Fiori Embedded Analytics in SAP S/4 HANA. What are these Analytics?

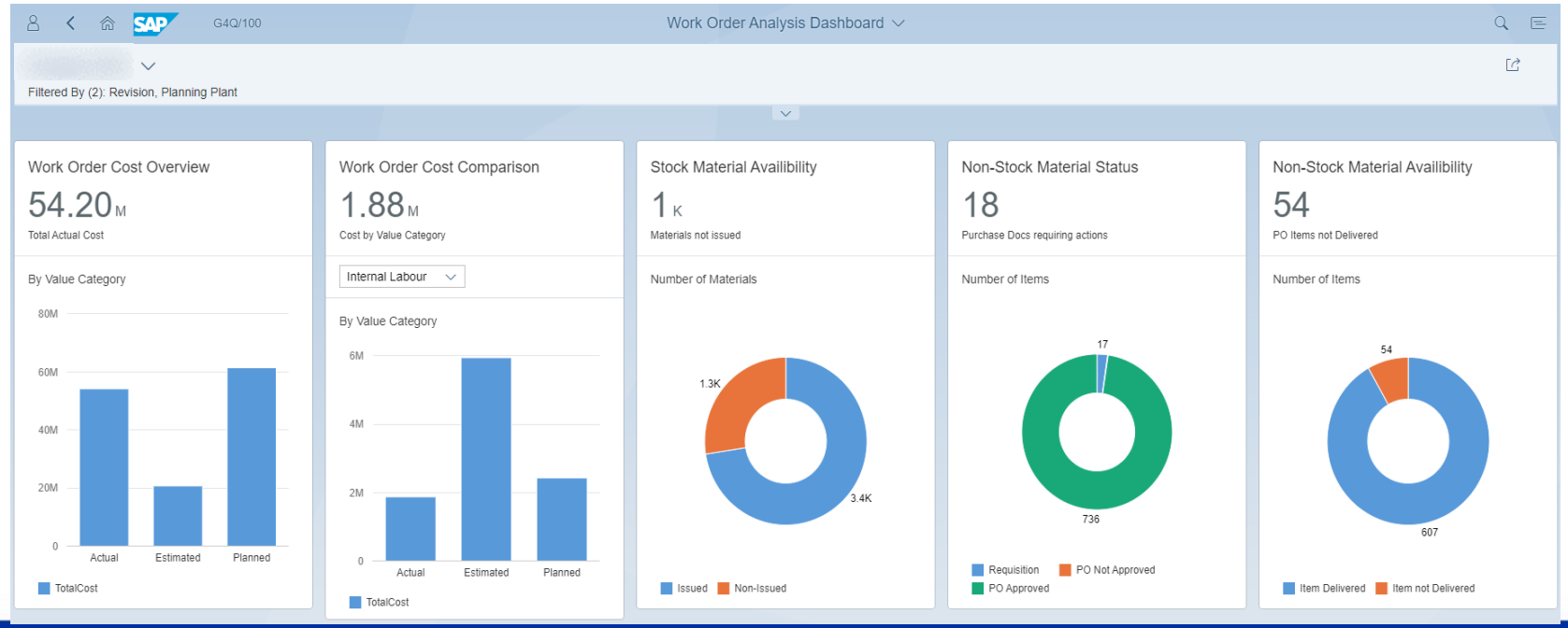
Graham Johnston
Work Management/EAM Consultant,
AGL Energy

What we will Cover

- What is Fiori Embedded Analytics?
- Why should they be considered?
- What is available & how does it work?
- Our Journey to Embedded Analytics
- Unpack a key analytic app delivered.
- My views on how to build and implement.
- Questions.

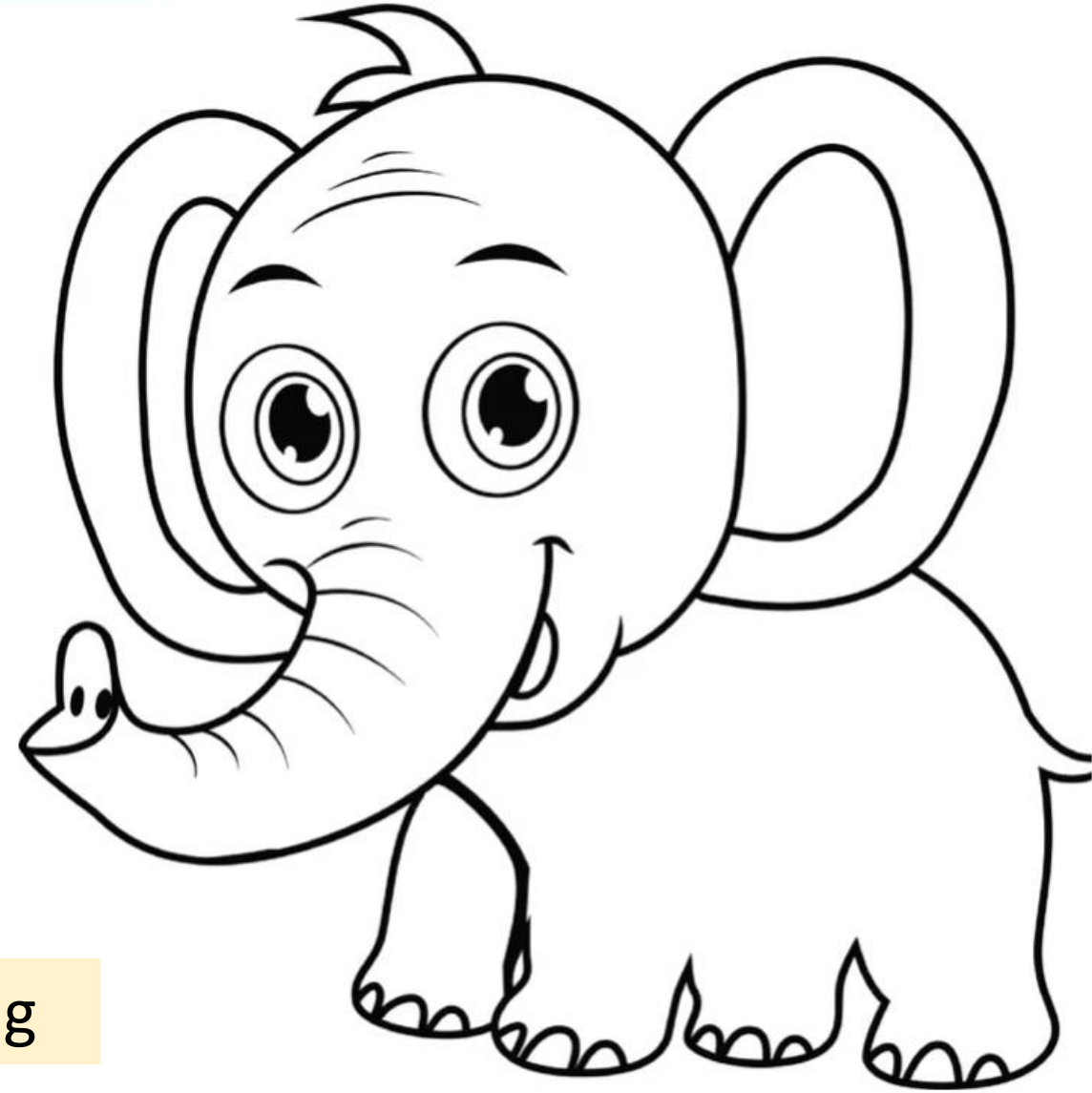
What is Embedded Analytics

- It is a collection of SAP Fiori tiles in SAP S/4HANA that enable real time operational reporting.
- Embedded Analytics uses SAP Fiori as the front-end user interface to visualise data from various functional areas.



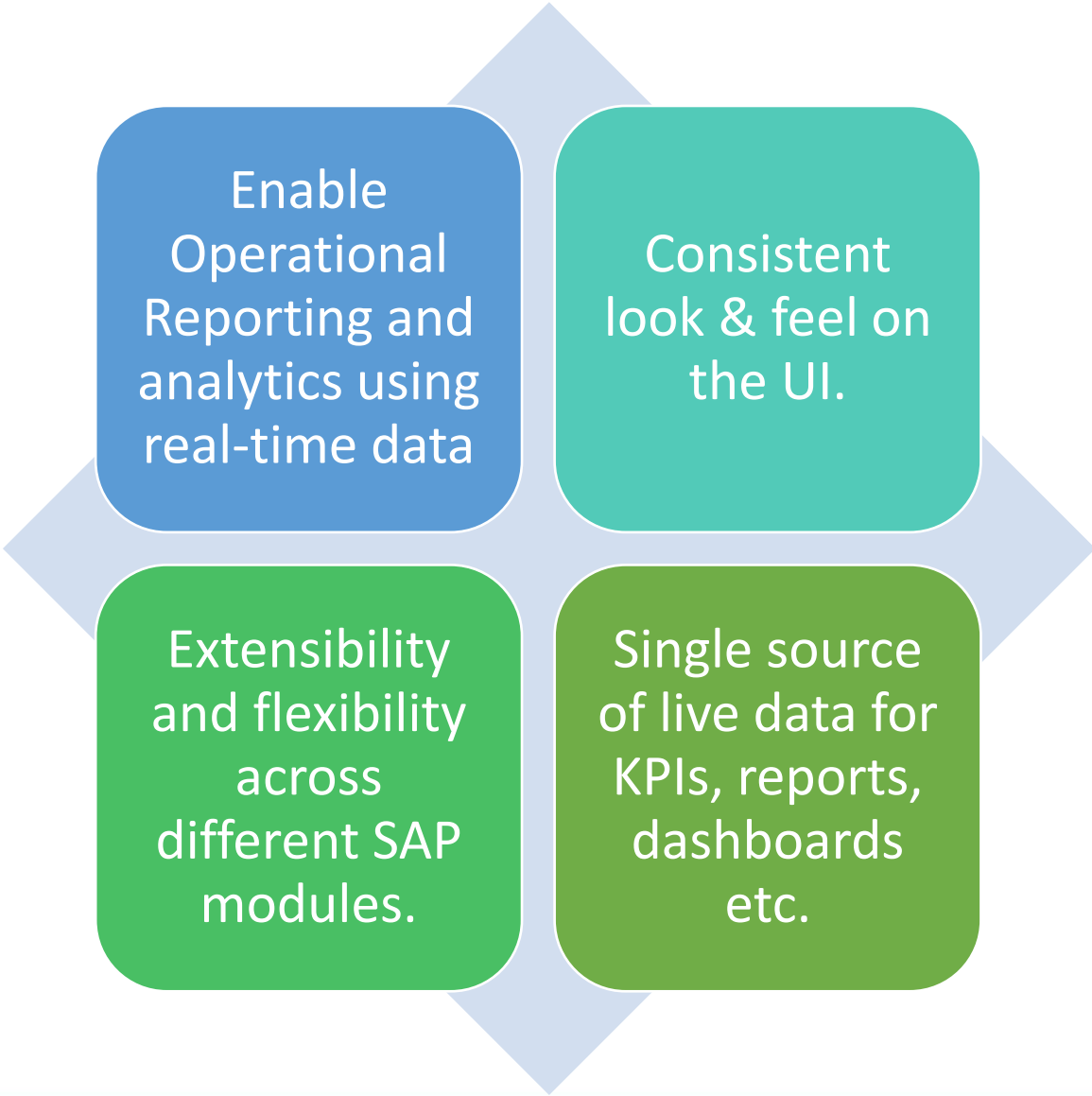
The Elephant in the room

- Fiori is too hard we use the GUI and just export data daily to create reports.
- We just use a different analytic tool because its easy.
  - Microsoft Power BI
  - Excel
  - Etc.
  - Etc.



Not very efficient for Operational reporting

Why Embedded Analytics



Reporting Data in older SAP

- The old PMIS and LIS reports replicated data to separate tables which made the data real-time.
- Great drilldown functionality
- No charts and lacked deeper detail.

Functional Location	OrdsCrtd	Compl.ords	EstTotalCosts	TotalPlnndCosts	Total act.costs	Int. wage costs	ExternalMatCost	Ext. wage costs	Int. mat. costs	Lubricant Costs	Miscell. costs
Total	852	705	0.00 AUD	11,867,206.99 AUD	11,833,063.96 AUD	99.59 AUD	474,181.96 AUD	9,031,233.15 AUD	2,153,172.09 AUD	2,125.71 AUD	172,251.46 AUD
[redacted]	12	5	0.00 AUD	4,810,838.91 AUD	4,453,145.00 AUD	0.06 AUD	0.00 AUD	4,453,144.94 AUD	0.00 AUD	0.00 AUD	0.00 AUD
[redacted]	8	2	0.00 AUD	994,105.34 AUD	637,947.24 AUD	0.14 AUD	133,607.09 AUD	95,026.84- AUD	593,893.21 AUD	0.00 AUD	5,473.64 AUD
[redacted]	12	10	0.00 AUD	886,513.19 AUD	1,841,883.23 AUD	1.36 AUD	15,380.81 AUD	1,840,503.48 AUD	14,893.92- AUD	0.00 AUD	891.50 AUD
[redacted]	9	8	0.00 AUD	741,592.30 AUD	587,626.36 AUD	0.07 AUD	2,948.00 AUD	259,300.67 AUD	325,377.62 AUD	0.00 AUD	0.00 AUD
[redacted]	1	0	0.00 AUD	500,245.17 AUD	496,976.00 AUD	0.00 AUD	0.00 AUD	404,839.86 AUD	92,118.14 AUD	0.00 AUD	18.00 AUD
[redacted]	3	1	0.00 AUD	476,618.47 AUD	451,845.53 AUD	0.00 AUD	19,842.60 AUD	396,149.74 AUD	35,424.68 AUD	0.00 AUD	428.51 AUD
[redacted]	2	0	0.00 AUD	441,352.90 AUD	451,227.52 AUD	0.00 AUD	0.00 AUD	450,489.34 AUD	738.18 AUD	0.00 AUD	0.00 AUD
[redacted]	15	14	0.00 AUD	197,335.89 AUD	121,656.42 AUD	3.46 AUD	0.00 AUD	80,360.90 AUD	41,292.06 AUD	0.00 AUD	0.00 AUD
[redacted]	26	1	0.00 AUD	166,119.18 AUD	102,304.60 AUD	0.00 AUD	13,693.00 AUD	0.00 AUD	88,611.60 AUD	0.00 AUD	0.00 AUD
[redacted]	5	5	0.00 AUD	111,601.11 AUD	113,764.81 AUD	0.14 AUD	3,444.20 AUD	83,321.60 AUD	26,998.87 AUD	0.00 AUD	0.00 AUD
[redacted]	1	1	0.00 AUD	96,667.32 AUD	78,887.43 AUD	9.40 AUD	160.40 AUD	17,161.00 AUD	61,524.63 AUD	0.00 AUD	32.00 AUD
[redacted]	1	1	0.00 AUD	93,906.10 AUD	93,906.30 AUD	0.30 AUD	93,906.00 AUD	0.00 AUD	0.00 AUD	0.00 AUD	0.00 AUD
[redacted]	8	8	0.00 AUD	91,148.71 AUD	80,555.11 AUD	0.12 AUD	5,675.64 AUD	15,544.77 AUD	58,507.58 AUD	0.00 AUD	827.00 AUD
[redacted]	1	0	0.00 AUD	87,994.70 AUD	86,532.49 AUD	0.00 AUD	0.00 AUD	0.00 AUD	86,532.49 AUD	0.00 AUD	0.00 AUD
[redacted]	1	1	0.00 AUD	82,558.73 AUD	75,050.56 AUD	0.00 AUD	3,205.90 AUD	0.00 AUD	71,844.66 AUD	0.00 AUD	0.00 AUD
[redacted]	5	2	0.00 AUD	82,430.00 AUD	74,272.02 AUD	0.02 AUD	74,272.00 AUD	74,272.00- AUD	0.00 AUD	0.00 AUD	74,272.00 AUD
[redacted]	9	0	0.00 AUD	69,788.73 AUD	47,171.31 AUD	0.00 AUD	1,641.08 AUD	45,043.69 AUD	454.50 AUD	0.00 AUD	32.04 AUD
[redacted]	1	0	0.00 AUD	62,301.49 AUD	62,285.56 AUD	0.00 AUD	0.00 AUD	61,991.93 AUD	293.63 AUD	0.00 AUD	0.00 AUD
[redacted]	1	1	0.00 AUD	53,804.00 AUD	47,367.00 AUD	0.00 AUD	0.00 AUD	47,367.00 AUD	0.00 AUD	0.00 AUD	0.00 AUD
[redacted]	1	1	0.00 AUD	50,863.06 AUD	59,263.06 AUD	0.00 AUD	10,410.00 AUD	0.00 AUD	0.00 AUD	0.00 AUD	48,853.06 AUD

NOTE: These are turned off as standard in S/4

What is under the hood with Embedded Analytics

The analytical models are implemented using Virtual Data Model (VDM)

VDM provides real-time access to the transactional data, and which therefore needs no data replication.

