Functional Dashboards for Project Management Using Forge

Camila Saavedra

VDC Manager

Julio Ojeda

Software Developer







About the speaker

Camila

Technology-oriented architect with 5 years of experience in innovation focusing on coordination, visualization, and analysis of AEC projects.

Current VDC Manager at Hermosillo

Led the implementation of the BIM program

Working towards expanding the adoption of BIM on a national scale.



About the speaker

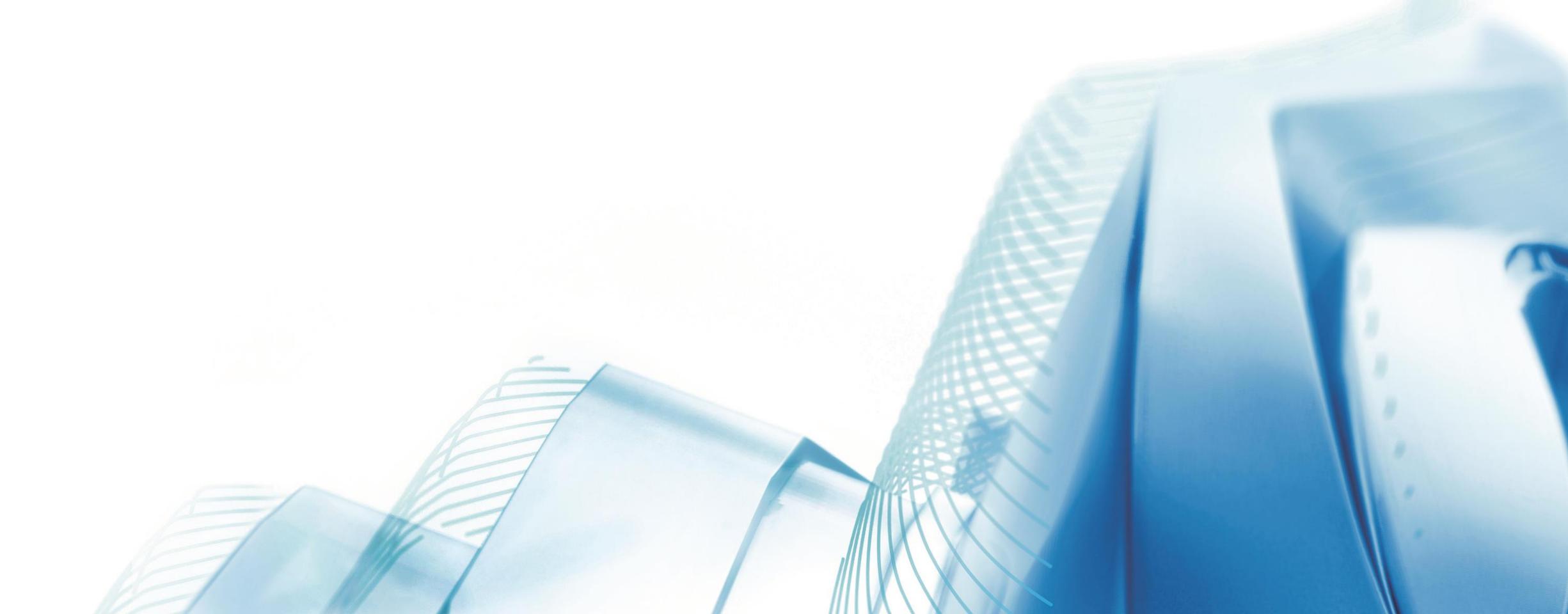
Julio Ojeda

Software developer and instructor with over 5 years of experience in the development of tools for the AEC industry.

Manager of the developing team focused on BIM/VDC integrations.

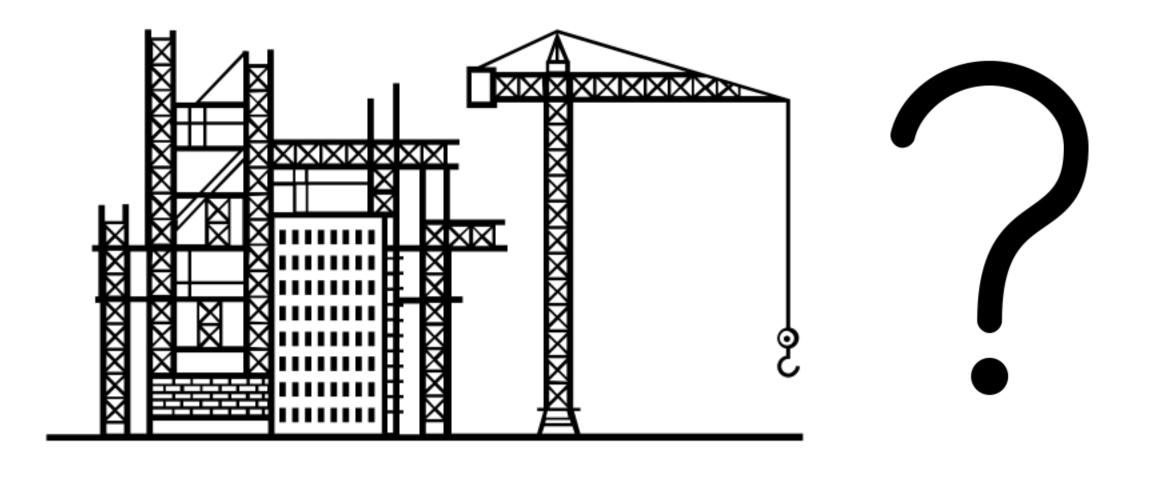
His main task is to gather business needs and apply software solutions to improve efficiency.

The need for a dashboard



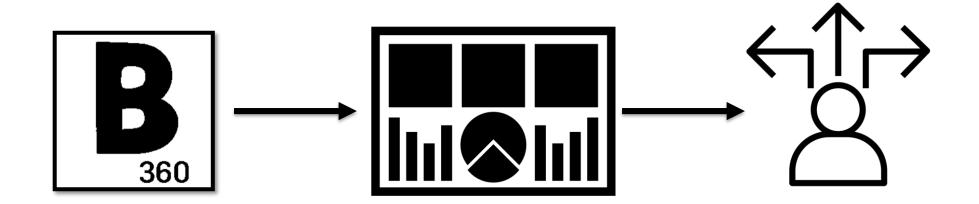
Why information in construction?



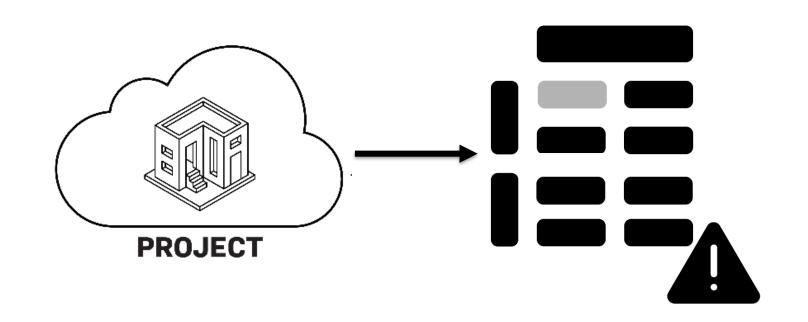


Learning Objectives

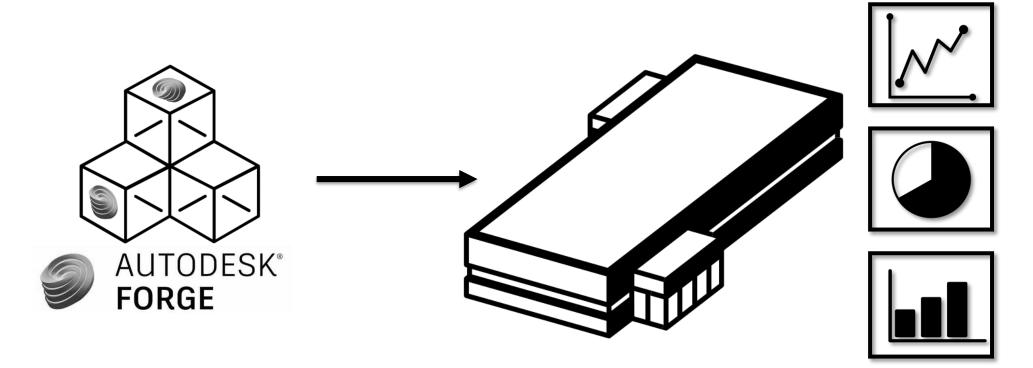
 CREATE INFORMATION LAYOUTS FOR BETTER DECISION-MAKING USING BIM 360 DATA



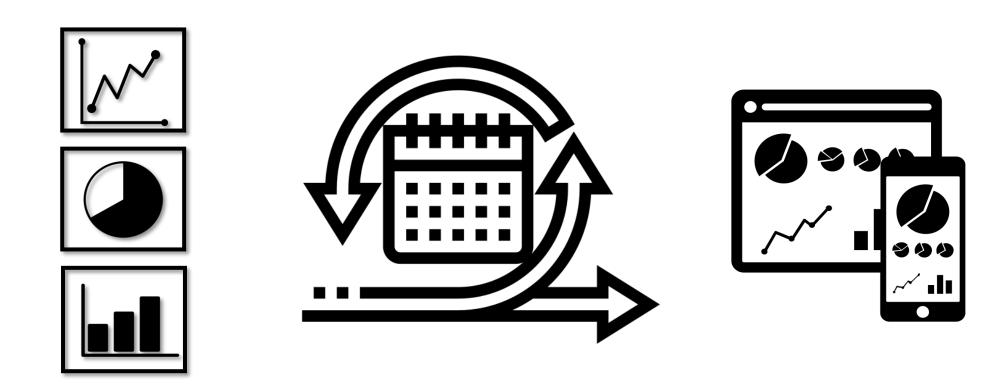
• USE THE INFORMATION IN BIM 360 DOCS FOR RISK ANALYSIS.



 COMBINE FORGE MODULES TO LINK VISUAL REFERENCE WITH PROJECT DATA



• TRACK BIM 360 PROJECT PERFORMANCE ON A DAILY BASIS.

