

Create Customized Navigation Patterns

In this use case, we explain how navigation patterns between worksheets in a planning view template can be set up. In the first example, we explain how the navigation from a main planning view worksheet to a more detailed planning view worksheet by double clicking a cell can be set up. The second example we are providing for this use case is to navigate from a main planning view worksheet to different key figure-specific worksheets by double clicking the key figure.

1. MAIN AND DETAILS VIEW (EXAMPLE 1)

1.1. How to start

As a first step, the planning views for which you want to create navigation patterns need to be created.

In the first worksheet, create the main planning view with the key figure that is relevant for planning, at the planning level you want to see. In our example, we are using the key figure “Consensus Demand without Promotion” at Product ID level.

Product ID	Key Figure	AUG 20	SEP 20	OCT 20	NOV 20	DEC 20	JAN 21	FEB 21	MAR 21	APR 21	MAY 21	JUN 21	JUL 21
HT_001	Consensus Demand	100	1 100	550	100	625	5 000	100	1 100	550	100	625	5 000
HT_002	Consensus Demand	700	700	700	700	700	18	700	700	700	700	700	18
HT_003	Consensus Demand	100	1 100	550	100	625	5 000	100	1 100	550	100	625	5 000
HT_004	Consensus Demand	700	700	700	700	700	18	700	700	700	700	700	18
HT_005	Consensus Demand	100	1 100	550	100	625	5 000	100	1 100	550	100	625	5 000
HT_006	Consensus Demand	700	700	6 000	700	700	18	700	700	6 000	700	700	18
HT_007	Consensus Demand	100	1 100	550	100	625	5 000	100	1 100	550	100	625	5 000
HT_008	Consensus Demand	700	700	700	700	700	18	700	700	700	700	700	18
HT_009	Consensus Demand	100	1 100	550	100	625	5 000	100	1 100	550	100	625	5 000
HT_010	Consensus Demand	700	700	700	700	700	18	700	700	700	700	700	18
HT_011	Consensus Demand	700	700	700	700	700	18	700	700	700	700	700	18

In the second worksheet, create a second planning view that contains all the key figures which might be needed to understand the main key figure. In this example, the second planning view is created at a different planning level (Product ID and Location ID).

Product ID	Location ID	Key Figure	AUG 20	SEP 20	OCT 20	NOV 20	DEC 20	JAN 21	FEB 21	MAR 21	APR 21	MAY 21	JUN 21	JUL 21
HT_002	HD_DC_FR	Consensus Demand without Promotion	526	582	401	323	440	106	190	339	405	427	268	344
		Consensus Demand	222	315	255	399	380	531	494	347	391	358	126	533
		Demand Planning Qty	470	485	438	244	272	465	395	541	160	392	501	133
		Delivered Qty Adjusted	503	242	585	112	182	161	244	469	319	235	235	447
		Confirmed Qty	519	327	319	449	463	421	398	522	141	293	380	374
		Actuals Revenue	556	117	390	234	536	183	411	188	311	271	422	113
		Actuals Price	106	146	356	559	189	300	415	195	264	249	583	168
		Calculated Stored Negativ	534	212	470	306	478	143	304	154	286	264	185	439
		Customer DC Sales Qty	458	238	104	110	408	390	202	165	266	496	526	279
		Customer DC Stock Qty	287	521	334	266	141	554	203	547	349	551	574	271
		Delivered Qty	254	159	231	445	349	473	320	480	532	335	382	308
		Demand Planning Bias (%)	10%	50%	20%	50%	30%	20%	10%	60%	50%	30%	40%	20%
		Demand Planning Forecast Error (%)	40%	60%	50%	10%	20%	40%	20%	30%	30%	20%	60%	10%

After the preparation is done, we build the connection from the “Main” worksheet to the “Details” worksheet. The trigger for the navigation is a double-click on the data area of the “Main” worksheet. To implement the navigation, we use the `Worksheet_BeforeDoubleClick` VBA event in combination with the SAP IBP APIs `GetAttributeValues` and `SetFilterValues`. Using the double-click event, we get the attribute combination of the specific cell in the “Main” worksheet and set it as a filter for the second worksheet, so that data for this combination only is shown.