VDM are a structured representation of Core Data Services (CDS) views that can be reused across different analytics

CDS View code

Data Definition: ZWM_I_PREVMAINTROUTINE Active

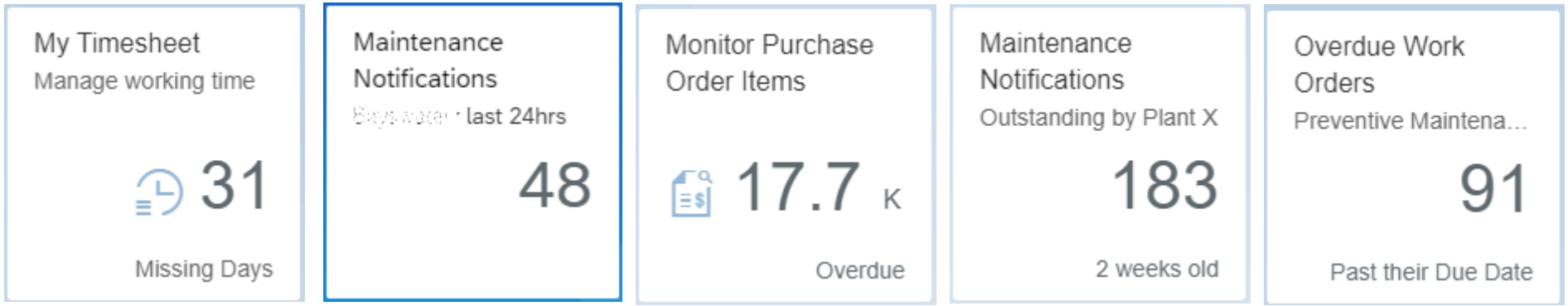
Properties Source Code

ADT-Link: adt://S4D/sap/bc/adt/ddic/ddl/sources/zwm_i_prevmaintroutine

```
34
35  {
36
37    key mhio.warpl                                                as MaintenancePlan, //mainte plan
38    key mhio.abnum                                                as CallNumber, //Maintenance Plan Call Number
39    key mhio.wppos                                                as MaintenanceItem, //Maintenance item
40    key mhis.zaehl                                                as MaintenancePackage, //Maintenance Package Number
41        case when mpos.priok <> ''
42        then mpos.priok
43        else 'NA'
44        end                                                       as Priority, //Item Priority
45        mhio.aufnr                                                as WorkOrder, //Order
46        mhis.nplda                                                as PlanDate, //plan date
47        afko.gstri                                                as ActualStartDate, //Actual start date
48        afih.ingpr                                                as PlannerGroup, //planner grp
49        aufk.vaplz                                                as MainWorkCenter, //main workcenter,
50        afih.gewrk                                                as WorkCenterInternalID,
51        afih.pm_objty                                             as WorkCenterTypeCode,
52        aufk.wawrk                                                as MainPlant, //main plant
53        aufk.stort                                                as Location, //location
54        aufk.sowrk                                                as MaintenancePlant, //maint plant
55        mpos.iwerk                                                as MaintPlanningPlant,
56        case when iloa.abckz <> ''
57        then iloa.abckz
58        else 'NA' end                                             as ABCIndicator,
59        afih.addat                                                as ReferenceDate,
60        jest.stat                                                 as Status,
61        case when jest.stat = 'I0045' then
62        (case when afih.addat <= mhis.nplda
```

Embedded Analytics User Experience

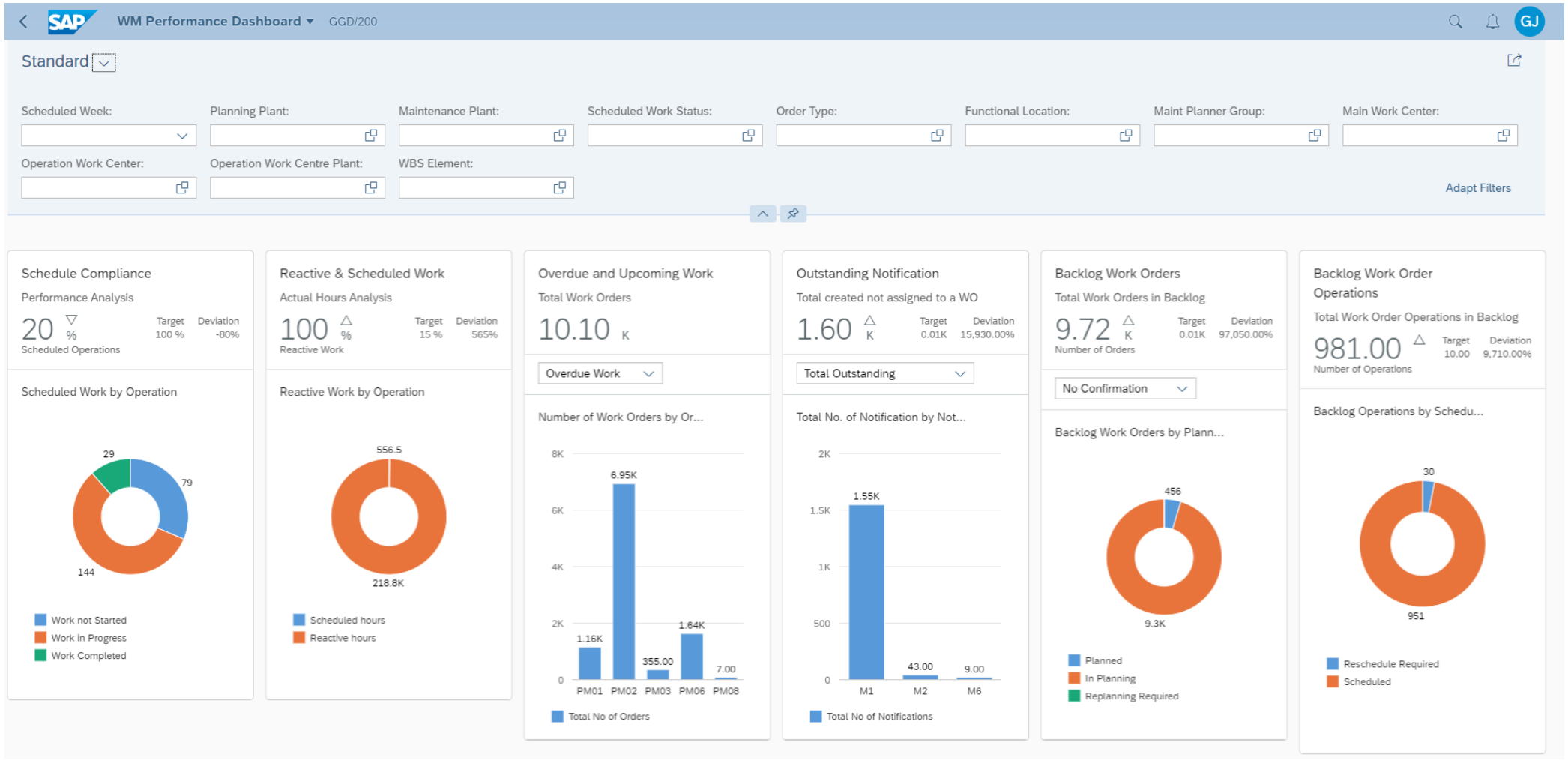
- Many users start using Fiori from Analytical apps. So embedded analytics is the MAIN part of Fiori.



These are Dynamic Variant Tiles which can be created by a User

Embedded Analytics Approach

Overview Page



The purpose of this page is to show an overview of predefined measures. It is also a starting point for deeper analysis

https://experience.sap.com/fiori-design-web/overview-page/

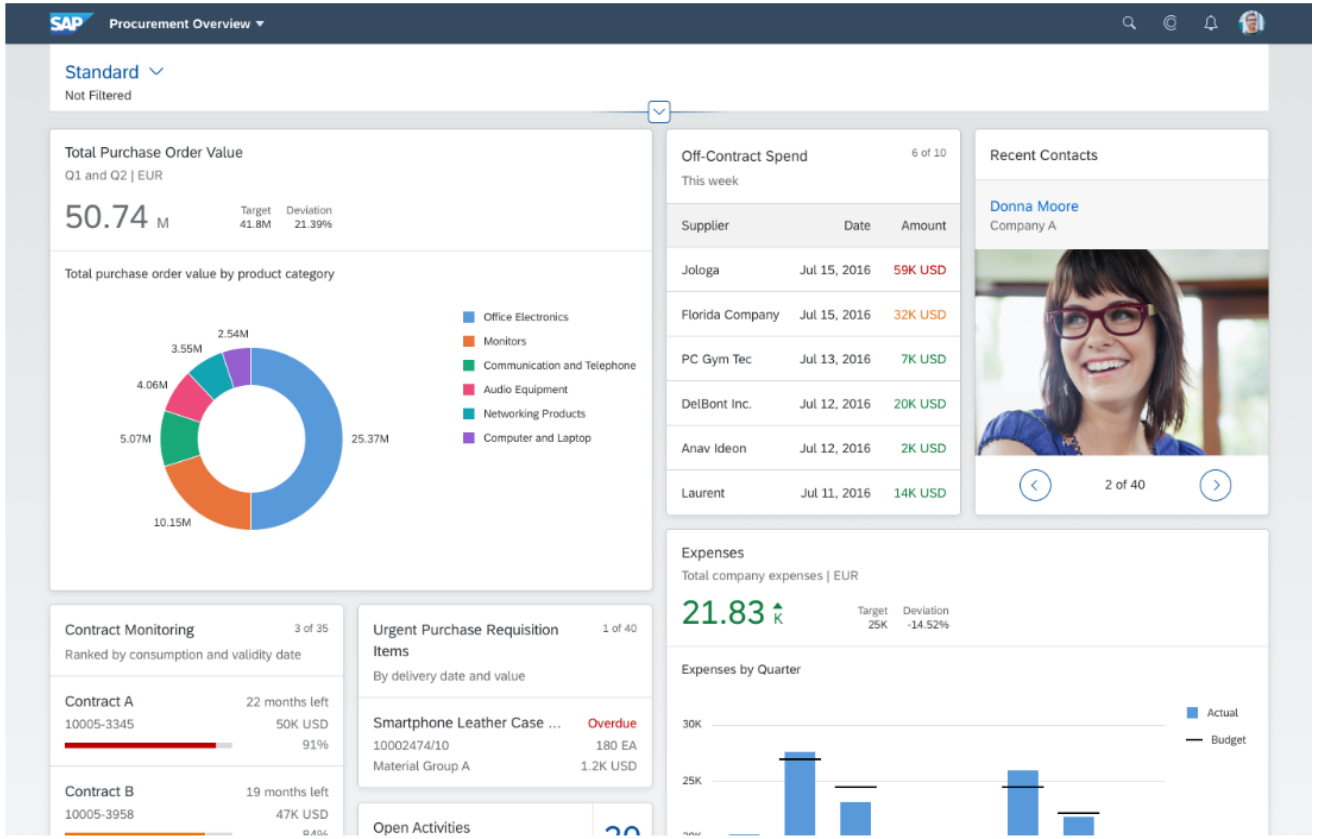
Overview Page Fiori Design

Use the overview page if:

- Users needs to filter and react to information from at least two different applications to complete their role-specific tasks.
- You want to offer **different information formats** (such as charts, lists, and tables) on a single page.
- You plan to have **at least three cards**. These cards should not all be of the same type.

Do not use the overview page if:

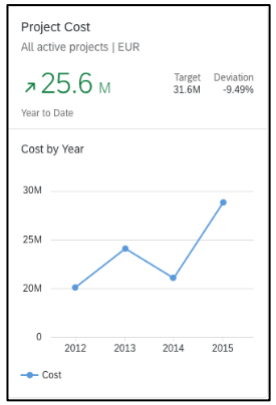
- A high-level or birds-eye view of application content is sufficient.
- You just want the user to launch an application.
- You want to show information about one object only. In this case, use the object page.
- You just represent one application and less than three cards. In this case, use the object page.

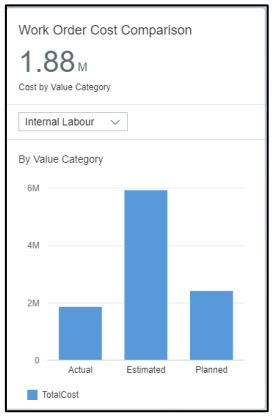


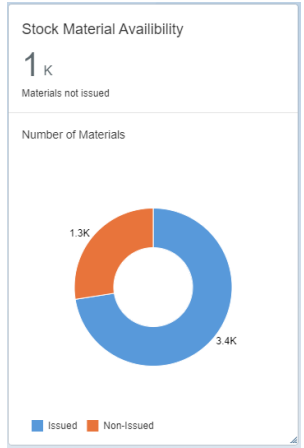
Source: https://experience.sap.com/fiori-design-web/overview-page/

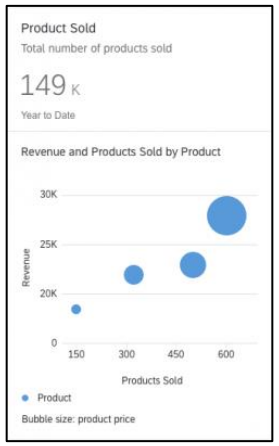
Overview Page Cards

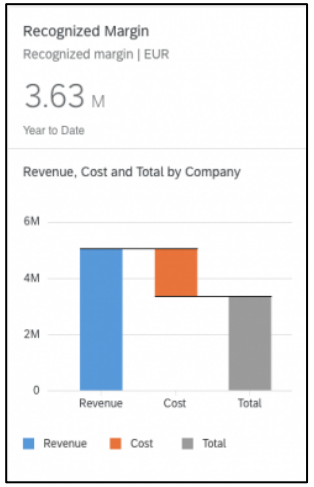
- Overview pages can have many different types of cards related to many parts of SAP.
- The types of graphs available are;
  - Line
  - Bubble
  - Column
  - Stacked column
  - Vertical bullet
  - Donut
  - Combined
  - Scatter plot
  - Waterfall









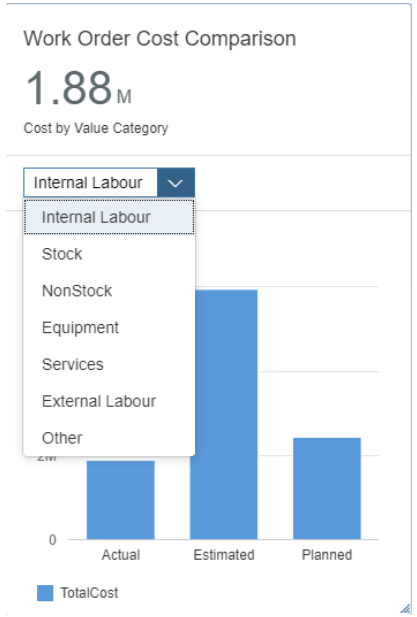


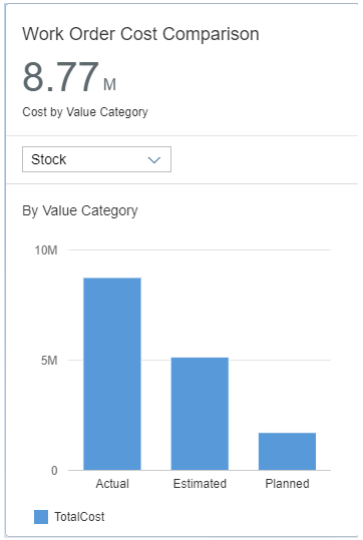
Overview Page Cards

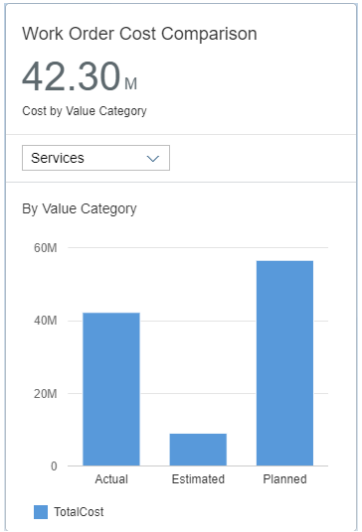
Analytical cards can have a View Switch activated.

