Understanding DSO (DataStore Object) Part 1: Standard DSO

Applies to:

SAP NetWeaver BW.

Summary

This is the first of a three part series of documents containing each and every detail about DSOs and their implementation for beginners in SAP BI. For advanced users also, this document has many small but usually ignored helpful facts. Other parts: Part 2, Part 3.

This document is based on Standard DSO and their implementation. Every minute detail has been included.

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DataStore Object

Definition

A DataStore object serves as a storage location for consolidated and cleansed transaction data or master data on a document (atomic) level.

This data can be evaluated using a BEx query.

A DataStore object contains key fields (such as document number, document item) and data fields that, in addition to key figures, can also contain character fields (such as order status, customer). The data from a DataStore object can be updated with a delta update into InfoCubes (standard) and/or other DataStore objects or master data tables (attributes or texts) in the same system or across different systems.

Unlike multidimensional data storage using InfoCubes, the data in DataStore objects is stored in transparent, flat database tables. The system does not create fact tables or dimension tables.

Use

Overview of DataStore Object Types

Type	**Structure**	**Data Supply**	**SID Generation**
Standard DataStore Object	Consists of three tables: activation queue, table of active data, change log	From data transfer process	Yes
Write-Optimized DataStore Objects	Consists of the table of active data only	From data transfer process	No
DataStore Objects for Direct Update	Consists of the table of active data only	From APIs	No

Standard DataStore Object

Use

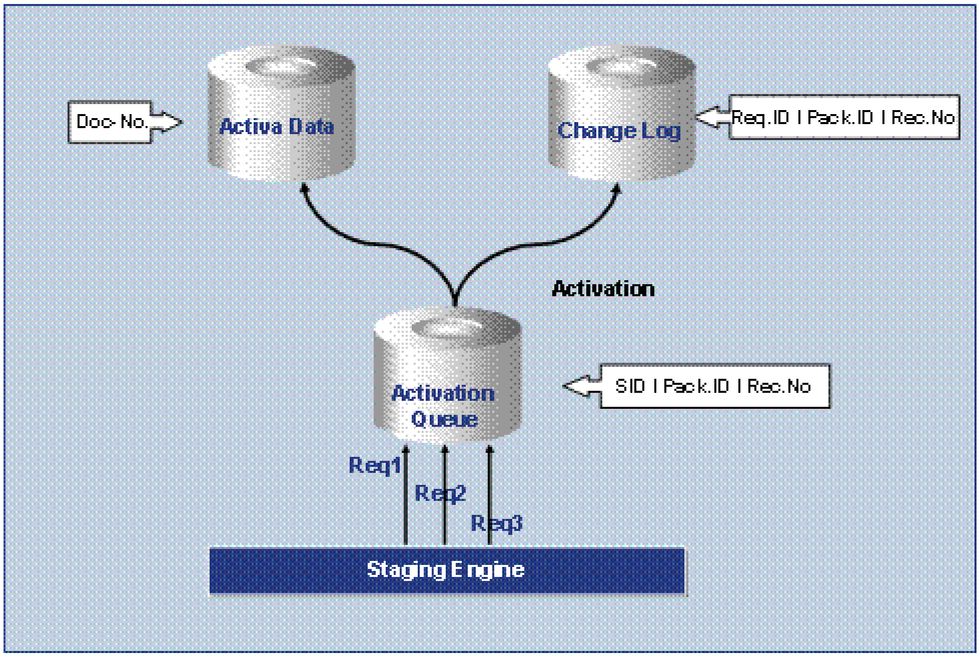
The standard DataStore object is filled with data during the extraction and loading process in the BI system.

Structure

A standard DataStore object is represented on the database by three transparent tables:

- **Activation queue**: Used to save DataStore object data records that need to be updated, but that have not yet been activated. After activation, this data is deleted if all requests in the activation queue have been activated.
- **Active data:** A table containing the active data (A table).
- **Change log**: Contains the change history for the delta update from the DataStore object into other data targets, such as DataStore objects or InfoCubes.

The tables of active data are built according to the DataStore object definition. This means that key fields and data fields are specified when the DataStore object is defined. The activation queue and the change log are almost identical in structure: the activation queue has an SID as its key, the package ID and the record number; the change log has the request ID as its key, the package ID, and the record number.



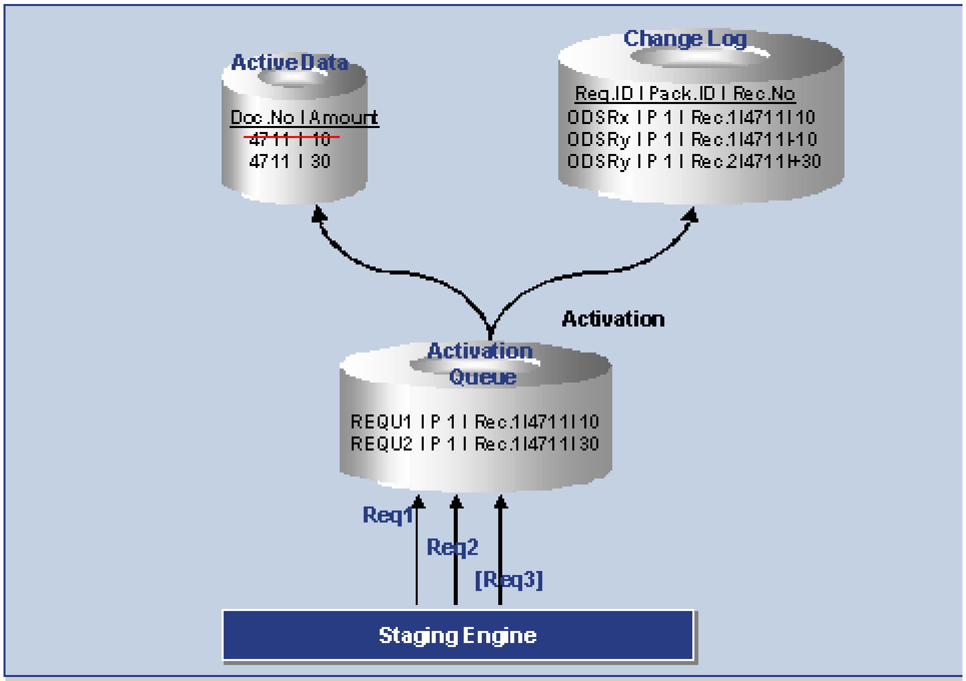
This graphic shows how the various tables of the DataStore object work together during the data load.

Data can be loaded from several source systems at the same time because a queuing mechanism enables a parallel INSERT. The key allows records to be labeled consistently in the activation queue.

The data arrives in the change log from the activation queue and is written to the table for active data upon activation. During activation, the requests are sorted according to their logical keys. This ensures that the data is updated to the table of active data in the correct request sequence.

Example for Activating and Updating Data

The graphic below shows how data is updated in a DataStore object and the effect of the activation step.


Active Data
Doc.No | Amount
~~4711 | 10~~
4711 | 30
Change Log
Req.ID | Pack.ID | Rec.No
ODSRx | P 1 | Rec.1|4711|10
ODSRy | P 1 | Rec.1|4711|-10
ODSRy | P 1 | Rec2|4711|+30
Activation
Activation Queue
REQU1 | P 1 | Rec.1|4711|10
REQU2 | P 1 | Rec.1|4711|30
Req1
Req2
[Req3]
Staging Engine

1. Request 1 with amount 10 and request 2 with amount 30 are loaded parallel into the DataStore object. This takes you to the activation queue. You are given a unique request ID there.
2. When you carry out the activation step, the requests are sorted by key, transferred into the table containing the active data, and immediately deleted from the activation queue. In the table containing the active data, the amount 10 is replaced by 30 (since Overwrite is set as the update type).
3. When you activate the data, the change log is also notified: The old record from the active table is saved as a negative (-10) and the new record is stored as a positive (+30).
4. If all the records are activated, you can update the changes to the data records for the DataStore object in the related InfoProvider in a separate step. The amount in this example is increased in the related InfoProviders by 20.

0RECORDMODE

Upon activation of Standard DSO, SAP Netweaver BW adds the 0RECORDMODE InfoObject to the definition of the Standard DSO and to all the three tables of the standard DSO.

