

# Performance Optimization of Long Running Queries Using OLAP Cache



## Applies to:

SAP BW 7.0. For more information, visit the [Business Intelligence homepage](#).

## Summary

This article explains how to improve performance of long running queries using Information Broadcasting by pre-filling the OLAP cache and the automation of the same by using process chain and an ABAP program.

**Authors:** Raghavendra Padmanaban T.S, Ananda Theerthan J

**Company:** Wipro Technologies

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## Author Bio

Raghavendra Padmanaban is working as BI Consultant at Wipro Technologies.

Ananda Theerthan J is working as BI Consultant at Wipro Technologies.

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## Introduction

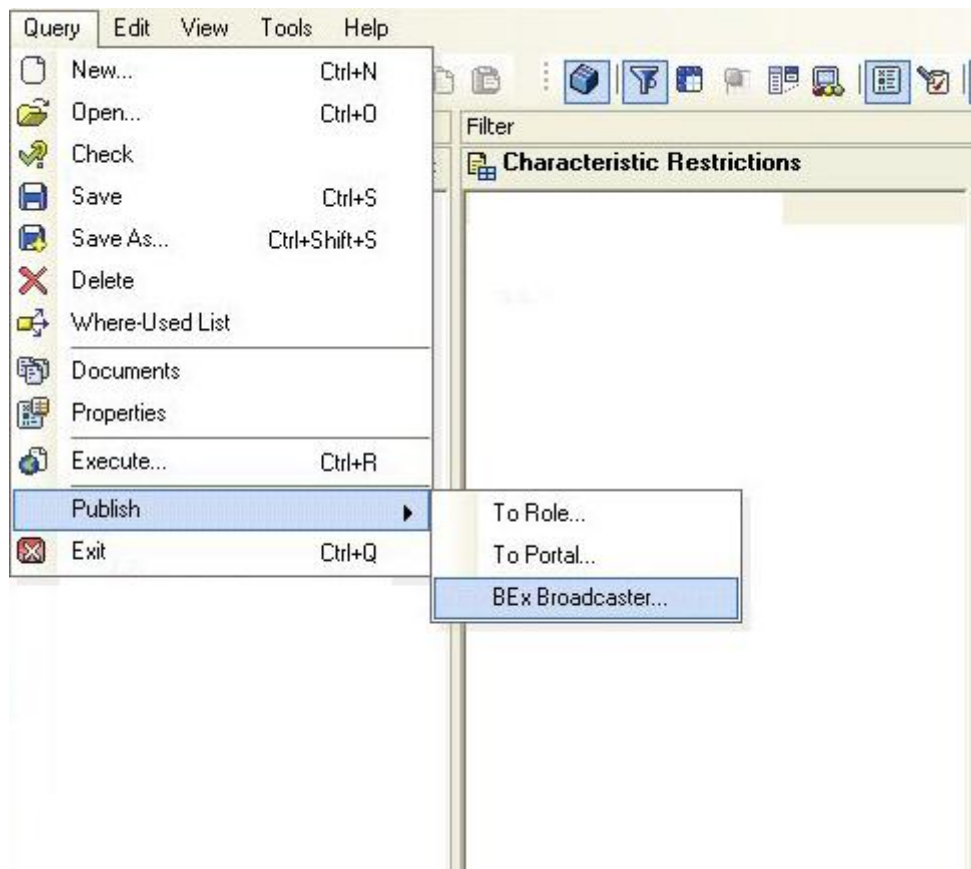
Increase query performance through Information Broadcasting of key queries by filling the OLAP cache where large number of users accessing a query or have query that access high volume of data. This article explains how to increase performance of long running BEx queries by filling the OLAP cache using information broadcasting which offers functions to optimize performance and for exception reporting. With the BEx Broadcaster, we can precalculate queries, query views, Web templates, reports and workbooks. The broadcasting function that we will be using for tuning query performance is "Filling the OLAP Cache".