This allows multiple views filtered in a single card

You use this when the same data is viewed by different attributes

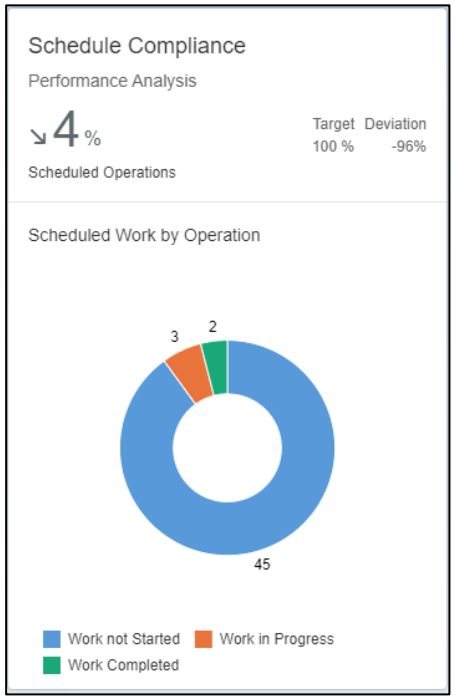


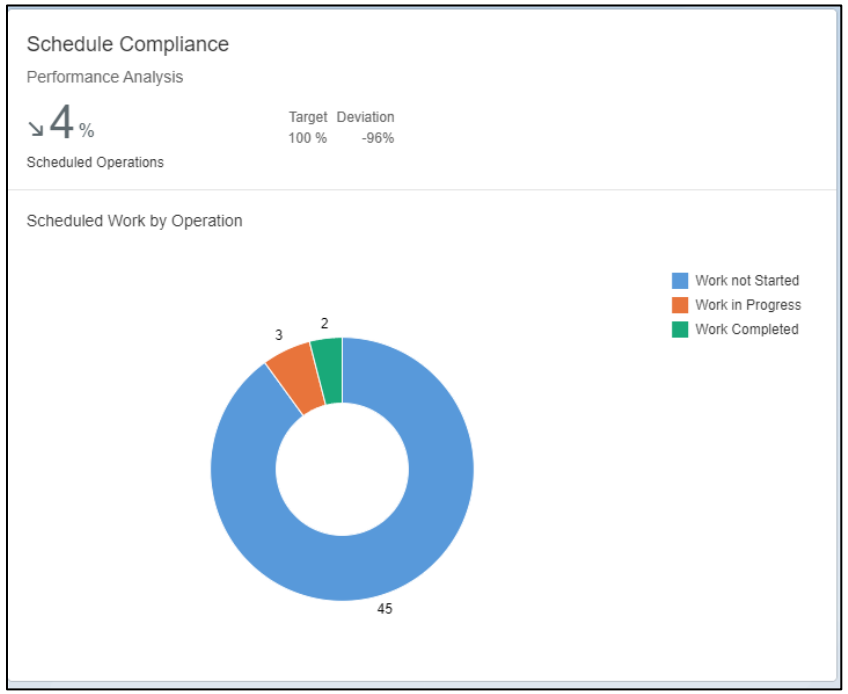




Overview Page Cards

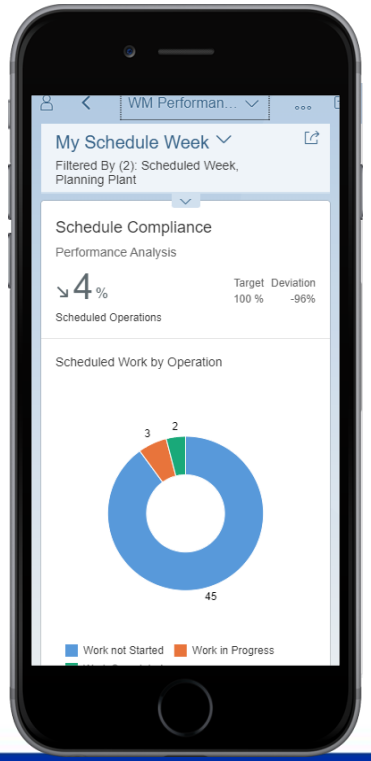
- Cards can be fixed or resizable
- Increasing the size can show more data points and increase the graph size

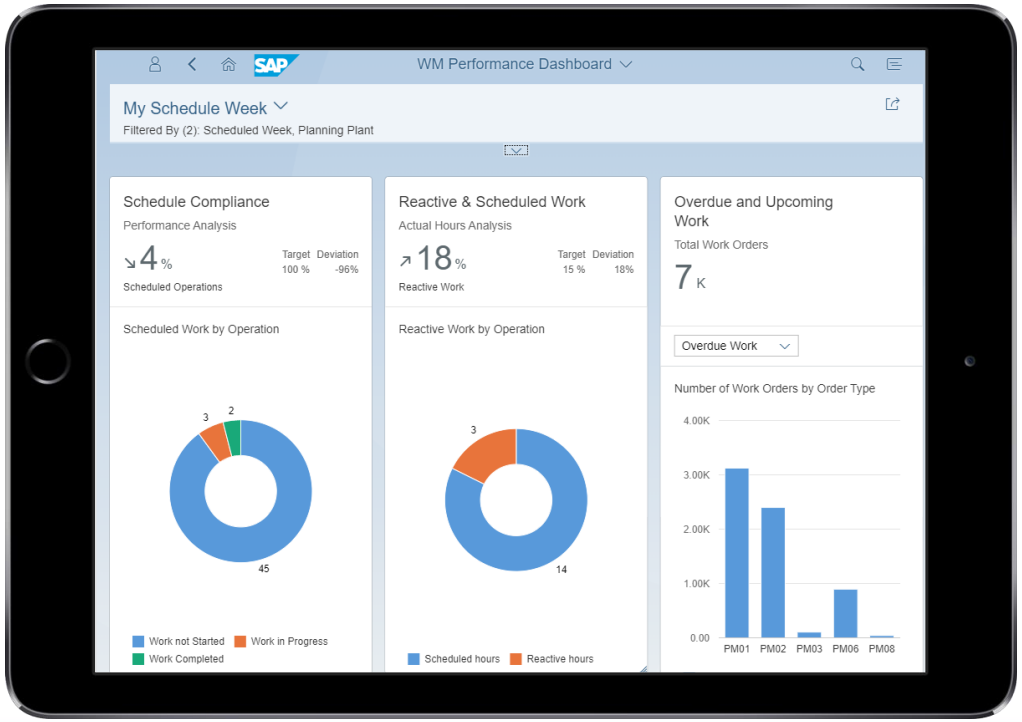




Overview Page Cards on Mobile

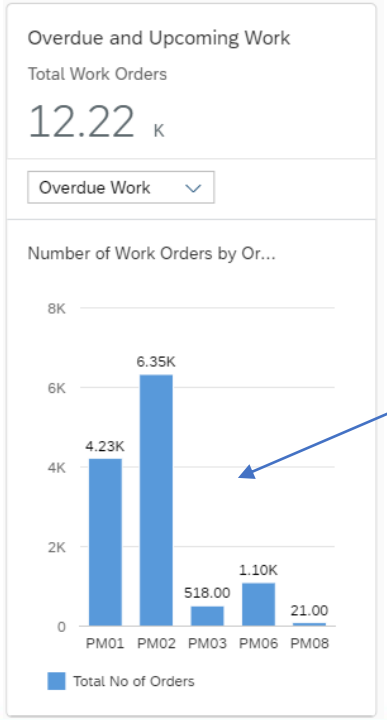
- Cards can be shown on Mobile devices
- Tablets show more cards but the cards fit nicely on a Smart Phone



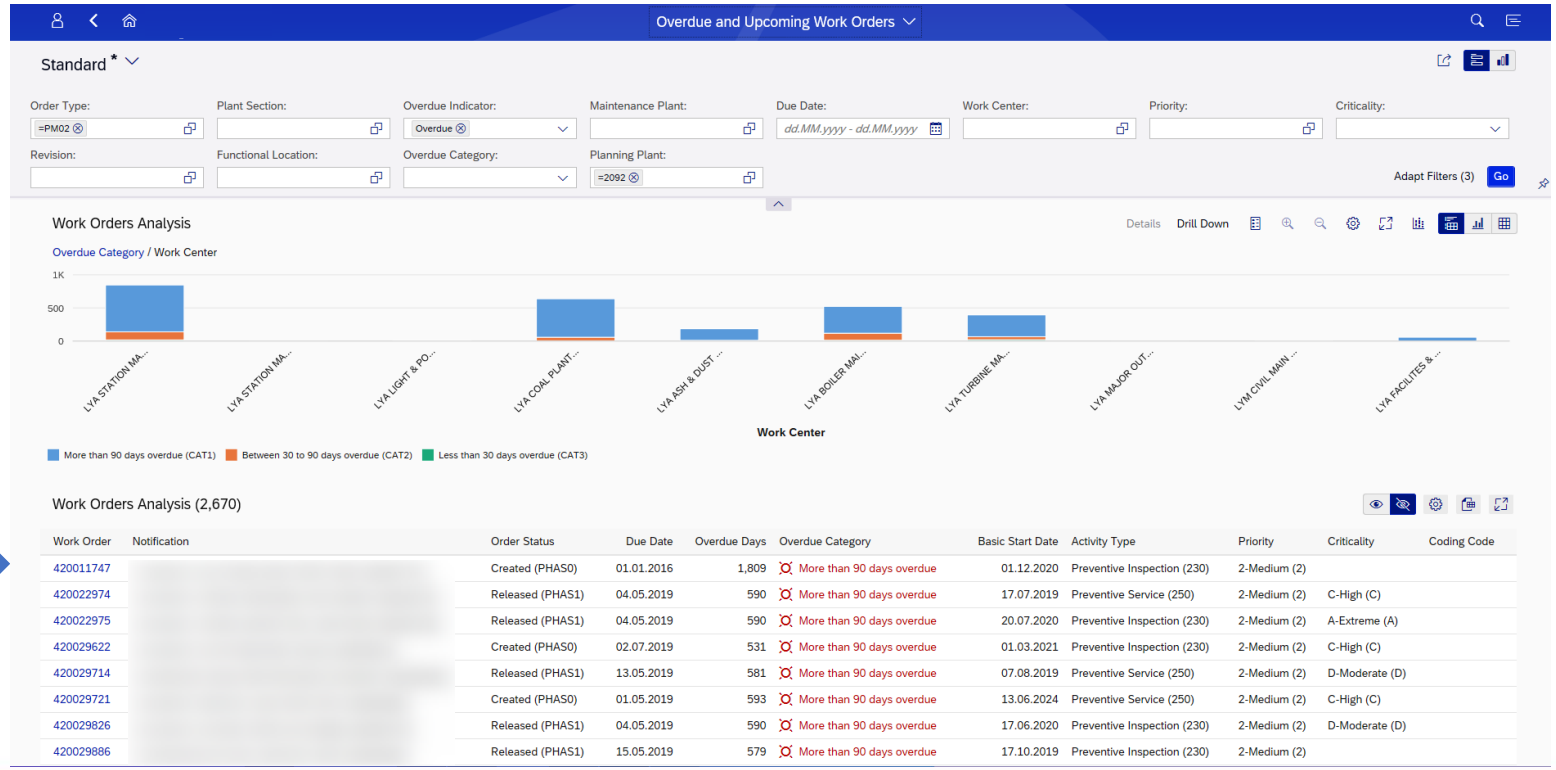


Overview Page Cards Deeper Dive

- Analytical cards are interactive so when a bar or the top of the cards is selected an additional app is opened.
- All filtered and selected bar information is transferred to another app.