This InfoObject is used internally by SAP Netweaver BW. You can overwrite the existing record for the same semantic key field combination, in addition to adding key figure values for the record with same semantic key field combination.

SAP Business Content offers DataSources for a number of standard business processes. The DataSource field ROCANCEL, for example is mapped to the 0RECORDMODE InfoObject in SAP NetWeaver BW. The combination of the Update mode set in transformation, along with the value of the 0RECORDMODE

InfoObject, helps SAP Netweaver BW properly treat the incoming record in the Active data and Change Log tables.

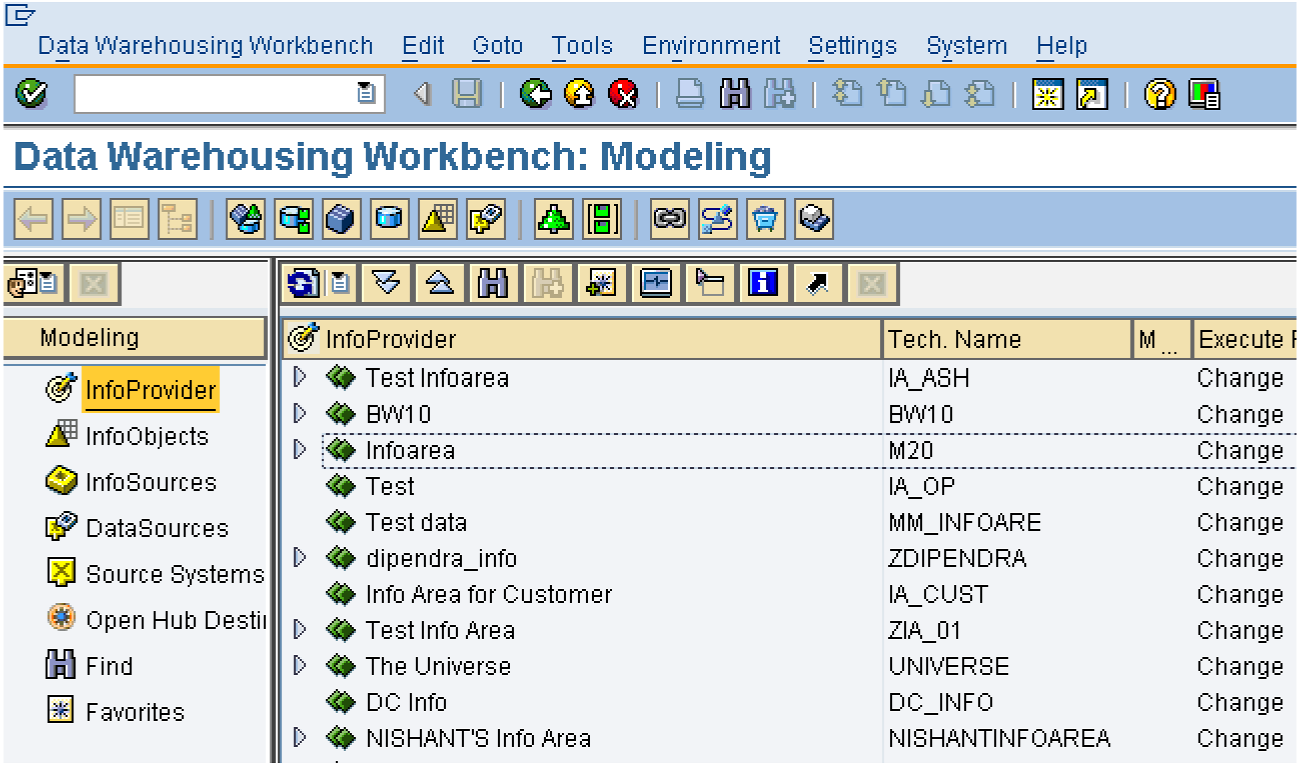
The following are the values for the field ROCANCEL and the meaning that they communicate about the record.

Value	Meaning
BLANK	The record provides an after image.
X	The record provides a before image.
A	The record provides an additive image.
D	The record must be deleted
R	The record provides a reverse image.
N	The record provides a new image.

Designing a standard DSO

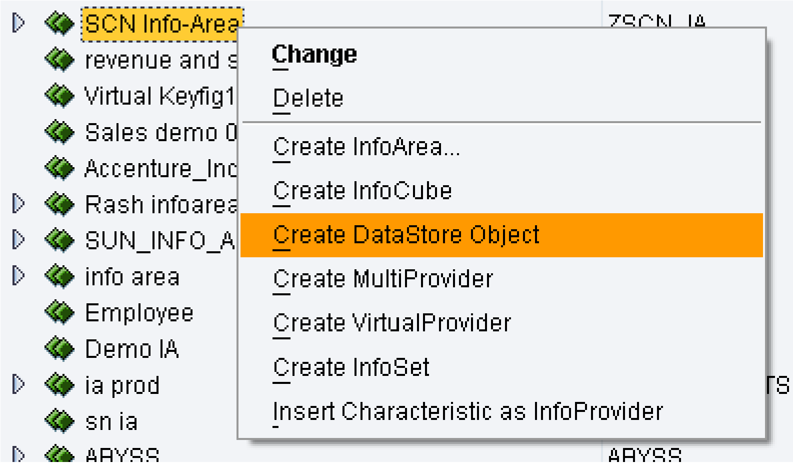
To create a Standard DSO, first go to **RSA1** transaction screen.

You will reach the DWW screen where you have to select **InfoProvider** under the **Modeling** pane present on the left side of the screen as shown below.



InfoProvider	Tech. Name	M ...	Execute F
Test Infoarea	IA_ASH		Change
BW10	BW10		Change
Infoarea	M20		Change
Test	IA_OP		Change
Test data	MM_INFOARE		Change
dipendra_info	ZDIPENDRA		Change
Info Area for Customer	IA_CUST		Change
Test Info Area	ZIA_01		Change
The Universe	UNIVERSE		Change
DC Info	DC_INFO		Change
NISHANT'S Info Area	NISHANTINFOAREA		Change

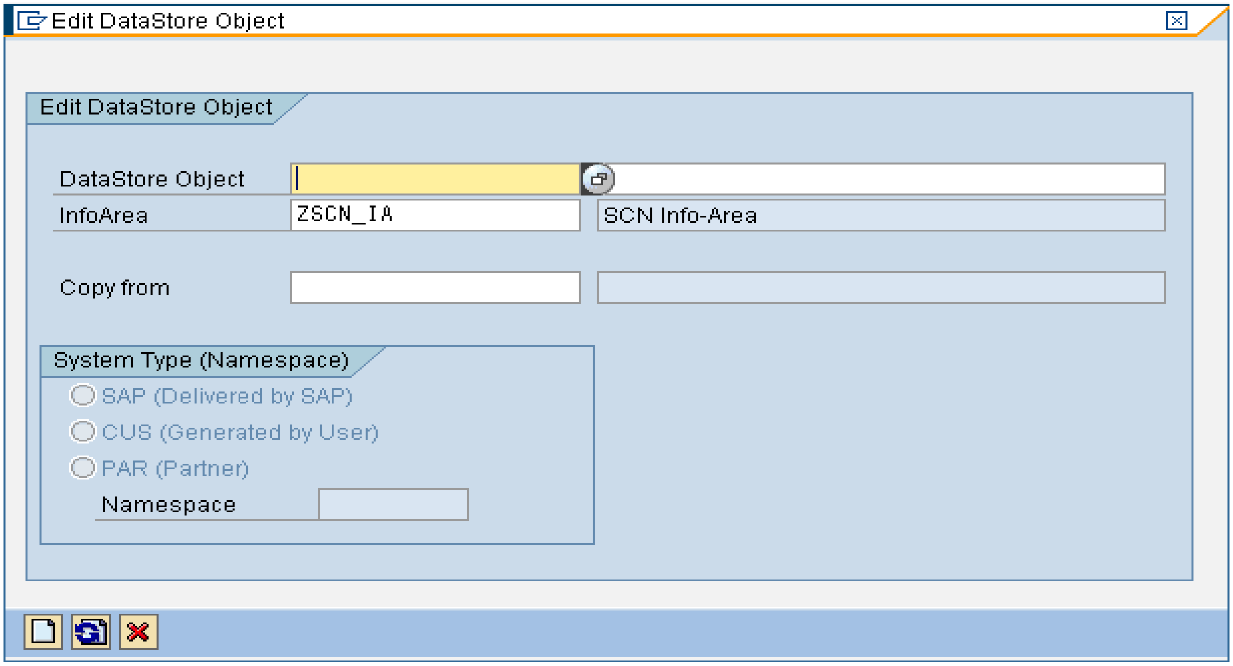
Now right click on your InfoArea and select **Create DataStore** Object from the context menu as shown below.