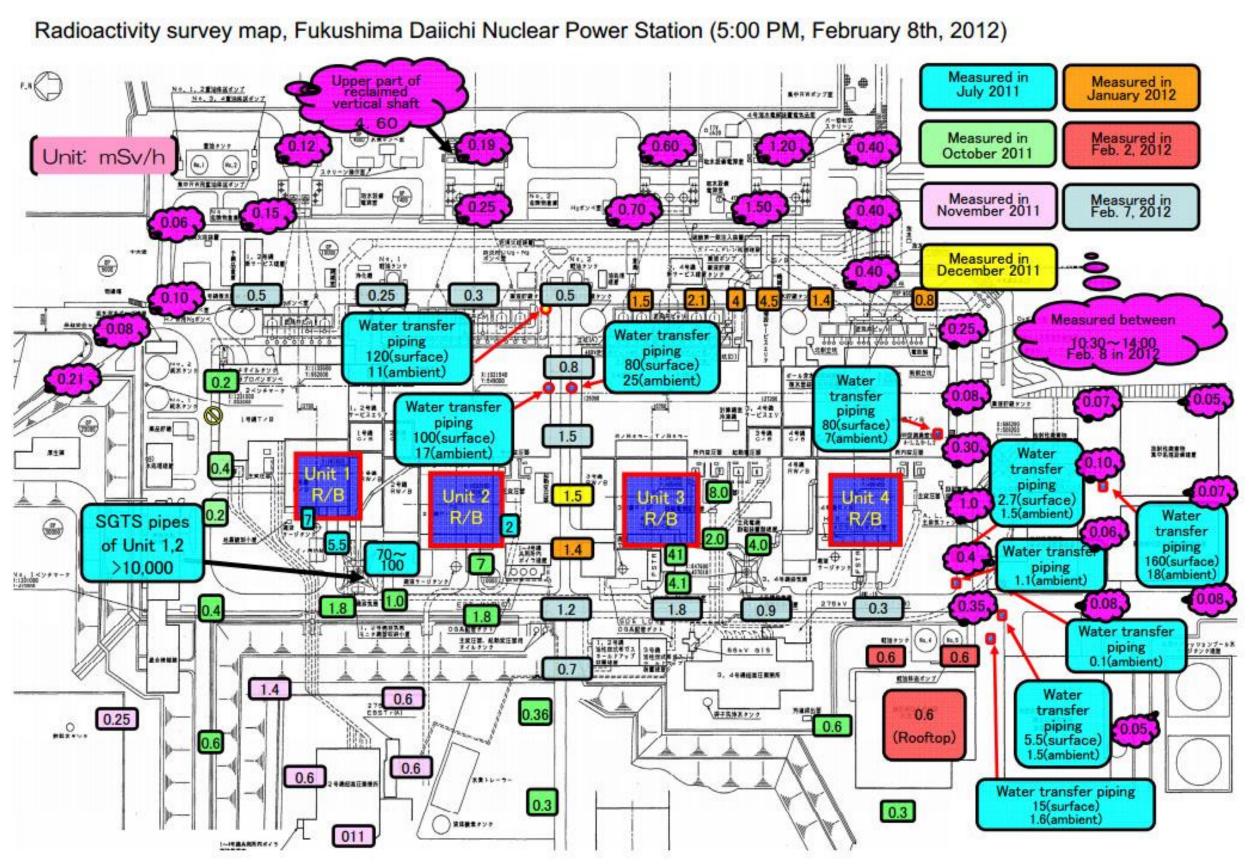


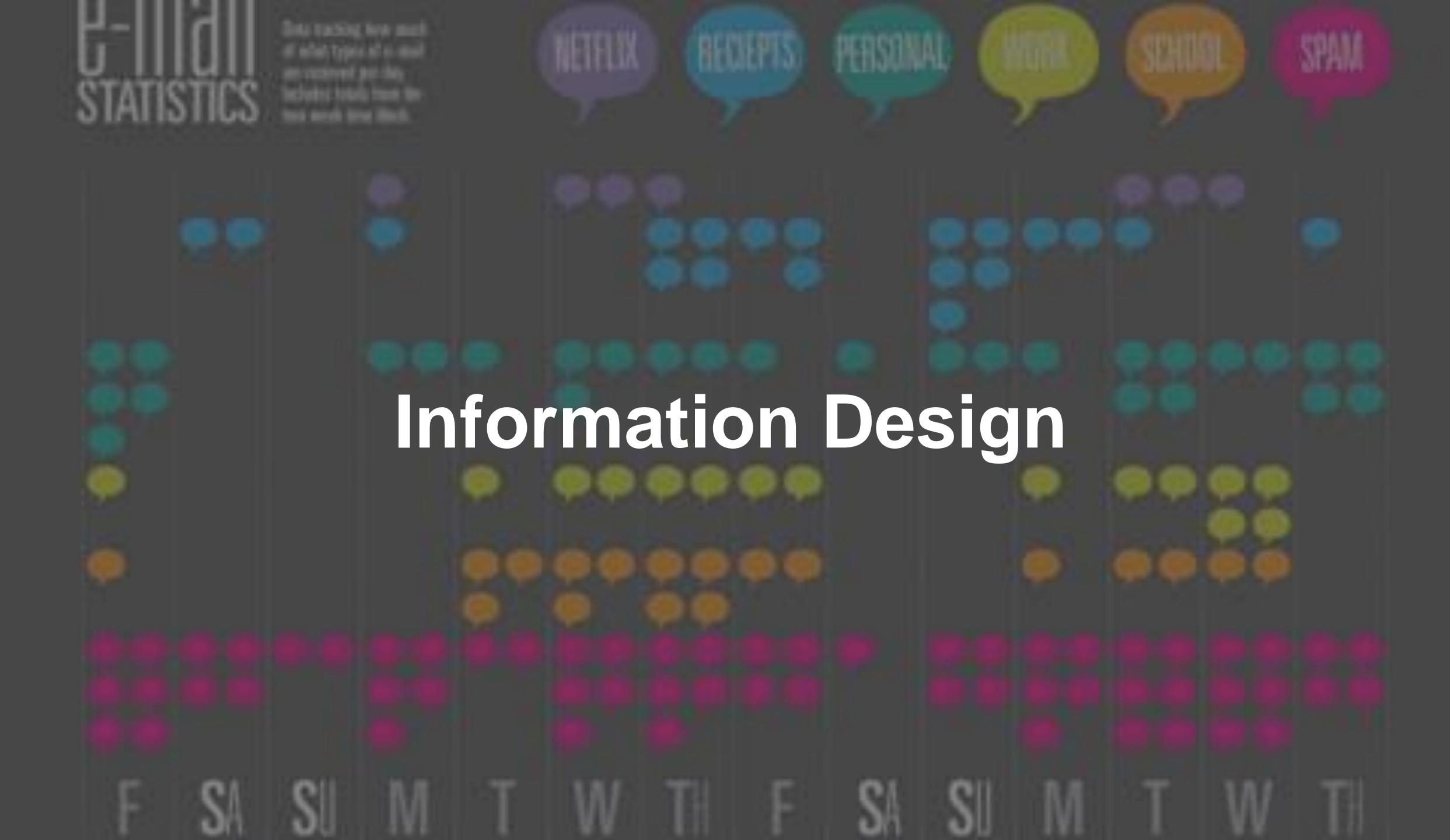
Learn how to create information layouts for better decision-making using BIM 360 data



Why a dashboard?







Information design, basic concepts to consider.`

"The practice of presenting information in a way that makes it most accessible and easily understood by users." (SEGD 2019).



Focus on the technical side of the visualization and you'll end up alienating your user.

Elements of a good story

ENGAGING

Information that is appealing and useful to the user.



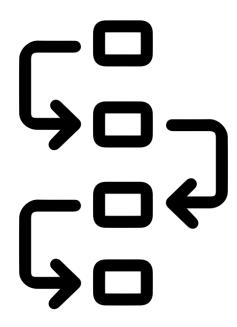
EASILY ABSORBED

It needs to be easy to understand and capture.



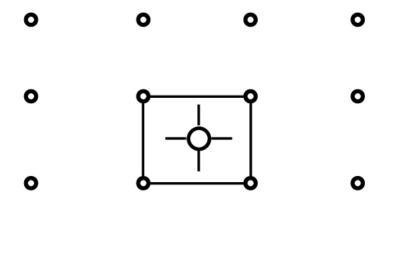
EXPLANATORY

Information that is appealing and useful to the user.



ACCURATE

Information that is appealing and useful to the user.



Steps

- 1. Defining objectives of the project.
- 2. Defining the audience.
- 3. Identifying the data available and required.
- 4. Understanding BIM 360's role.

Start with the end in mind, defining objectives.



What do you want to achieve?

Defining your audience and their needs.



Plan for how they think



Design for how they see



Write for how they read

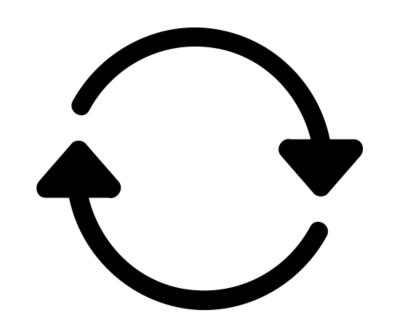


Create for how they feel

Identifying your data

UPDATES

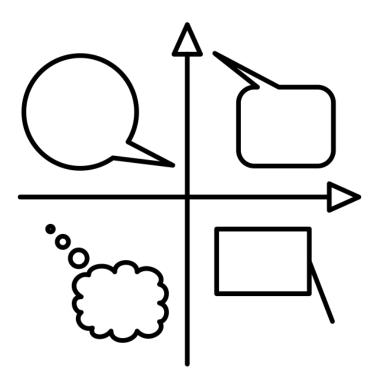
How is information going to be changing?



TYPES

Qualitative

Quantitative



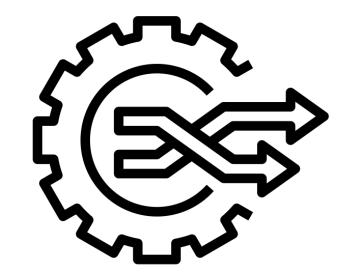
PROVIDERS

Who is feeding the information?