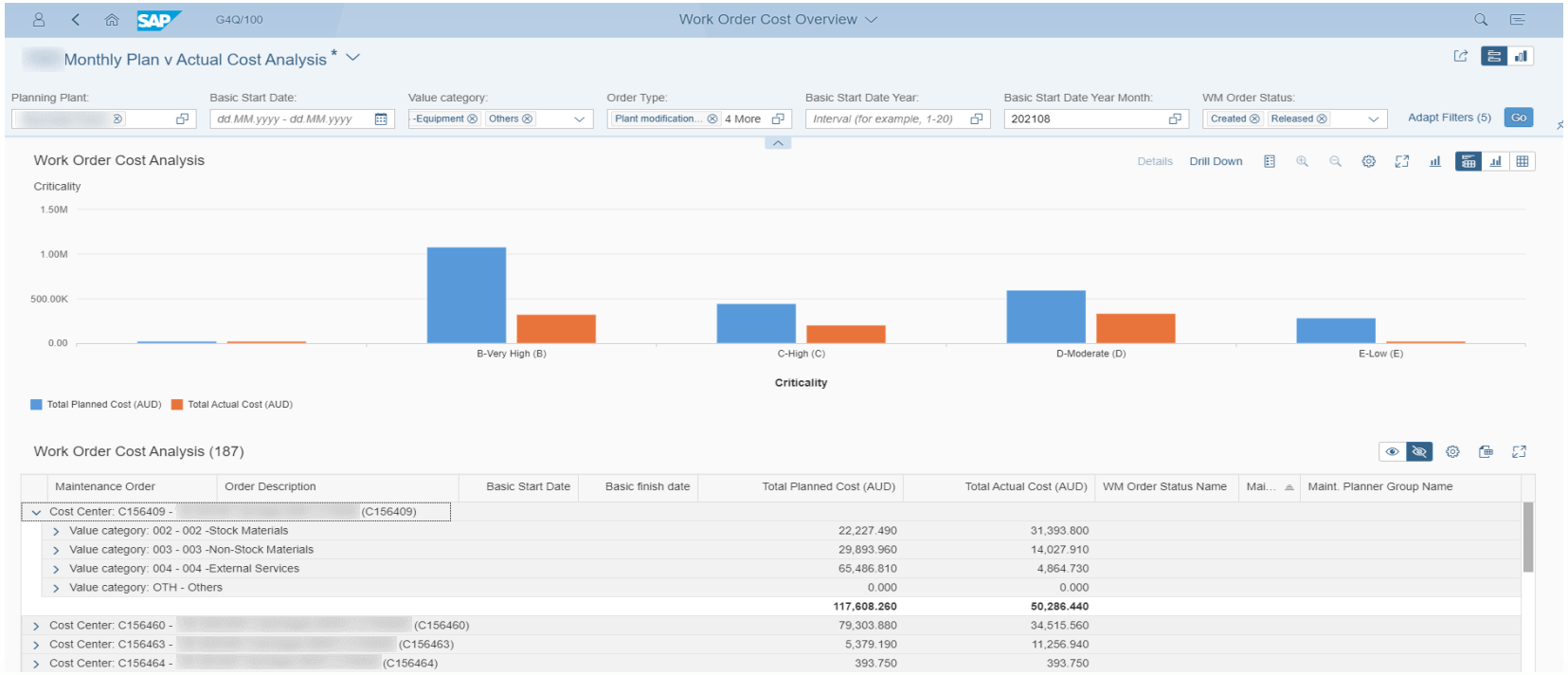


Select a bar & the app opens showing only that information



Analytical List Page

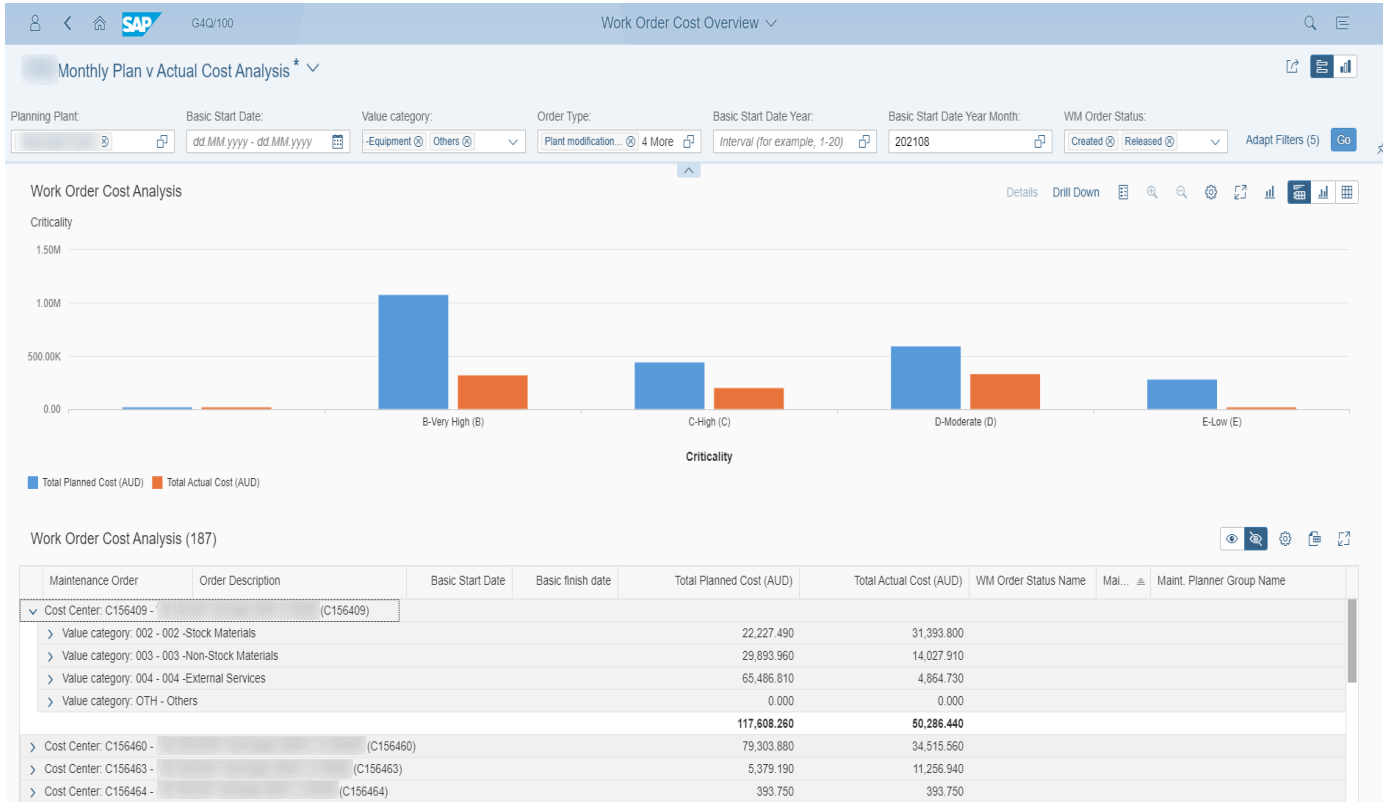
- Analytical list pages (ALP) are used to analyse data from different perspectives.
- Based on the filters set the information is visualised by the chart section and the list section



https://experience.sap.com/fiori-design-web/analytical-list-page/

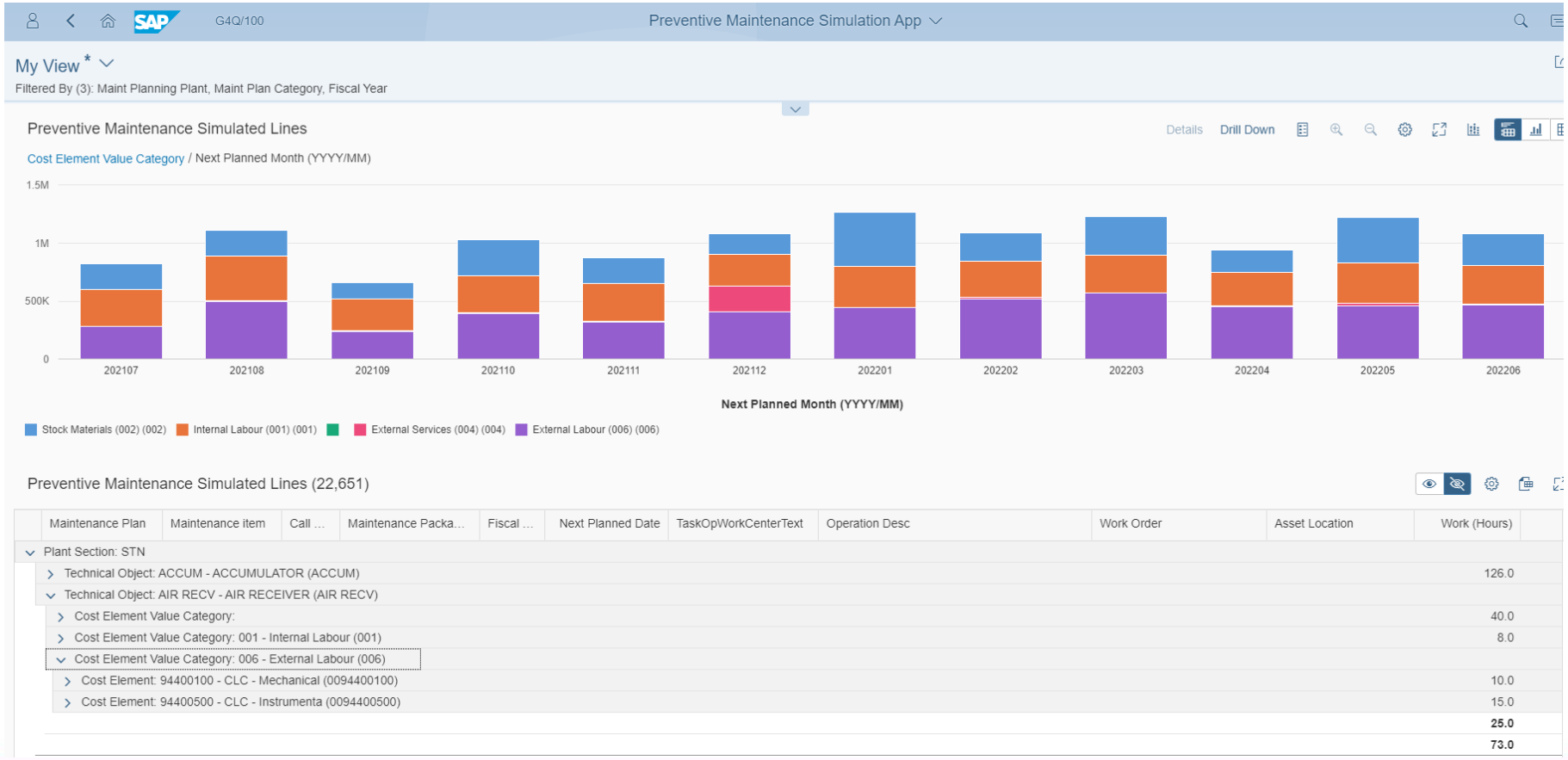
Analytical List Page

- There are 3 views in an ALP
  - Hybrid – Chart & List
  - Chart view
  - List view
- If a chart bar is selected the list shows only that data
- Key Lesson – spend time setting up the chart and list columns as Variants



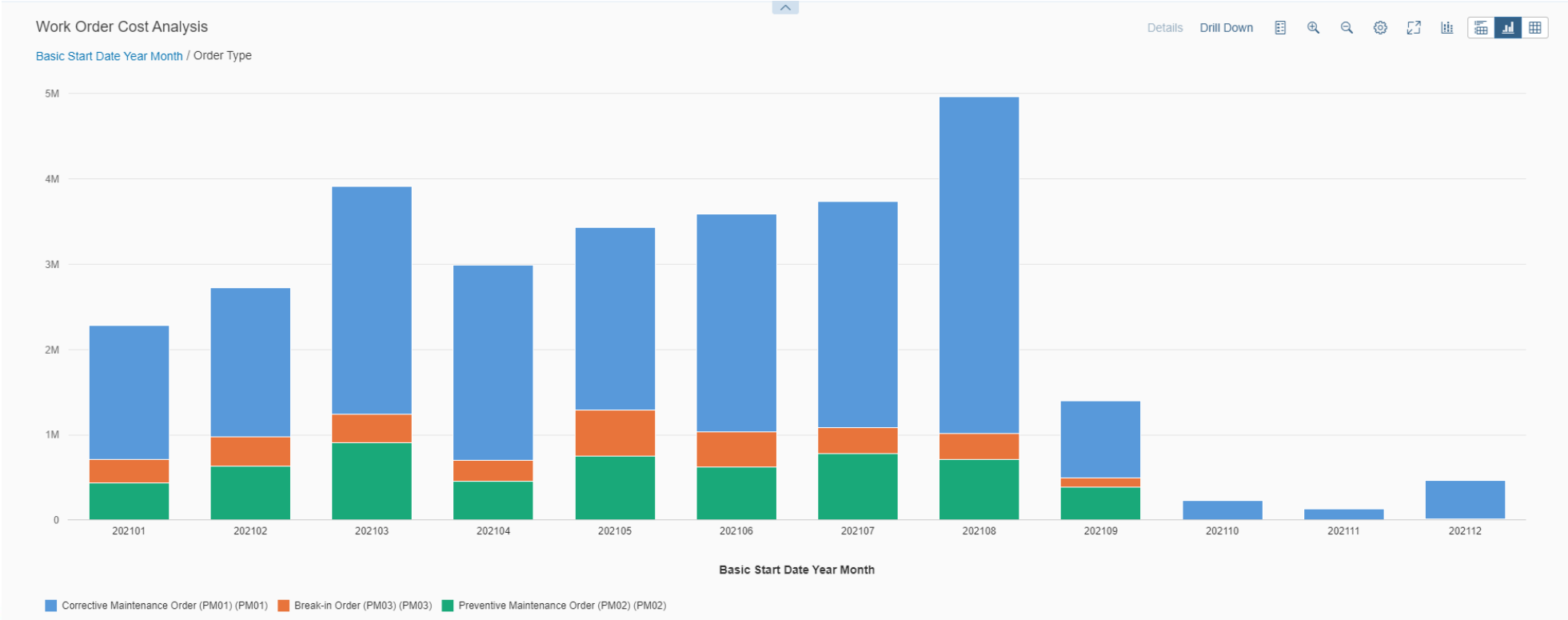
Analytical List Page – Hybrid View

- This is a combination of chart and list.
- The chart is good for showing trends that will drilldown to the list



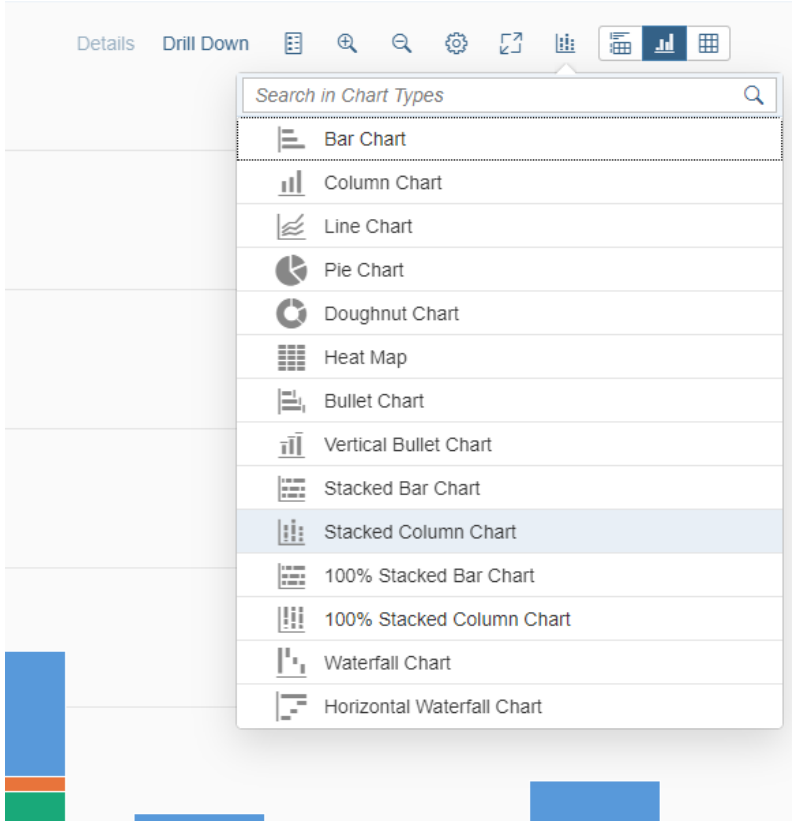
Analytical List Page – Chart Only View

- The Charts can be set up with different axis, categories and series based on the data available.
- The ALP filters control what data the chart reads.

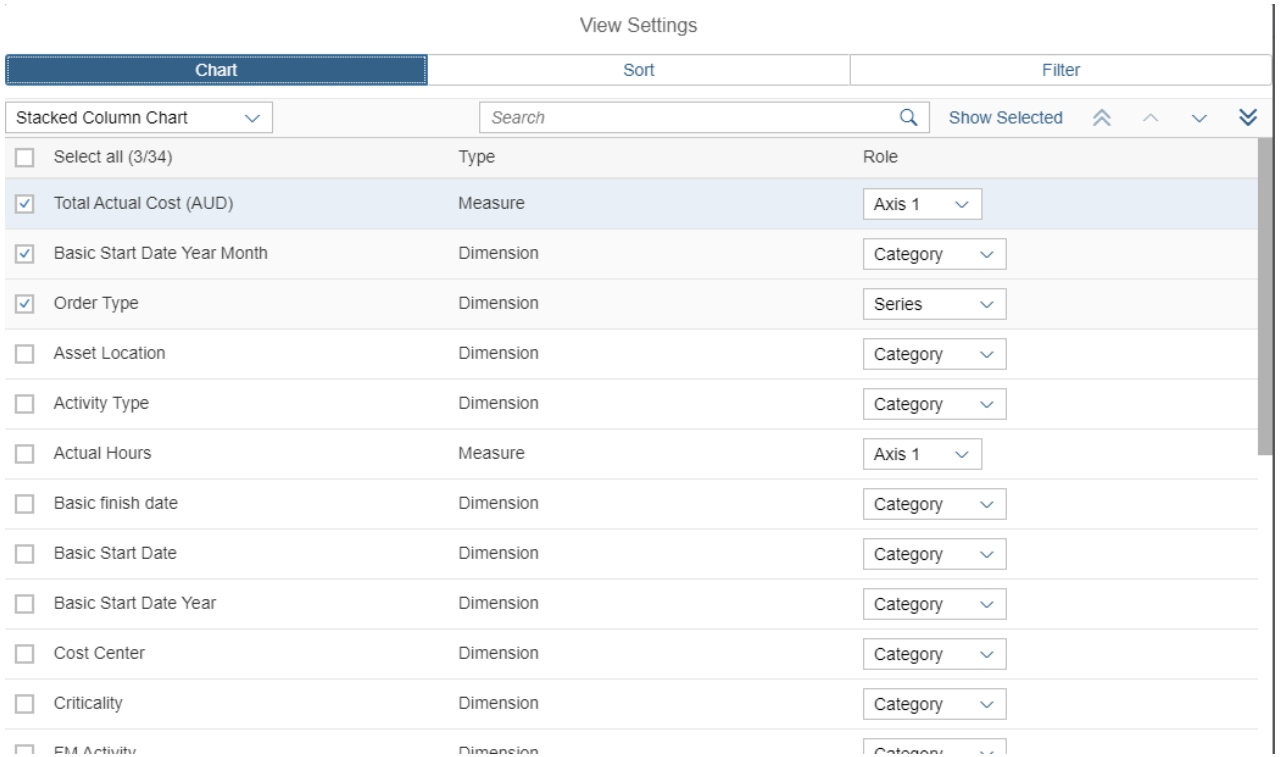


Analytical List Page – Chart Only View

- Many different charts are available.