The distribution type Fill OLAP Cache allows you to precalculate queries and to fill the OLAP cache with the generated data. If the users call Web Applications, queries, reports or workbooks that are based on this data, the access time is significantly reduced and the workload on the application server is considerably less. Whenever a query is run, it looks out for data in cache memory and if not found then hits database using select statements. This increases the time taken to execute a query. Hence the OLAP cache can be pre-filled for the value for which the query will be run and next time when the query is actually run, it fetches the data from cache memory rather than database which will increase the performance. Here, we will start by creating a variant for query and use the created variant for filling the OLAP cache.

## Creating Query Variant & Broadcaster Settings

Steps:

1. Open BEx Analyzer.
2. Run the query for which OLAP cache needs to be filled.
3. Create a global variant in query for the required selection.
4. Open BEx Query Designer and navigate to BEx Broadcaster.



After successful login, the below screen will be displayed.

**Broadcaster**

Settings for Object Type Query Open | **Overview of Scheduled Settings**

Description	Technical Name	Owner	Last Changed	Scheduled
No Settings Available for Query Cache Test ( ZTEST_CACHE )				

Create New Setting Create New Setting with the Wizard Documentation

Click on “create new settings” to create new broadcaster setting.

In the distribution type menu select ‘Fill OLAP Cache’

Next, click on “General Precalculation” tab.

Do the setting as shown below.

**Broadcaster**

Settings for Object Type Query Open | **Overview of Scheduled Settings**

Description	Technical Name	Owner	Last Changed	Scheduled
No Settings Available for Query Cache Test ( ZTEST_CACHE )				

Create New Setting Create New Setting with the Wizard Documentation

**Setting New setting**

Description:

Distribution Type: Broadcast E-mail Output Format: Online Link to Current Data

**Recipient(s)**

- Broadcast E-mail
- Broadcast to the Portal
- Broadcast to the Printer
- Broadcast E-Mail (Bursting)
- Broadcast According to Exceptions
- Broadcast (Multi Channel)
- Precalculate Value Set
- Fill OLAP Cache**
- Fill MDX Cache

User:  + + +

User in Role:  + + +

E-Mail Addresses:  + + +

Authorization Use:

Language: English

User-specific:

▼ **Broadcaster**

Settings for Object Type   | **Overview of Scheduled Settings**

Description	Technical Name	Owner	Last Changed	Scheduled
No Settings Available for Query Cache Test ( ZTEST_CACHE )				

**Setting New setting**

Description

Distribution Type  Output Format

**User Language** | General Precalculation | Filter Navigation

Authorization User   → Give the authorization user name

Language

Give the username for background processing having required authorization. If the user doesn't have sufficient authorization, the cache process would fail.

**Broadcaster**

Settings for Object Type   | [Overview of Scheduled Settings](#)

Description	Technical Name	Owner	Last Changed
No Settings Available for Query Cache Test ( ZTEST_CACHE )			

**Setting New setting**

Description

Distribution Type  Output Format

User/Language **General Precalculation** Filter Navigation

**Variable Assignment**

Determine Here

Name  Variable Values [Create](#) Description

Name

Determine from Variants

Variant

Select the first option to give a constant value to the variable VAR\_01 for which cache will be filled every time the event is triggered. These VAR\_01,VAR\_02 are static and if this option is selected, cache will be filled for the same value every time the event is triggered. Click on create link to create variable values as shown below

**Variable Entry**

Available Variants:

**General Variables**

Variable	Current Selection	Description
* Calendar Year/Month (Single Value, Required)	10.2009 <input type="button" value="Copy"/>	
* Company Name	XXXX  <input type="button" value="Copy"/>	

We will be dealing with dynamic variant option as explained below.

**Broadcaster**

Settings for Object Type   | **Overview of Scheduled Settings**

Description	Technical Name	Owner	Last Changed	Scheduled
No Settings Available for Query Cache Test ( ZTEST_CACHE )				

**Setting New setting**

Description

Distribution Type   Output Format

User/Language **General Precalculation** Filter Navigation

**Variable Assignment**

Determine Here

Name   Variable Values [Change](#) Description

Name

Determine from Variants

Here You Can Create a Description for the Variable Assignment

Give suitable description for the variable.

The next option 'Determine from Variants' is used to get values from variants created in query. So the pull down menu shows the list of variants created in query. Select the required variant in this screen as cache will be filled based on the variant value.