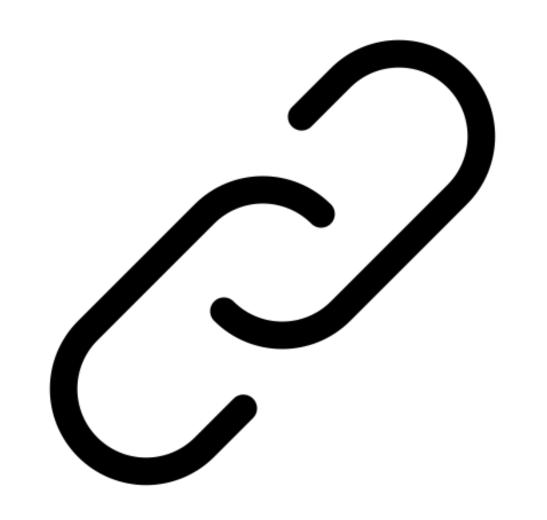
PROCESSING

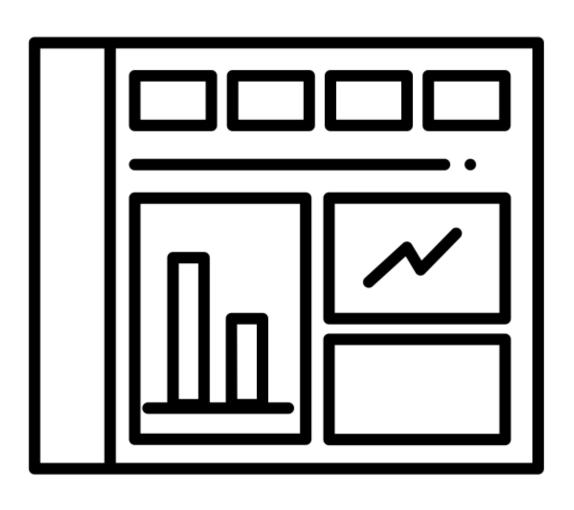
What steps to take for data to be useful?



Where BIM 360 comes into play



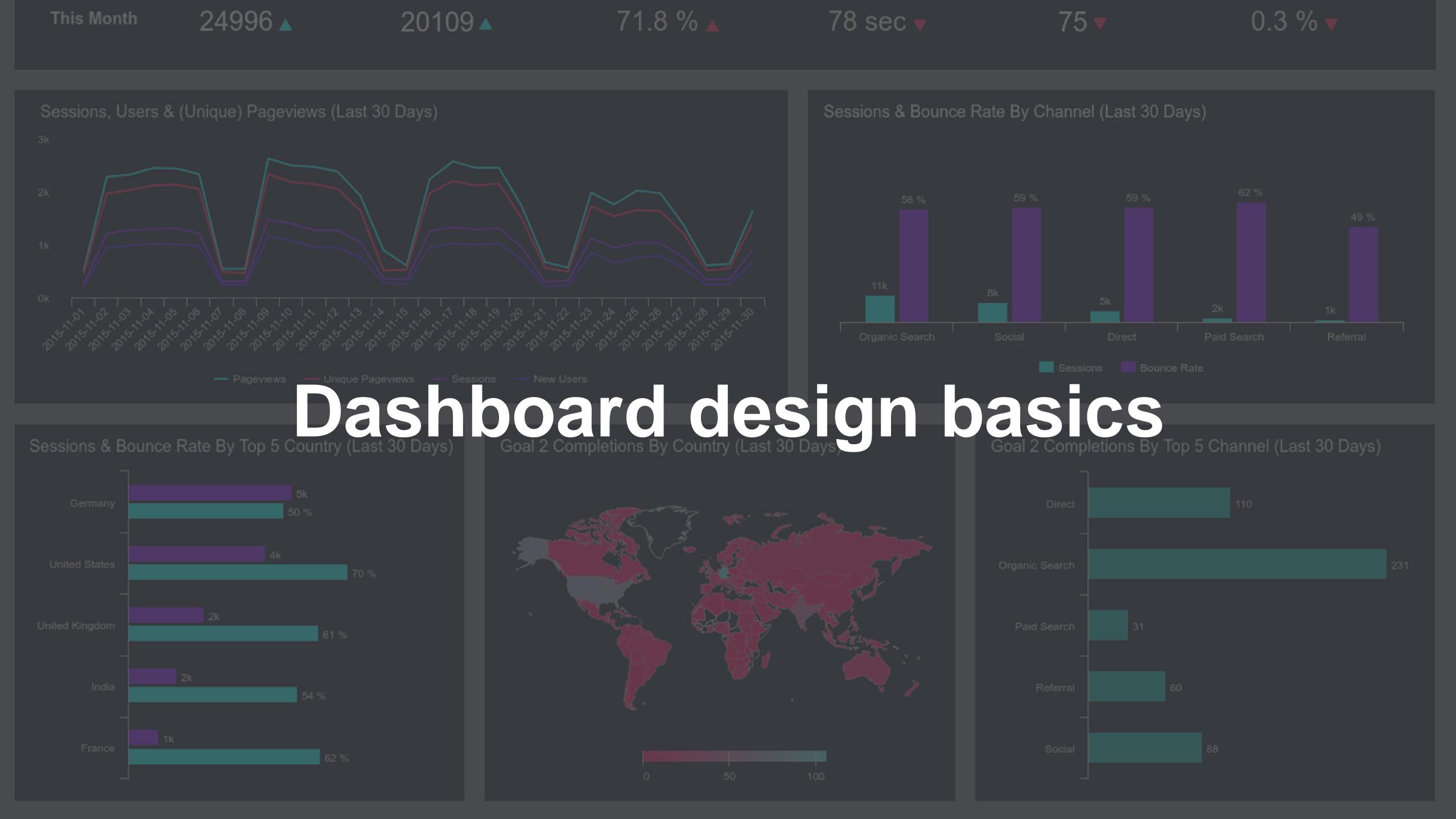








Dashboard

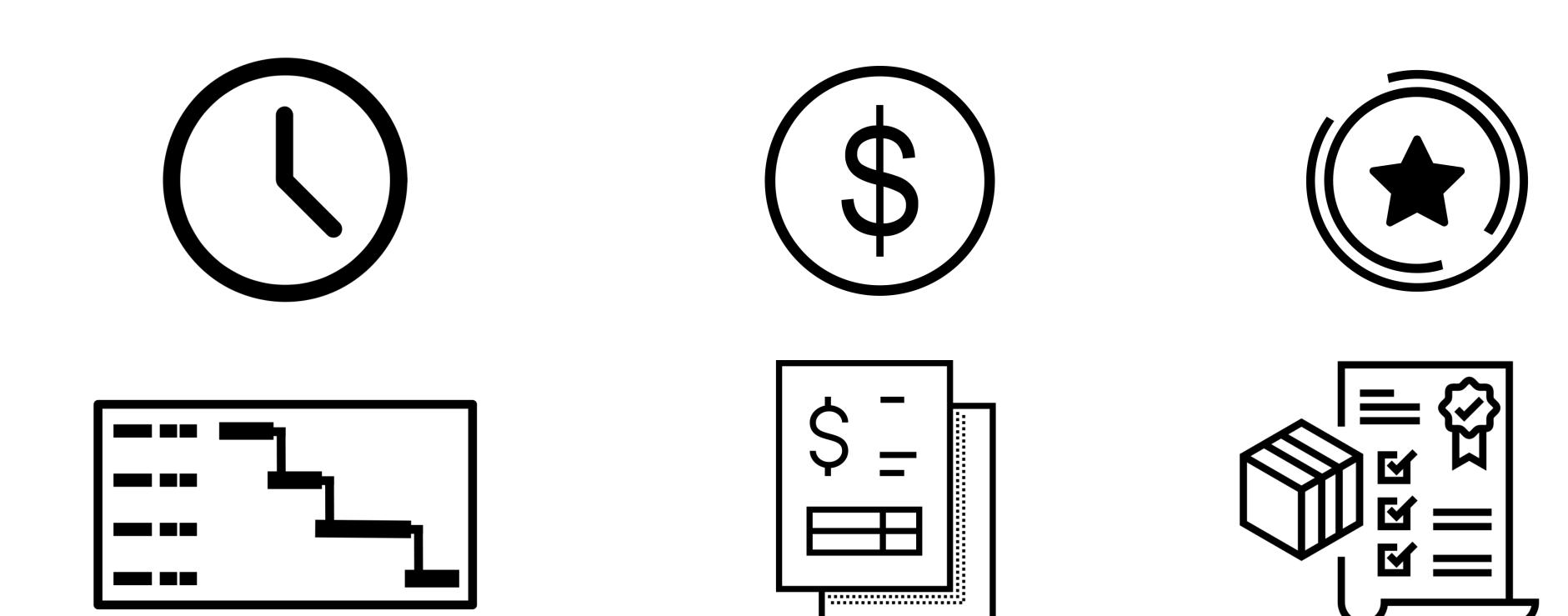


The audience: The project manager

- What kind of choices will be taking place on a daily basis?
- What information is required for said choices?
- What are the timeframes that apply to the operations of the role?
- How tech savvy is the average user?
- What is their routine?
- How can we simplify their life by providing the information the usually need at a glance?



The objective: tracking time, quality and cost.