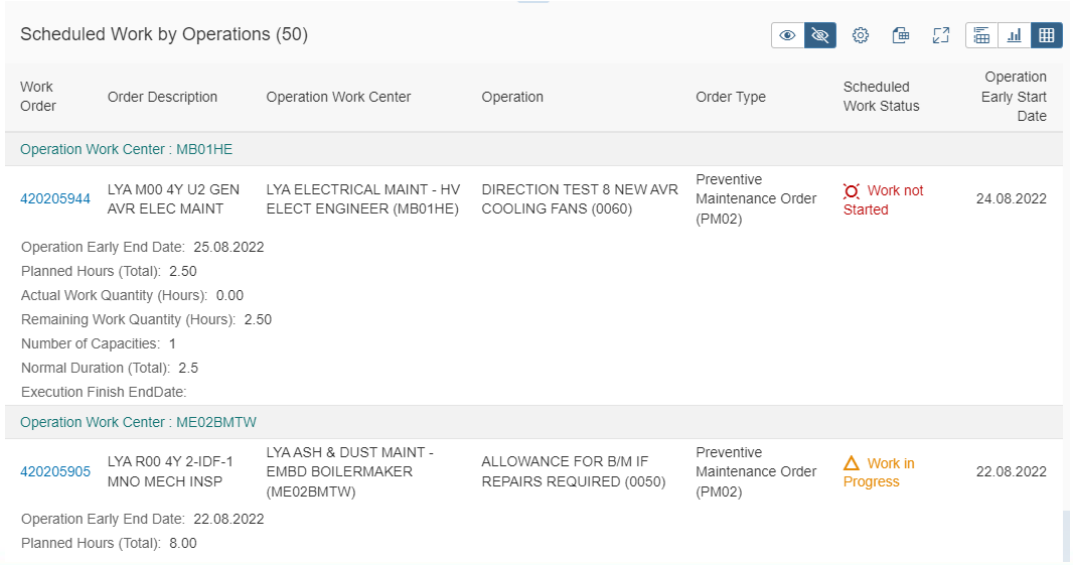


- Many of the fields are also available to set up the charts.



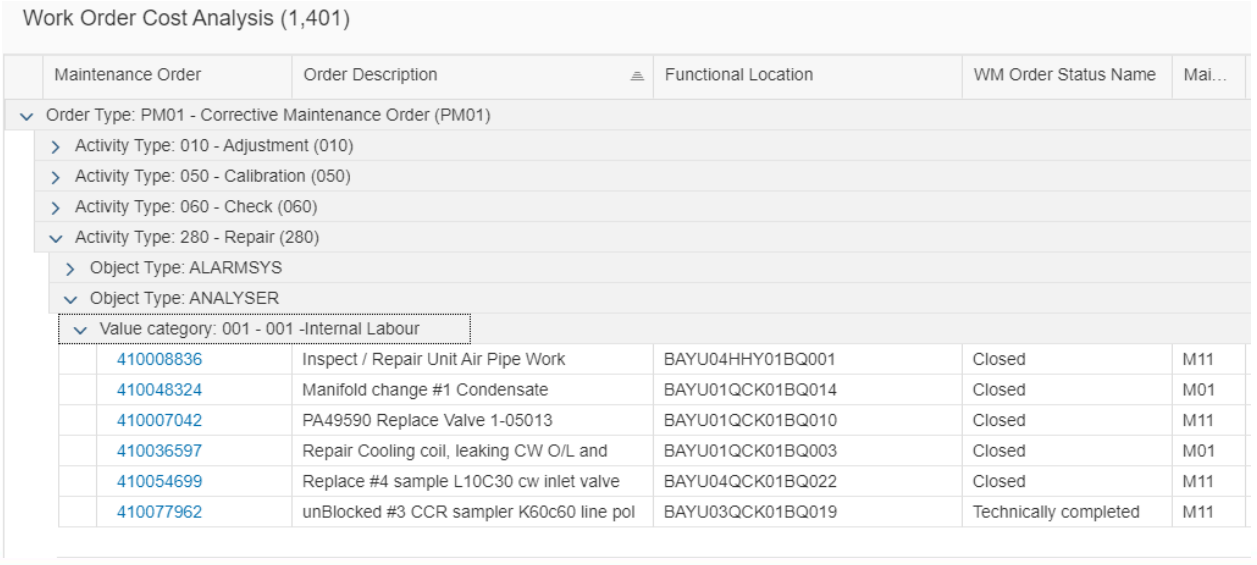
Analytical List Page – List Only View

- The ALP usually have 2 different lists depending on the reported information.
  - Responsive List
  - Analytical table (ALV)
- Both lists have there advantages and disadvantages



Scheduled Work by Operations (50)

Work Order	Order Description	Operation Work Center	Operation	Order Type	Scheduled Work Status	Operation Early Start Date
Operation Work Center : MB01HE						
420205944	LYA M00 4Y U2 GEN AVR ELEC MAINT	LYA ELECTRICAL MAINT - HV ELECT ENGINEER (MB01HE)	DIRECTION TEST 8 NEW AVR COOLING FANS (0060)	Preventive Maintenance Order (PM02)	Work not Started	24.08.2022
Operation Early End Date: 25.08.2022 Planned Hours (Total): 2.50 Actual Work Quantity (Hours): 0.00 Remaining Work Quantity (Hours): 2.50 Number of Capacities: 1 Normal Duration (Total): 2.5 Execution Finish EndDate:						
Operation Work Center : ME02BMTW						
420205905	LYA R00 4Y 2-IDF-1 MNO MECH INSP	LYA ASH & DUST MAINT - EMBD BOILERMAKER (ME02BMTW)	ALLOWANCE FOR B/M IF REPAIRS REQUIRED (0050)	Preventive Maintenance Order (PM02)	Work in Progress	22.08.2022
Operation Early End Date: 22.08.2022 Planned Hours (Total): 8.00						

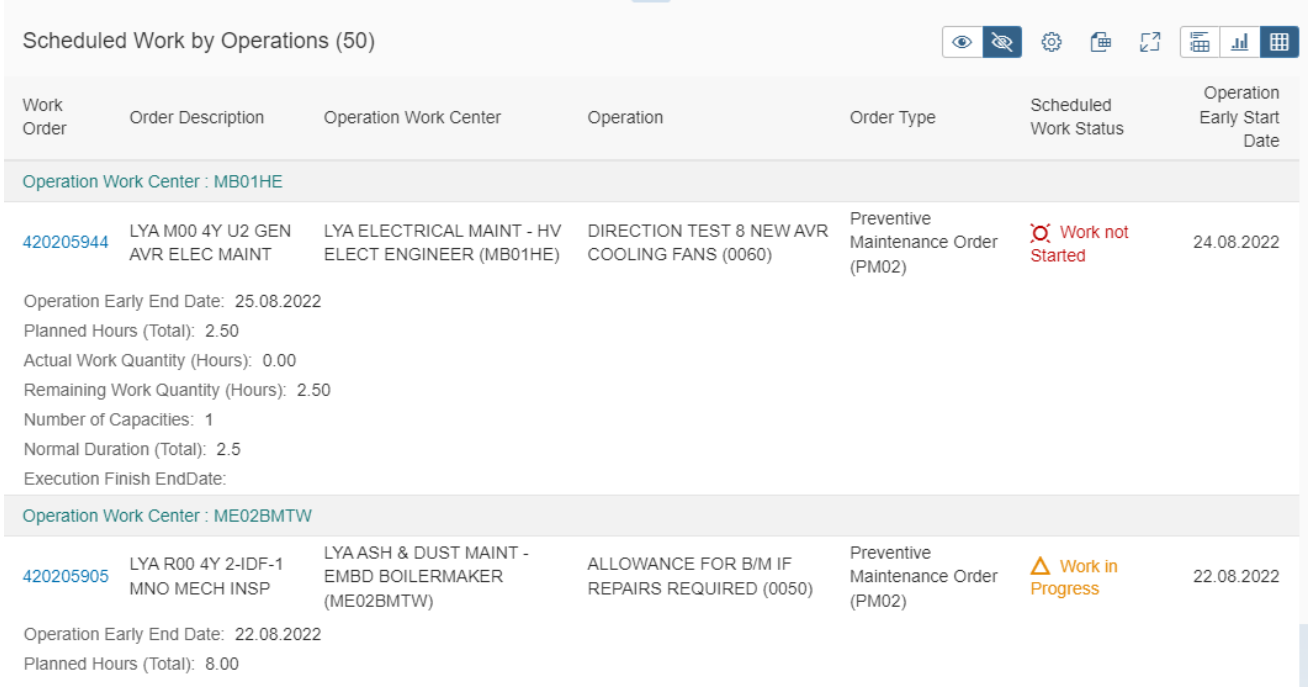


Work Order Cost Analysis (1,401)

Maintenance Order	Order Description	Functional Location	WM Order Status Name	Mai...
Order Type: PM01 - Corrective Maintenance Order (PM01)				
Activity Type: 010 - Adjustment (010)				
Activity Type: 050 - Calibration (050)				
Activity Type: 060 - Check (060)				
Activity Type: 280 - Repair (280)				
Object Type: ALARMSYS				
Object Type: ANALYSER				
Value category: 001 - 001 -Internal Labour				
410008836	Inspect / Repair Unit Air Pipe Work	BAYU04HHY01BQ001	Closed	M11
410048324	Manifold change #1 Condensate	BAYU01QCK01BQ014	Closed	M01
410007042	PA49590 Replace Valve 1-05013	BAYU01QCK01BQ010	Closed	M11
410036597	Repair Cooling coil, leaking CW O/L and	BAYU01QCK01BQ003	Closed	M01
410054699	Replace #4 sample L10C30 cw inlet valve	BAYU04QCK01BQ022	Closed	M11
410077962	unBlocked #3 CCR sampler K60c60 line pol	BAYU03QCK01BQ019	Technically completed	M11

Analytical List Page – List Only View

- Responsive List
  - Use various controls such as Micro Charts & indicators.
  - Focus on line items.
  - Line items are independent.
  - Not for lists greater than 1000 lines.
  - Can be used on a Smartphone
  - Smart Tables are now available in the latest S/4 version.



Analytical List Page – List Only View

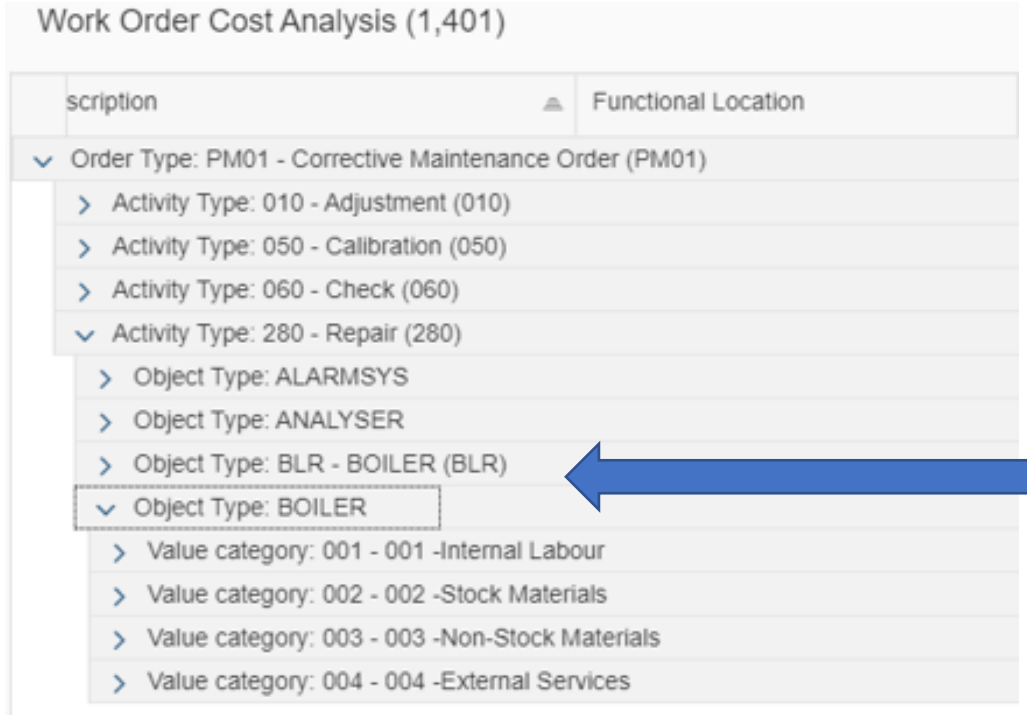
- Analytical table (ALV)
  - More than 1000 record
  - Good for comparison between data
  - Sum many columns
  - Multiple grouping
  - Not good for Smartphones

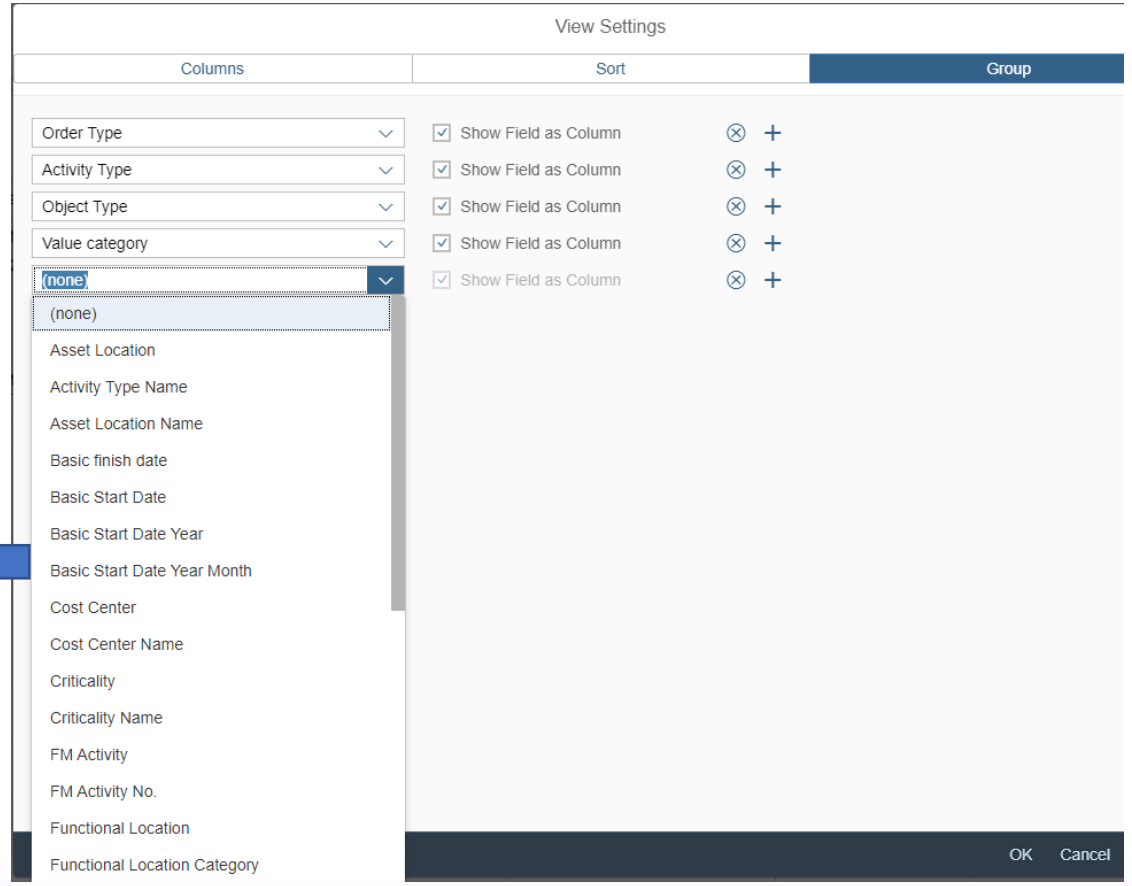
Work Order Cost Analysis (1,401)

