

# A Proteus based PCR Solution

## User Manual for Kværner

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## Introduction

The initiative for this solution came after multiple attempts to have a PCR solution based on Excel.

The flexibility of Excel is a terrific strength, but can be an equally terrific weakness when making complex and business critical solutions - especially when they involve large amounts of disparate sets of data that gets passed through pivot-tables and then referenced in formulas from over 40 sheets. Having VBA code also adds another hidden layer of complexity that makes it nearly impossible to maintain and obtain an acceptable result from a QA perspective ([ref article from Forbes 2013](#)).

There are several core challenges when designing such a system in an optimal way:

1. Traceability and transparency: "How can I understand how any given number is produced?"
2. Historic tracking of changes. This is an aspect of the above traceability, but could be regarded as a separate item; the above relates to traceability of the current source data to the derived result, while this aspect relates to how a traceable history is created.
3. Maintainability and Robustness: "How can I make changes to the system without 'breaking' anything"

This new solution tries to address the above challenges in a systematic way to ensure that the path the source data takes (mainly from Promineo Cost) is traceable in a transparent way while being reasonably maintainable, and leaving historic traceability on several levels.

Below is a list of technical features, and the rest of the document acts as a user manual for their practical use.

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## List of features

- Two modules (workspaces):
  1. Admin Setup: Define/Maintain the Cost mappings / Spreadsheet layouts.
  2. Project Cost Reporting: The interactive reporting solution.
- Historic data is produced (manually triggered) for each cutoff period:
  1. By storing data in history tables for historic trend reporting (Cost Review numbers and KPI result).
  2. As encapsulated representations of the entire solution and its data (called "report containers"). The list of these files are made available to be opened from within the solution.
- Mapping table to aggregate Project costs from CostCenters in Promineo to a level called "Cost Review" and then a new mapping table aggregates it further to "Financials". Inconsistencies in the mappings are monitored (warnings are given) to ensure that all costs are aggregated to their proper destination in the cost hierarchy. The mapping tables serve a second purpose: To define the row layout of the Spreadsheet Report, allowing full control of its contents (avoiding to have "hard to maintain" logic defined there).
- Any number of KPIs can be defined, and they can be either manual (punched by user) or derived from a formula. Pass/Fail intervals can be defined and there is a "Formula builder utility" that allows making named references to values in to the 2 mentioned aggregated levels (via IDs defined in mapping tables).
- Show complete history for each KPI, including average fail%. A cumulated such fail% is presented in the project summary.
- Project Summary page showing high level critical indicators of project status.
- Interactive Dashboards (for Costs and KPIs) allowing users get overviews while allowing drill downs into details behind the overviews.
- Comments can be given for (for each cutoff) for individual items on:
  1. Report Assessments (for defined and customizable categories).
  2. Financials.
  3. Cost Review.
  4. KPI
- For all of the above comments: Comments for last cutoff is available to ensure continuity.
- Risk and Opportunity Register maintainable from within the solution.

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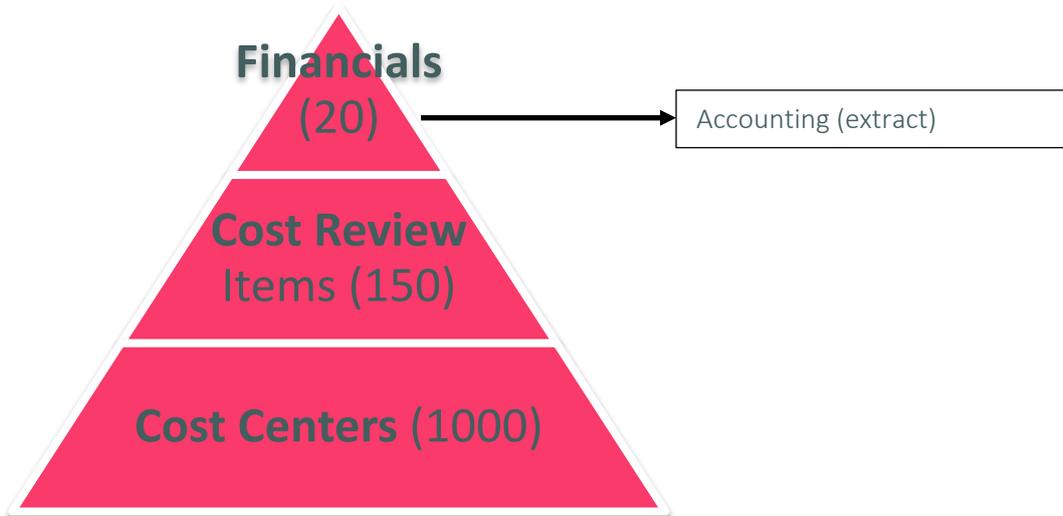
## Definitions of Terms