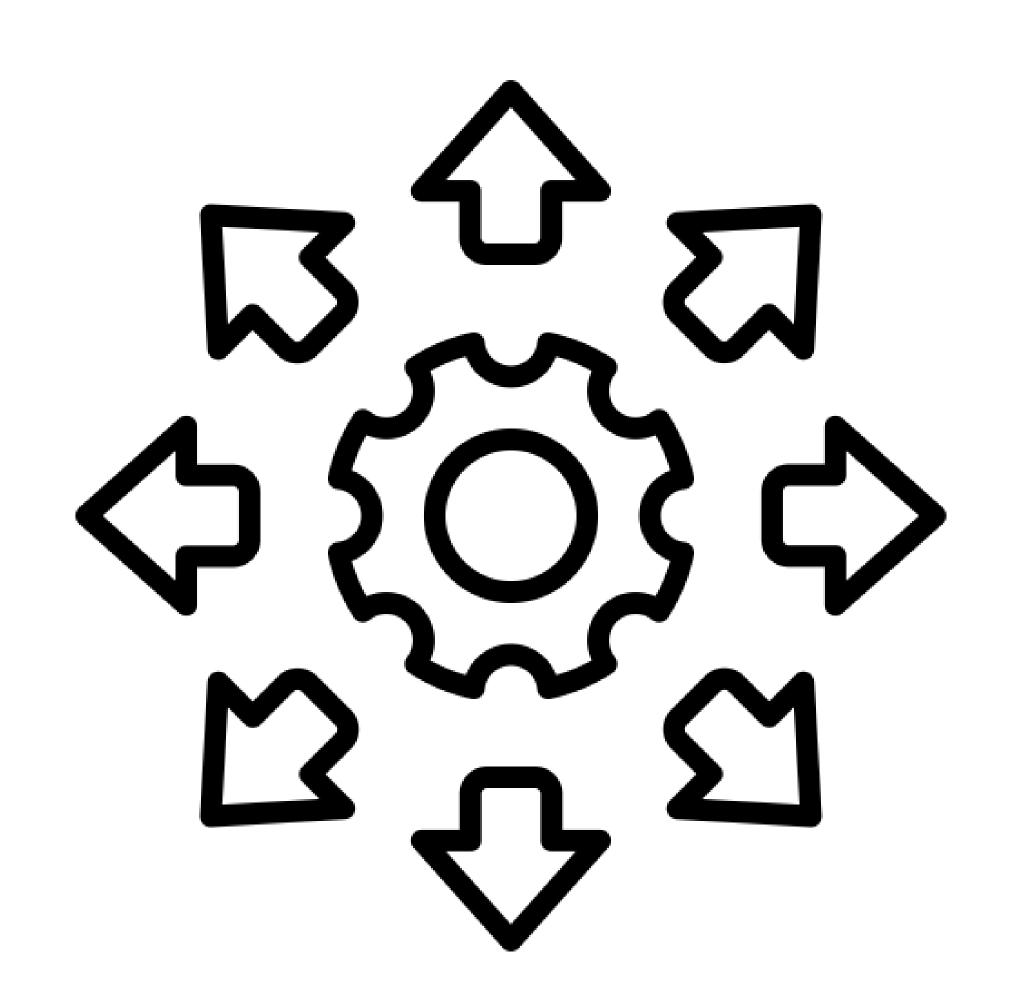


Kinds of dashboard

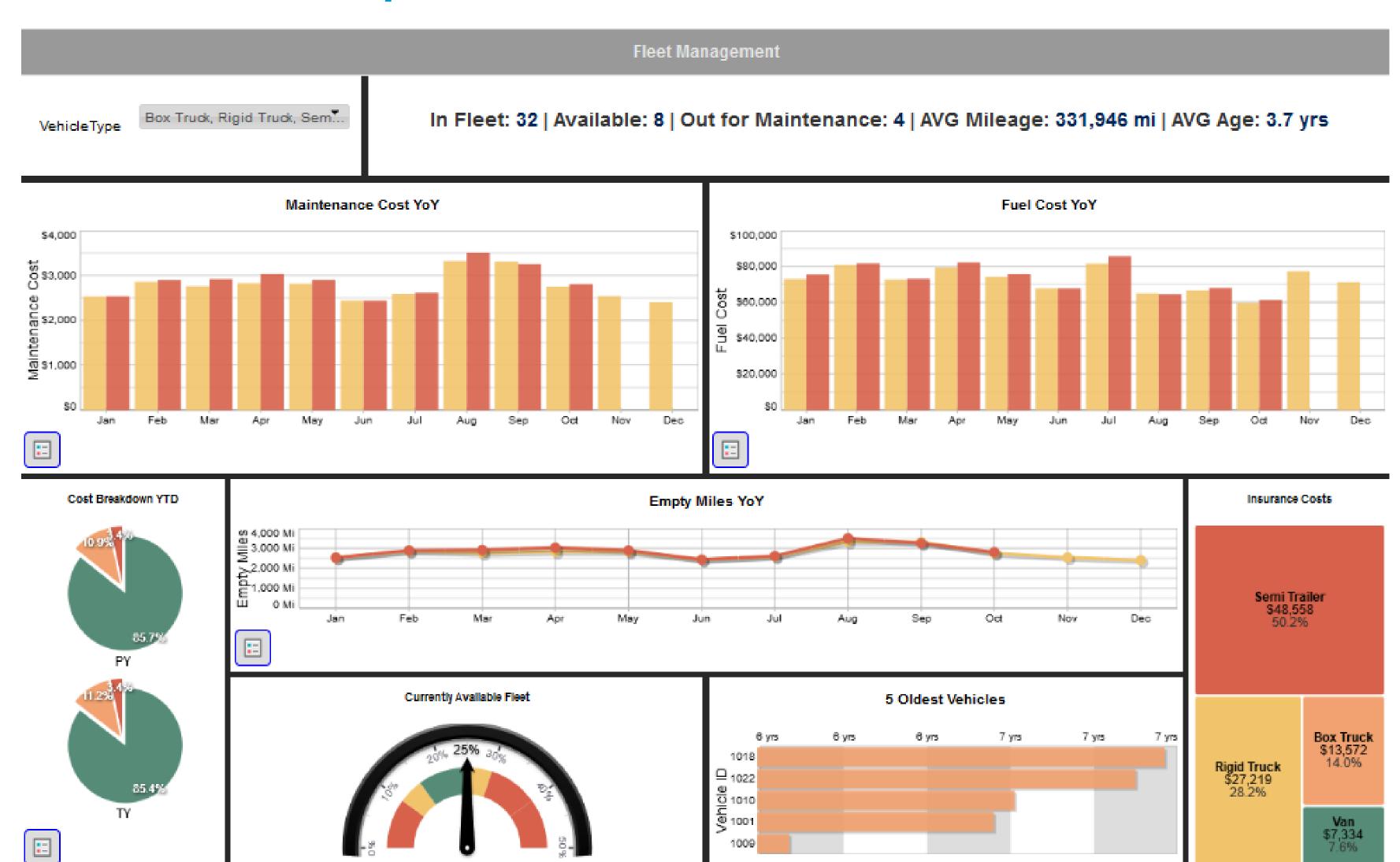
Operational Dashboards

Strategic Dashboards

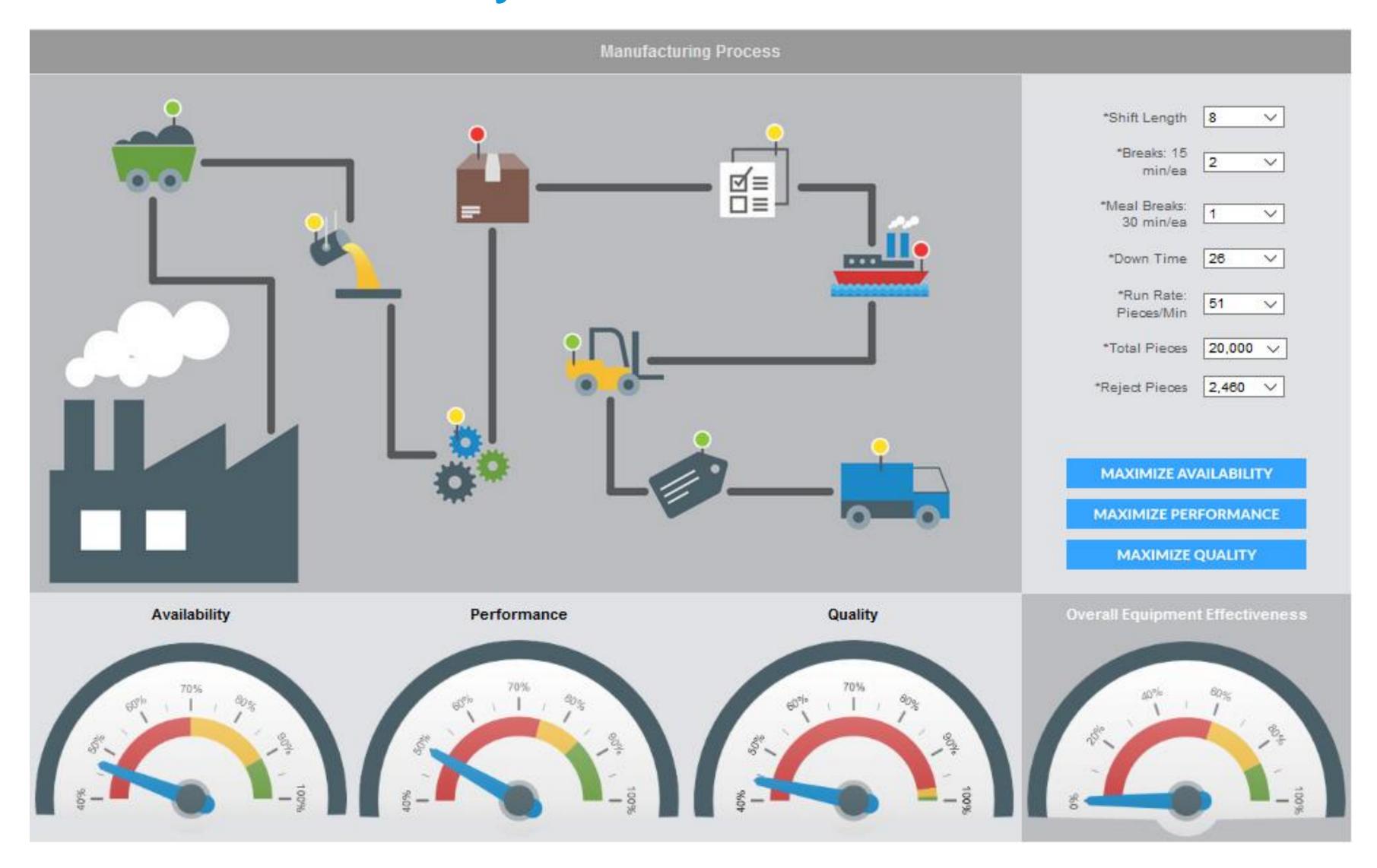
Analytical Dashboards



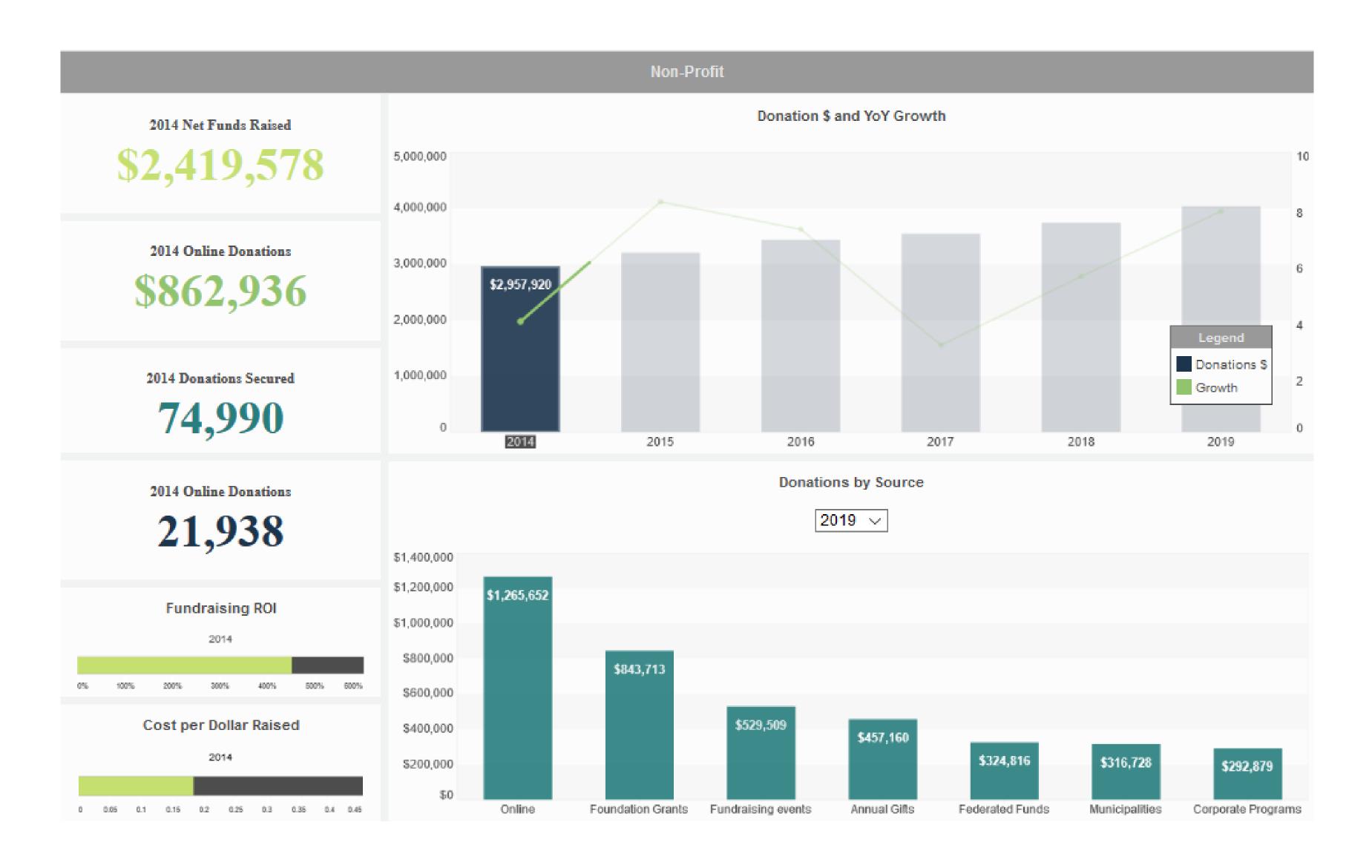
Operational Dashboards