Maintenance Order	Order Description	Functional Location	WM Order Status Name	Mai...
Order Type: PM01 - Corrective Maintenance Order (PM01)				
Activity Type: 010 - Adjustment (010)				
Activity Type: 050 - Calibration (050)				
Activity Type: 060 - Check (060)				
Activity Type: 280 - Repair (280)				
Object Type: ALARMSYS				
Object Type: ANALYSER				
Value category: 001 - 001 -Internal Labour				
410008836	Inspect / Repair Unit Air Pipe Work	BAYU04HHY01BQ001	Closed	M11
410048324	Manifold change #1 Condensate	BAYU01QCK01BQ014	Closed	M01
410007042	PA49590 Replace Valve 1-05013	BAYU01QCK01BQ010	Closed	M11
410036597	Repair Cooling coil, leaking CW O/L and	BAYU01QCK01BQ003	Closed	M01
410054699	Replace #4 sample L10C30 cw inlet valve	BAYU04QCK01BQ022	Closed	M11
410077962	unBlocked #3 CCR sampler K60c60 line pol	BAYU03QCK01BQ019	Technically completed	M11

Analytical List Page – List Only View

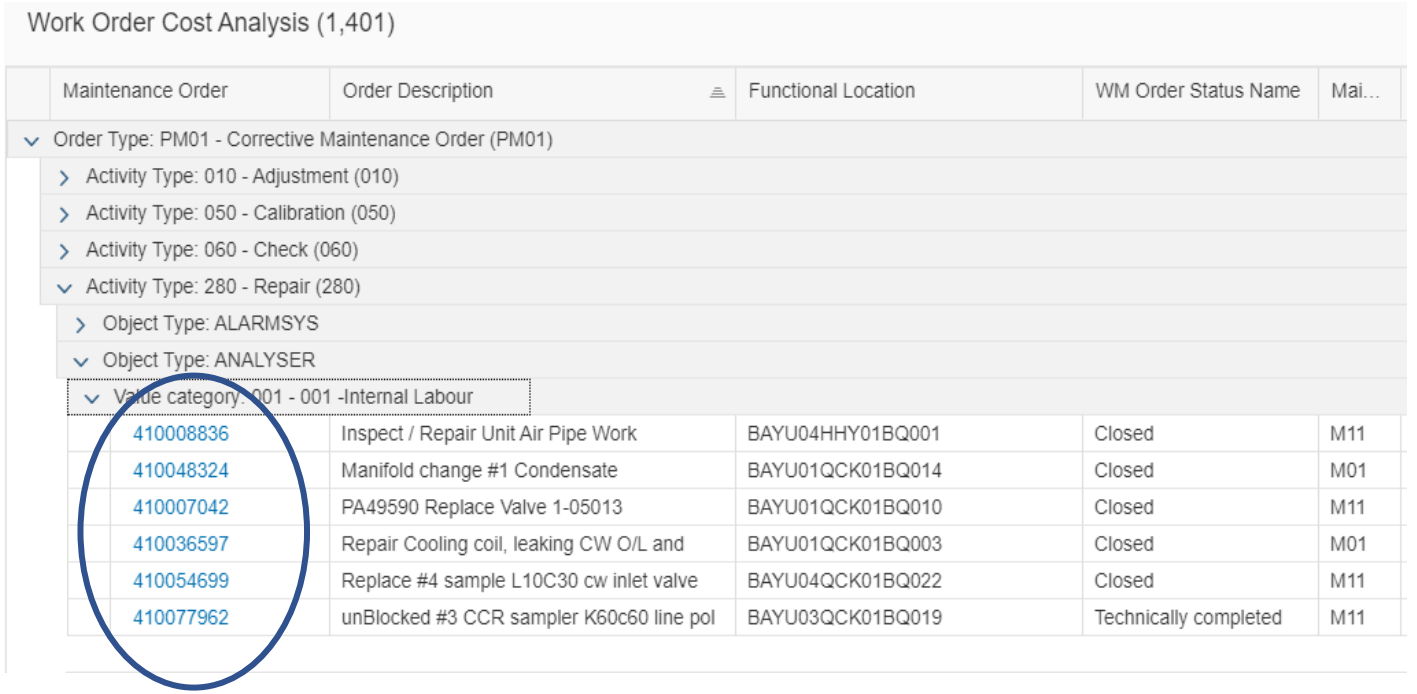
- Apart from sorting the ALV list is capable of multiple grouping.
- Great for drilling down





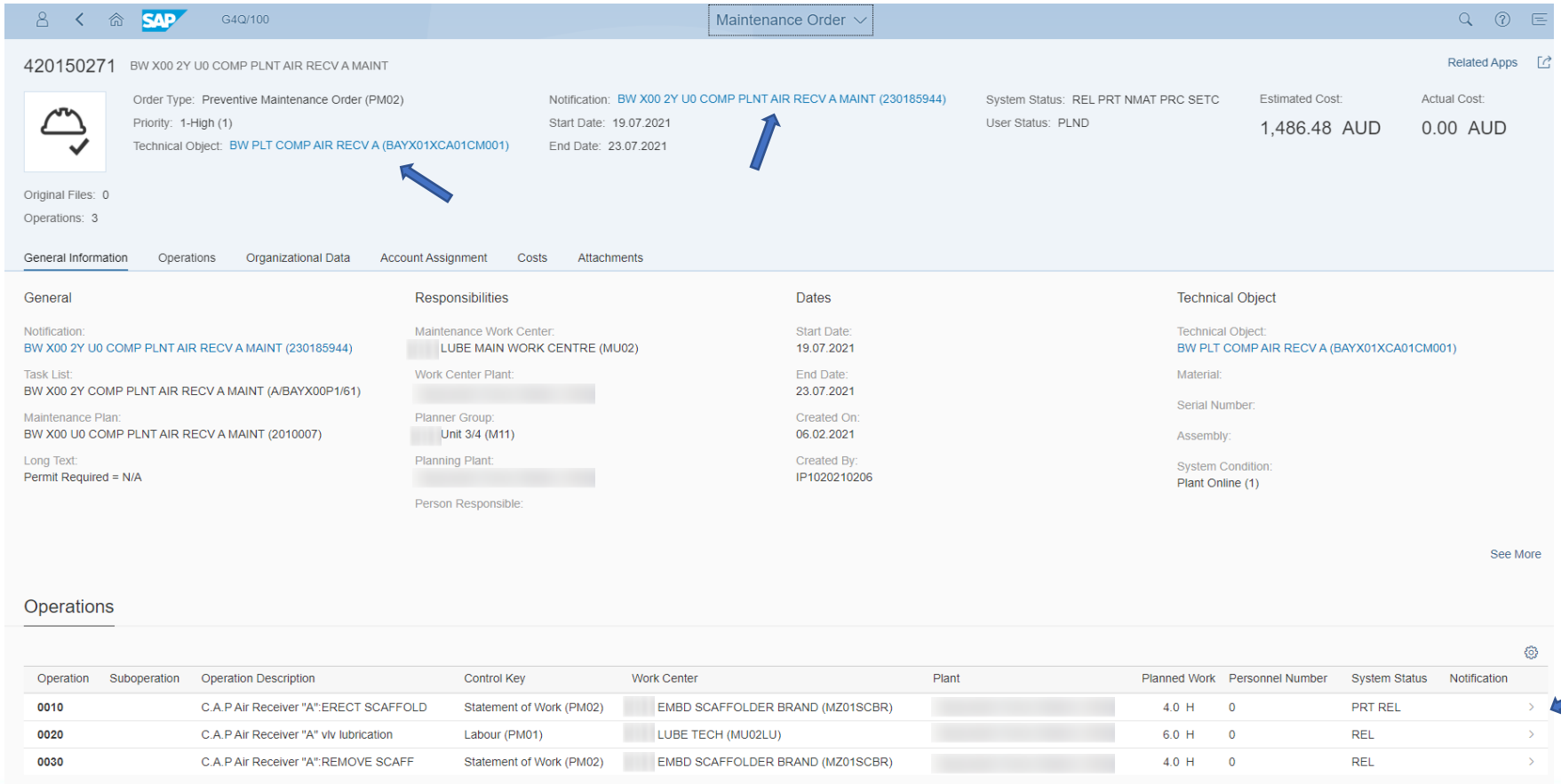
Object Pages

- Object pages are used to display an object such as a Work Order, Purchase Orders, Materials, etc.
- Basically it is an ‘Object on a page’
- Accessing these is done via a hyperlink in most list report



Object Pages

- Object pages can have tables and allows interaction with other objects via hyperlinks.

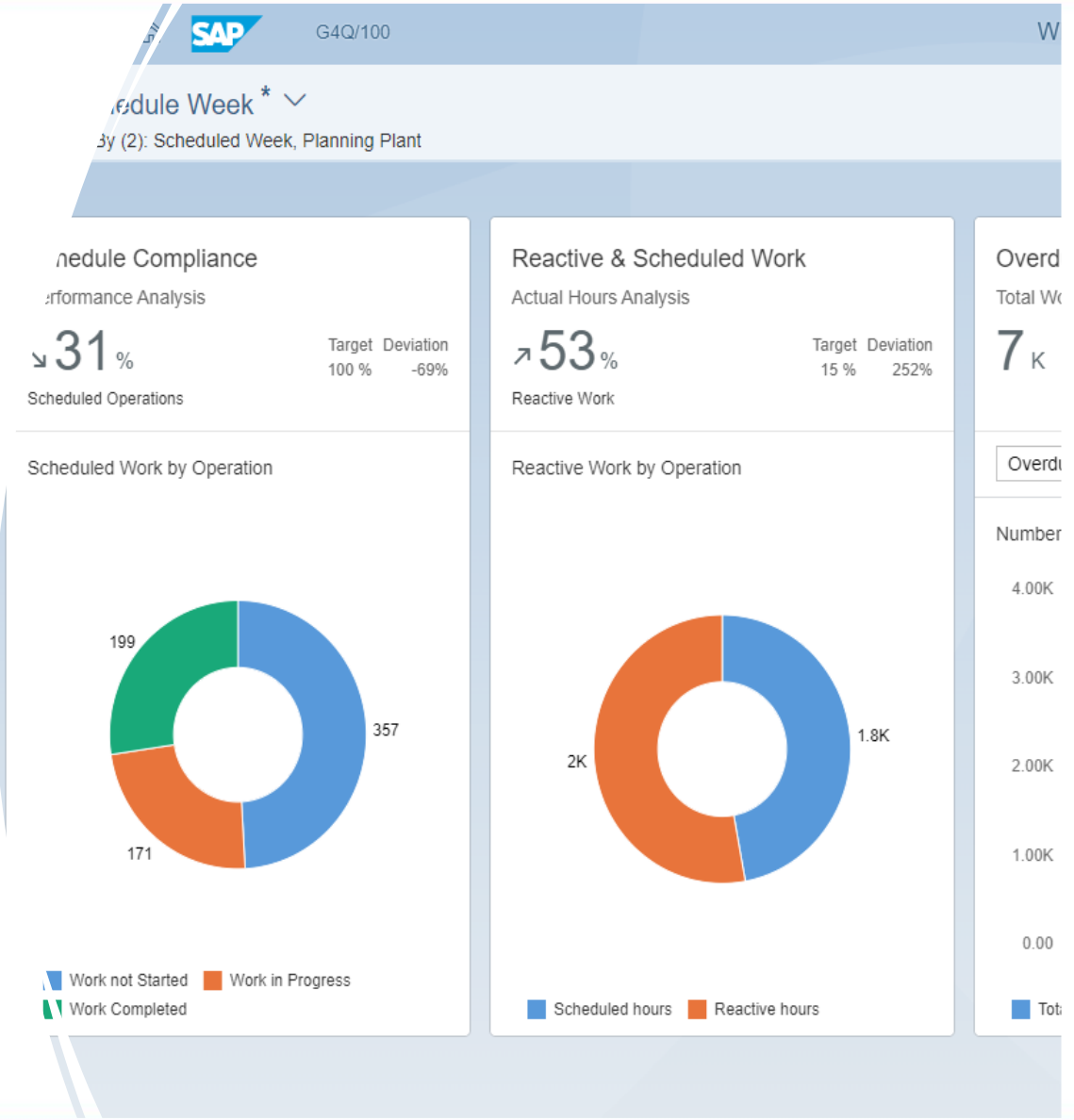


Other Object Page can be opened

Our journey with Embedded Analytics and what we achieved

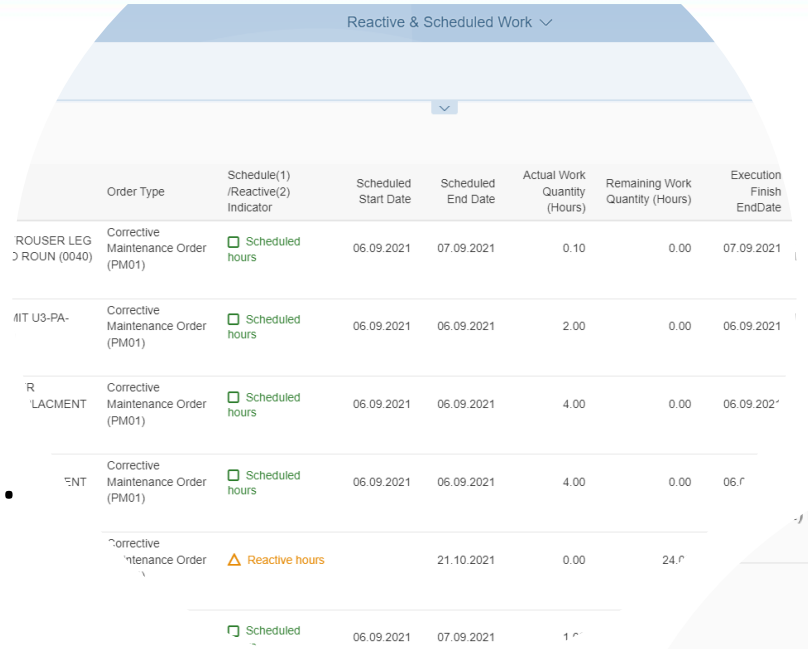
How did we start with Embedded Analytics?