The code for this use case, is part of the worksheet “Main” and looks like the following:

```
Private IBPAutomationObject As Object
```

```
Private Sub Worksheet_BeforeDoubleClick(ByVal Target As Range, Cancel As Boolean)
```

```
On Error GoTo ErrorHandler:
```

```
Dim attributes() As String
```

```
If IBPAutomationObject Is Nothing Then Set IBPAutomationObject =  
Application.COMAddIns("IBPXLClient.Connect").Object
```

```
'get Attributes
```

```
attributes = IBPAutomationObject.GetAttributeValues(Target)
```

```
'set Filter for Details
```

```
Call IBPAutomationObject.SetFilterValues (attributes, Worksheets("Details"))
```

```
Worksheets("Details").Activate
```

```
Exit Sub
```

```
ErrorHandling:
```

```
'Implement an error handling to help the user to understand what went wrong  
MsgBox Err.Description, vbOKOnly, "Microsoft Excel: Custom VBA code"
```

```
End Sub
```

Code explained row by row:

Private IBPAutomationObject As Object

The SAP IBP automation object enables you to call the SAP IBP APIs. The variable for the SAP IBP automation object needs to be declared as object data type in the VBA code, see [SAP IBP Automation Object](#) on the SAP Help Portal.

Private Sub Worksheet_BeforeDoubleClick(ByVal Target As Range, Cancel As Boolean)

We are using the Microsoft Excel `Worksheet_BeforeDoubleClick` event to trigger the navigation using double-click, see the Microsoft [documentation](#).

On Error GoTo ErrorHandler:

If an error occurs when the VBA code runs, continue at section “ErrorHandling”.

Dim attributes() As String

Variable declared as string array to save the returned attribute values of the cell, which has been double-clicked.

If IBPAutomationObject Is Nothing Then Set IBPAutomationObject =
Application.COMAddIns("IBPXLClient.Connect").Object

If the SAP IBP automation object was not set yet, we retrieve it from the SAP IBP, add-in for Microsoft Excel (Excel add-in).

attributes = IBPAutomationObject.GetAttributeValues(Target)

Getting the attribute values for the range object called Target. This object defines the cell that has been double-clicked. For more information about the API `GetAttributeValues`, see [GetAttributeValues](#) on the SAP Help Portal.

Call `IBPAutomationObject.SetFilterValues (attributes, Worksheets("Details"))`

Setting the determined attribute values as an attribute-based filter for the "Details" worksheet. Predefined filter settings in the "Details" worksheet are overwritten. For more information about the API `SetFilterValues` and its parameters, see [SetFilterValues](#) on the SAP Help Portal.

`Worksheets("Details").Activate`

In the last step, the "Details" worksheet needs to be activated. With this, the worksheet is opened and the data gets automatically refreshed and updated with the new filter setting. (No additional Refresh action is needed.)

Exit Sub

Exit the method without running the ErrorHandling section if no error occurred in between.

ErrorHandling:

Marker of the error handling section.

`MsgBox Err.Description, vbOKOnly, "Microsoft Excel: Custom VBA code"`

Shows an error message with the error description. If an error occurs when calling the SAP IBP APIs, the Excel add-in provides an error description, which explains what went wrong. Please make sure to include appropriate error handling, depending on the additional custom code/methods you are implementing. If you do not, the users will get technical VBA error messages that they might not understand.

Further comments to the code:


- To be able to use the SAP IBP APIs, an active connection to the SAP IBP system is needed.
- **GetAttributeValues:** The range which is provided as parameter must be part of the data area of the planning view. If, for example, the key figure cell is double-clicked, an error message comes up.
- **SetFilterValues:** If no worksheet parameter is passed, the filter settings of the active worksheet (Excel.ActiveSheet) are changed. The referenced worksheet must contain a planning view, and at least one filter criterion must be passed.