Analytical Dashboards



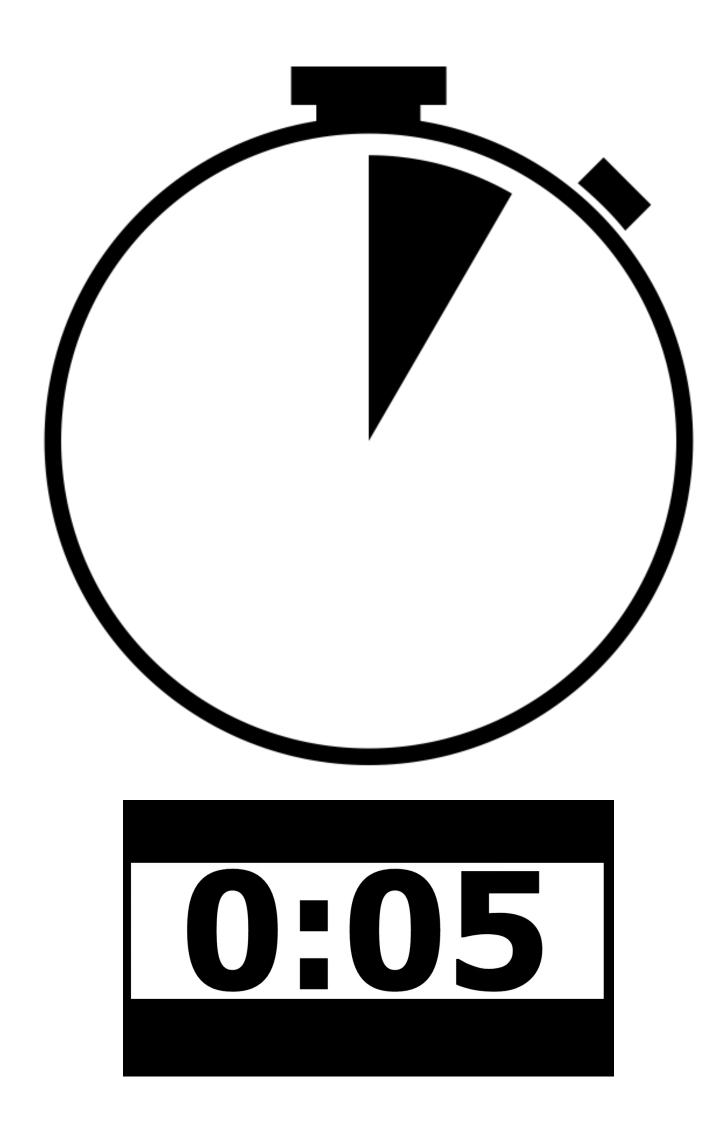
Strategic Dashboard



Dashboard construction guidelines

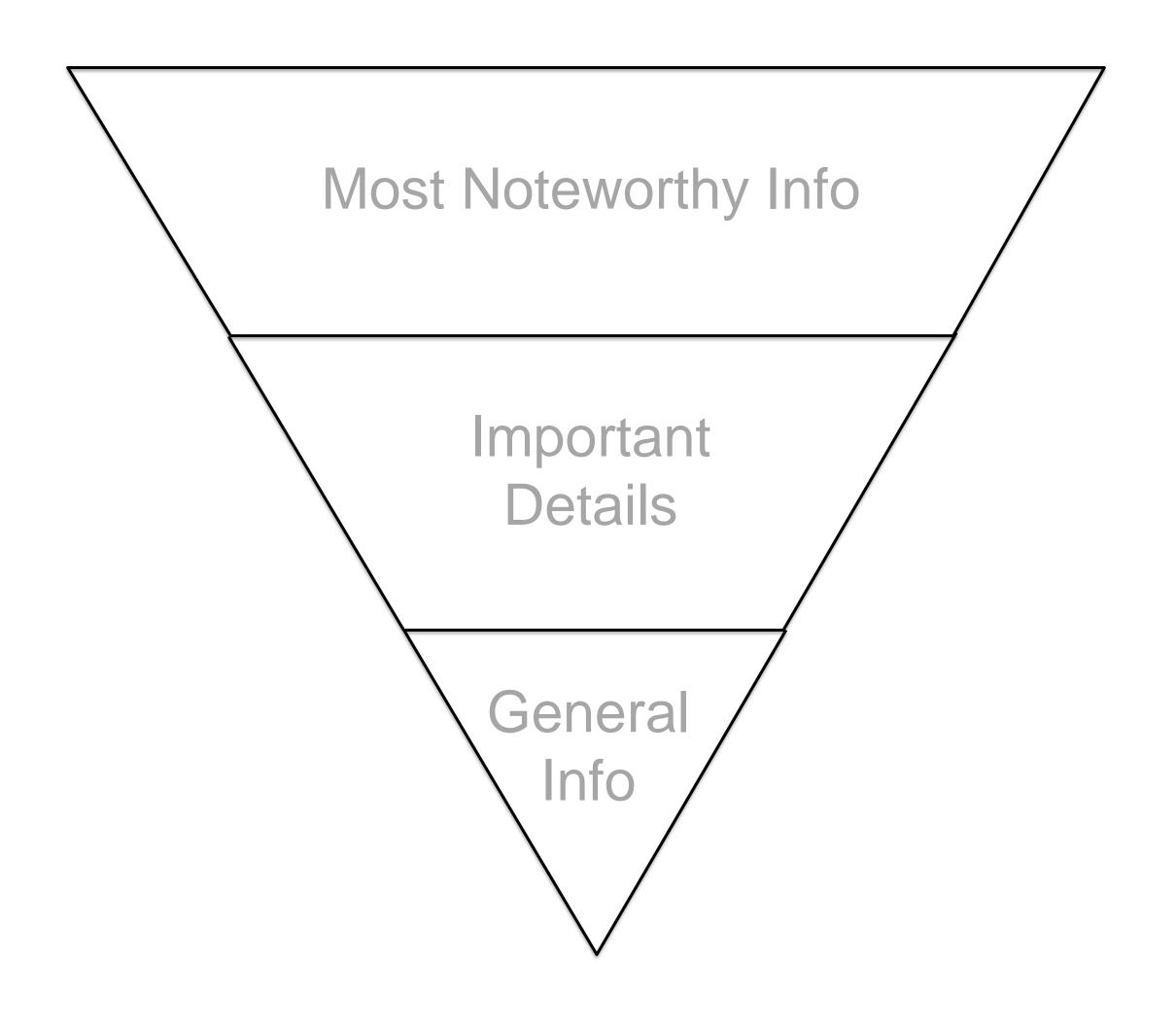
- 1. 5 second rule
- 2. Inverted pyramid
- 3. Managing iterations
- 4. Customize vs personalize
- 5. Be consistent