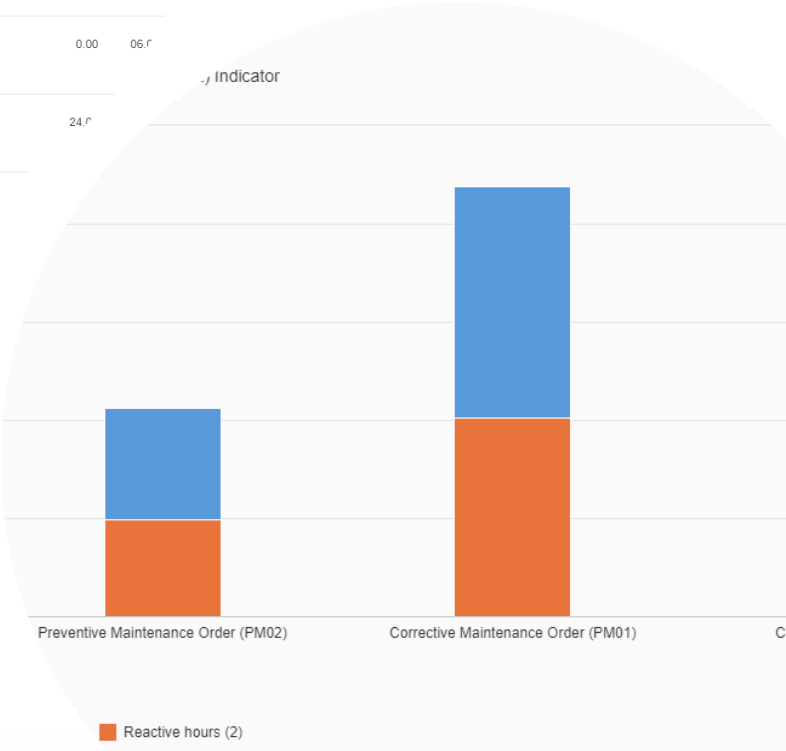
- The Business was measuring performance by downloading S/4 data to Excel and using Power BI to report.
- In 2017 there were no Fiori Embedded Analytics in S/4 HANA.
- The Business requested some real-time interactive Maintenance KPI analytics.
- The developer and myself had little experience so our first Overview page took a few months to build.



How did we start with Embedded Analytics?

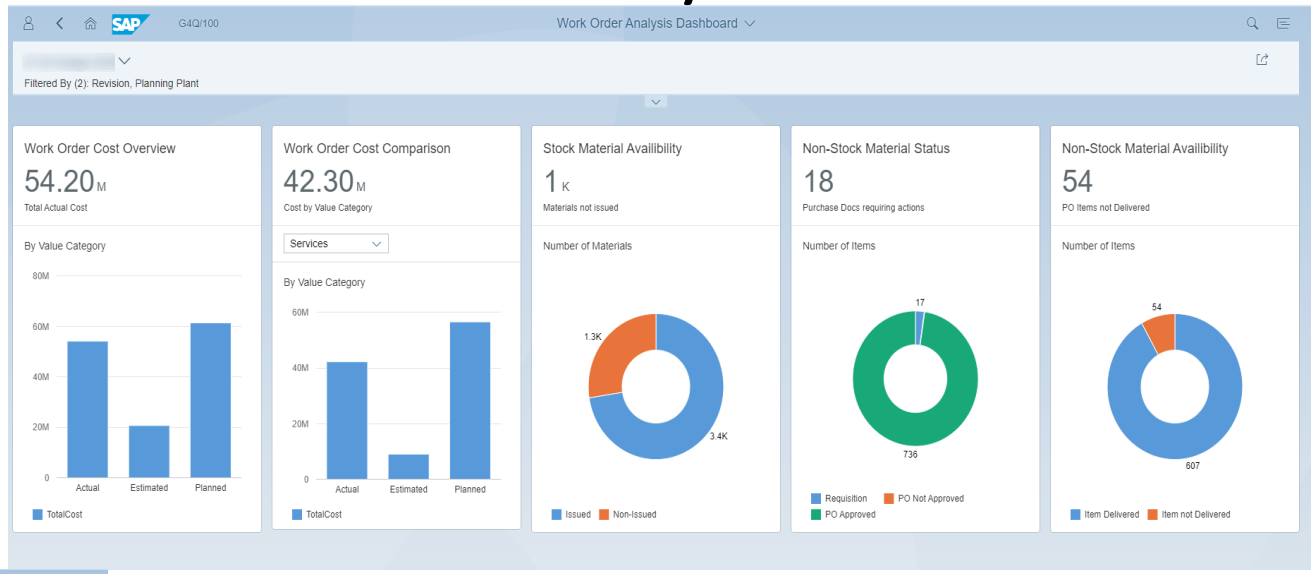
- Once we delivered out first Overview page the Business wanted more Operational Reports.
- These Embedded Analytics are used daily by all levels from Shop Floor people to Management.
- The Embedded Analytics are used The key selling point for Embedded Analytics is **‘Real-time Data’**

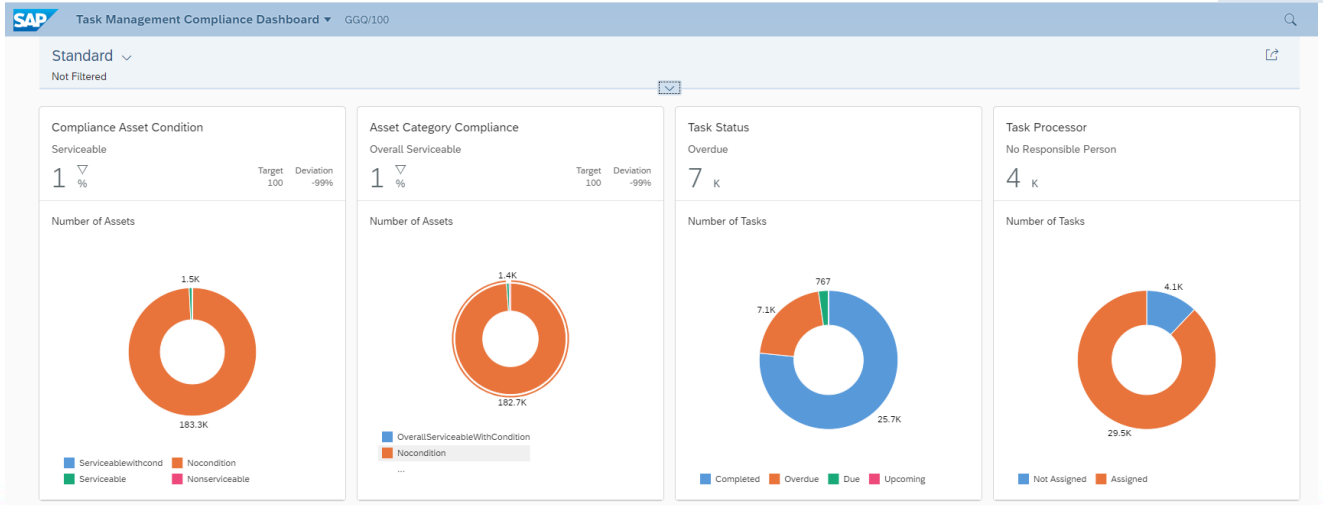




What was next with Embedded Analytics?

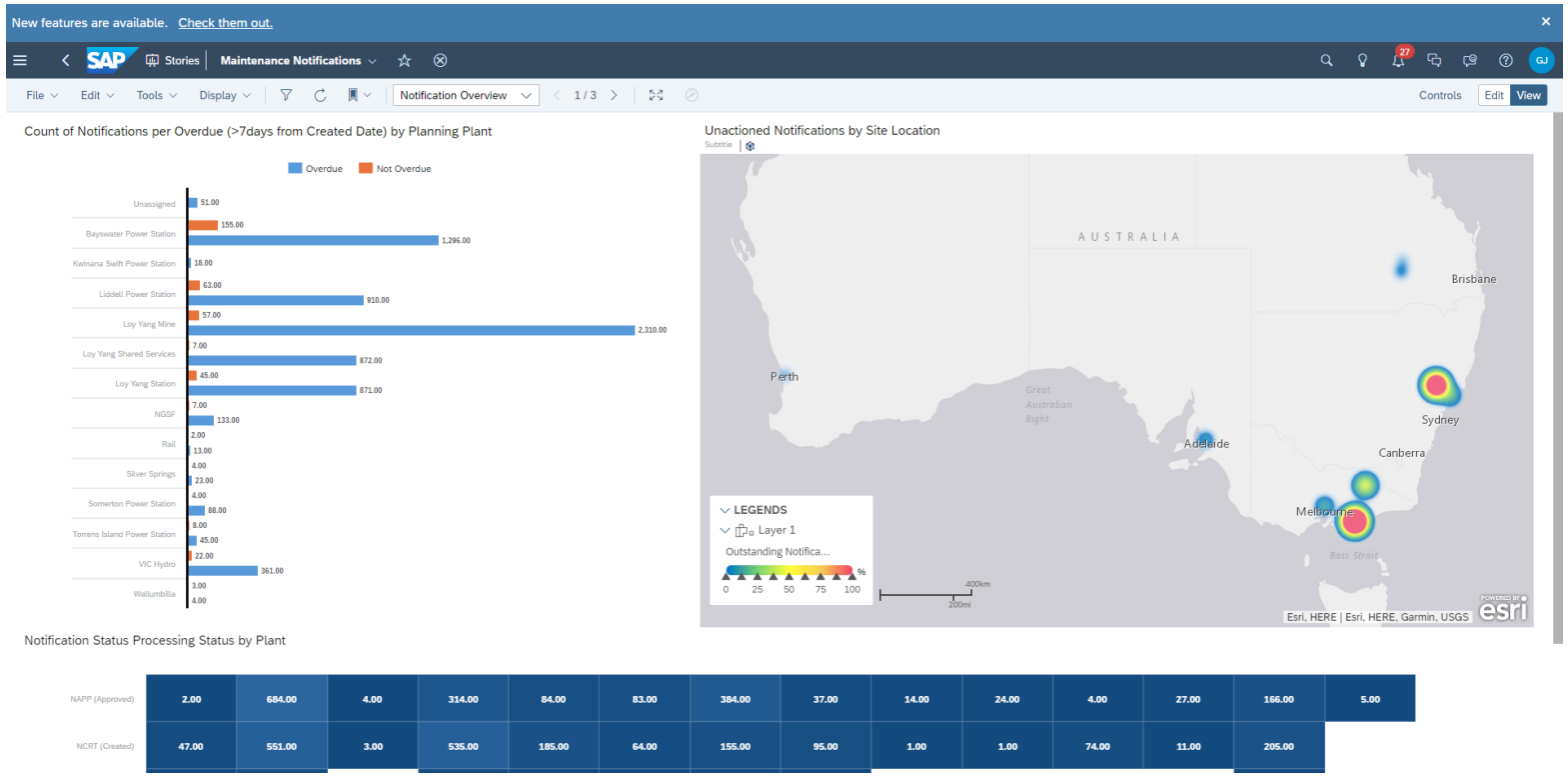
- A Work Order Analysis dashboard for costs and Material usage.
- An app to measure Technical Compliance Tasks.
- And others

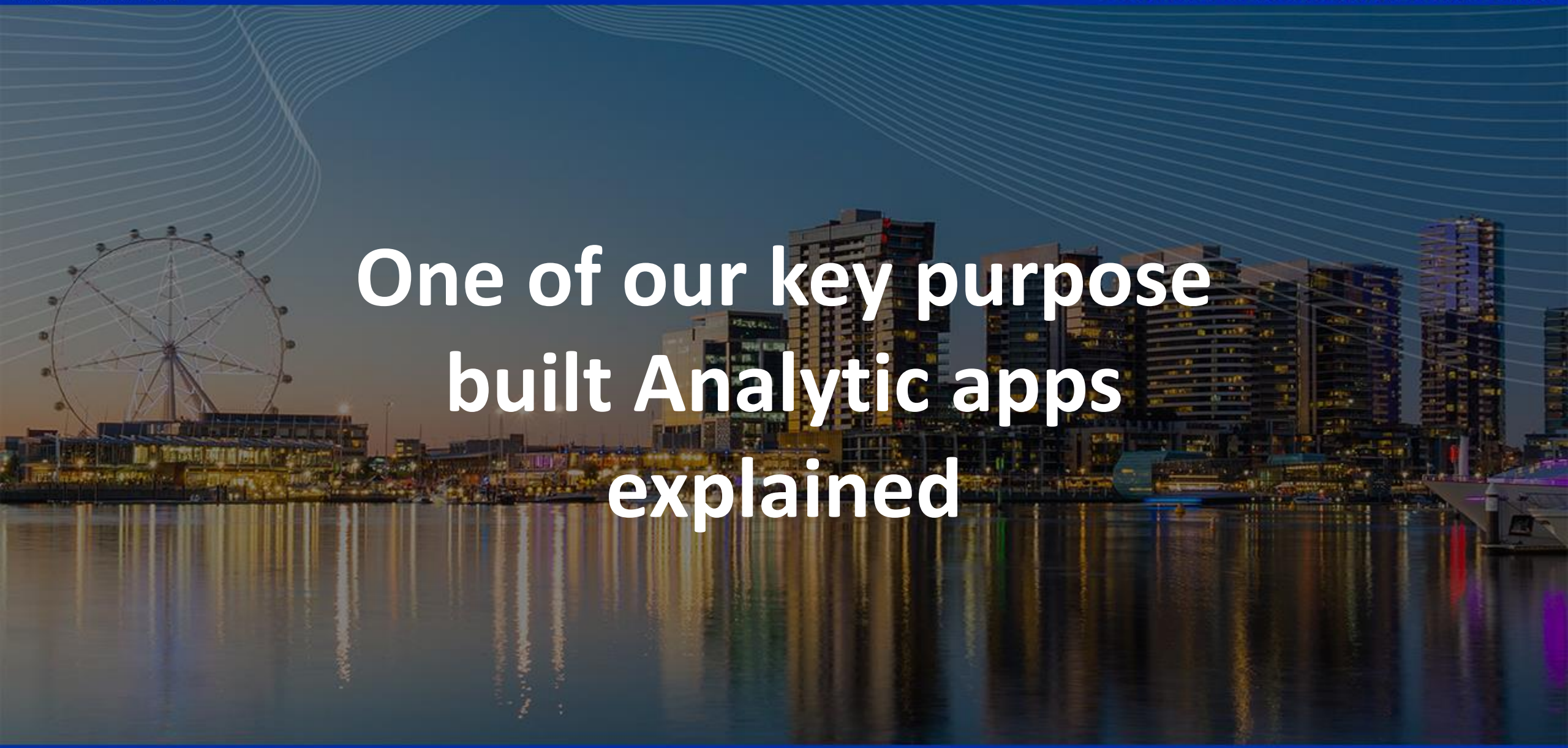




SAP Analytics Cloud (SAC) - Experimenting

- SAC has 2 Data options
  - **Live Link -** 'Real-time', calculations done S/4
  - **Data Import –** uploaded data or Data lake
- Data Import is the same as using Power BI (in my view)
- Because we have the CDS views built we are looking at 'Live Link' connections
- SAC will do the same as Fiori Embedded Analytics but is a lot more flexible an End User.





One of our key purpose built Analytic apps explained

Preventive Maintenance Cost Simulation App

- This Analytic app was built for simulating costs of Preventive Maintenance for our bottom-up budgeting project.
- We decided to push it outside the box and made the ALP app do a lot more than just calculate a cost.
- Some of the key parts are
  - Can simulate Preventive Maintenance over several years by Fiscal or Calendar
  - Includes all costs based on the Value Categories of Internal Labour, Services, etc.
  - Shows all Materials & Services on that will be used including costs.
  - Shows hourly rates for Internal Labour based on Activity Rates.
  - Lists all Work Orders created including their status and Start Date.
- This app gathers a lot of information for Cost Budget decisions.

Preventive Maintenance Cost Simulation App versus GUI Transactions.

Scenario – Report on Preventive Maintenance Cost for the next Financial Year for a Plant.

Using the GUI, you would have to do a combination of 4 to 5 different transactions. Then export to Excel add formulas to calculate the costs for the Financial Year.

