

Whitepaper SCP Archiving Process

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INTRODUCTION

Part of the process in Supply Chain Planning is a need to know how the forecast suggested by a system or proposed by a planner differs from the actual data as times progresses. The purpose of forecasting is not just to predict it for future dates, but to influence it and to provide some insights about strategic options and future events.

The archiving process provides tools to analyze the accuracy of the forecast. That can be done on a different time basis. The process should improve decision making, support regular strategic performance review by identifying future performance gaps and enable senior executives to manage performance expectations.

SEEDED ARCHIVE MEASURES AND ITS EXPRESSIONS

Archive measures expressions are using the recursive technique, and it may be arduous to follow. Examples of seeded archive related measures:

For each profile (Bookings and Shipments), there are seeded archive measures:

- Final Shipments Forecast 3 Months Ago Latest Archive = Archive (Final Shipments Forecast 3 Months ago, 1, "Month", "Rolling").
- Final Bookings Forecast 3 Months Ago Latest Archive = Archive (Final Bookings Forecast 3 Months ago, 1, "Month", "Rolling").

Archive() function has 4 arguments and retrieves the archive data for a measure. The information is used to view previous values for the measure which were stored in an archive table. The arguments are Measure Name, Period Number, Period Type, and Archive Type. The values for the Period Type and Archive Type arguments must be specified within double quotes. The period number should be a number, for example, 1, 5, or 27. 1 indicates to get the latest archive. In this expression, Archive function will retrieve the latest value of Final Bookings Forecast 3 Months Ago.

If you run archiving on April, archive measure expression function will check March 1st, if no archive is found on that date, it will search for data +/- 15 days when the period time is month. If the third parameter 'Month' is changed to 'Week' then the threshold will be +/- 3 days. All the archives in SCP cloud are time-based archiving.

- Final Shipments Forecast 3 Months Ago = MeasureOffset(Final Shipments Forecast 3 Months Ago Latest Archive, Final Shipments Forecast, "Month", 3)
- Final Bookings Forecast 3 Months Ago = MeasureOffset(Final Bookings Forecast 3 Months Ago Latest Archive, Final Bookings Forecast, "Month", 3)
-

MeasureOffset() function has 4 arguments and returns the relevant value for a time period. The arguments are Archived Forecast Measure Name, Forecast Measure Name, Time Period, and Time Offset. The time period must be specified within double quotes. The valid values for the time period argument are "Week" and "Month". The time offset should be a number, for example, 1, 5, or 27

You can analyze the overall performance of a plan by measuring the forecast accuracy, by using mean absolute percentage error (MAPE), mean absolute deviation (MAD), and forecast bias to measure the forecast accuracy. MAPE is a measurement of the percentage difference between the actual value (actual shipments) and the statistical forecast.

Therefore, shipments or bookings measures are required in the archive for MAPE statistics calculations, based on the measure used to create the forecast. If your plan forecasts shipments data, then only the shipments forecast measures are needed. If your plan forecasts bookings data, then only the bookings measures are needed. The following shipments or bookings measures are required:

- Final Shipments Forecast
- Final Shipments Forecast 3 Months Ago
- Final Shipments Forecast 3 Months Ago Latest Archive
- Final Bookings Forecast
- Final Bookings Forecast 3 Months Ago
- Final Bookings Forecast 3 Months Ago Latest Archive

MAPE archives created on a rolling basis can be referenced in a user-defined measure expression that uses the Archive function. The archive type is a parameter of this function. The valid values for archive type are "Rolling" and "Adhoc."

Archive of type "Rolling" is created only when the archive process is run via Build Plan Archive with "Enable for MAPE calculations" checkbox enabled. Another difference, when running Build Plan Archive with "Enable for MAPE calculations" on, the user has an option to provide a user-defined archive name when the archive was run. MAPE has different calculation versions as well.

