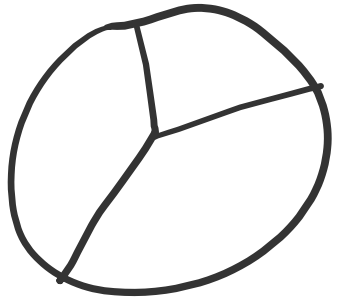
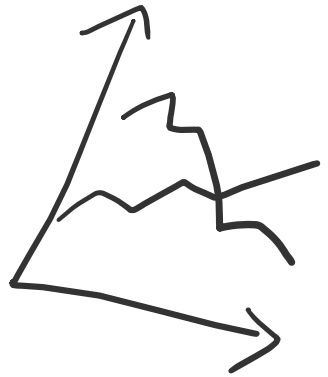


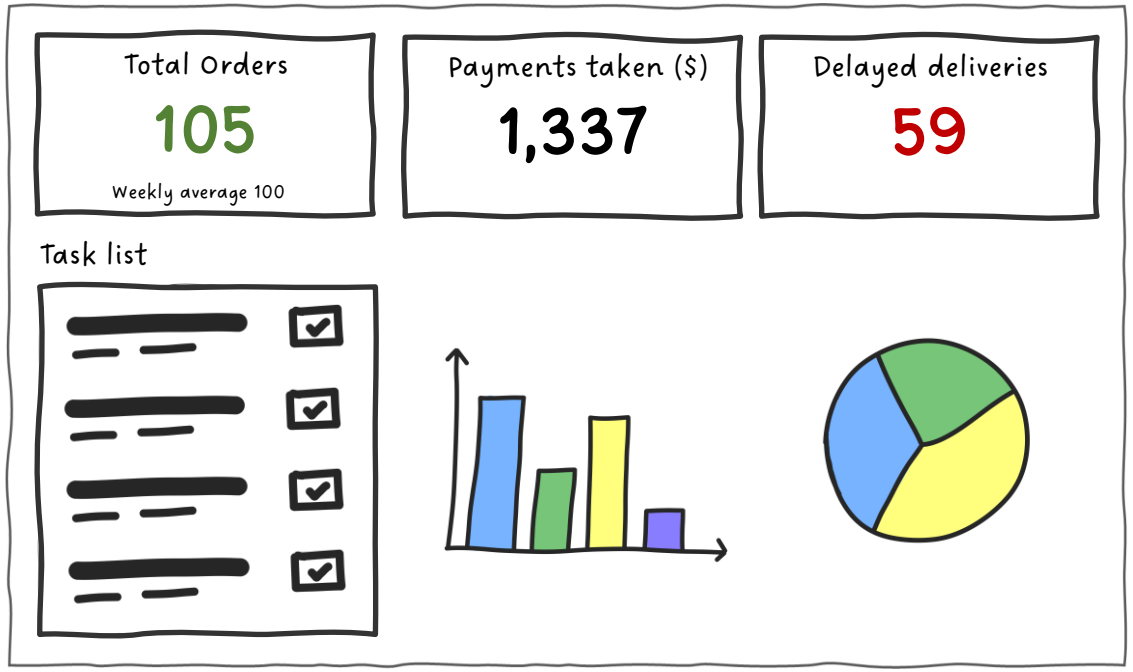


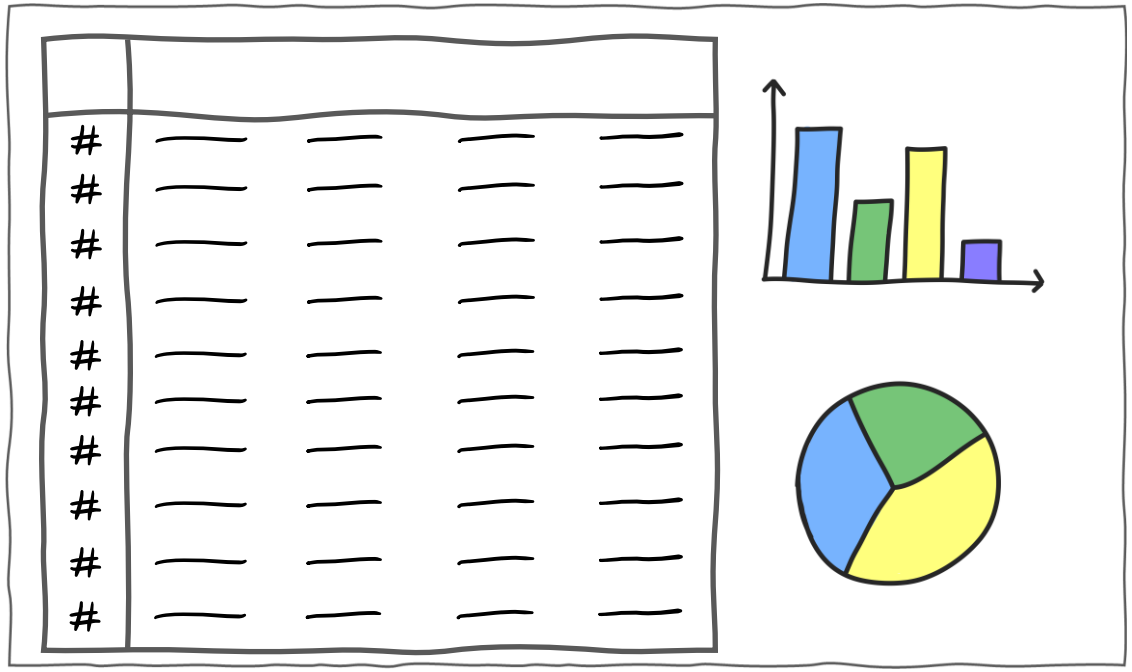
Dashboarding

How to build dashboards in Mendix

There's two key types of dashboard...