**Setting New setting**

Description:

Distribution Type:  Output Format:

User/Language:  Filter Navigation:

**Variable Assignment**

Determine Here

Name:  Variable Values: [Change](#) Description:

Name:

Determine from Variants

Variant:

After selecting the required variants, save the setting created by clicking on the 'Save' button.

The filling of OLAP cache is scheduled using the "Schedule" option as shown below.

Once the setting is created for a query, the filling of OLAP cache can be scheduled either with an event trigger or on daily, weekly or monthly basis. The option "**Execution with Data change in the InfoProvider**" is used to fill OLAP cache whenever there is a change in data load status. The option "**Direct Scheduling**" can be used to schedule this job daily, monthly or weekly basis.

**Scheduling Test**

**Execution with Data Change in the InfoProvider**

Cache Test

**Direct Scheduling in the Background Processing**

Create New Scheduling

Periodic All

Next Start at:  At:



## Enable Cache

The OLAP cache will be filled only if the cache property is enabled for a particular query or infoprovider.  
To enable cache for a query, navigate to TCODE RSRT.

Input the query technical name and click on properties.

Change the **cache mode** setting as shown below.

Query Properties -> Move into Query Designer

Read Mode	H Query to Read When You Navigate or Expan...	<input checked="" type="checkbox"/> InfoProvider Setting
Req. Status	0 All PartProviders Up to Released Status (RQ...	<input checked="" type="checkbox"/> InfoProvider Setting
Cache Mode	1 Main Memory Cache Without Swapping	<input type="checkbox"/> InfoProvider Setting
<input checked="" type="checkbox"/> Update Cache Objects in Delta Process		<input checked="" type="checkbox"/> InfoProvider Setting
SP Grouping	0 No Grouping	<input checked="" type="checkbox"/> InfoProvider Setting
<input type="checkbox"/> Use Selection of Structure Elements		
<input type="checkbox"/> Calculate w/ Packed Numbers		
<input type="checkbox"/> no parallel processing		
<input type="checkbox"/> Generation log		
Optimization Mode	0 Query Will Be Optimized after Generation	
<input type="checkbox"/> All Basic Key Figures Input Ready		
Disaggregation on Totals	Default	
Statistic Det.	2 All	

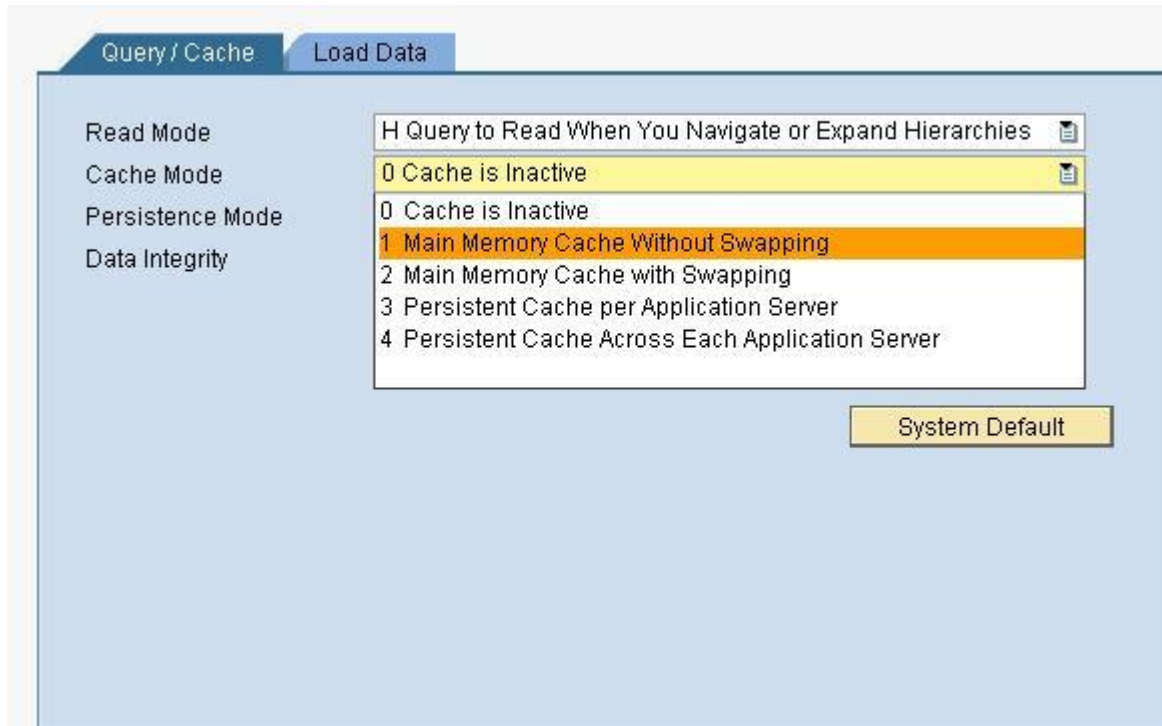
**Note:** Cache will be enabled only for the query for which this setting has been made. If there are multiple queries from an info provider, cache should be enabled for all queries individually.