Process Options Basic Submit Cancel

Name Build Plan Archive

Description Archive Plan will call Archive Plan Data job to... Notify me when this process ends

Schedule As soon as possible **Submission Notes**

Advanced Options

[Parameters](#) [Schedule](#) [Notification](#)

*** Plan** RT-SOP-Archive

Do not delete archives
 Delete archives automatically

Most Recent Days to Keep

Enable for MAPE calculations

Archive Time Hierarchy Gregorian Calendar

Archive Time Level Month

Measure Catalog for Archival Default S&OP Archive C:

Use default archive name
 Use user-defined archive name

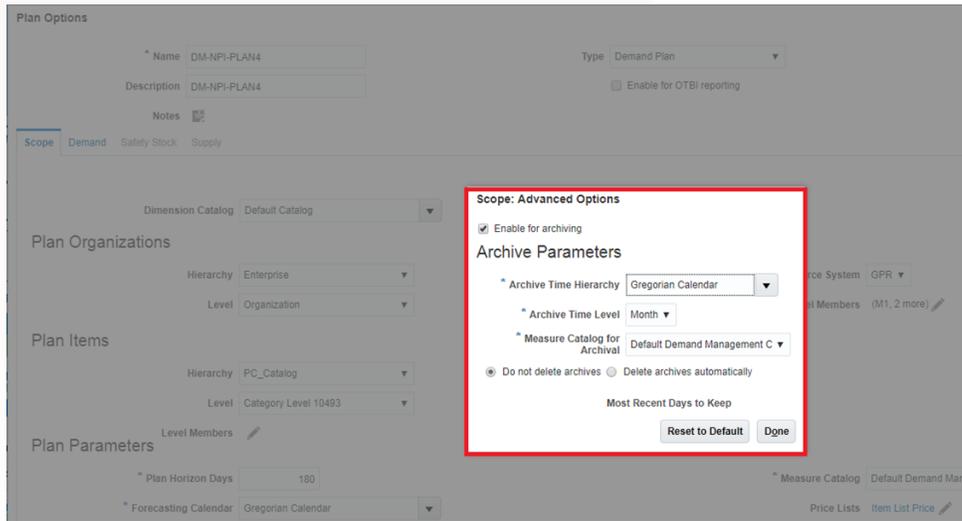
Note, if you want to archive the measure for forecast error/accuracy calculation, you should run the archive process before the plan start date modification (plan start date gets changed as part of the plan run), and before the new forecast run. Meaning, when you ran the archive process as part of the plan run, the archive process has run after the forecasting engine process. Aside from the above, there is no functional difference whether you run archive as part of plan run or as part of Build Plan Archive job.

PREPARATION

Archived data needs some advanced preparations, based on the data you want to use (1-month ago/3 months ago/6 months ago, etc.). Note, archiving is not supported in Planning Central.

You need to establish what plan's key measures to archive at a point in time and to compare the current plan's data to past versions of the plan. This way you can understand strategic and tactical changes in the plan.

To Archive plan, the first step is to enable Plan for Archival. Plan Archival is done in Plan Edit Options under Select Advanced Options.



Archiving Catalog

For archiving catalog, you need to include only the measures that need to be archived. In this example, it will be Final Shipments Forecast 3 Months Ago. If user interested only in 3 Months archiving, there is no need to archive 1 month or 2 months ago, since the measure Final Shipments Forecast 3 Months Ago bring Final Shipment Forecast into the calculation.

EXAMPLE STEP BY STEP ARCHIVING 1 MONTH AGO

Forecast 1 month ago is the forecast that was forecasted 1 month ago. For example, let's take today's date is June 2019. Forecast 1 Month ago is the forecast for June 2019 that was executed in May 2019. If we didn't forecast in February 2019 and Archive was not executed, there will be no Forecast 1 Month Ago. In the following table describes exactly this scenario, where we have Final Shipments Forecast starts in March 2019 and all our Archive related measures are empty.

	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019	Sept 2019
Final Shipments History	550	600	900							

Final Shipments Forecast				142	145	150	180	200	140	300
Final Shipments Forecast 1 Month Ago				142						
Final Shipments Forecast 1 Month Ago Latest Archive										
Final Shipments Forecast 1 Months MAPE										

In the same month of March, the user ran the archive process; the archive measures will not be updated since archiving will check March 1st, if no archive is found on that date, it will search for data +/- 15 days on a monthly system, as we mentioned before with "Month" parameter.