For more information, see [SAP IBP APIs](#) on the SAP Help Portal.

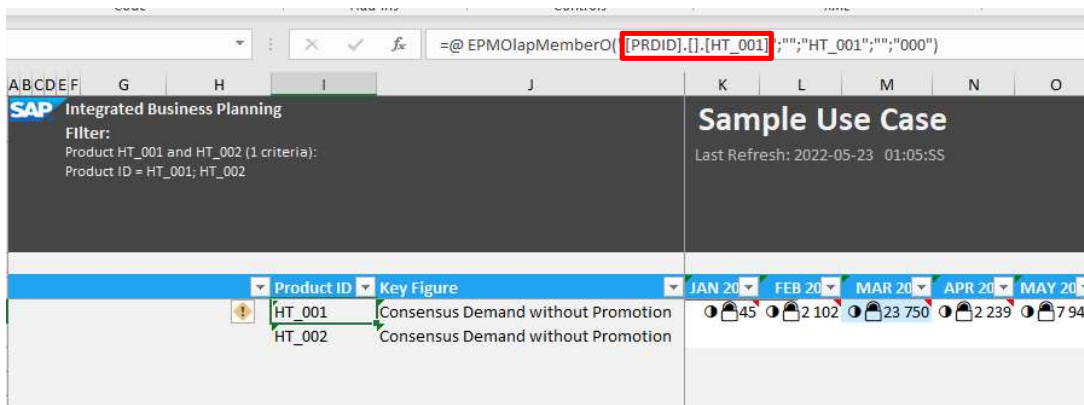
1.2. Format for attribute values

We aimed to define the SAP IBP APIs to be as simple as possible, to reduce the code lines which need to be written, and to make them easy to use. The input parameters, as well as the return values are using simple data types used in Microsoft Excel. This is the case for the two methods we've used so far.

A string array is used as return value for the attribute values of the API `GetAttributeValues`. The same string array can be used as input parameter for the API `SetFilterValues`. What does the format we are using look like?

Matches			
Expression	Value	Type	Context
 attributes		String(0 to 0)	Sheet2.Worksheet_BeforeDoubleClick
attributes(0)	"[PRDID].[].[HT_001]"	String	Sheet2.Worksheet_BeforeDoubleClick

Each entry of the array has the format **[attribute ID].[].[attribute value]**. In the example above, you see `[PRDID].[].[HT_001]`. In this case, PRDID is the attribute ID, the square brackets in the middle stay empty and the square brackets at the end include the attribute value, which is HT_001. This is the same format that is used in the formula when selecting an attribute value in an open planning view, as shown in the screenshot below.



If the respective planning view contains 3 different attributes, this is what the return value of `GetAttributeValues` for one specific cell would look like.

Matches			
Expression	Value	Type	Context
attributes		String(0 to 2)	Sheet2.Worksheet_BeforeDoubleClick
attributes(0)	"[PRDID].[HT_001]"	String	Sheet2.Worksheet_BeforeDoubleClick
attributes(1)	"[LOCID].[HD_DC_CA_E]"	String	Sheet2.Worksheet_BeforeDoubleClick
attributes(2)	"[CUSTID].[BÁL3000]"	String	Sheet2.Worksheet_BeforeDoubleClick

A one-dimensional string array with three entries, one for each attribute, is returned. With the same approach, you can define filter settings in a one-dimensional string array, and use it as input parameter for the API `SetFilterValues`.

1.3. Merge Filter settings

The API `GetFilterValues` can be used to determine the attribute-based filter settings that have been defined in a planning view (see [GetFilterValues](#) on the SAP Help Portal). This enables you to get the filter settings of a specific planning view and merge them with additional filter criteria.

