOPEUR	Shop Europe		Shop Europe w Comparability	CHAR	000010
2	ZEUYRCOMP	EU Comparable Year		Valid To	NUMC	000004
3	ORECORDMODE	BW Delta Process: Update Mode		Valid From	CHAR	000001
4	ZEUCOMPFY	Comp Flag Yearly		Comp Flag Yearly	CHAR	000003
5	ZSHMNGR	Shop Manager		Shop Manager		
6	ZMGREMAIL	Manager Email Address		Manager Email Address		

- Date to:

`CONCATENATE SOURCE_FIELDS-/BIC/ZEUYRCOMP '1231' INTO RESULT.`

- Date From:

`CONCATENATE SOURCE_FIELDS-/BIC/ZEUYRCOMP '0101' INTO RESULT.`

In the BW queries we would have to specify a variable for Key date that will be used for defining a comparable year during query runtime. The same key date variable can be used in the query for other purposes, e.g. for Year to Date, Month to Date, Stock at a point in time calculations, etc.

This design scenario is rather performing in SAP HANA, and comparable analytics for each key date (comparable year) can be derived within seconds, and not minutes, on the same transactional datasets.

## Business Planning on Comparable Stores

Enabling comparability by store may be a first step in business planning and forecast generation. In order to compare apples to apples we only want to use comparable history by store, year, product cluster, etc.

Comparable store analytics may be applied in the backend rules when generating a forecast proposal (e.g. version 0) in SAP BPC. It can also be useful in preparing actuals for machine learning (ML) regression algorithms. At the same time comparability may be an important classifier on the SAP BPC front end side where planning analysts can apply different forecast drivers depending on store's comparability status.

For more information on how to benefit from demand planning models for Retailers in SAP BPC Embedded see the following white paper:

[Tackling Retail Out of Stock Problem and Demand Planning with SAP BPC Embedded](#)



Sergei Peleshuk has over 15 years of experience implementing BI technologies for global clients in retail, distribution, fast-moving consumer goods (FMCG), oil, and gas, finance and insurance industries. He has helped organizations to design robust BI reporting and planning capabilities, leading them through all project phases: from analysis of requirements to building BI roadmaps, technical architecture, and efficient BI teams. Sergei is an expert in SAP Business Warehouse (SAP BW), SAP HANA, SAP BPC, BusinessObjects, SAP Analytics Cloud, and SAP Lumira. You may contact Sergei by email at [peleshuk@biportal.org](mailto:peleshuk@biportal.org)