Actionable & Reporting

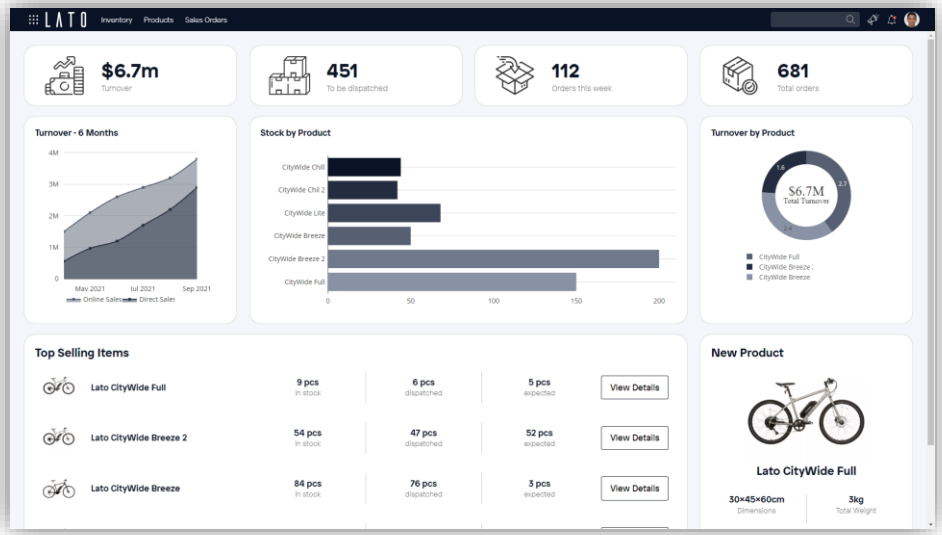


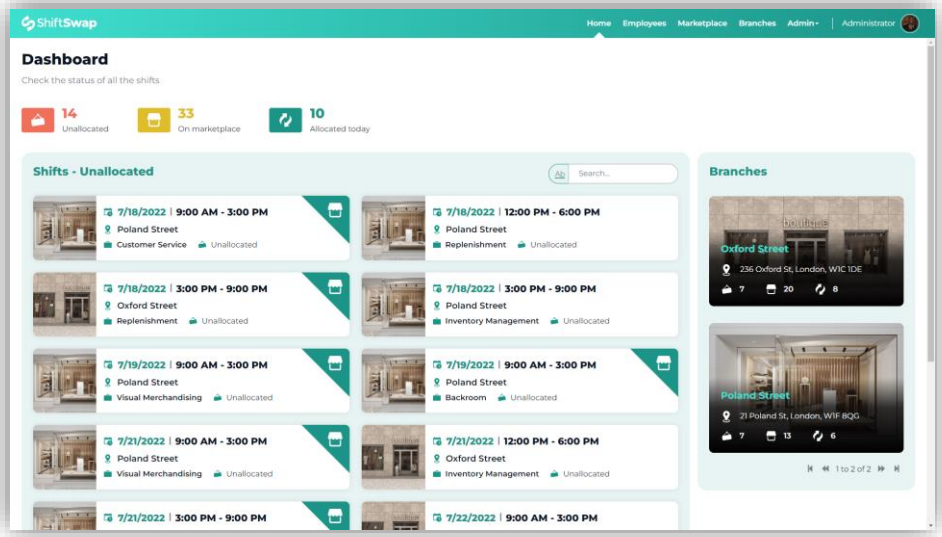


An actionable dashboard is generally a landing page for a user and the type you're likely to build in Mendix. It should show them any current key data that may need attention and point them towards today's actions or other common tasks.

Reporting dashboards involve rolling up and analysing large groups of data. This is best accomplished with an external tool such as Power BI or Grafana. It also usually includes point-in-time or comparative reporting.

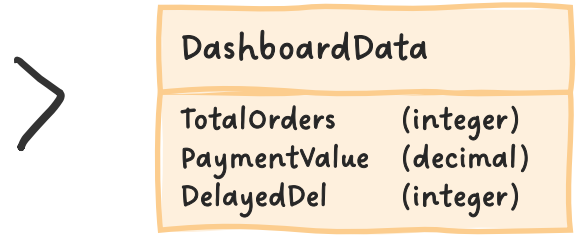