To enable cache for an infoprovider,

Select the infoprovider

Navigate to Environment -> Infoprovider Properties -> Change.

Select the cache mode as shown below.



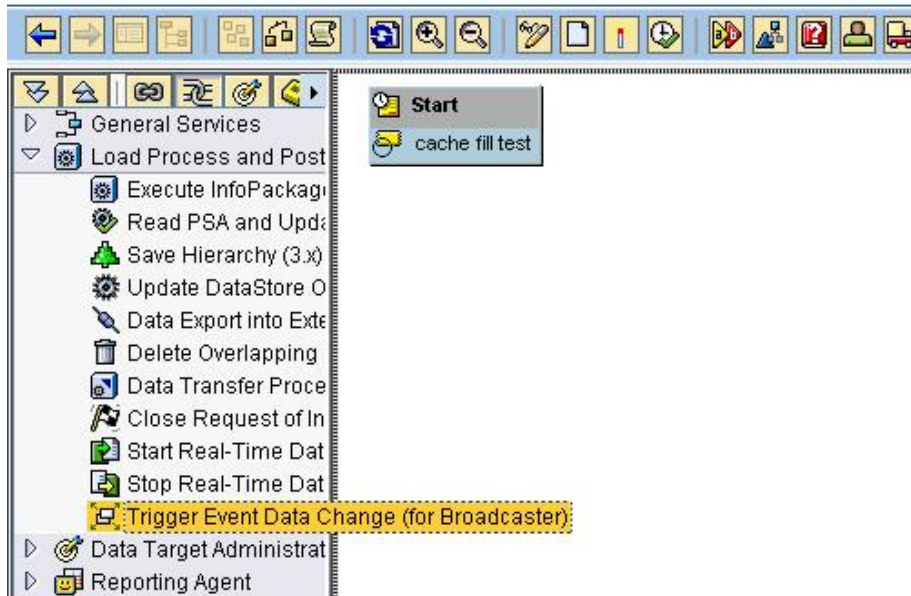
**Note:** If cache is enabled for an infoprovider, cache will be filled for all queries built on the infoprovider.

## Automation of Event

The OLAP cache is filled for the selected variant once the Event is triggered. So, we need to create a process chain to automate this event trigger.

Goto RSPC

Create New Chain as shown below



After selecting the “Trigger Event Data Change” process, navigate to the process maintenance screen by double clicking on the process.

## Process Maintenance: Trigger Event Data Change (for Broad

The screenshot shows the SAP Process Maintenance interface for the process 'Trigger Event Data Change'. The variant is 'ZCACHE1' and the description is 'cache fill test'. The last change was on 20.07.2009 at 16:52:31. Below this, there are two tables for selecting InfoProviders.