Next month in April, the user ran the forecast and archive process. The following table describes how values will be updated in archive measures.

	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019	Sept 2019
Final Shipments History	550	600	900	200						
Final Shipments Forecast					210	220	200	300	240	240
Final Shipments Forecast 1 Month Ago				142	210	220	200	300	240	240
Final Shipments Forecast 1 Month Ago Latest Archive				142	145	150	180	200	140	300
Final Shipments Forecast 1 Months MAPE				0.29						

As mentioned before MAPE refers to persistent forecast error and is deviation of the Actual from the forecasted quantity. Absolute value of $\{(Actual - Forecast) = |A - F| / A$. In the above example, $|200 - 142| / 200 = 0.29$.

Please note, Final Shipments Forecast 1 Months MAPE was calculated since you have Final Shipments Forecast 1 Months Ago Latest Archive from last month. You can analyze the impact of the adjustments on the plan by viewing the changes in the key performance indicators between the plan version archived in May and the current plan.

EXAMPLE STEP BY STEP ARCHIVING 3 MONTHS AGO

In the next example, you will examine archiving 3 months ago. The following table consists of 6 measures relevant to the archiving process with monthly time-level running from Oct 2018 to Aug 2019.

You have Final Shipments History until December 2018, and you executed forecast in January 2019. When you run archiving in January, the process will save the value of 143 that you forecasted in January into Final Shipments Forecast 3 Months Ago in the future of March 2019, since in the March this will be forecast that was executed 3 months ago. Seeing that you ran archiving process for the first time, the Final Shipments Forecast 3 Months Ago Latest Archive is null until March 2019.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550								
Final Shipments Forecast				553	142	143	145	144	142	150	215
Final Shipments Forecast 3 Months Ago						143	145	144	142	150	215
Final Shipments Forecast 3 Months Ago Latest Archive											
Final Shipments Forecast 3 Month MAPE											

In the next month, February 2019, you have actuals running through January 2019 and forecast starting from February 2019.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550	600							
Final Shipments Forecast					450	300	550	400	420	500	400
Final Shipments Forecast 3 Months Ago						143	550	400	420	500	400
Final Shipments Forecast 3 Months Ago Latest Archive						143	145	144	142	150	215
Final Shipments Forecast 3 Month MAPE											

In the next month March 2019, you run forecast starting March 2019 and run Archive process, the following will be calculated.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550	600	900						
Final Shipments Forecast						193	195	197	199	201	504
Final Shipments Forecast 3 Months Ago						143	550	197	199	201	504
Final Shipments Forecast 3 Months Ago Latest Archive						143	550	400	420	500	400
Final Shipments Forecast 3 Month MAPE											

In the next month April 2019, you run forecast starting April and run Archive process, the following will be calculated.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550	600	900	200					
Final Shipments Forecast							216	217	218	220	472
Final Shipments Forecast 3 Months Ago						143	550	197	218	220	472
Final Shipments Forecast 3 Months Ago Latest Archive						143	550	197	199	201	504
Final Shipments Forecast 3 Month MAPE											

In the next month May 2019, you run forecast starting May and run Archive process, the following will be calculated.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550	600	900	200	500				
Final Shipments Forecast								282	283	285	471
Final Shipments Forecast 3 Months Ago						143	550	197	218	285	471
Final Shipments Forecast 3 Months Ago Latest Archive						143	550	197	218	220	472
Final Shipments Forecast 3 Month MAPE						0.288	0.119				

In the next month June 2019, you run forecast starting June and run Archive process, the following will be calculated.

	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019
Final Shipments History	500	450	550	600	900	200	500	300			
Final Shipments Forecast									287	289	479
Final Shipments Forecast 3 Months Ago						143	550	197	282	289	479
Final Shipments Forecast 3 Months Ago Latest Archive						143	550	197	282	285	471
Final Shipments Forecast 3 Month MAPE						0.288	0.119	0.343			

EXAMPLE OF DATA ARCHIVING FROM 1 MONTH AGO UNTIL 3 MONTHS AGO

In this example, the data is visualized in the table how the data is archived for 1, 2 and 3 months ago.