You will get the following window wherein you are required to fill in the technical name and description of the DSO to be created.

SAP has also provided an option of copying the entire DSO structure from another DSO using the **Copy from** Text-Field. This structure can be modified later.

In this case, we will be building the DSO from scratch.


Edit DataStore Object

Edit DataStore Object

DataStore Object

InfoArea ZSCN_IA SCN Info-Area

Copy from

System Type (Namespace)

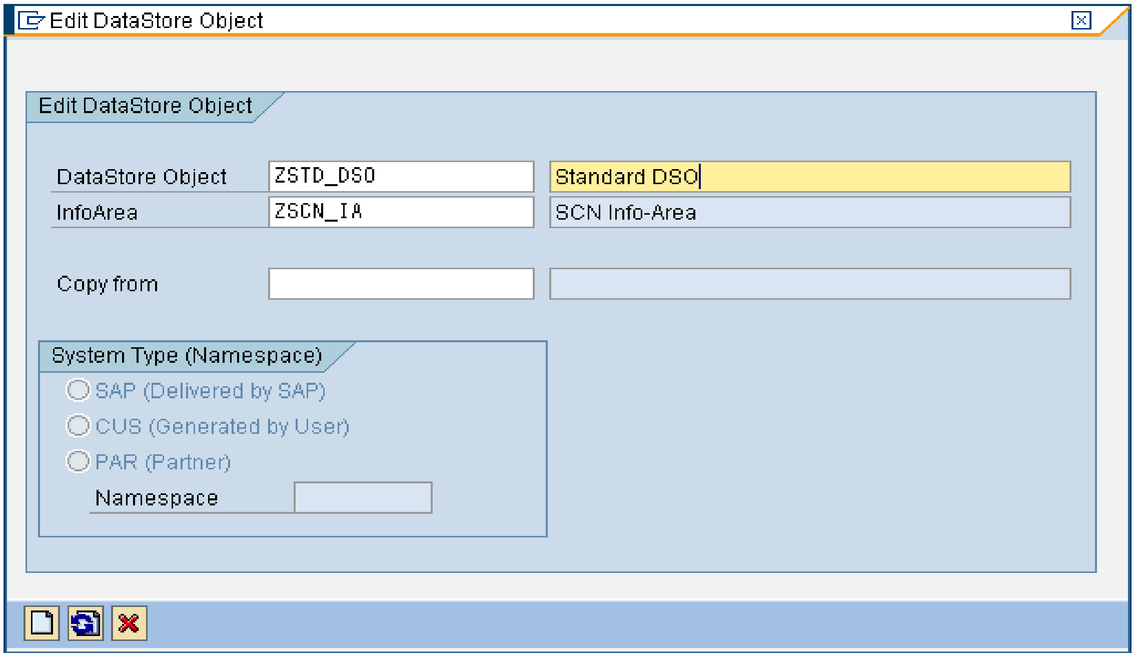
○ SAP (Delivered by SAP)

○ CUS (Generated by User)

○ PAR (Partner)

Namespace

The filled in details are shown below. Press the Create 🗋 button to continue.



Edit DataStore Object

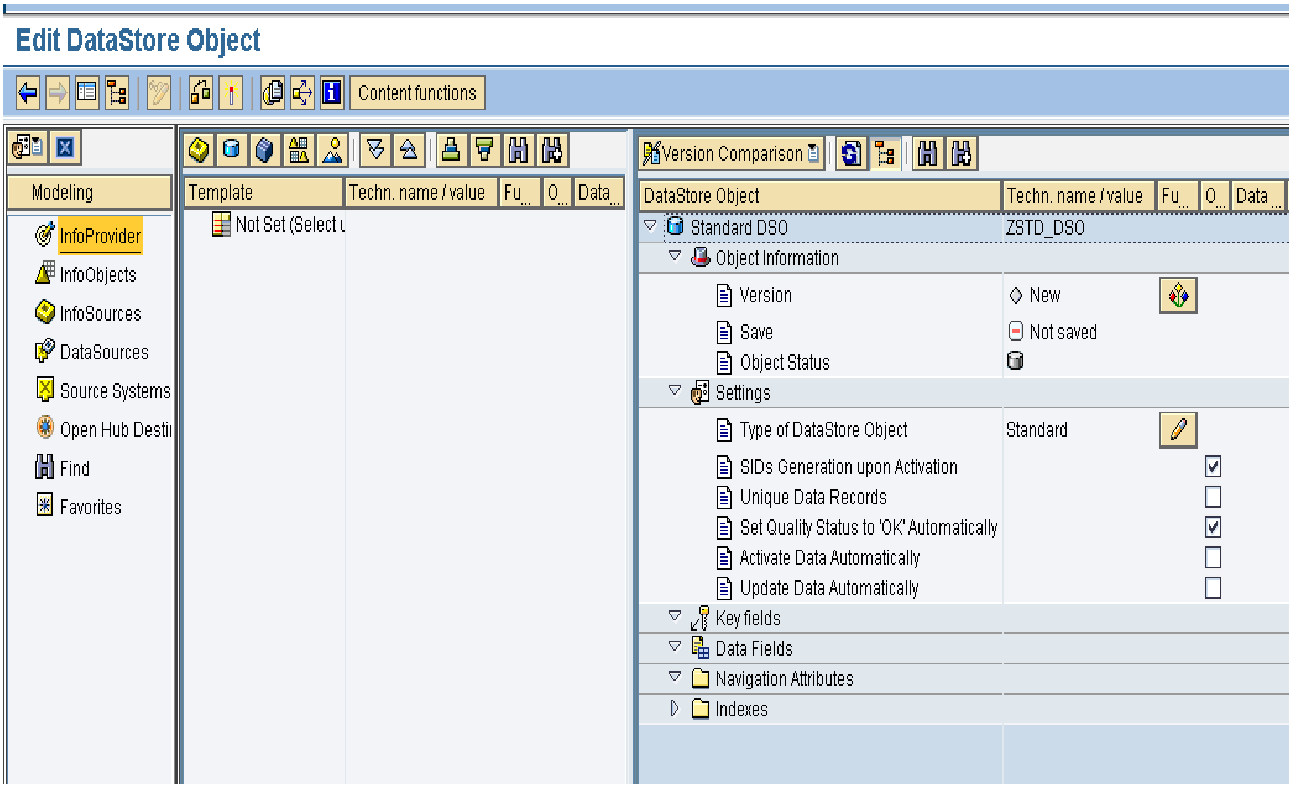
DataStore Object	ZSTD_DSO	Standard DSO
InfoArea	ZSCN_IA	SCN Info-Area
Copy from		

System Type (Namespace)

- ○ SAP (Delivered by SAP)
- ○ CUS (Generated by User)
- ○ PAR (Partner)

Namespace

You will reach the following screen for editing the DSO.