Mendix dashboard samples...





Aggregating data...

If you're creating a dashboard you'll more than likely need some aggregated data. So let's start with a non-persistent entity...



Now you have a choice about HOW to aggregate that data:

Microflow **Aggregate Tables** **OQL**

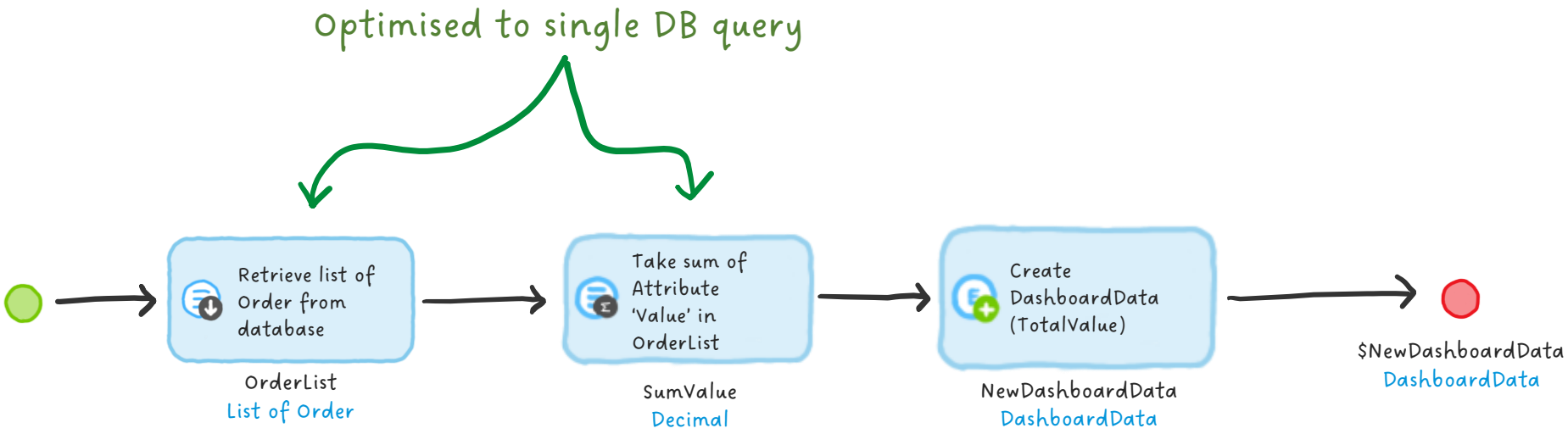
The best choice is usually to use a microflow. The next best choice is to change your dataset to aggregate the data as it goes where possible and still use a microflow. The final option for large sets of data or to aggregate multiple groups of data in one go is to write an OQL query.