How long do you think it would take to produce this report?

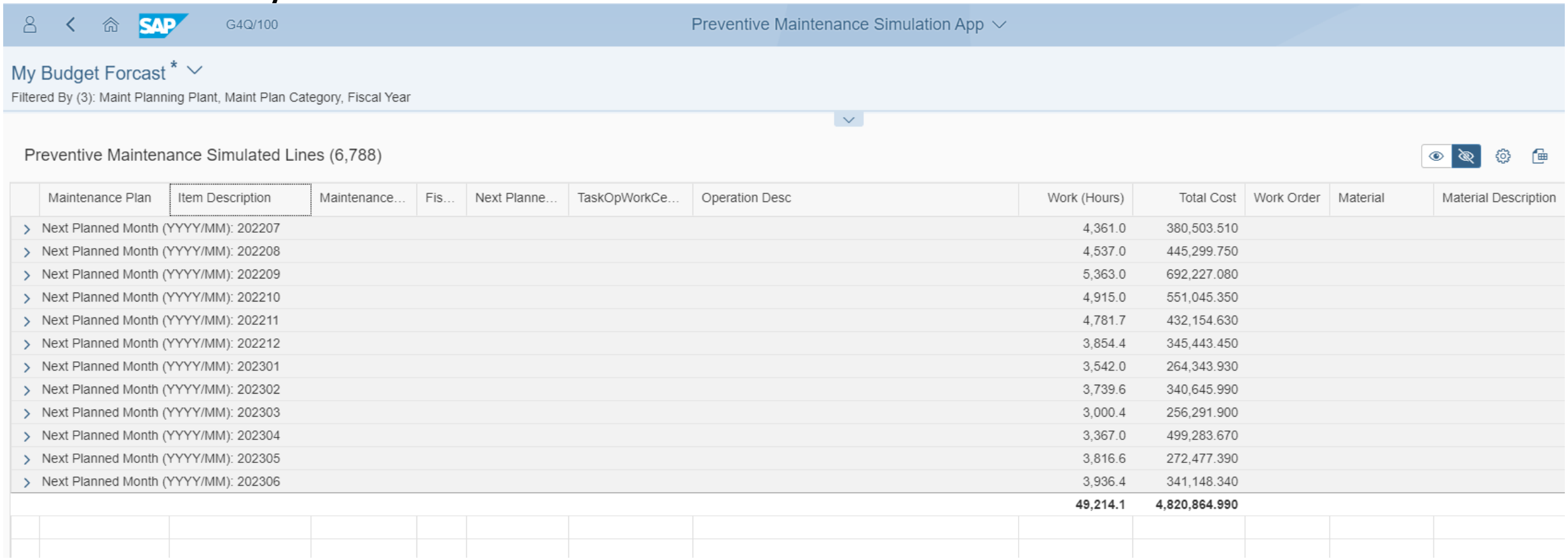
2 hours for the GUI transactions if you're lucky they don't short dump then a few hours to work on Excel to produce the report

Produce the same report using Preventive Maintenance Simulation app how long do you think?

23 seconds

Preventive Maintenance Cost Simulation App

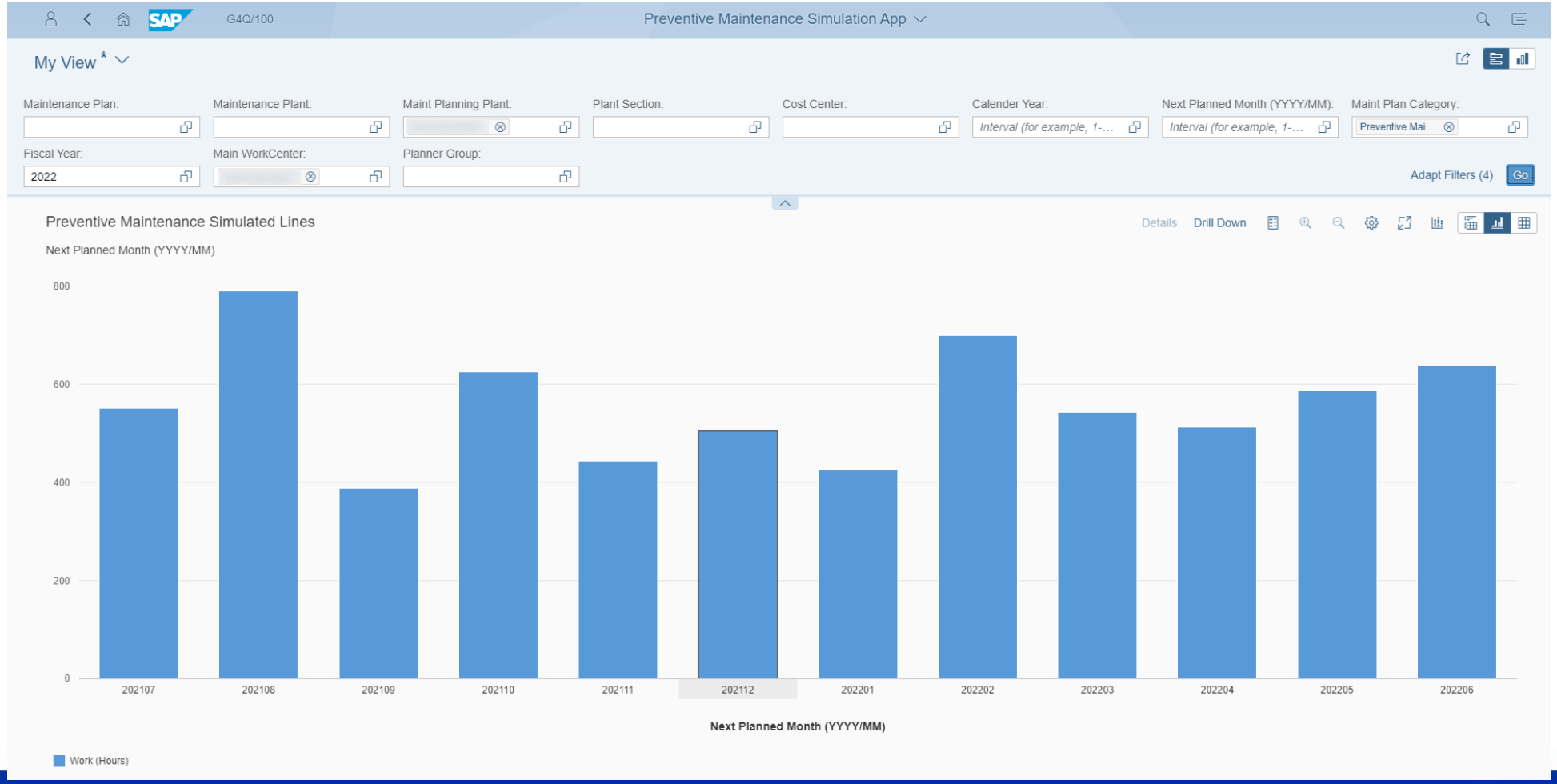
- Having the grouping set up you can show cost and man hours by month in a fiscal year.



Maintenance Plan	Item Description	Maintenance…	Fis…	Next Planne…	TaskOpWorkCe…	Operation Desc	Work (Hours)	Total Cost	Work Order	Material	Material Description
Next Planned Month (YYYY/MM): 202207							4,361.0	380,503.510			
Next Planned Month (YYYY/MM): 202208							4,537.0	445,299.750			
Next Planned Month (YYYY/MM): 202209							5,363.0	692,227.080			
Next Planned Month (YYYY/MM): 202210							4,915.0	551,045.350			
Next Planned Month (YYYY/MM): 202211							4,781.7	432,154.630			
Next Planned Month (YYYY/MM): 202212							3,854.4	345,443.450			
Next Planned Month (YYYY/MM): 202301							3,542.0	264,343.930			
Next Planned Month (YYYY/MM): 202302							3,739.6	340,645.990			
Next Planned Month (YYYY/MM): 202303							3,000.4	256,291.900			
Next Planned Month (YYYY/MM): 202304							3,367.0	499,283.670			
Next Planned Month (YYYY/MM): 202305							3,816.6	272,477.390			
Next Planned Month (YYYY/MM): 202306							3,936.4	341,148.340			
							49,214.1	**4,820,864.990**			

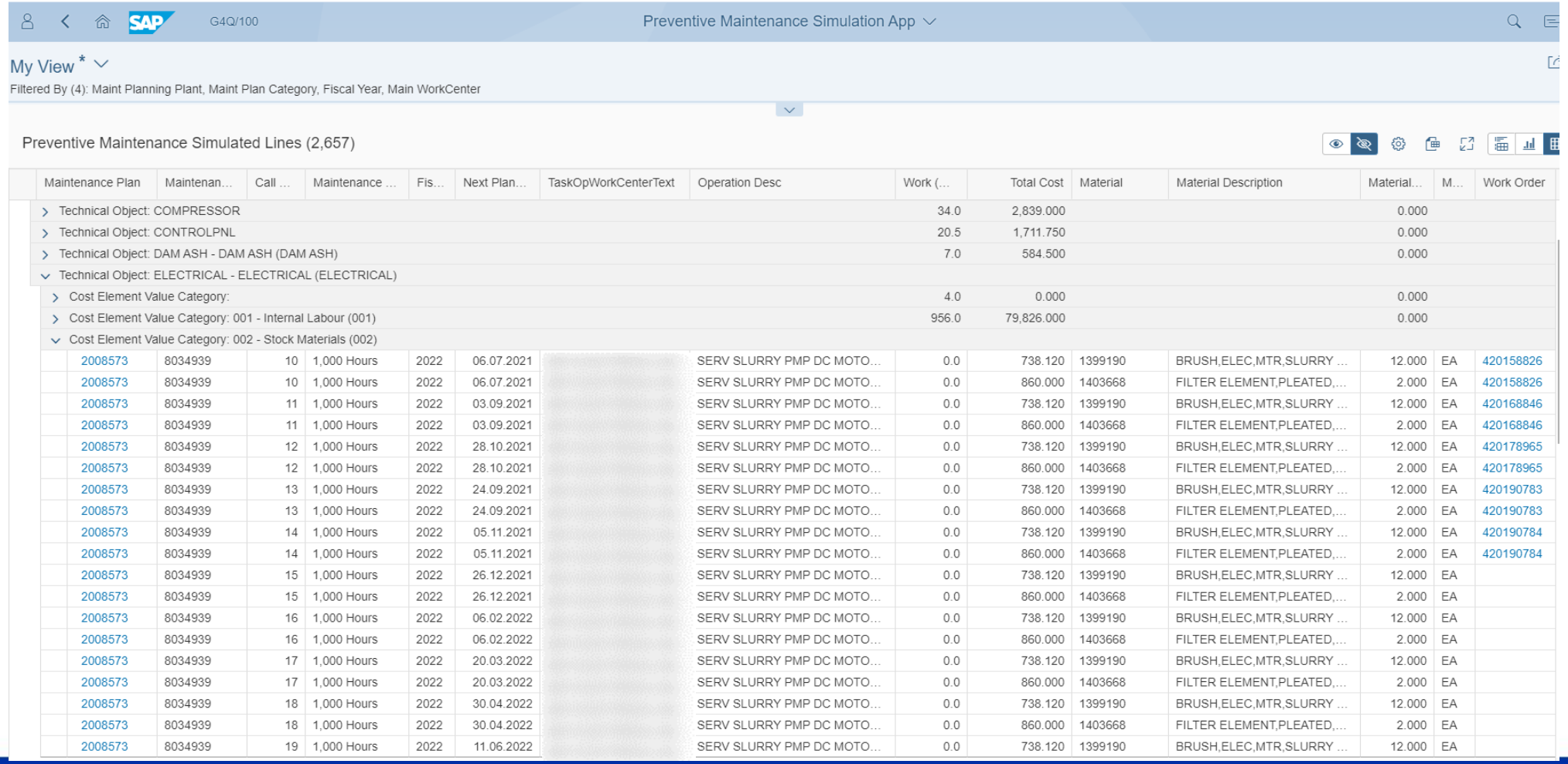
Preventive Maintenance Cost Simulation App

- Charting Work hours give a great visual of load per month.



Preventive Maintenance Cost Simulation App

- Being able to drill down to Task List Operations and Materials is a bonus



Maintenance Plan	Maintenan...	Call ...	Maintenance ...	Fis...	Next Plan...	TaskOpWorkCenterText	Operation Desc	Work (...	Total Cost	Material	Material Description	Material...	M...	Work Order
Technical Object: COMPRESSOR								34.0	2,839.000			0.000		
Technical Object: CONTROLPNL								20.5	1,711.750			0.000		
Technical Object: DAM ASH - DAM ASH (DAM ASH)								7.0	584.500			0.000		
Technical Object: ELECTRICAL - ELECTRICAL (ELECTRICAL)														
Cost Element Value Category:								4.0	0.000			0.000		
Cost Element Value Category: 001 - Internal Labour (001)								956.0	79,826.000			0.000		
Cost Element Value Category: 002 - Stock Materials (002)														
2008573	8034939	10	1,000 Hours	2022	06.07.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	420158826
2008573	8034939	10	1,000 Hours	2022	06.07.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	420158826
2008573	8034939	11	1,000 Hours	2022	03.09.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	420168846
2008573	8034939	11	1,000 Hours	2022	03.09.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	420168846
2008573	8034939	12	1,000 Hours	2022	28.10.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	420178965
2008573	8034939	12	1,000 Hours	2022	28.10.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	420178965
2008573	8034939	13	1,000 Hours	2022	24.09.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	420190783
2008573	8034939	13	1,000 Hours	2022	24.09.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	420190783
2008573	8034939	14	1,000 Hours	2022	05.11.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	420190784
2008573	8034939	14	1,000 Hours	2022	05.11.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	420190784
2008573	8034939	15	1,000 Hours	2022	26.12.2021		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	
2008573	8034939	15	1,000 Hours	2022	26.12.2021		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	
2008573	8034939	16	1,000 Hours	2022	06.02.2022		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	
2008573	8034939	16	1,000 Hours	2022	06.02.2022		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	
2008573	8034939	17	1,000 Hours	2022	20.03.2022		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	
2008573	8034939	17	1,000 Hours	2022	20.03.2022		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	
2008573	8034939	18	1,000 Hours	2022	30.04.2022		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	
2008573	8034939	18	1,000 Hours	2022	30.04.2022		SERV SLURRY PMP DC MOTO...	0.0	860.000	1403668	FILTER ELEMENT,PLEATED,...	2.000	EA	
2008573	8034939	19	1,000 Hours	2022	11.06.2022		SERV SLURRY PMP DC MOTO...	0.0	738.120	1399190	BRUSH,ELEC,MTR,SLURRY ...	12.000	EA	

My Views on how to Build and Implement

- Know the intended Business consumers of the app.
- Confirm what is being measured Embedded Analytics.
- Look for any standard apps first
  https://fioriappslibrary.hana.ondemand.com/sap/fix/externalViewer/
- Build mock ups to show the Business Groups (Excel charts work).
- Research the data by knowing were is sits in S/4 i.e. Tables, Field, etc.
- Be prepared to
  - Change the design or add more information (be Agile).
  - Think outside the box. (What else can this app do?)
- Work with the developers so they understand the Business Process.

The approach to custom Fiori apps should be led by Functional experts and UI5 Developers, not Analytic experts.

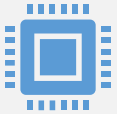

Any
Questions

Embedded Analytics Takeaways

Embedded analytics is ‘Real-time’ for Operational Reporting day to day.

Embedded analytics comes with a lot of options in the form of Charts, lists, pages, etc.

The main user types addressed by Embedded analytics are Operational users.



Embedded analytics can be part of a day in a life of any Professional using S/4 HANA.

How to Connect with Me

E: graham.johnston2@agl.com.au

M: +61 437640272

Li: linkedin.com/in/grahamjohnston49/

@greedygraham