5 second rule





Inverted pyramid





Managing iterations



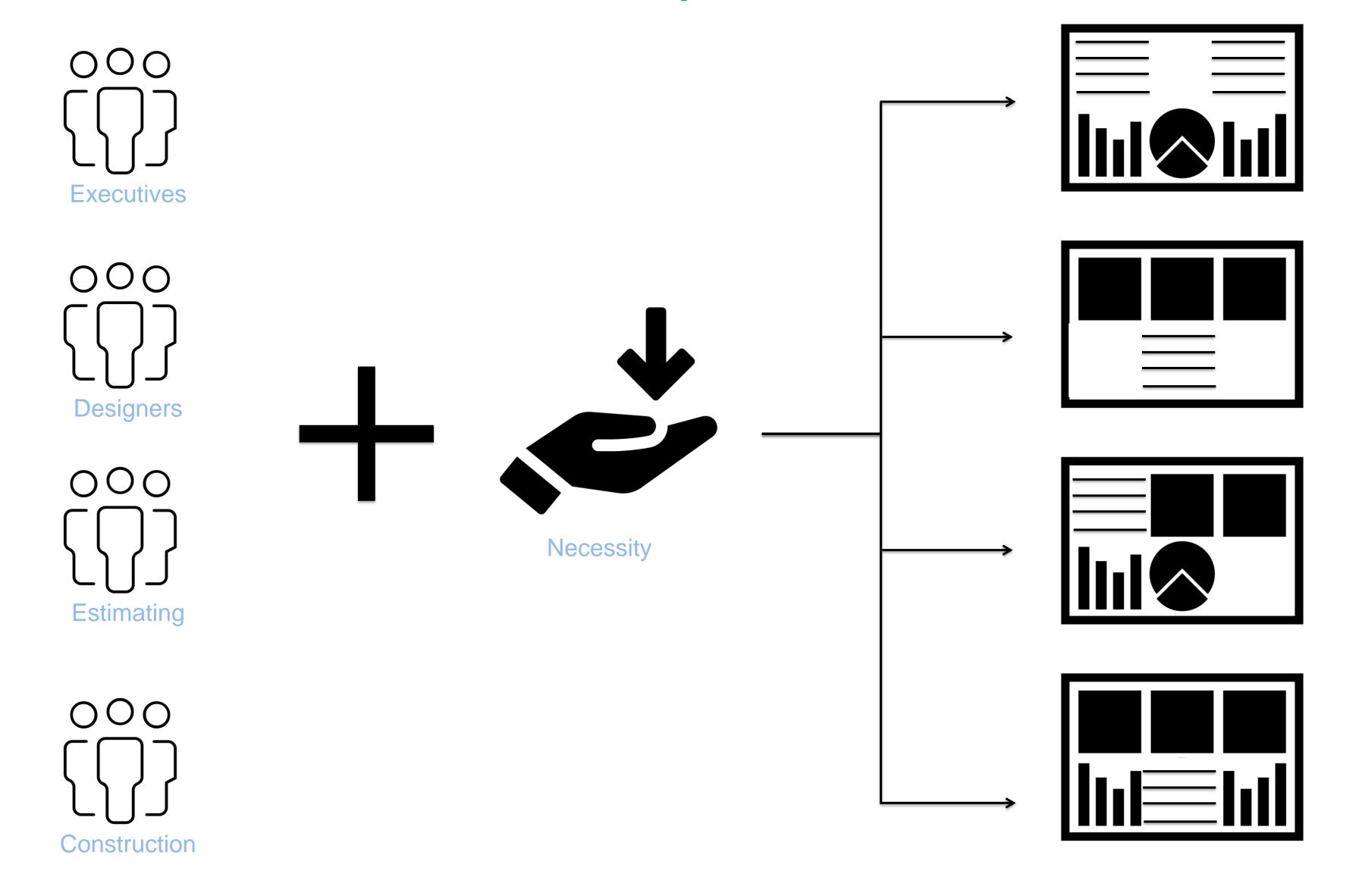
Customize vs personalize



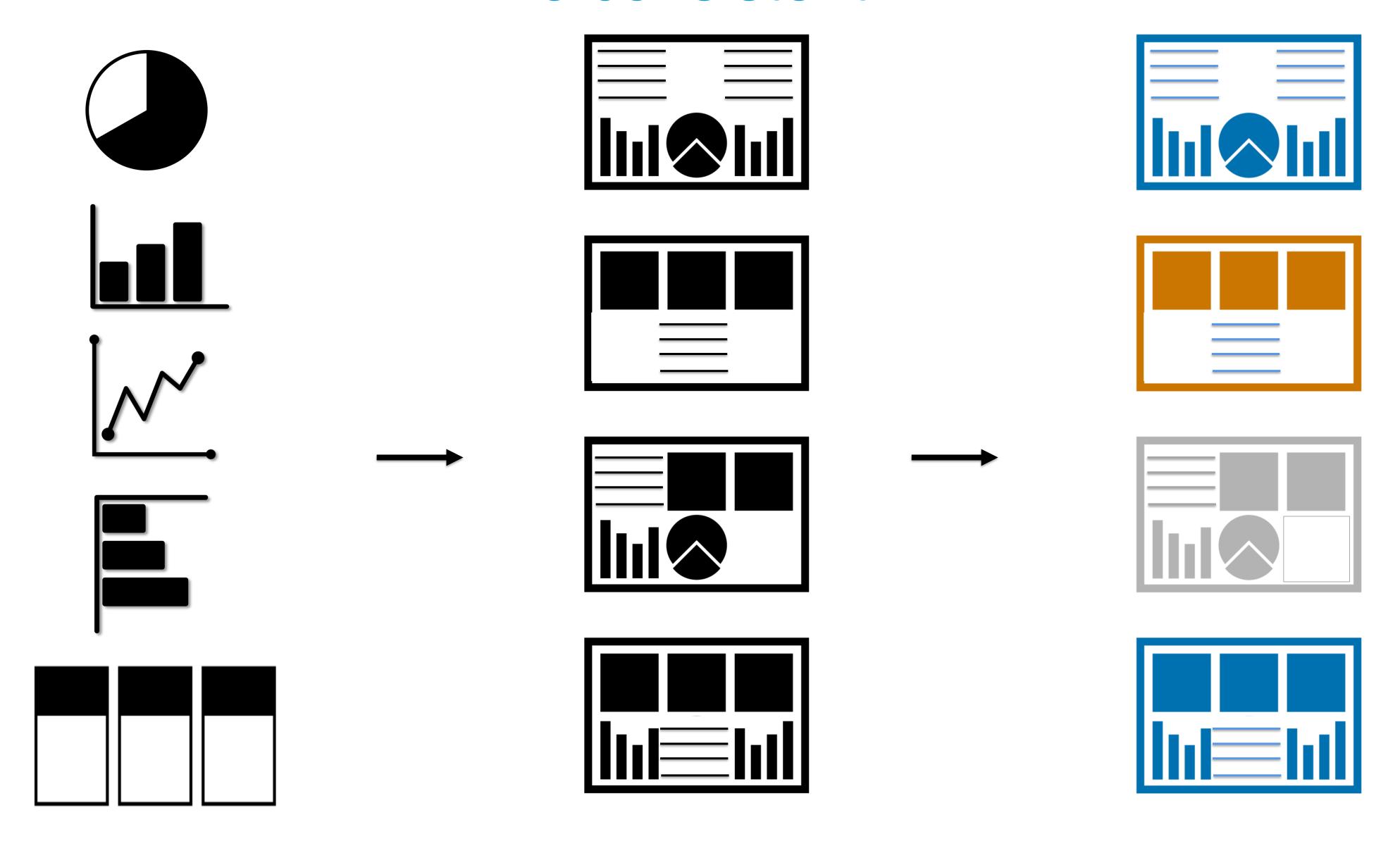
Customize vs personalize

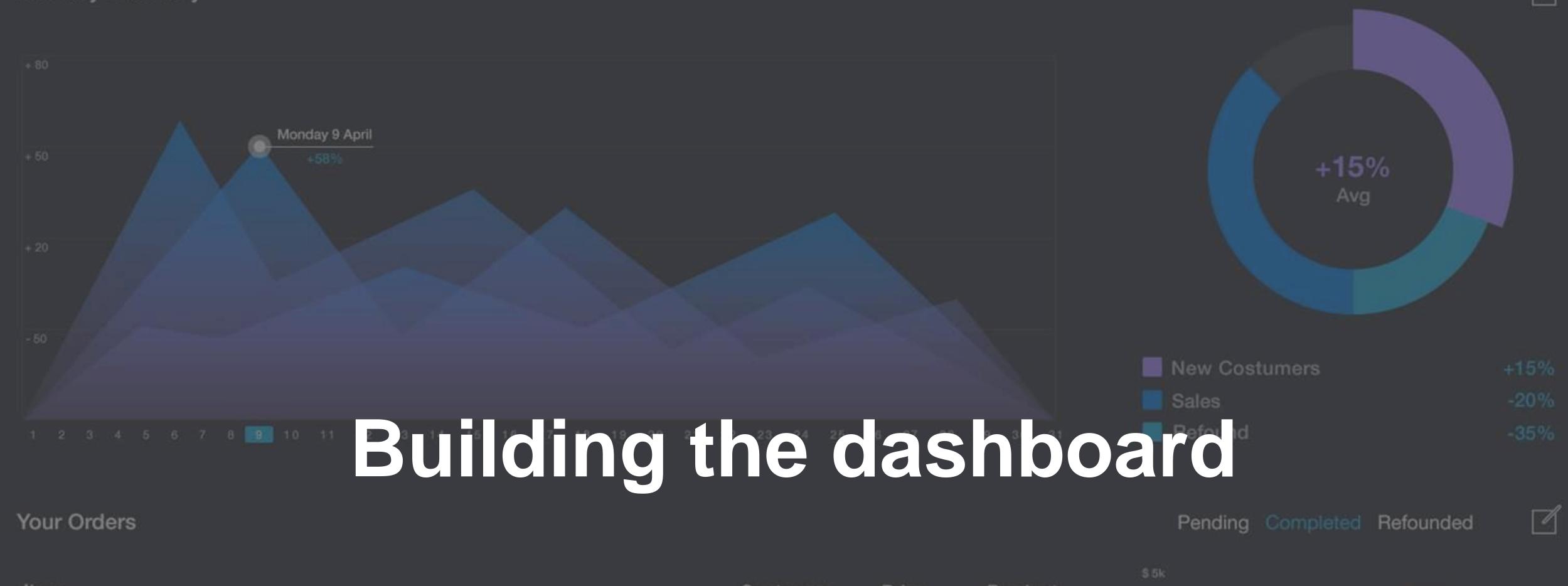


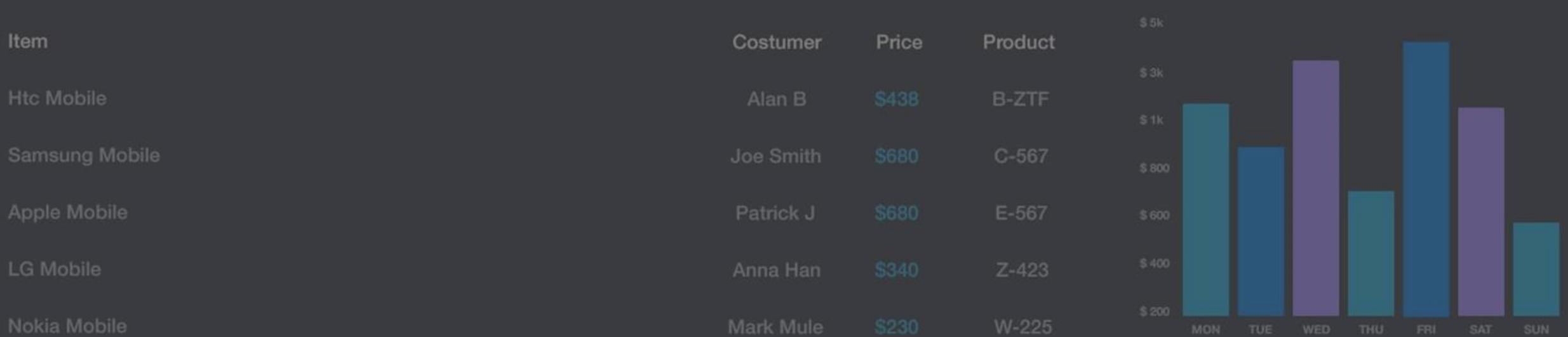
Customize vs personalize



Be consistent







Final Steps

STEP 2

STEP 3

MAPPING YOUR DATA

DEFINING INFORMATION

STEP 1

DETERMINING
CHARACTERISTICS

STEP 4

GROUPING THE INFORMATION

Determining the dashboard characteristics

| Element | Definition | |
|----------------------|---|--|
| Name | CTQ Control | |
| Description | Control panel to measure and identify risk factors in the project's status regarding the time, cost and quality objectives. | |
| Audience | Construction Project Manager | |
| Audience Description | CPM that will need to monitor the current and past performance of a project in order to capitalize on project | |
| | To be able to gather the current status of a project based on time, cost and quality and evaluate it against the control parameters. | |
| | To present the past performance of a project regarding time, cost and quality to identify trends. | |
| Objective | To visualize the future activities to be performed in the project to properly adjust current actions to meet the cost, time and quality objectives. | |
| | Analytical – The dashboard will need to show past and present | |
| Kind of dashboard | information for planning. | |
| Types of data | | |
| Usage | Daily at the beginning and end of the workday. | |

Defining the information required

| Time | Cost | Quality |
|-------------------------|-------------------|------------------------------|
| Contract Substantial | | |
| Completion | Current Egress | Number of issues |
| Contract Beneficial | | |
| Occupancy | Current Ingress | Type of issues |
| Projected Substantial | | |
| Completion | Balance | # Open Issues |
| Projected Beneficial | | |
| Occupancy | Pending Ingress | # Closed issues |
| Delay | Pending Egress | Issues in time |
| Percentage of delay | % Cost completion | Issues with expired deadline |
| | | Checklists |
| Number of tasks delayed | | completed |
| Average Delay | | Passed checklists |
| Design Deadlines | | Failed checklists |
| Procurement Deadlines | | |

Mapping the information in BIM 360

| Information | Location | Source Format | Target Format | Processing Needed | | | |
|----------------------------------|----------------------|---------------|---------------|-------------------|--|--|--|
| Time | | | | | | | |
| Contract Substantial Completion | Project Schedule | .MPP | XML | NO | | | |
| Contract Beneficial Occupancy | .MPP | XML | NO | | | | |
| Projected Substantial Completion | Project Schedule | .MPP | XML | NO | | | |
| Projected Beneficial Occupancy | Project Schedule | .MPP | XML | NO | | | |
| Delay | Project Schedule | .MPP | XML | NO | | | |
| Percentage of delay | Project Schedule | .MPP | XML | NO | | | |
| Number of tasks delayed | Project Schedule | .MPP | XML | NO | | | |
| Average Delay | Project Schedule | .MPP | XML | NO | | | |
| Design Deadlines | Design Schedule | .MPP | XML | NO | | | |