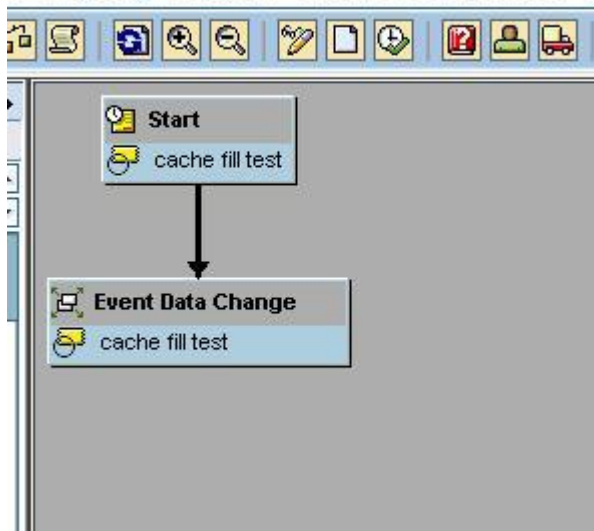
Determine InfoProviders using process chains: Select the variants to be included

S...	Icon	Ty.	Variant	Description
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				

Specify InfoProviders directly: Select InfoProviders using input help for the 'InfoProvider' field

Icon	InfoProvider	Description
	ZCTEST	CACHE TEST

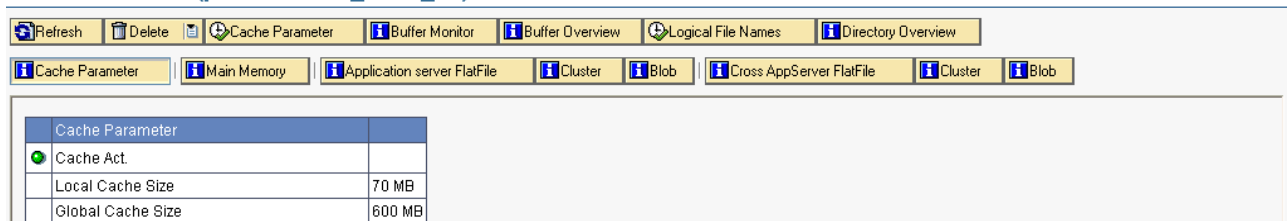
## Display Active Version: cache fi



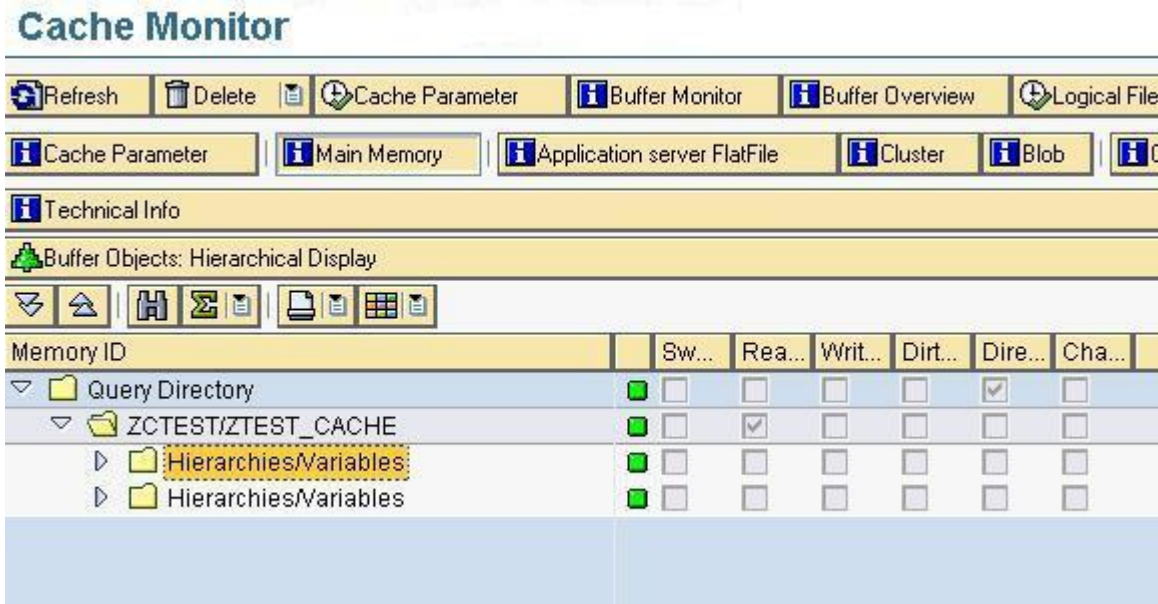
Select the required infoprovider and activate the chain after connecting the start variant and event trigger process. The chain can be scheduled as per the report frequency and the OLAP cache is filled accordingly. To check whether cache is filled for the selected variant, navigate Tcode RSRCACHE and check as shown below.