Microflow...

Your first option is to use a microflow as the data source for your dashboard. You can use retrieve actions to gather the data and then list activities to aggregate it (with counts or sums for example).

When you do this Mendix will automatically optimise the query so the database will simple return the aggregate value; so long as you don't use the retrieve result again in the microflow!

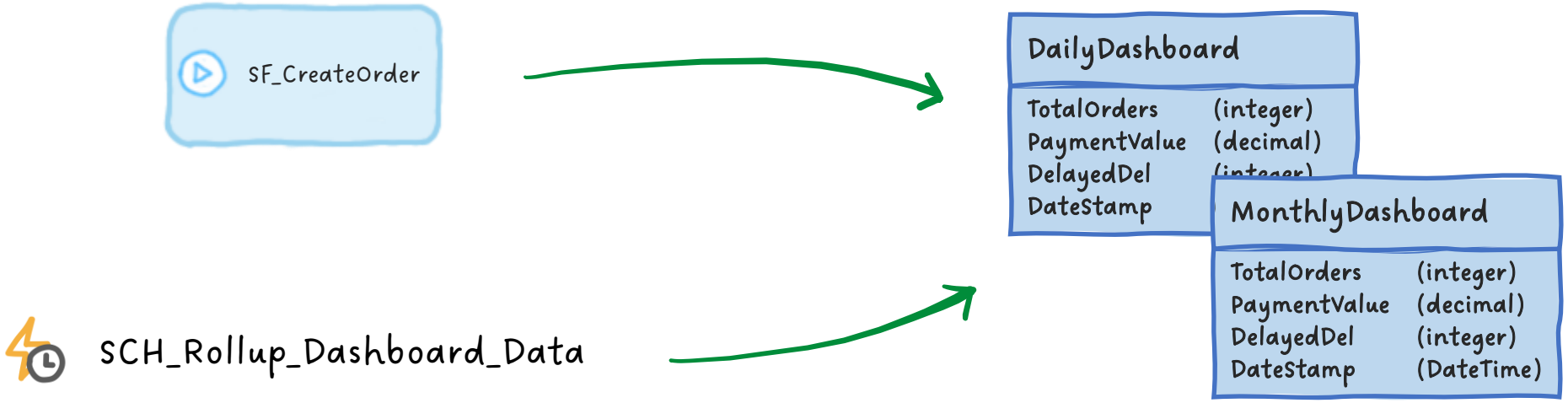
This becomes less effective the more aggregates you wish to retrieve but works fine for most circumstances.



Storing aggregated data...

When you are dealing with a high volume of data, or want to compare data across periods, then it's sometimes best to maintain aggregate tables. These tables can store Date/Time stamped, rolled up data which can then be used directly from the table.

There's a couple of ways to do this. You can either update the tables as you create new records, or make changes, in the source data. Or you can use scheduled tasks to run an aggregate function on a timer, maybe over night, to roll up the data.