Given the case that you defined a filter for an attribute, and the filter is not included in the planning view settings of the “Main” worksheet (non-visible filter). This filter does not reduce the list of products, but it affects the values which are shown. In our example, a filter is included for a few customers.

Attribute-Based Filter

Filter: (Ad Hoc Filter)
Add
Update
Delete
Organize

Attribute	Operator	Values
Customer ID	=	CA1000; CA2000; US9001; US9002 ...
Brand ID	=	ConsumersChoice Kitchen Products; Cor ...

Add Attribute

If you want to pass the filter settings from the planning view including the combination chosen using double-click as filter to another worksheet, the existing VBA code needs to be adjusted.

In this case, first we determine the filter settings from the “Main” planning view definition using the API `GetFilterValues`. Then we merge the retrieved filter settings with the attribute values of the combination chosen using double-click and pass them to the “Details” planning view.

See below the VBA code with the extension explained above. The changes are highlighted in yellow:

```
Private Sub Worksheet_BeforeDoubleClick(ByVal Target As Range, Cancel As Boolean)
```

On Error GoTo ErrorHandler:

```
Dim attributes() As String
Dim filterValues() As String
Dim filterToPass As Variant
```

```
If IBPAutomationObject Is Nothing Then Set IBPAutomationObject =
Application.COMAddIns("IBPXLClient.Connect").Object
```

```
'get Attributes
attributes = IBPAutomationObject.GetAttributeValues(Target)
filterValues = IBPAutomationObject.GetFilterValues
'set Filter for Details
filterToPass = MergeArray(attributes, filterValues)
```

```
Call IBPAutomationObject.SetFilterValues (filterToPass, Worksheets("Details"))
Worksheets("Details").Activate
Exit Sub
```

ErrorHandler:

```
'Implement an error handling to help the user to understand what went wrong
MsgBox Err.Description, vbOKOnly, "Microsoft Excel: Custom VBA code"
```

End Sub

Code Explained Row by Row:

filterValues = IBPAutomationObject.GetFilterValues

Getting the filter values from the active sheet, in this case, the "Main" worksheet. The format is the same as explained in section 1.3:

filterValues		String(0 to 5)	Sheet2.Worksheet_BeforeDoubleClick
filterValues(0)	"[CUSTID].[CA1000]"	String	Sheet2.Worksheet_BeforeDoubleClick
filterValues(1)	"[CUSTID].[CA2000]"	String	Sheet2.Worksheet_BeforeDoubleClick
filterValues(2)	"[CUSTID].[US9001]"	String	Sheet2.Worksheet_BeforeDoubleClick
filterValues(3)	"[CUSTID].[US9002]"	String	Sheet2.Worksheet_BeforeDoubleClick
filterValues(4)	"[BRAND].[ConsumersChoice Kitchen Product]"	String	Sheet2.Worksheet_BeforeDoubleClick
filterValues(5)	"[BRAND].[ConsumersChoice Television]"	String	Sheet2.Worksheet_BeforeDoubleClick

filterToPass = MergeArray(attributes, filterValues)

Merging the two arrays, to pass them as a filter to the "Details" worksheet.

As there is no standard VBA function available to merge two arrays, we created a custom method to do so. The method might be further improved, if needed:

```
Private Function MergeArray(list1 As Variant, list2 As Variant) As Variant
```

```
Dim result As Variant
Dim size1 As Long
Dim size2 As Long
```

```
size1 = UBound(list1)
size2 = UBound(list2)
result = list1
```

```
ReDim Preserve result(size1 + size2 + 1)
Dim i As Integer
For i = 0 To size2
    result(size1 + 1 + i) = list2(i)
Next i
```

```
MergeArray = result
End Function
```

Further comments to the code:

In the SAP IBP, add-in for Microsoft Excel, you can choose “not equal to” filter settings. The API `GetFilterValues` considers such filter settings as well. This is what the return value looks like:

Attribute	Operator	Values	
Customer ID	≠	CA1000; CA2000; US9001; US9002	X
Brand ID	=	ConsumersChoice Kitchen Products; Cor	X
Add Attribute			

filterValues		
filterValues(0)	"[CUSTID].[CA1000]"	String
filterValues(1)	"[CUSTID].[CA2000]"	String
filterValues(2)	"[CUSTID].[US9001]"	String
filterValues(3)	"[CUSTID].[US9002]"	String
filterValues(4)	"[BRAND].[ConsumersChoice Kitchen Product	String
filterValues(5)	"[BRAND].[ConsumersChoice Television]"	String

To define “not equal to” filter settings, in the string array the character “!” is included before the attribute value definition, as described in 1.2.

Please note: The example code does not work as it should if the filter settings from the planning view definition include an attribute value from the combination chosen using double-click. By merging the arrays, the attribute value is added twice. If needed, doubled entries should be filtered out when merging the arrays.

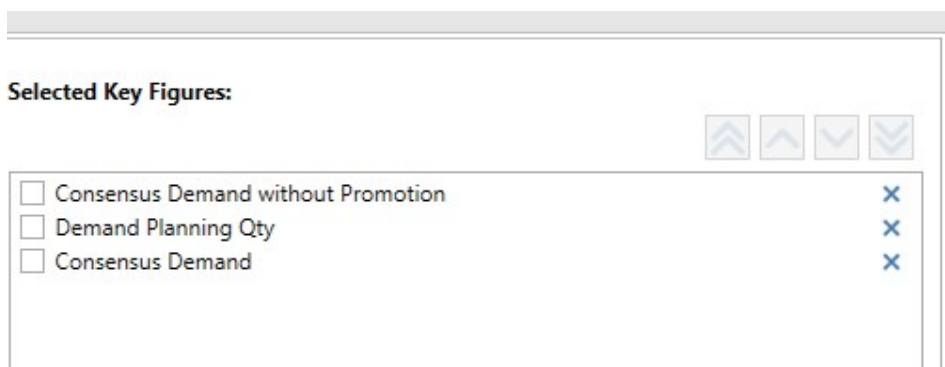
As an additional example, instead of retrieving the filter settings of the “Main” planning view, you could also retrieve predefined filter settings from the “Details” planning view and merge them with the filter for the combination chosen using double-click. As always, feel free to adjust the use cases to your business needs.

2. KEY FIGURE DEPENDENT NAVIGATION (EXAMPLE 2)

Let's change the scenario a bit. In this example, you have a “Main” planning view created in the first worksheet. It contains several key figures, and it is mainly used for planning tasks. In some cases, the planner needs further information about specific key figures, maybe even at a different planning level. Therefore, you want to include navigation patterns to additional worksheets with more detailed information about specific key figures. In our example, the user can double-click a key figure, and if there is a predefined worksheet for this key figure, the worksheet is opened.

2.1. How to set-up this use case

As a first step, you would need to add the needed key figures to the “Main” planning view.



Then create additional worksheets with detailed planning views for all the key figures you want to navigate to. In our example, we create two additional worksheets for the key figures “CONSENSUSDEMAND” and for “DEMANDPLANNINGQTY”. Please name the Excel worksheet the same way as the ID of the key figure. This makes the navigation and the VBA code easier.