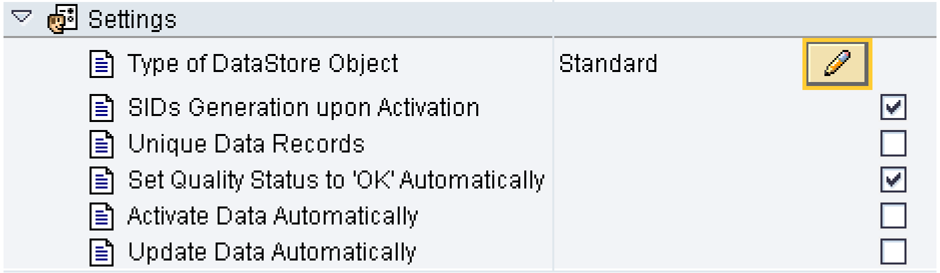
Edit DataStore Object

DataStore Object	Techn. name / value	Fu...	O...	Data ...
▽ Standard DSO	ZSTD_DSO			
▽ Object Information				
Version	◇ New			
Save	Not saved			
Object Status				
▽ Settings				
Type of DataStore Object	Standard			
SIDs Generation upon Activation		☑		
Unique Data Records		□		
Set Quality Status to 'OK' Automatically		☑		
Activate Data Automatically		□		
Update Data Automatically		□		
▽ Key fields				
▽ Data Fields				
▽ Navigation Attributes				
▷ Indexes				

Settings in Standard DSO

As you can see, the following settings are available in a Standard DSO.

All of them will be explained one-by-one below in detail.

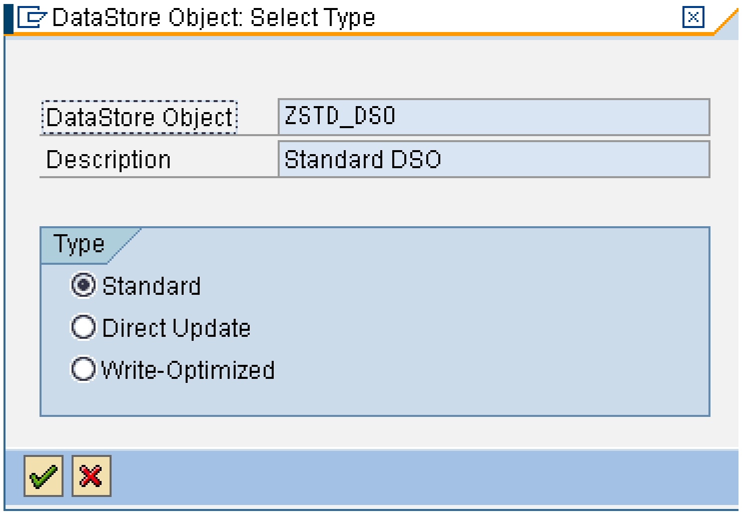


Settings	
Type of DataStore Object	Standard ✎
SIDs Generation upon Activation	☑
Unique Data Records	□
Set Quality Status to 'OK' Automatically	☑
Activate Data Automatically	□
Update Data Automatically	□

Type of DataStore Object

By Default, the DSO type is created as a standard type. This can be changed by clicking on the Change icon✎.

You will get the following pop-up.



DataStore Object: Select Type

DataStore Object	ZSTD_DSO
Description	Standard DSO

Type

● Standard
○ Direct Update
○ Write-Optimized

Since we are creating a Standard DSO, we will leave these settings unchanged and go back to the previous screen by pressing ✓ .

SID Generation upon Activation

When checked(Occurs by default), the SIDs Generation Upon Activation box causes the system to generate an integer number known as a Surrogate ID (SID) for each master data value. These SIDs are stored in separate tables called SID tables. For each characteristic InfoObject, SAP Netweaver BW checks the existence of an SID value for each value of an InfoObject in the SID table. The system then generates a new value of SID if an existing value is not found. The SID is used internally by SAP Netweaver BW when a query is based on a DSO.

In cases where the Standard DSO is not used for reporting and is just used for staging purposes, it is recommended to uncheck this checkbox.

Unique Data Records

This setting is used when there's no chance that the data being loaded to a standard DSO will create a duplicate record. It improves performance by eliminating some internal processes. If this box is checked and it turns out that there are duplicate records, you will receive an error message Because of this, you should only select this box when you are sure that you won't have duplicate data.

Set Quality Status to 'OK' Automatically

The Set Quality Status to 'OK' automatically flag results in the quality status of the data being set to "OK" after being loaded without any technical errors; the status must be set to this to activate newly loaded data in the standard DSO. Only activated data can be passed to further data targets.

Activate Data Automatically

Data loaded into standard DSOs first get sorted in the Activation Queue table, which is activated using the activation process. To make this process automatic, you should check this flag.

Update Data Automatically

Activated data available in a standard DSO can be passed to other data targets, such as another DSO or an InfoCube. This process can be automated by setting this flag.

Including Key Fields and Data Fields in the DSO

The DSO contains 2 kinds of fields namely, the key field and the data field.

The combination of key fields is responsible for uniquely identifying the data.

All other objects can be included as data fields.

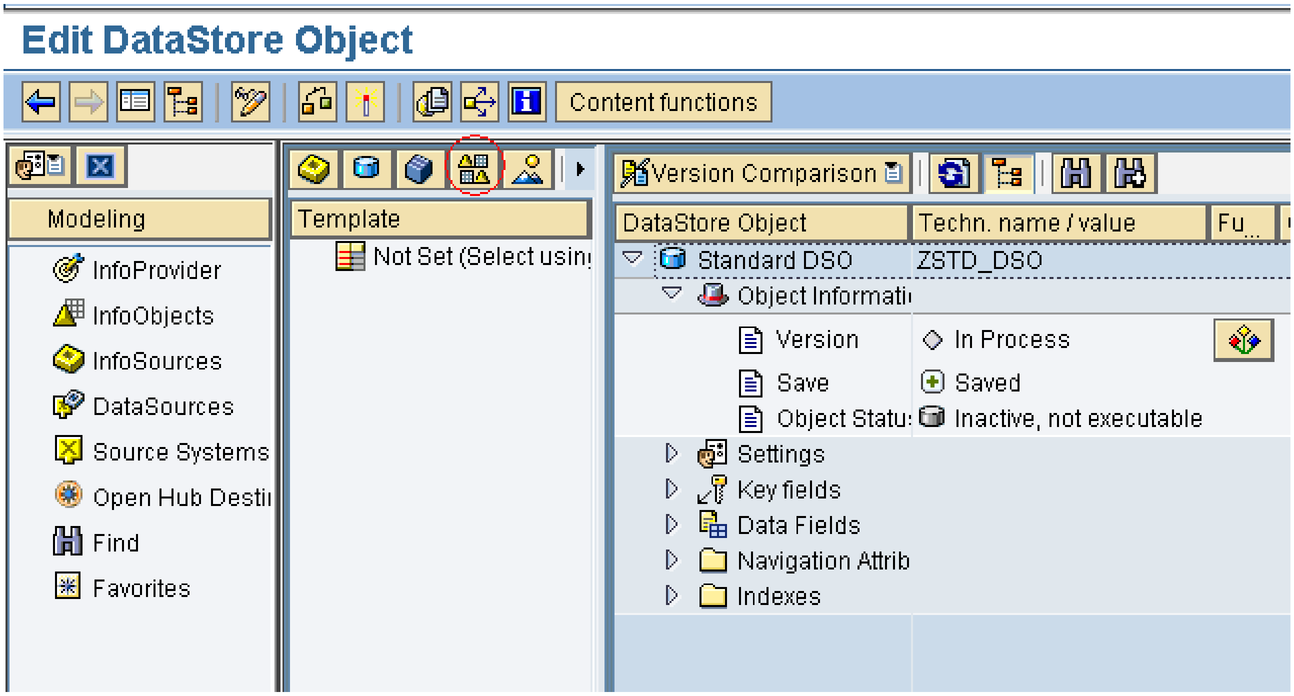
There are two ways to provide input InfoObjects into the DSO:

- Using Templates
- Using Direct Input

We will be explaining the use of both the methods with the example below.