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Final Shipments Forecast	450	500	450	750	490	900
Final Shipments Forecast 1 Month Ago		500	450	750	490	900
Final Shipments Forecast 1 Month Ago Latest Archive		500	600	800	550	1,000
Final Shipments Forecast 2 Months Ago			600	750	490	900
Final Shipments Forecast 2 Months Ago Latest Archive			600	800	550	1,000
Final Shipments Forecast 3 Months Ago				800	490	900
Final Shipments Forecast 3 Months Ago Latest Archive				800	550	1,000

ADVANTAGE OF THE APPROACH

The approach is to calculate and to keep rolling 3 months ago forecast by re-archiving the rolling number every month. In this case, you need to go only to the latest archive. This approach avoids maintaining multiple intermediate measures for rolling archive.

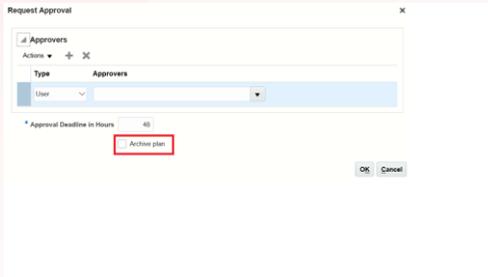
Seeded MAPE looks at Final Shipments Forecast 3 Months Ago since MAPE is calculated only for historical buckets. Final Shipments Forecast 3 Months Ago Latest Archive acts as an intermittent measure used to avoid multiple intermittent lag measures as mentioned before.

AGGREGATE AND CALCULATE

In configuring planning measures, there is an option to specify Aggregation Parameters Order such as "Calculate then aggregate" or "Aggregate then calculate." Dependent measures will be archived only when "Aggregate then calculate" option is selected, meaning, Expression measure A = Measure B/ Measure C, then B and C will be archived.

ARCHIVING SOP OPTION

Furthermore, only in the S&OP plan, there is an option to Archive plan as part of Request Approval.



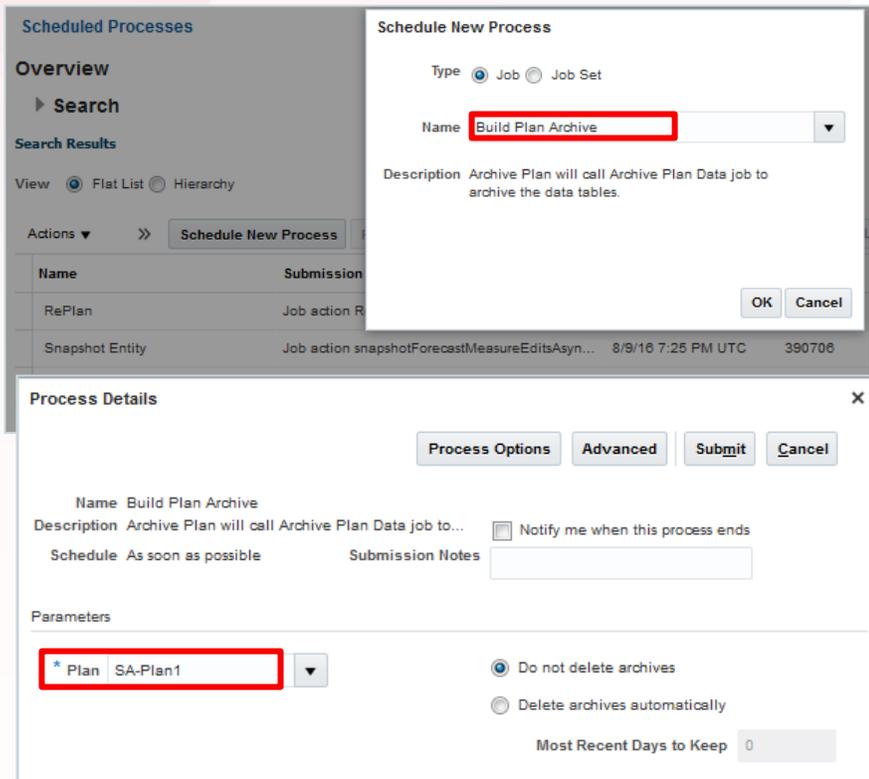
The Approval action is a manual plan action. The purpose of the Request Approval action was to support the plan approval workflow. In the Request Approval UI, plan approvers are selected, a time limit for approval is established, and a checkbox option to archive is available. Upon approval by the plan approvers, workflow proceeds and the Approve plan action is applied automatically. If the Archive option is checked, then the Archive plan action is also applied.