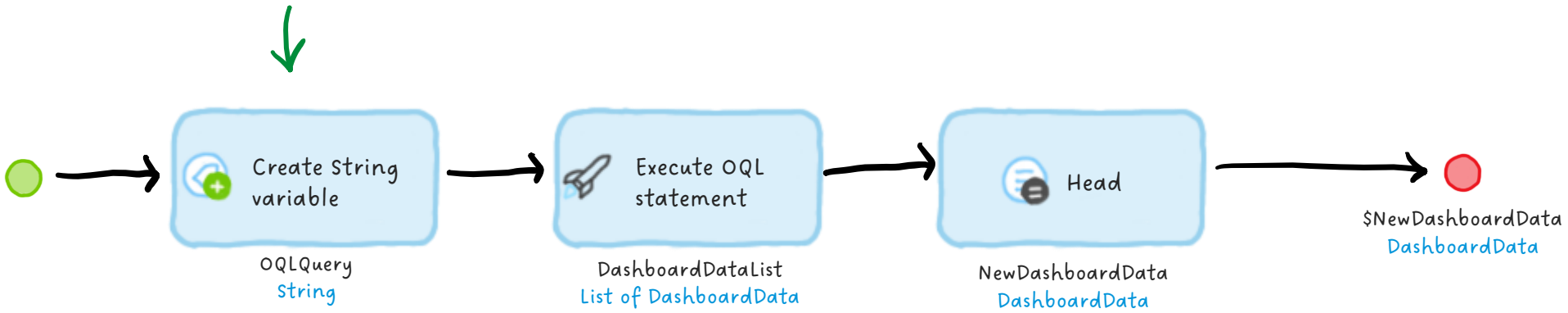


OQL

When aggregating large sets of data or multiple values you can use a query language called OQL. OQL is a lot like SQL but there are some subtle difference, check out the OQL Guide for more info. It allows you to execute a single query and return multiple aggregated values in one go. All you need is a non-persistent entity with matching attributes ready to receive the data.

To do this you'll first need to visit the Marketplace and download the OQL Component. This will allow you to execute your OQL queries.

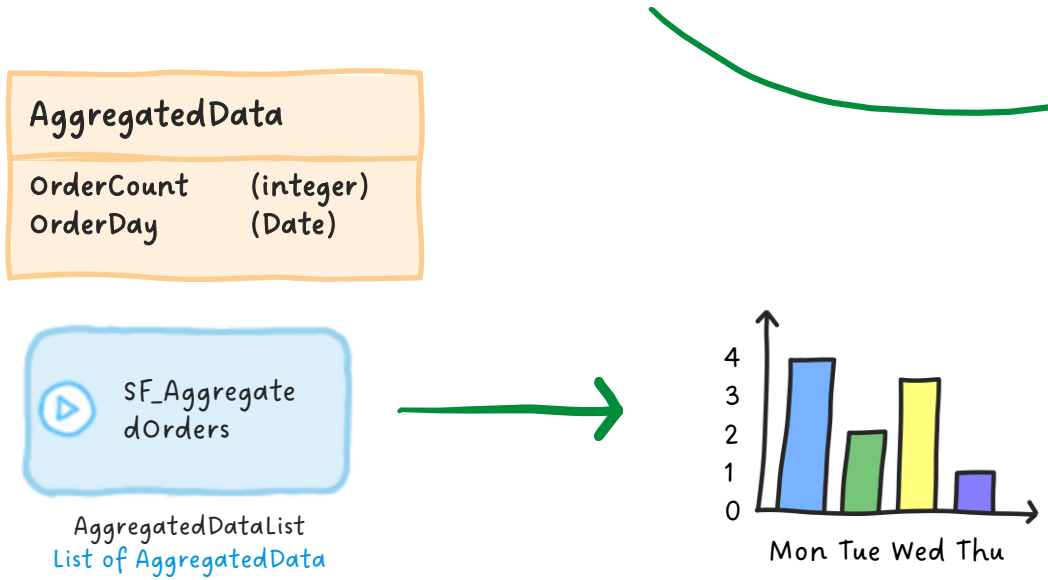
```
'SELECT COUNT(1) AS TotalOrders, SUM(PricePaid) AS PaymentValue FROM Store."Order" WHERE
createdDate >=  ''' + formatDateTime(addDays([%BeginOfCurrentDay%],-30),'yyyy-MM-dd') + '\''
```



Preparing chart data...