Term	Description
<b>Spreadsheet Report</b>	The embedded Spreadsheet containing the non-interactive version of the PCR to be stored/distributed as the official PCR Report. It is based on an Excel template that contains a minimum of manually maintained formulas (in the order of 10).
<b>Mapping Tables</b>	The 2 tables for mapping Cost Centers first to Cost Review level and then to Financials level. The Mapping Tables also act as row-wise definition of how the corresponding data will be presented in the Spreadsheet Report.
<b>CostCenter – Cost Review Items – Financial Items</b>	The hierarchy of how costs are aggregated. The term "CostCenter" is specific to Promineo Cost, whereas the aggregation layers called "Cost Review" and "Financials" are defined / maintained in the PCS Solution.
<b>Cost Review / Financials Bookmark</b>	A named reference to a specific row in the Cost Review / Financials grid, and allows references to KPI formulas (see below).
<b>KPI</b>	The solution supports defining an arbitrary long list of KPI:s (Key Performance Indicator), which can be either Manually punched or Derived from a formula. The formula refers back to a row bookmark and a column name, and such formulas can be built through a utility form.
<b>Report Container</b>	A snapshot of the Proteus Workspace, including all data loaded into it. Such a file can be double clicked and will bring up an identical user experience as when the data was "live" (but no edits are possible).

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## The flow of cost data

There is a tree-fold mapping structure that dictates the "flow of aggregation" and each interface between one layer and another is a mapping from a larger to a smaller set of item (number in parenthesis indicates approximate number of items):



The mapping between Cost Centers and Cost Review Items and mechanisms to ensure that this mapping is "complete", is handled by the Workspace "Admin Setup" described in next chapter.

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## Workspace "Admin Setup"

In order to ensure that all costs (defined in CostCenters) are aggregated to their proper Cost Review Items and then (through another mapping) to Financials Items.

### Defining the list of Financials Items

Please note that the setup of Financials Items (as is the case later for Cost Review Items) is two-fold:

1. To define the row-wise layout as seen in Spreadsheet Report.
2. To define act as a "Grouping" level for Cost Review Items.

Below is a screenshot of "Financials Setup" with explanations given for each red numbered marker.

The screenshot shows the 'Admin Setup' workspace with two main tables. The left table, 'Financials Items', has columns: Row, ItemIndx, Item, Book Mark, Row Formula, Sort O, IsHidden, #CR, and #CS. The right table, 'Cost Review Items for selected Financials Item: Prelim', has columns: Row, Item, Book Mark, and #CS. Below it is a table for 'Cost Centers for selected Financial / Cost Review Item: Prelim/Teambuilding' with columns: Title, WBS6, and CostCenter. Red numbered markers are placed as follows: 1. In the 'Financials Items' table, row 0, column 'ItemIndx'. 2. In the 'Financials Items' table, row 7, column '#CR'. 3. In the 'Cost Review Items' table, row 7, column '#CS'. 4. In the 'Cost Centers' table, row 4, column 'WBS6'.

1. Editing the list of Financials Items and their field values. The order of items reflects the layout that will be produced in the Spreadsheet report.
2. Indicators of how many Cost Review Items are currently mapped to the Financials item. The number to right of it indicates how many CostCenters are aggregated to it. A red background color indicate that no cost centers are mapped to it (i.e it will get no cost from aggregation).
3. By selecting an item in this Cost Review grid...
4. ... the related CostCenters will be listed in this grid.