## Cache Monitor

On the *Cache Monitor* screen you can get information on the global cache parameters, the amount of memory used by the query runtime objects and the current underlying cache structure.



Click on “Main Memory”



IF the cache is filled successfully, a folder below the query directory is created with the query technical name and the list of variants created for that query is shown. On double clicking the highlighted item, the selection for which the cache is filled can be seen.

Detailed Display

Cache Object	
Created On	15.10.2009 14:43:48
Created By	Test
Cluster ID	11111111
CS ID	0

Variable	SIGN field in creation of SELECT-OPTIONS tables	Operator in Select Options and other Expressions	Dim: Field for a User-Defined Characteristic Value
DPCALMON (Calendar Year/Month (Single Value, Required Entry))	I	EQ	200904
ZP_COMP (Company Name)	I	EQ	XXX

Hierarchy

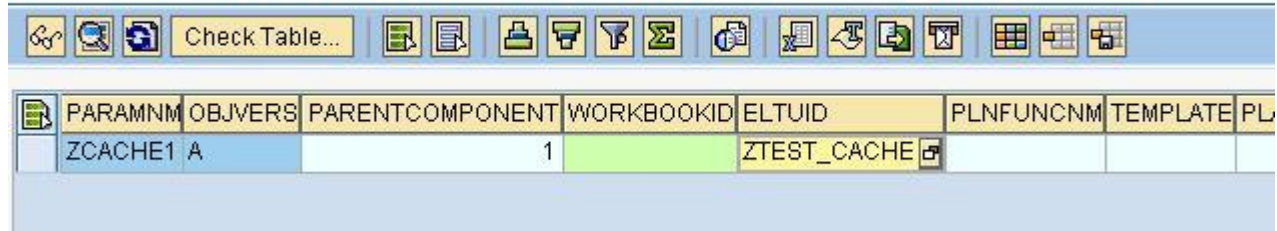
None Exist

## Automation of Query Variant

The variant which is created in query is static and doesn't change dynamically. To make the query variant get dynamic values, we need to automate the process using an ABAP program. The variants created in query, workbook, web application etc are stored in database table **rsrparametriza**.

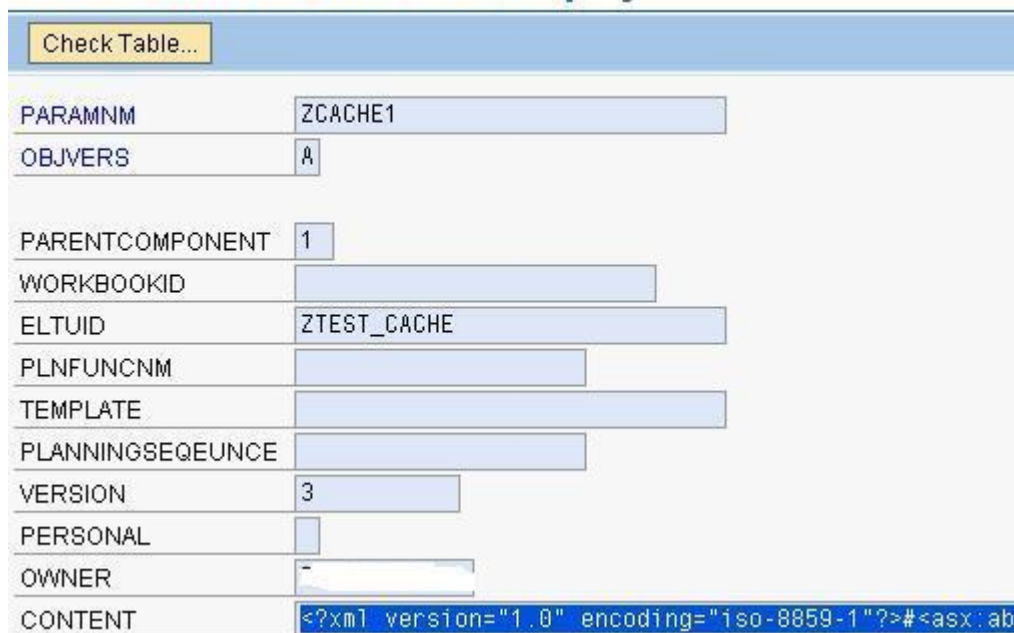
The field **PARAMNM** stores the variant technical name and **ELTUID** stores the query technical name for which the variant is created. The field **CONTENT** stores the values given for the variant in XML format as shown below.