Mendix provides charts based on the Plotly library. You can grab the Charts widget from the Marketplace or, if you want more control, there's the AnyChart option (see next page...)

If you're using a standard chart widget then you can quite easily connect your data source to an aggregate microflow, like the one shown previously. Just drop a DataView onto your page (the context isn't important*) and then follow the steps to the right.



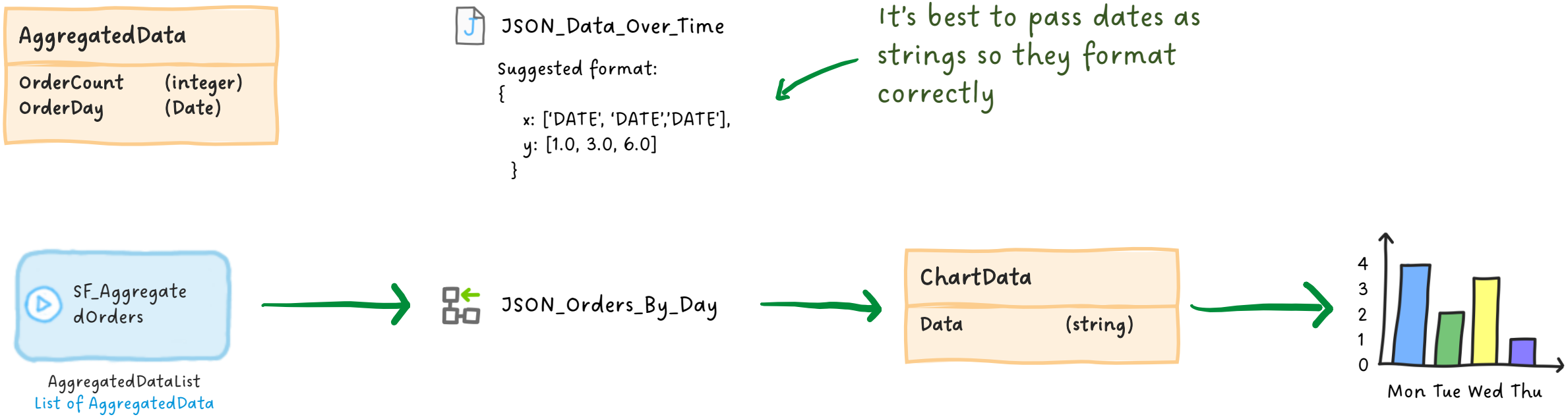
1. Choose a chart type and drag it on
2. Add a Series to the chart
3. Leave your series as static and select an entity to display
4. Choose a data source:
    1. If you want to use a microflow choose microflow and select or create an aggregation flow using the techniques we've shown
    2. If you want a direct query leave it as database and enter some Xpath to filter your data if you wish
5. Next specify your data points then:
    1. For microflows you're done but note the data must be sorted in the microflow
    2. For a direct database query then set a sort attribute and select how you'd like to aggregate duplicate data (Sum in our example) so when it finds data for matching X values it knows how to handle them

Preparing AnyChart data...

To use AnyChart then the data should be provided in a JSON format.

We can do this by providing a JSON structure file and using an Export Mapping to convert our data retrieved from the table. This can then be added to a non-persistent entity to serve up to the chart on your page.