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## Defining Cost Review Items (CRI)

TCost Center Item should be given an "Initial Update Statement" that can define which WBS codes should be

## Setting Initial Update Statements for each CRI

Each Cost Center Item should be given an "Initial Update Statement" that can define which WBS codes should be assigned to it:

Row	Item	Book Mark	Financials Ref	Int Upd Crit	Preview	Sort Order	#CS
G	Prelim	Row_0010	01-Prelim		Preview	10	0
R	PCG, bank guarantee and other financials	CR01_PCG	01-Prelim	15%	Preview	20	0
R	Insurance	CR01_Insure	01-Prelim		Preview	30	0
R	Tender cost	CR01_Tender	01-Prelim	210000-%	Preview	40	216
R	Legal costs	CR01_Legal	01-Prelim	22%	Preview	50	20
R	Verification cost	CR01_Verify	01-Prelim		Preview	60	0
R	Teambuilding	CR01_Teamb	01-Prelim	000000-%	Preview	70	7
R	Training	CR01_Train	01-Prelim	23%	Preview	80	0
R	HSE general cost	CR01_Gen	01-Prelim	330000-41%	Preview	90	0
R	Misc Prelim	CR01_Prelim	01-Prelim		Preview	100	0
R	Office	CR01_Office	01-Prelim		Preview	110	0
R	IT/IS	CR01_ISIT	01-Prelim		Preview	120	0
R	Travel (reimb.)	CR01_Travel_R	01-Prelim		Preview	130	0

CostCenter	Title
808004-330000-4110-2.NOK	Bulk Struct
808004-330000-4110-3.NOK	Bulk Struct
808004-330000-4120-2.NOK	Bulk Valves
808004-330000-4120-3.NOK	Bulk Piping
808004-330000-4130-3.NOK	Bulk Electrog
808004-330000-4170-3.NOK	Bulk Surfact
808004-330000-4175-3.NOK	Bulk Insulat
808004-330000-4135-2.NOK	Bulk Instrum
808004-330000-4135-3.NOK	Bulk Instrum
808004-330000-4140-3.NOK	Bulk Telecof
808004-330000-4145-3.NOK	Bulk HVAC
808004-330000-4150-3.NOK	Bulk Archite
808004-330000-4155-2.NOK	Bulk Safety
808004-330000-4155-3.NOK	Bulk Safety

Descriptions of the number markers:

1. Criteria for matching WBS6 code to this Cost Review Item (CRI).
2. Preview button to see effect of Criteria (if Action Button is pressed).
3. #CS =Number of Cost Centers that is mapped to this CRI.
4. The actual CostCenters that are mapped to this CRI.

## Executing the Initial Update Statements

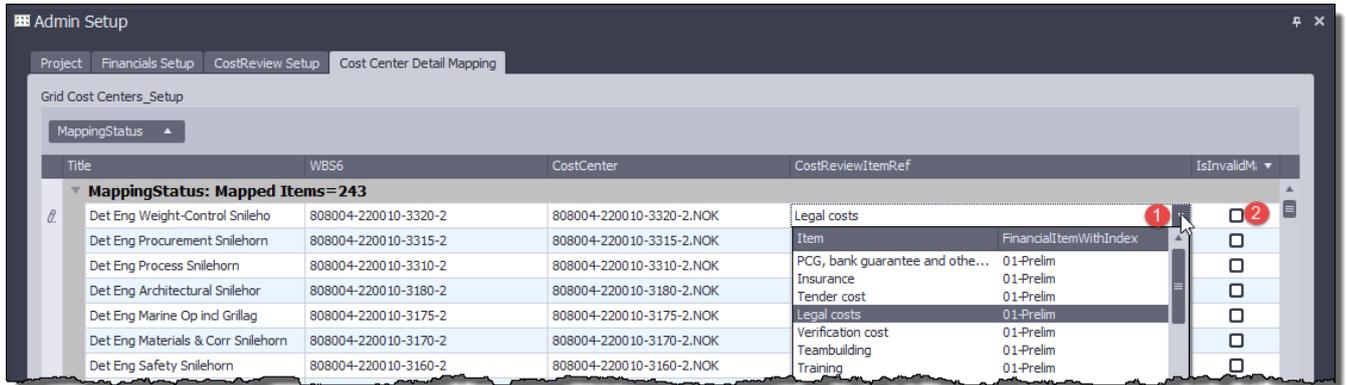
There is a so called "Actionbutton" that can be pressed (double-click) to run the Initial Update Statements:

Name	Descrip...
Actions	
Set Initial Cost Review Mappings	
Clear mappings for project	
Backup all mappings for Project Revision	
Restore mappings for Project Revision from Backup	

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## Lowest level (manual) mapping of Cost Centers

In case you can't make the Initial Update Statements precise enough, you need to be able to make manual mappings between a CostCenter and a CRI:



1. Dropdown list of all Cost Review Items
2. Indicator if (for whatever reason) a CostCenter is mapped to an invalid CRI.