**Data Browser: Table RSRPARAMETRIZA Select Entries 1**



PARAMNM	OBJVERS	PARENTCOMPONENT	WORKBOOKID	ELTUID	PLNFUNCNM	TEMPLATE	PL
ZCACHE1	A	1		ZTEST_CACHE			

## Table RSRPARAMETRIZA Display



PARAMNM	ZCACHE1
OBJVERS	A
PARENTCOMPONENT	1
WORKBOOKID	
ELTUID	ZTEST_CACHE
PLNFUNCNM	
TEMPLATE	
PLANNINGSEQUEUNCE	
VERSION	3
PERSONAL	
OWNER	
CONTENT	<?xml version="1.0" encoding="iso-8859-1"?>#<asx:ab

Select the required entry and click on display which will take us to the above screen. Copy the entire contents from the field '**CONTENT**' and paste it in a notepad file which will look as below.

```
<?xml version="1.0" encoding="iso-8859-1"?>#<asx:abap xmlns:asx="http://www.sap.com/abapxml"
version="1.0"><asx:values><PAGE><item><VNAM>0PCALMON</VNAM><DATA_PROV>DATA_PROVIDE
R_1</DATA_PROV><RANGE><RRRANGE><SIGN>I</SIGN><OPT>EQ</OPT><LOW>200904</LOW><HI
GH></RRRANGE></RANGE></item><item><VNAM>ZP_COMP</VNAM><DATA_PROV>DATA_PROVIDE
R_1</DATA_PROV><RANGE><RRRANGE><SIGN>I</SIGN><OPT>EQ</OPT><LOW>XXX</LOW><HI
GH></RRRANGE></RANGE></item></PAGE></asx:values></asx:abap>
```

The values between the tags <VNAM> & </VNAM> are the variable technical names used in query. The tag <RANGE> stores either the single or range values given for a particular variant within <LOW> and <HIGH> tags. We need to identify the LOW and HIGH values for a date field which needs to be changed frequently so that cache can be filled for the required selection. Now, the values between the tags <LOW> and <HIGH> needs to be changed and updated back to the table. A sample program is given on how to update the table

values having standard naming convention for the variants. This program finds and updates the date values for which a query variant is created.

**Note** If the format of the XML code in **CONTENT** field is not maintained correctly, the query doesn't run and the entry from rsrparametriza needs to be deleted manually for the query to open.