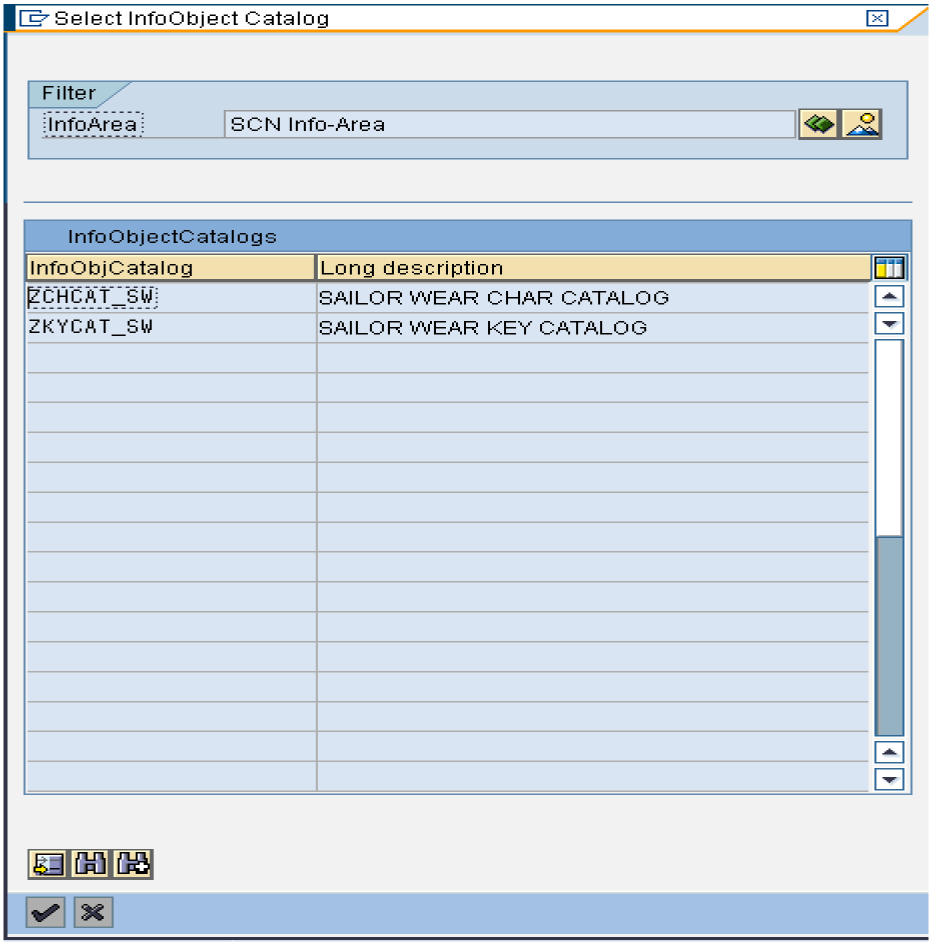
Using Templates

Click on the InfoObject Catalog button circled in Red below.



The following pop-up opens up.

Select the InfoArea associated with the InfoObjects you require using button.



Select InfoObject Catalog

Filter

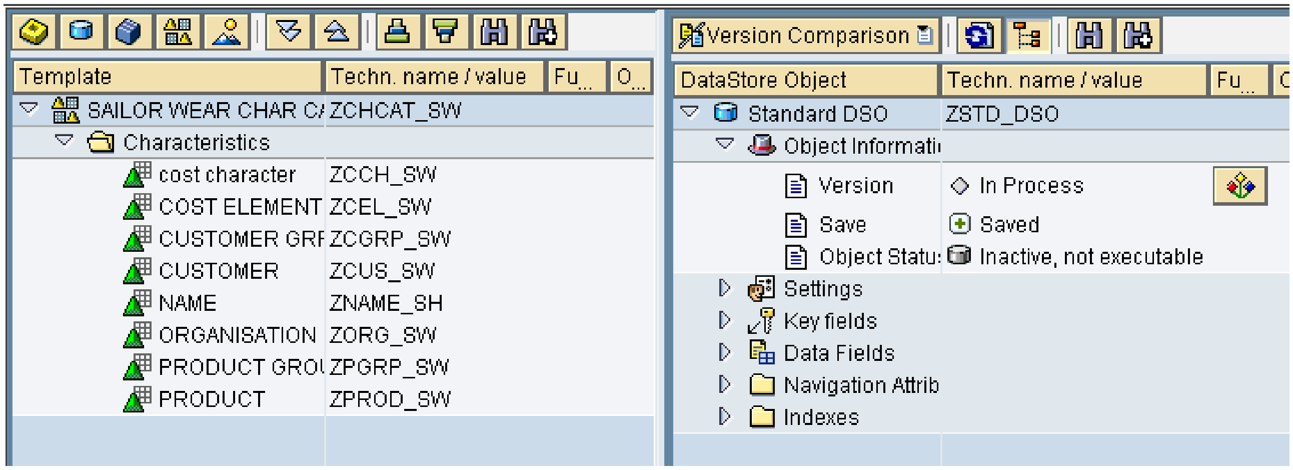
InfoArea: SCN Info-Area

InfoObjectCatalogs

InfoObjCatalog	Long description
ZCHCAT_SW	SAILOR WEAR CHAR CATALOG
ZKYCAT_SW	SAILOR WEAR KEY CATALOG

Firstly, for including the key fields double click on the Characteristics catalog.

You will see that the left template pane contains all the Characteristic Info-Objects contained in the Catalog.



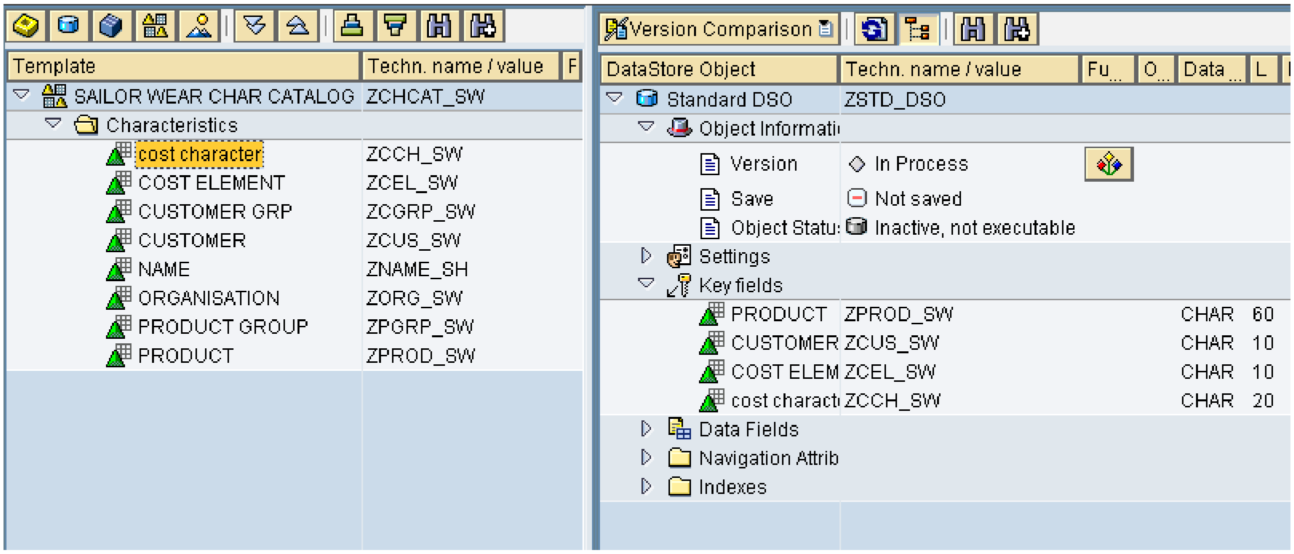
Template	Techn. name / value	Fu...	O...
SAILOR WEAR CHAR C/	ZCHCAT_SW		
Characteristics			
cost character	ZCCH_SW		
COST ELEMENT	ZCEL_SW		
CUSTOMER GRF	ZCGRP_SW		
CUSTOMER	ZCUS_SW		
NAME	ZNAME_SH		
ORGANISATION	ZORG_SW		
PRODUCT GROI	ZPGRP_SW		
PRODUCT	ZPROD_SW		

Version Comparison

DataStore Object	Techn. name / value	Fu...	C
Standard DSO	ZSTD_DSO		
Object Informati			
Version	In Process		
Save	Saved		
Object Statu:	Inactive, not executable		
Settings			
Key fields			
Data Fields			
Navigation Attrib			
Indexes			

Now simply drag and drop the info-objects required to be added as key fields from the left pane to the Key Fields menu in the right pane.