BUILD ARCHIVAL SCHEDULED PROCESS

The archive build process can be submitted and scheduled through a Scheduled Process. The process can be run immediately, scheduled for a one time run, or run on a regular basis.

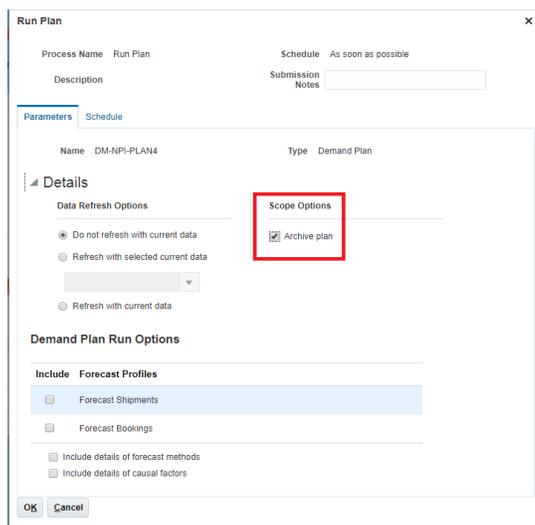
The name of the plan is entered on the Build Plan Archive form. Other information required to build the archive is pulled from the selections made in the Plan Options-Advanced Options dialog. The information includes the measure catalog name, the time hierarchy, and the time level. The Delete Archive options can be changed; these changes take precedence of the same setting in Plan Options.

If your planning cycle doesn't follow fixed date, for example, depending on the year quarter, planning cycle may start in the middle of the months and then shift to the end of the month, then perhaps automatic archival process doesn't fit your business requirement.



MANUAL ARCHIVE - PART OF THE PLAN RUN

The user can run the Archiving process as part of the plan run by selecting Scope Options in Parameters.



BEST PRACTICES

One of the best practices customers should follow to delete archrivals after some time due to performance and process usability. A plan's archives can be deleted using the "Delete Plan Archive" ESS request. The customer can select the name of the plan or can delete plan archive based on the time range, for example, delete all the archives that are older than 1 year.

Name Delete Plan Archive

Process Details

Process Options Advanced Submit

Name Delete Plan Archive

Description Delete the archives of a plan based on an archi... Notify me when this process ends

Schedule As soon as possible Submission Notes

Parameters

* Plan SA-Plan1

Archives to delete SA-Plan1 - 1 - 2016/05/20

Delete archives within time range

From Date To Date

Moreover, If the archival process is not planned well and the customer archives everything in the plan, this may lead to consuming large table space, and the archival process may fail. As mentioned before, you should determine what you are trying to accomplish with the archival process and how archived measures are used.

As well, you should review measures in the plan that have no expressions referencing non-existing measure.

The best practice when creating Archive – is to duplicate the Default Demand Management Catalog using Configure Planning Analytics Task -> Measure Catalogs tab, then remove measures that do not add value in an archive.

TIPS

Parameter 1 in Archive() function, goes back by 1 month ago using timestamp. In order not to wait months to set up and test archiving, you can change this parameter from 1 to 0, for example for CRP/UAT. With the above settings, you will not need to wait 1 month/1 week to pass in order values be displayed in the archive, but archive will take the latest available value. On Production parameter 1 shouldn't change.

SECURITY

To create archives for the calculation of the MAPE statistics at a week or month level, the user must be an administrator and have Manage Rolling Archives security privilege. The administrator runs the Build Plan Archive scheduled process from the Tools work area.

CONCLUSION

Archiving is a powerful mechanism that can drive decision-making processes by regularly observing review of how objectives and initiatives are impacting financial objectives and allocating or reallocating resources based on the forecast.

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