| Completion Percentage | Project Schedule | .MPP | XML | NO | | | |
| Procurement Deadlines | Procurement Schedule | . XLXS | XML | YES | | | |
| | | Cost | | | | | |
| Current Egress | Procurement Schedule | . XLXS | XML | YES | | | |
| Current Ingress | Balance Account | . XLXS | XML | YES | | | |
| Balance | Balance Account | . XLXS | XML | YES | | | |
| Pending Ingress | Balance Account | . XLXS | XML | YES | | | |
| Pending Egress | Procurement Schedule | . XLXS | XML | YES | | | |
| % Cost completion | Not available | - | - | _ | | | |
| | | Quality | | | | | |
| Number of issues | BIM 360 API | | | NO | | | |
| Type of issues | BIM 360 API | | | NO | | | |
| # Open Issues | BIM 360 API | | | NO | | | |
| # Closed issues | BIM 360 API | | | NO | | | |
| Issues in time | BIM 360 API | | | NO | | | |
| Issues with expired deadline | BIM 360 API | | | NO | | | |
| Checklists completed | BIM 360 API | | | NO | | | |
| Passed checklists | BIM 360 API | | | NO | | | |
| Failed checklists | BIM 360 API | | | NO | | | |

Grouping and visualization of data

BASE LAYOUT

| | Information | Visualization | | | | | |
|------------|----------------------|---------------|--|--|--|--|--|
| Indicators | | | | | | | |
| | Contract Substantial | | | | | | |
| | Completion | DATE | | | | | |
| TIME | Projected S.C. | DATE | | | | | |
| I IIVI⊏ | Percentage of delay | % | | | | | |
| | #of tasks delayed | Pie Chart | | | | | |
| | Average Delay | Figure | | | | | |
| | Current Egress | Bar chart | | | | | |
| | Current Ingress | Bar chart | | | | | |
| COST | Balance | Figure | | | | | |
| COST | Pending Ingress | Bar chart | | | | | |
| | Pending Egress | Bar chart | | | | | |
| | % Completion | Pie Chart | | | | | |
| | Number of issues | Figure | | | | | |
| | Types of issues | Bar chart | | | | | |
| QUALITY | Open vs Closed | | | | | | |
| QUALIT | issues | Pie Chart | | | | | |
| | % expired issues | Pie Chart | | | | | |
| | %Pass checklists | Pie Chart | | | | | |

| | Information | Visualization | | | | | | |
|---------|----------------------|---------------|--|--|--|--|--|--|
| | Time Reference | | | | | | | |
| | Tasks | Gantt Chart | | | | | | |
| | Start Date | Gantt Chart | | | | | | |
| TIME | End Date | Gantt Chart | | | | | | |
| I IIVIE | Duration | Gantt Chart | | | | | | |
| | | | | | | | | |
| | Percentage completed | Gantt Chart | | | | | | |
| | Purchase Order | Gantt Chart | | | | | | |
| Cost | Purchase Order Date | Gantt Chart | | | | | | |
| Cost | Purchase Order | | | | | | | |
| | Amount | Gantt Chart | | | | | | |
| Design | Design Documents | Gantt Chart | | | | | | |

| Project Reference | | | | | |
|-------------------|-------------|---------------|--|--|--|
| | Information | Visualization | | | |
| MODEL | 3D Model | BIM 360 API | | | |

| Indicators | | | | | | |
|------------|-----------------------|---------------|--|--|--|--|
| | Information | Visualization | | | | |
| TIME | Delays over time | line chart | | | | |
| | Ingress over time | line chart | | | | |
| COST | E gress time | line chart | | | | |
| CUSI | Payment applications | | | | | |
| | overtime | Bar chart | | | | |
| QUALITY | # of issues over time | line chart | | | | |