** DON'T FORGET TO WRAP YOUR EXPORTED DATA IN SQUARE BRACKETS! **

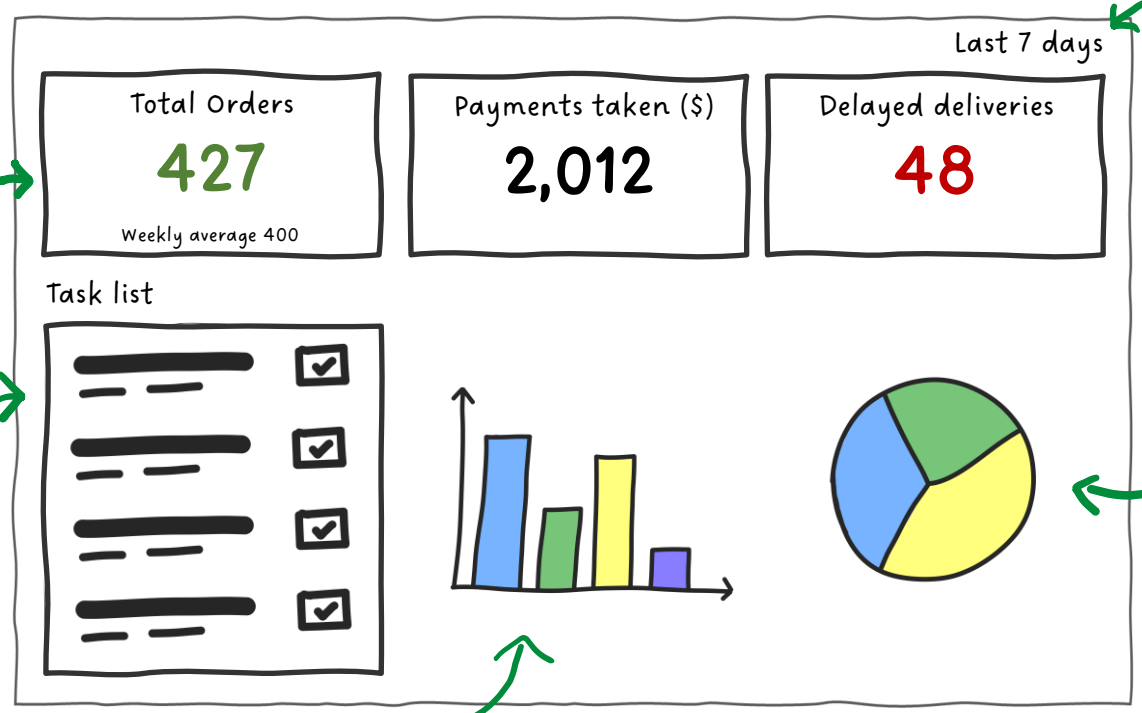


Dashboard design tips...

Different users may need different dashboards. Don't be afraid to create multiple dashboards!

Large KPI Values
These are great for highlighting areas at a glance, through use of dynamic colours, that may need attention. Try not to have more than 4 on a page.

Avoid large blocks of data
If you need to show a list of data, such as a task list or pending orders, try and keep the list short with only the key information shown. The user can then click through for more info.



Time frame
Always make sure you state what time frame the data on the dashboard covers. The time frame should preferably be consistent across the whole dashboard. (Sometimes you might need unique sections though)

Pie, Donut, Heat map charts
These charts are often misused so use with caution. Avoid using them with large groups of data or data that has very similar ranges for each group.

Bar, line and column
- Great for comparing data groups
- Line charts should have no more than 5 lines
- Bar/Column charts should have no more than 8 bars
- If there's no logical sort for the data (time for example) then try to sort biggest to smallest

This is just a few options. Mendix allows for almost unlimited creativity through SASS, widgets on the Marketplace and your own custom pluggable widgets!

Exposing data for a reporting dashboard...

When you want to do an external reporting dashboard the easiest way to accomplish this is to publish your data as an OData source. You can then connect to this using Power BI, Grafana or Excel, and then use your chosen software to slice up the data and display it how you want to.

It's worth giving some consideration as to whether this is the right solution though. If you require comparative reporting (one period vs another), point-in-time reporting, or to combine data from multiple sources then it might be worth considering publishing your data to a Data Warehouse.