## Source Code of the Tool Used to Automate the Query Variant

```
CONSTANTS : lc_pat TYPE c LENGTH 2 VALUE '20',
            lc_parameter TYPE c LENGTH 7 VALUE 'ZCACHE1' "Give variant name.
```

```
DATA : l_count TYPE i,
      l_off TYPE i,
      l_moff TYPE i,
      l_mlen TYPE i,
      l_startdate_old TYPE sy-datum,
      l_enddate_old TYPE sy-datum,
      l_startdate TYPE sy-datum,
      l_enddate TYPE sy-datum,
      l_month_old type /bi0/oicalmonth,
      l_month_new TYPE /bi0/oicalmonth.
```

```
DATA: l_year TYPE i,
      l_month TYPE i.
```

```
DATA : lt_variant TYPE TABLE OF rsrparametriza,
      lw_variant LIKE LINE OF lt_variant.
```

```
SELECT * FROM rsrparametriza INTO TABLE lt_variant
WHERE paramnm LIKE lc_parameter AND objvers = 'A'.
```

```
LOOP AT lt_variant INTO lw_variant.
```

```
sy-subrc = 0.
CLEAR: l_off, l_moff, l_month, l_year, l_count.
```

```
WHILE sy-subrc = 0.
  FIND lc_pat IN SECTION OFFSET l_off OF
    lw_variant-content
    MATCH OFFSET l_moff
    MATCH LENGTH l_mlen.
```

```
IF sy-subrc = 0.
```

```
**- counter to track no.of hits
  l_count = l_count + 1.
```

```
**- fetch value(low) , considering there are no ranges given in variant
```

```
IF l_count = 1.
  l_month_old = lw_variant-content+l_moff(6).
```

```
  l_year = l_month_old+0(4).
  l_month = l_month_old+4(2).
```

```
IF l_month = 12.
  l_year = l_year + 1.
  l_month_new+0(4) = l_year.
  l_month_new+4(2) = 01.
```

```
ELSE.
```

```

        l_month_new+0(4) = l_year.
        l_month_new+4(2) = l_month + 1.
    ENDIF.
ENDIF.

**- set the offset for next search.
    l_off = l_moff + 6.

**- if a range variable is used, l_count will be 2 for HIGH value and the above block
should be modified.

    ENDIF.
ENDWHILE.

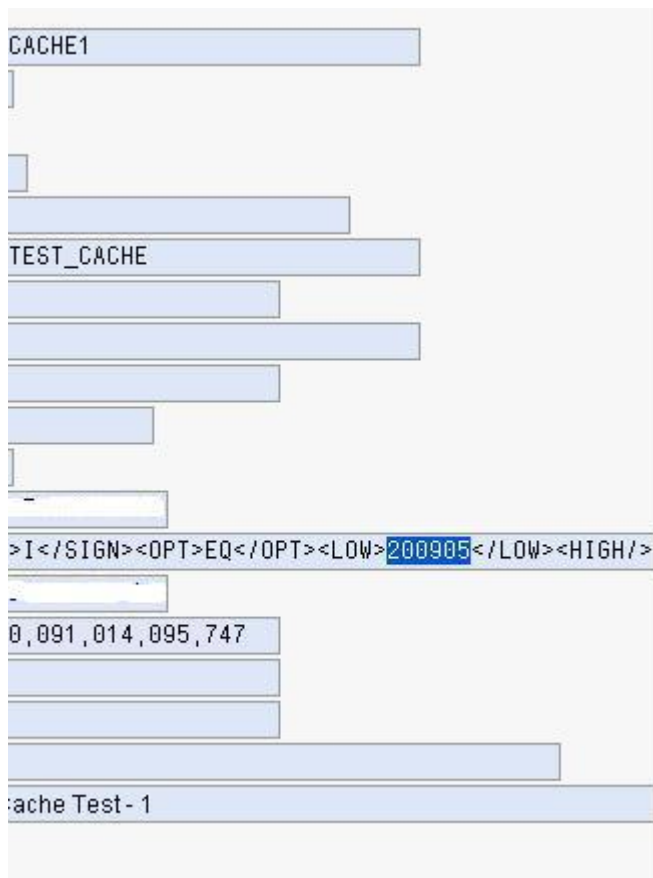
REPLACE ALL OCCURRENCES OF l_month_old IN lw_variant-content WITH l_month_new.

UPDATE rsrparametriza FROM lw_variant.

ENDLOOP.

```

Before running the program, the value of the variant is as shown



After execution of program,

PARENTCOMPONENT	
WORKBOOKID	
ELTUID	ZTEST_CACHE
PLNFUNCNM	
TEMPLATE	
PLANNINGSEQUENCE	
VERSION	4
PERSONAL	
OWNER	
CONTENT	SIGN><OPT>EQ</OPT><LOW>200906</LOW>
TSTPNM	
TIMESTAMP	20,091,014,095,747
CONTTIMESTAMP	0

This program can be scheduled based on the report frequency and once this is done, the event should be triggered using process chain so that cache is filled for the updated variant. So when the report is run, the data is fetched from cache memory which is prefilled and this increases the performance of long running queries.

## Related Content

[Information Broadcasting](#)

[Filling the OLAP Cache](#)

For more information, visit the [Business Intelligence homepage](#).

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