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## Workspace "Project Cost Reporting"

This is the workspace where the actual work on the Reporting is done.

### Spreadsheet Report

Below is a screenshot showing the embedded Spreadsheet Report:

### KPIs

Below is a screenshot showing the KPI form:



Below are some details explained about the list of KPIs:

Category	Caption	Edit	Value	Last_Value	Trend	Fail%
<b>Category: 01-Project Management , KPI Fail%=42%</b>						
	Margin achievements vs. As Sold		0,07	-3,2	↑	67 %
	Development Revenue		0,25	0	→	33 %
	Client VOR's pending over 60 days		89	27	→	11 %
	Achieved Contract Milestones			1,8	→	33 %
	Current manning vs. Baseline manning		97	111	→	67 %
<b>Category: 02-Engineering &amp; Procurement , KPI Fail%=40%</b>						
	PEM status (Manual input)			79	→	56 %
	Engineering performance (Mhr/tons)		1,78		→	0 %

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Descriptions of the number markers:

1. Grouping title with fail statistics for group
2. KPI Title
3. KPI Type: Hand with Pen indicated that it is manual, and red color indicates missing value.
4. The current KPI value
5. The last KPI value
6. The Trend relative last snapshot
7. The Average Fail% for the KPI

## Defining a new KPI

### Defining the Description

Guideline Expression KPI Pass/Fail Intervals

ID: MarginvsSold Category: 01-Project Management

Caption: Margin achievements vs. As Sold SortOrder: 1

KPI Guideline:  
Rationale for keeping a zero value, is that it directly measures our ability to be predictable.  
Reporting shall be based on input according to "Revenue Value Development" where revenue shall be equal to Contract Value reported to Client.  
Any changes in contingency shall be commented.

Descriptions of the number markers:

1. A unique ID (required but not used unless you need to refer from one KPI to another).
2. The Grouping Category (it is a good idea to prefix with a 2 digit numeric index since that controls the sorting order of the group).
3. The Caption of the KPI to show in table.
4. KPI Guideline: The instructions for users so that the value can be more clearly understood. Can also be used to give indications on what to comment on if KPI fails.

### Defining the Logic

In order to lower the threshold for defining KPI Expressions, a utility has been added that allows selecting which Cost Review / Financial Item to get the value for:

Guideline Expression KPI Pass/Fail Intervals

Bookmark Picker: CostReview: CR05\_Equip Field Picker: ActCost Insert Formula

Example Picker: Insert Sample

Expression Editor:  
cGridCostReview.LookupCellValue("BookMark", "CR01\_Teamb", "ActCost") /  
cGridCostReview.LookupCellValue("BookMark", "CR05\_Equip", "ActCost")

Test Expression

Value: 0,733439689075679 <- Calculated

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1. Bookmark picker with all bookmarks defined for Cost Review and Financials.
2. Value Type picker with all the fields to choose from.
3. Button for inserting a sub-Expression for obtaining the value.
4. Expression Editor with the final expression being "built".
5. Button to test the expression (or the selected parts of it).
6. Result shown when above button is pressed.
7. List of examples to pick from as a starting point for doing manual changes afterwards.
8. Button to insert the selected example in the Expression Editor

## *Defining the Threshold Intervals*

Figure below shows the tab where KPI thresholds are defined:

Field	Value
Threshold Low	-1
Threshold High	0
Graph Floor	-3,2
Graph Ceiling	2,2
Green On This Value	5
Lower Is Good	<input type="checkbox"/>

1. The lower threshold value (from a purely numeric perspective).
2. The higher threshold value (again from a purely numeric view, i.e. this must be higher than (1)).
3. The Graph's lowest value (on its y-axis).
4. The Graph's highest value (y-axis).
5. In the case where only ONE value represents green, you specify it here (in exceptional cases).
6. If lower value are better, check this box (then values below the (1) will be colored green, otherwise red).

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