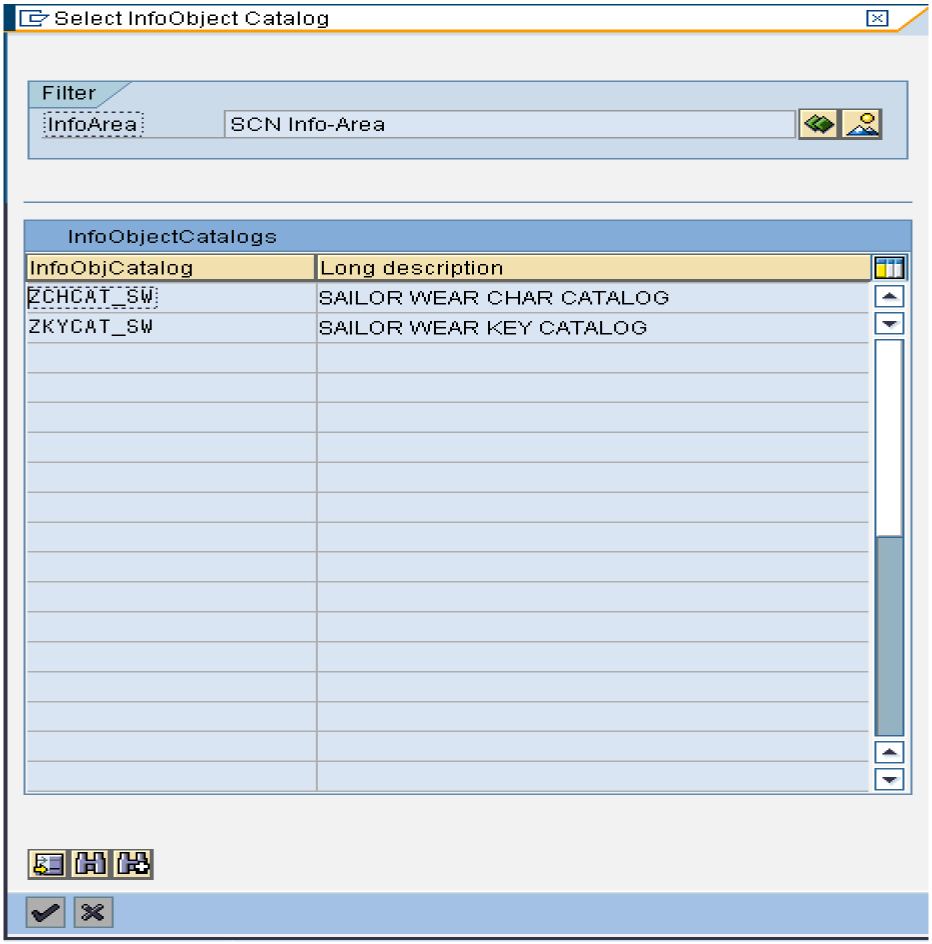
As you can see below, we have successfully added the key fields.



Template	Techn. name / value	F
SAILOR WEAR CHAR CATALOG	ZCHCAT_SW	
Characteristics		
cost character	ZCCH_SW	
COST ELEMENT	ZCEL_SW	
CUSTOMER GRP	ZCGRP_SW	
CUSTOMER	ZCUS_SW	
NAME	ZNAME_SH	
ORGANISATION	ZORG_SW	
PRODUCT GROUP	ZPGRP_SW	
PRODUCT	ZPROD_SW	

DataStore Object	Techn. name / value	Fu...	O...	Data ...	L	I
Standard DSO	ZSTD_DSO					
Object Informati						
Version	In Process					
Save	Not saved					
Object Statu	Inactive, not executable					
Settings						
Key fields						
PRODUCT	ZPROD_SW			CHAR	60	
CUSTOMER	ZCUS_SW			CHAR	10	
COST ELEM	ZCEL_SW			CHAR	10	
cost charact	ZCCH_SW			CHAR	20	
Data Fields						
Navigation Attrib						
Indexes						

Now open up the InfoObject catalog again and select the key figures to add the Data Fields.



Select InfoObject Catalog

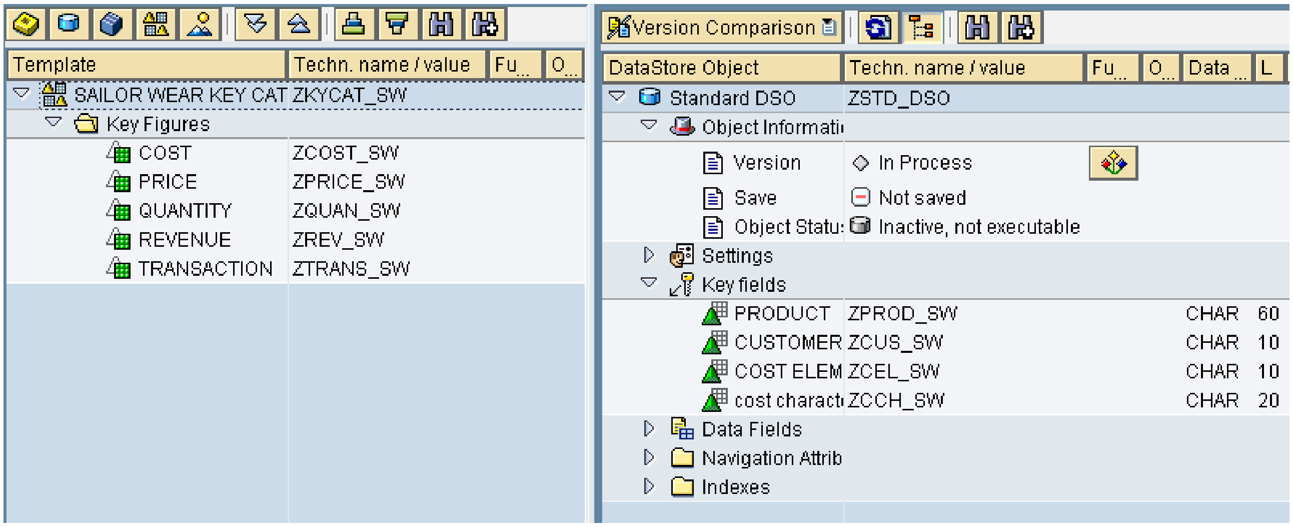
Filter

InfoArea: SCN Info-Area

InfoObjectCatalogs

InfoObjCatalog	Long description
ZCHCAT_SW	SAILOR WEAR CHAR CATALOG
ZKYCAT_SW	SAILOR WEAR KEY CATALOG

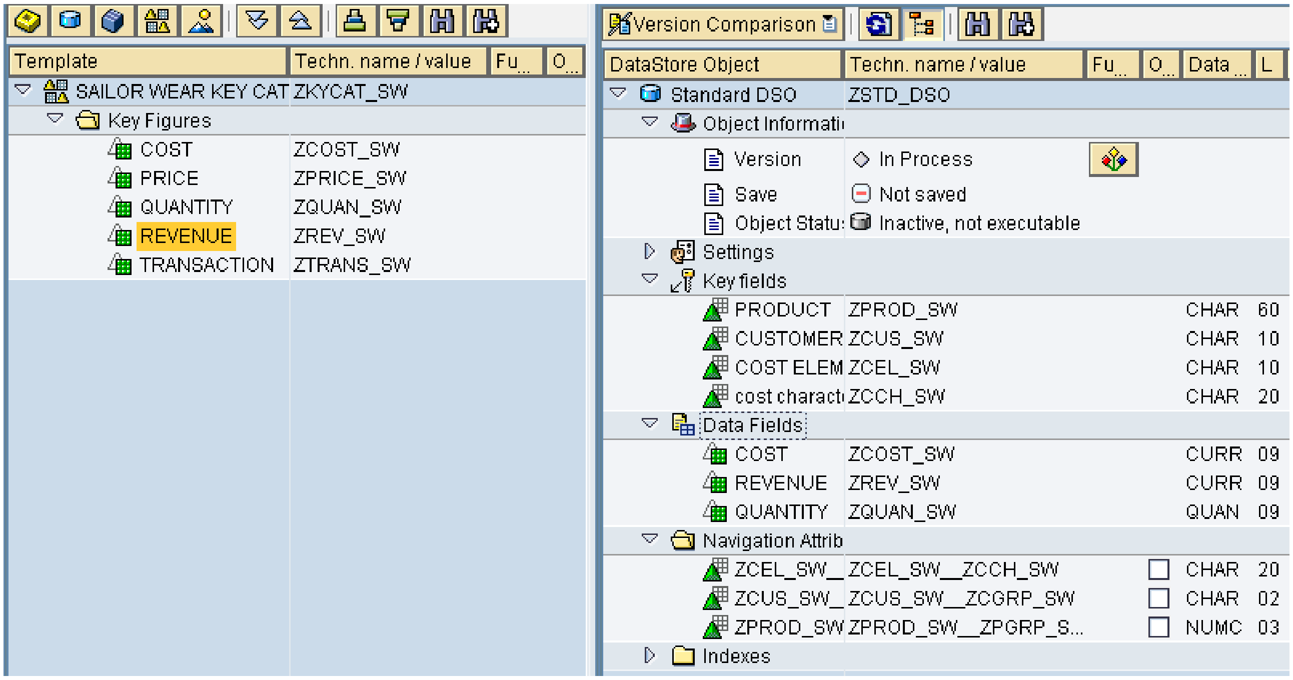
You will see that the left template pane contains all the Key Figure Info-Objects contained in the Catalog.