In the next step, the VBA code from the former use case needs to be extended, as shown below. The changes are highlighted in yellow:

```
Private Sub Worksheet_BeforeDoubleClick(ByVal Target As Range, Cancel As Boolean)
```

```
    Dim formula As String
```

```
    Dim keyFigure As String
```

```
    Dim targetSheet As Worksheet
```

```
    formula = Target.Formula2
```

```
    If InStr(1, formula, "=@ EPMOlapMemberO("[KEY_FIGURES].[.[" = 0 Then
```

```
        Exit Sub
```

```
    End If
```

```
    keyFigure = Replace(formula, "=@ EPMOlapMemberO("[KEY_FIGURES].[.[" , "")
```

```
    keyFigure = Left(keyFigure, InStr(1, keyFigure, "]" - 1)
```

```
    On Error GoTo NWS:
```

```
        Set targetSheet = ActiveWorkbook.Sheets(keyFigure)
```

```
    On Error GoTo ErrorHandling:
```

```
        Dim attributes() As String
```

```
        Dim filterValues() As String
```

```
        Dim filterToPass As Variant
```

```
        If IBPAutomationObject Is Nothing Then Set IBPAutomationObject =  
            Application.COMAddIns("IBPXLClient.Connect").Object
```

```
        'get Attributes
```

```
        attributes = IBPAutomationObject.GetAttributeValues(Target.Offset(0, 1))
```

```
        filterValues = IBPAutomationObject.GetFilterValues
```

```
        'set Filter for Details
```

```
        filterToPass = MergeArray(attributes, filterValues)
```

```
        Call IBPAutomationObject.SetFilterValues (filterToPass, targetSheet)
```

```
        targetSheet.Activate
```

```
    Exit Sub
```

```
ErrorHandling:
```

```
    'Implement an error handling to help the user to understand what went wrong
```

```
    MsgBox Err.Description, vbOKOnly, "Microsoft Excel: Custom VBA code"
```

```
    Exit Sub
```

```
NWS:
```

```
MsgBox "No detailed planning view was found for the selected key figure.", vbOKOnly, "Microsoft Excel:  
Custom VBA code"
```

End Sub

Code explained row by row:

```
formula = Target.Formula2  
If InStr(1, formula, "@ EPMOlapMemberO("[KEY_FIGURES].[.]", "=") = 0 Then  
    Exit Sub  
End If  
Check whether the formula of the target cell contains a key figure.
```

```
keyFigure = Replace(formula, "@ EPMOlapMemberO("[KEY_FIGURES].[.]", "=")  
keyFigure = Left(keyFigure, InStr(1, keyFigure, "]"") - 1)  
Extract the key figure ID.
```

On Error GoTo NWS:

If an error occurs, go to the section NWS.

```
Set targetSheet = ActiveWorkbook.Sheets(keyFigure)
```

Determine the worksheet with the name of the key figure ID. We included a specific error handling for the case that no detailed planning view was configured for the specific key figure ID, see below:

NWS:

```
MsgBox "No detailed planning view was found for the selected key figure.", vbOKOnly, "Microsoft Excel:  
Custom VBA code"
```

A message box is shown to explain the user that there is no preconfigured planning view available.

```
attributes = IBPAutomationObject.GetAttributeValues(Target.Offset(0, 1))
```

As the range which is provided as parameter for GetAttributeValues needs to be part of the data area of the planning view, we need to shift the Target range by one column (to the right).

```
Call IBPAutomationObject.SetFilterValues (filterToPass, targetSheet)
```

```
targetSheet.Activate
```

The variable targetSheet is now passed to the SetFilterValues API, instead of one specific worksheet (hard coded). This makes it possible to navigate to different worksheets. Then the targetSheet is activated.

Further comments to the code:

- This example code works only if the key figure is in the last column, (what we call our standard layout). If the key figure is in another column, you can adjust the code accordingly to determine the column, where the data area of the planning view starts.
- The advantage of this code is that it can be easily extended by business users. If they want to have an additional detailed view, they can add a new worksheet and create a planning view by themselves. The only thing which needs be considered is that the name of the worksheet should be the same as the key figure ID. To add additional worksheet navigations, no code extension is needed, and therefore the template administrator doesn't need to be involved.
- Please note that sheet names can be only 31 characters long, and SAP IBP key figure IDs can have up to 32 characters. Code adjustments would be needed, if key figures IDs with 32 characters should be used for the navigation.

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