Template	Techn. name / value	Fu...	O...
SAILOR WEAR KEY CAT	ZKYCAT_SW		
Key Figures			
COST	ZCOST_SW		
PRICE	ZPRICE_SW		
QUANTITY	ZQUAN_SW		
REVENUE	ZREV_SW		
TRANSACTION	ZTRANS_SW		

DataStore Object	Techn. name / value	Fu...	O...	Data ...	L
Standard DSO	ZSTD_DSO				
Object Informati					
Version	In Process				
Save	Not saved				
Object Statu:	Inactive, not executable				
Settings					
Key fields					
PRODUCT	ZPROD_SW			CHAR	60
CUSTOMER	ZCUS_SW			CHAR	10
COST ELEM	ZCEL_SW			CHAR	10
cost charact	ZCCH_SW			CHAR	20
Data Fields					
Navigation Attrib					
Indexes					

Similar to what we did before, simply drag and drop the info-objects required to be added as key fields from the left pane to the Key Fields menu in the right pane.



Template	Techn. name / value	Fu...	O...
SAILOR WEAR KEY CAT	ZKYCAT_SW		
Key Figures			
COST	ZCOST_SW		
PRICE	ZPRICE_SW		
QUANTITY	ZQUAN_SW		
REVENUE	ZREV_SW		
TRANSACTION	ZTRANS_SW		

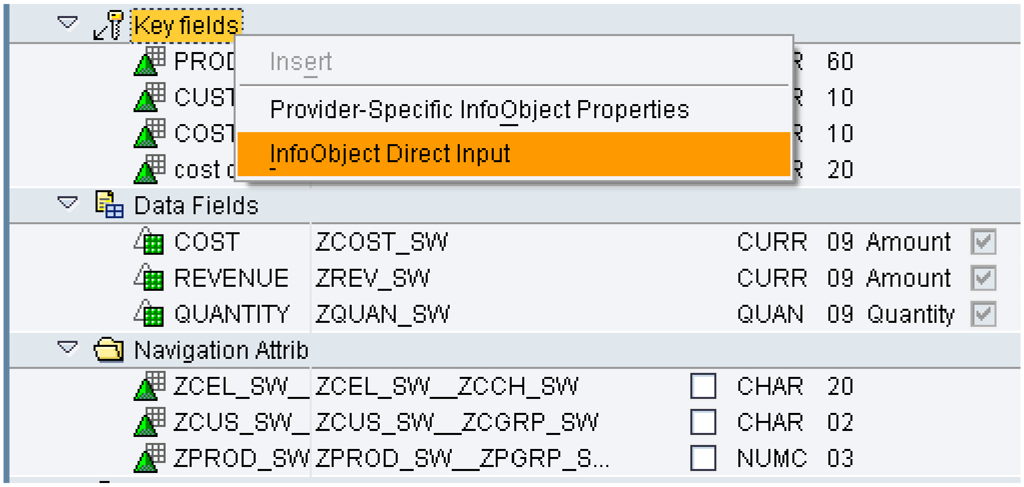
DataStore Object	Techn. name / value	Fu...	O...	Data ...	L
Standard DSO	ZSTD_DSO				
Object Informati					
Version	In Process				
Save	Not saved				
Object Statu:	Inactive, not executable				
Settings					
Key fields					
PRODUCT	ZPROD_SW			CHAR	60
CUSTOMER	ZCUS_SW			CHAR	10
COST ELEM	ZCEL_SW			CHAR	10
cost charact	ZCCH_SW			CHAR	20
Data Fields					
COST	ZCOST_SW			CURR	09
REVENUE	ZREV_SW			CURR	09
QUANTITY	ZQUAN_SW			QUAN	09
Navigation Attrib					
ZCEL_SW_	ZCEL_SW__ZCCH_SW		□	CHAR	20
ZCUS_SW_	ZCUS_SW__ZCGRP_SW		□	CHAR	02
ZPROD_SW	ZPROD_SW__ZPGRP_S...		□	NUMC	03
Indexes					

Using Direct Input

Now we will add some new key fields using InfoObject Direct Input method. You can use the method to add data fields too.

We will illustrate the addition of 0CALWEEK and 0DOC_NUMBER InfoObject to the key fields.

To achieve this, right click on the Key Fields (Highlighted below) and select InfoObject Direct Input from the context menu.



Key fields

PROD			R	60	
CUST			R	10	
COST			R	10	
cost c			R	20	

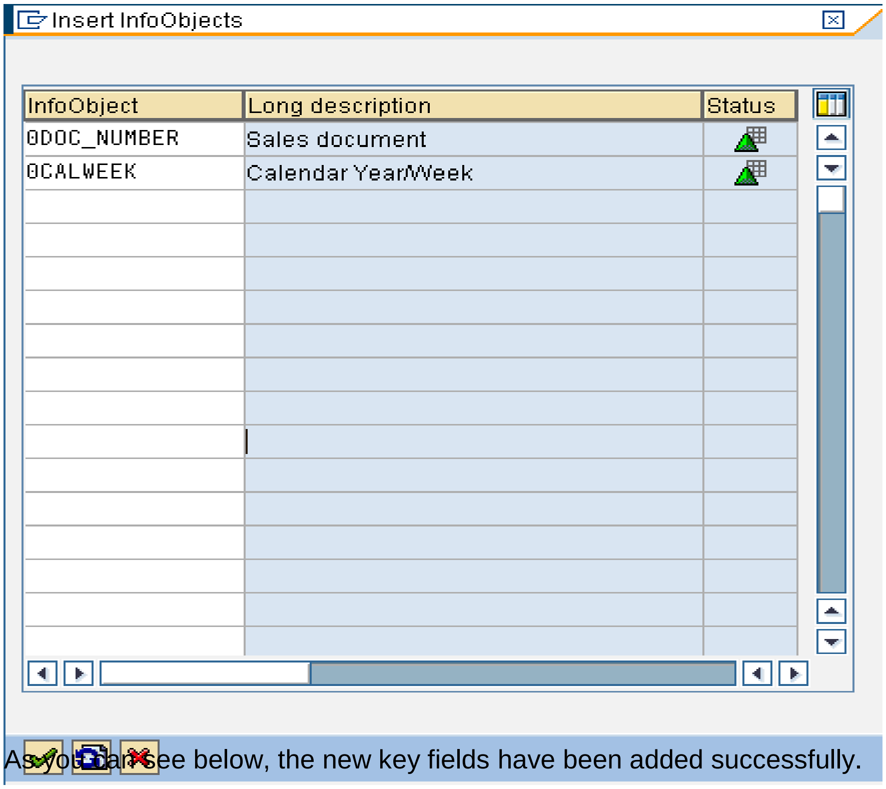
Data Fields

COST	ZCOST_SW		CURR	09 Amount	☑
REVENUE	ZREV_SW		CURR	09 Amount	☑
QUANTITY	ZQUAN_SW		QUAN	09 Quantity	☑

Navigation Attrib

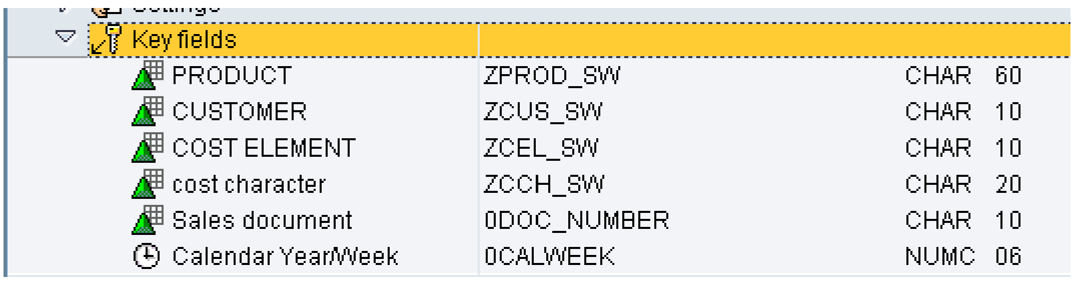
ZCEL_SW_	ZCEL_SW__ZCCH_SW	□	CHAR	20
ZCUS_SW_	ZCUS_SW__ZCGRP_SW	□	CHAR	02
ZPROD_SW	ZPROD_SW__ZPGRP_S...	□	NUMC	03

The following pop-up opens. Here you can input the technical names of the InfoObjects you have to include and press enter to see their descriptions as shown below. Press ✓ to confirm.


Insert InfoObjects

InfoObject	Long description	Status
0DOC_NUMBER	Sales document	
0CALWEEK	Calendar Year/Week	

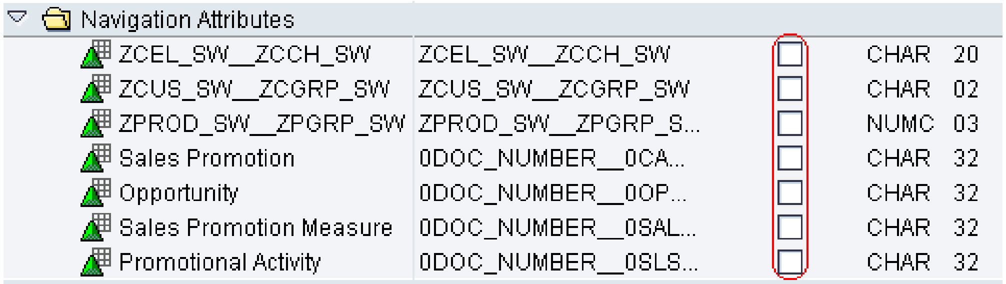
As you can see below, the new key fields have been added successfully.


Key fields

PRODUCT	ZPROD_SW	CHAR	60
CUSTOMER	ZCUS_SW	CHAR	10
COST ELEMENT	ZCEL_SW	CHAR	10
cost character	ZCCH_SW	CHAR	20
Sales document	0DOC_NUMBER	CHAR	10
Calendar Year/Week	0CALWEEK	NUMC	06

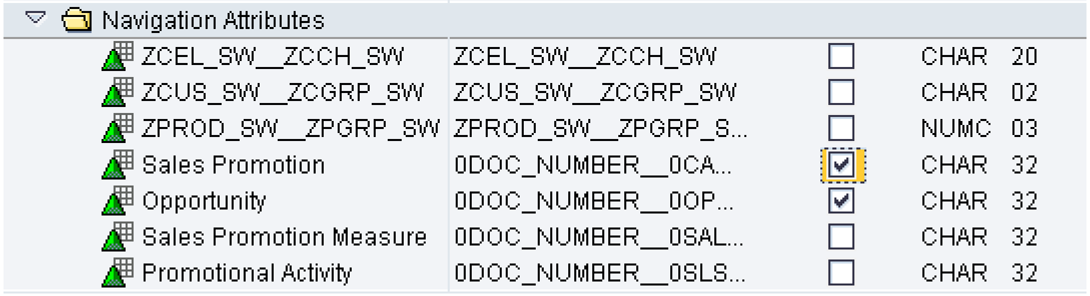
Navigational Attribute Inclusion

Navigational attributes defined in the included InfoObjects are available for viewing under the Navigational Attributes Column. They are included automatically but you still have to confirm them by selecting the On/Off checkboxes circled in red below.



Navigation Attributes				
ZCEL_SW__ZCCH_SW	ZCEL_SW__ZCCH_SW	☐	CHAR	20
ZCUS_SW__ZCGRP_SW	ZCUS_SW__ZCGRP_SW	☐	CHAR	02
ZPROD_SW__ZPGRP_SW	ZPROD_SW__ZPGRP_S...	☐	NUMC	03
Sales Promotion	0DOC_NUMBER__0CA...	☐	CHAR	32
Opportunity	0DOC_NUMBER__0OP...	☐	CHAR	32
Sales Promotion Measure	0DOC_NUMBER__0SAL...	☐	CHAR	32
Promotional Activity	0DOC_NUMBER__0SLS...	☐	CHAR	32

Here we have included the Sales Promotion and Opportunity Navigational attributes as shown below.



Navigation Attributes				
ZCEL_SW__ZCCH_SW	ZCEL_SW__ZCCH_SW	☐	CHAR	20
ZCUS_SW__ZCGRP_SW	ZCUS_SW__ZCGRP_SW	☐	CHAR	02
ZPROD_SW__ZPGRP_SW	ZPROD_SW__ZPGRP_S...	☐	NUMC	03
Sales Promotion	0DOC_NUMBER__0CA...	☑	CHAR	32
Opportunity	0DOC_NUMBER__0OP...	☑	CHAR	32
Sales Promotion Measure	0DOC_NUMBER__0SAL...	☐	CHAR	32
Promotional Activity	0DOC_NUMBER__0SLS...	☐	CHAR	32

Final Steps

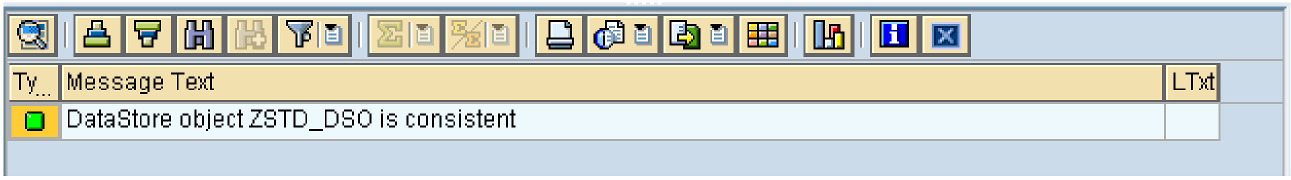
Now our DSO structure design is complete.

Now we follow through the usual routine of Save, Check and Activate.

Save using the 💾 button.

Press to check for errors.

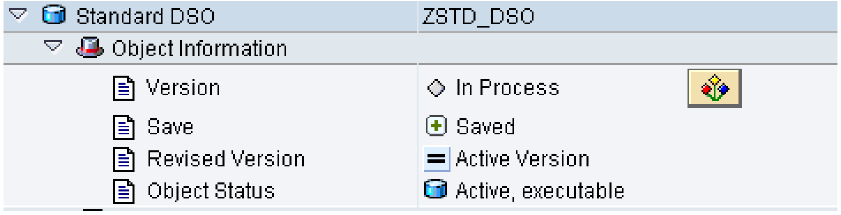
The following message confirms that there are no errors in design.



Ty...	Message Text	LTxt
🟩	DataStore object ZSTD_DSO is consistent	

Press the button to activate the DSO.

The Object Information menu now shows the DSO as active.



Standard DSO	ZSTD_DSO
Object Information	
Version	◇ In Process
Save	Saved
Revised Version	= Active Version
Object Status	Active, executable

The Standard DSO design is now complete.

Related Content

http://help.sap.com/saphelp_nw04s/helpdata/en/f9/45503c242b4a67e10000000a114084/content.htm

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Understanding DSO (DataStore Object) Part 2: Write-Optimized DSO

Understanding DSO (DataStore Object) Part 3: Direct Update DSO

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