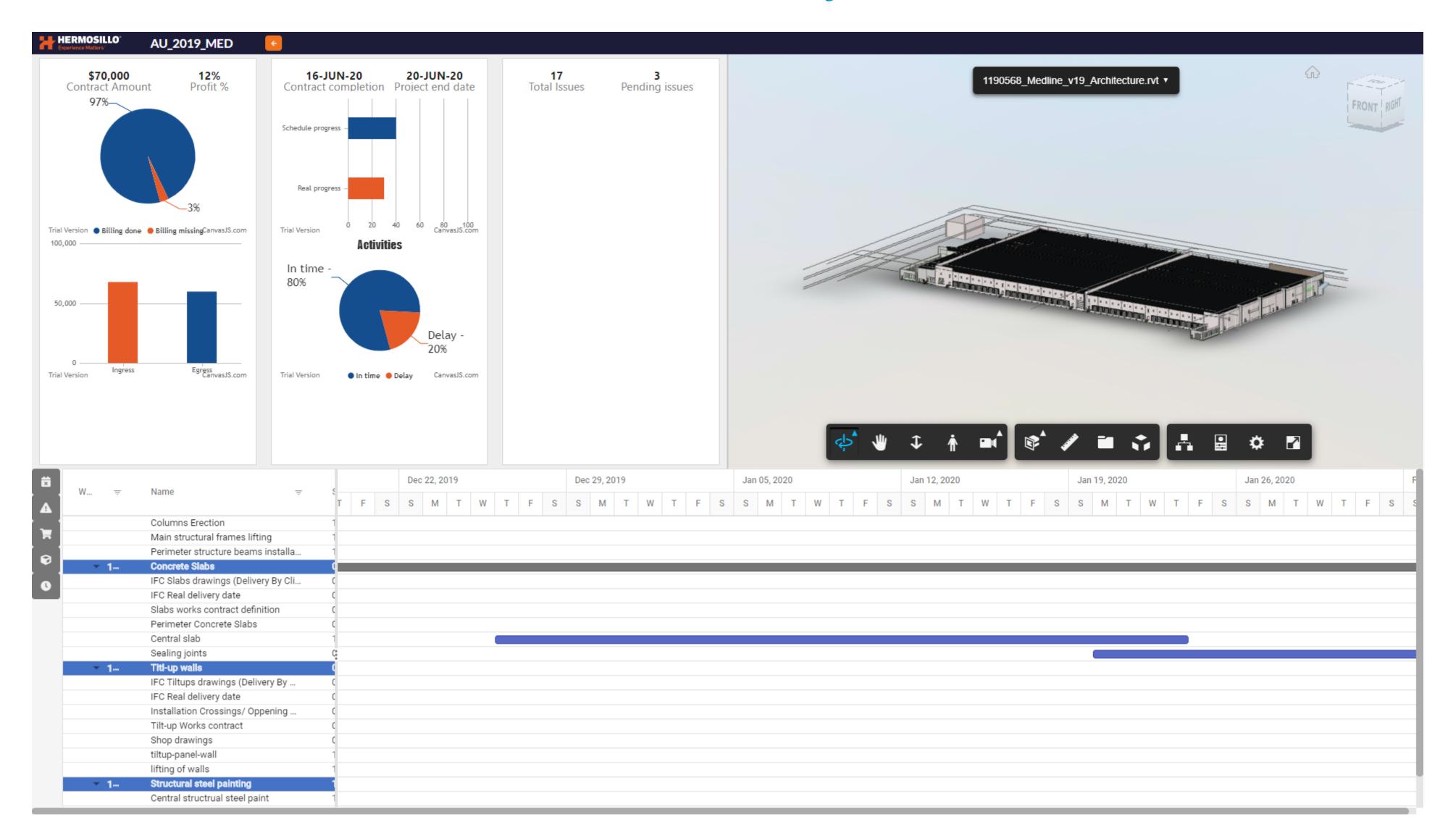
| Time Reference | | | | | |
|----------------|---------------|---------------|--|--|--|
| | Information | Visualization | | | |
| TIME | Delayed Tasks | Gantt Chart | | | |

ITERATIONS

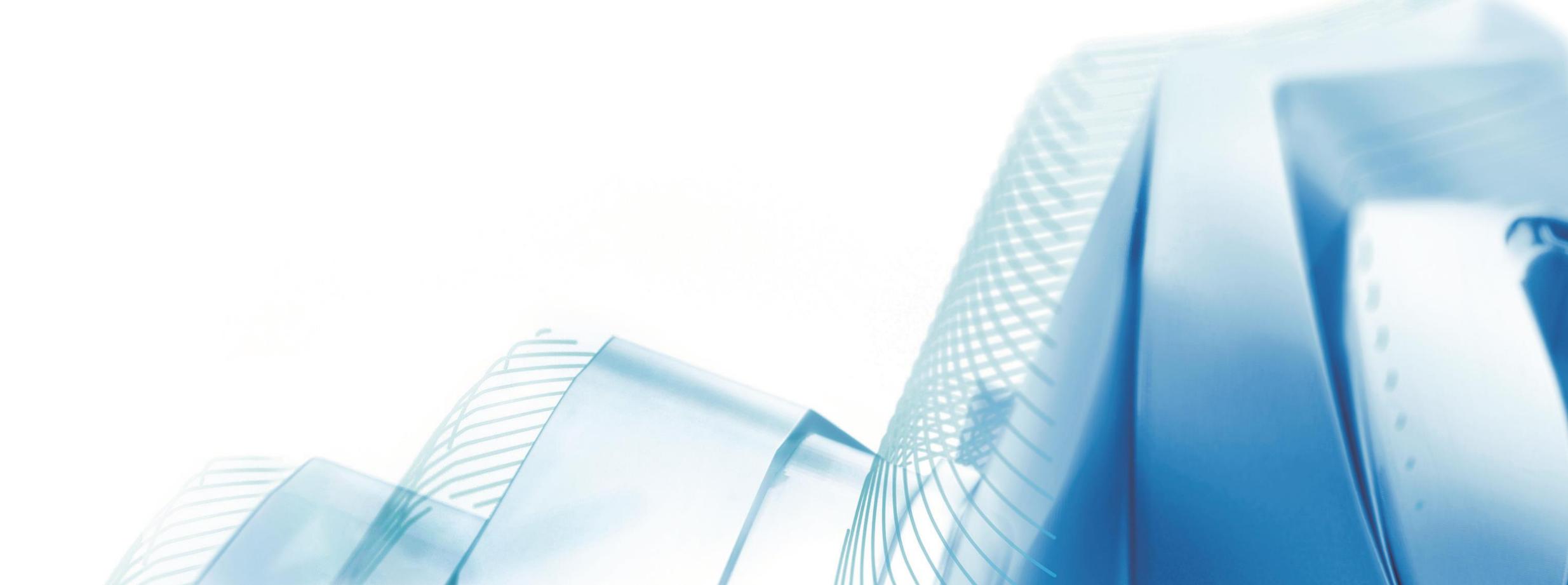
Sections of the layout

Project Reference Indicators Time Reference

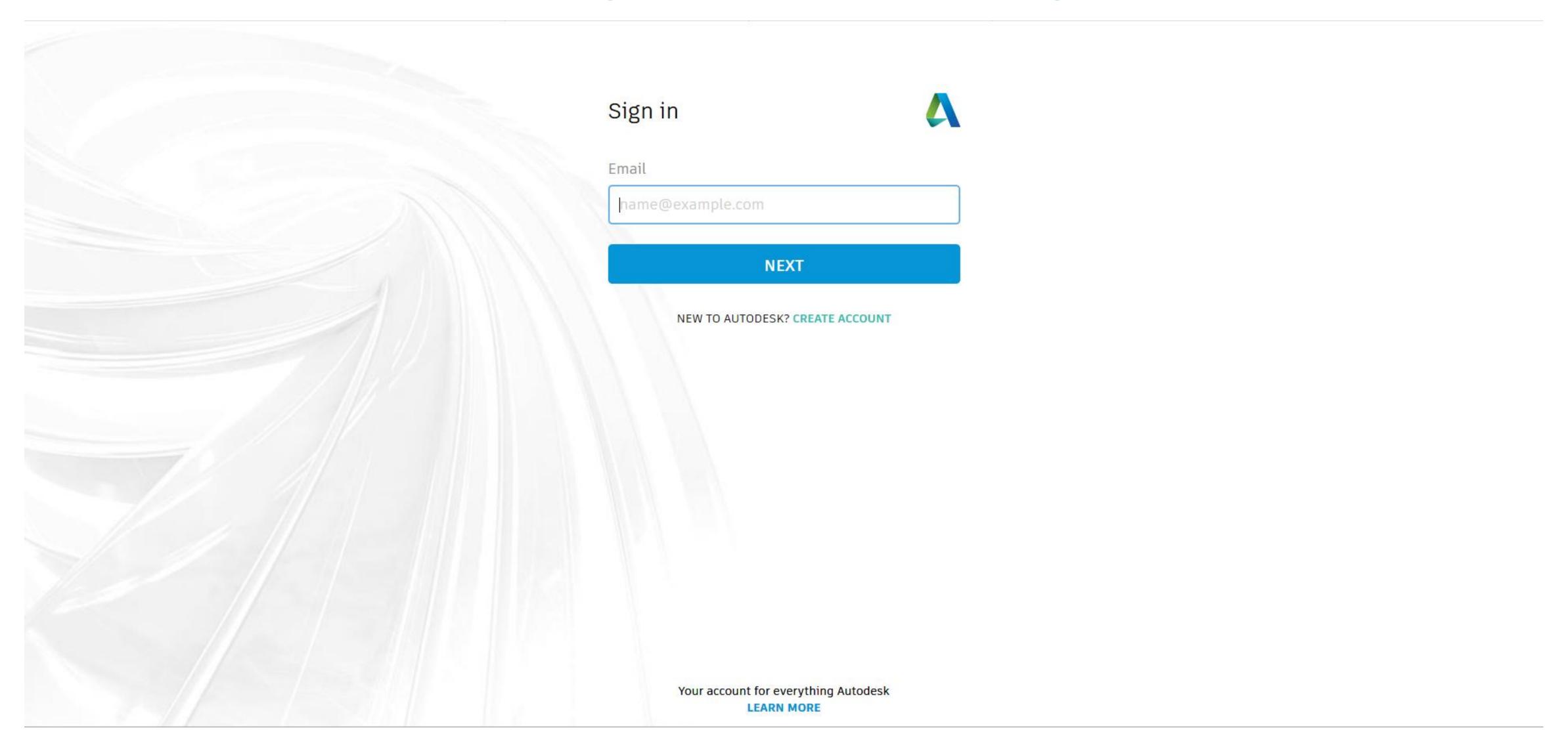
The final Layout

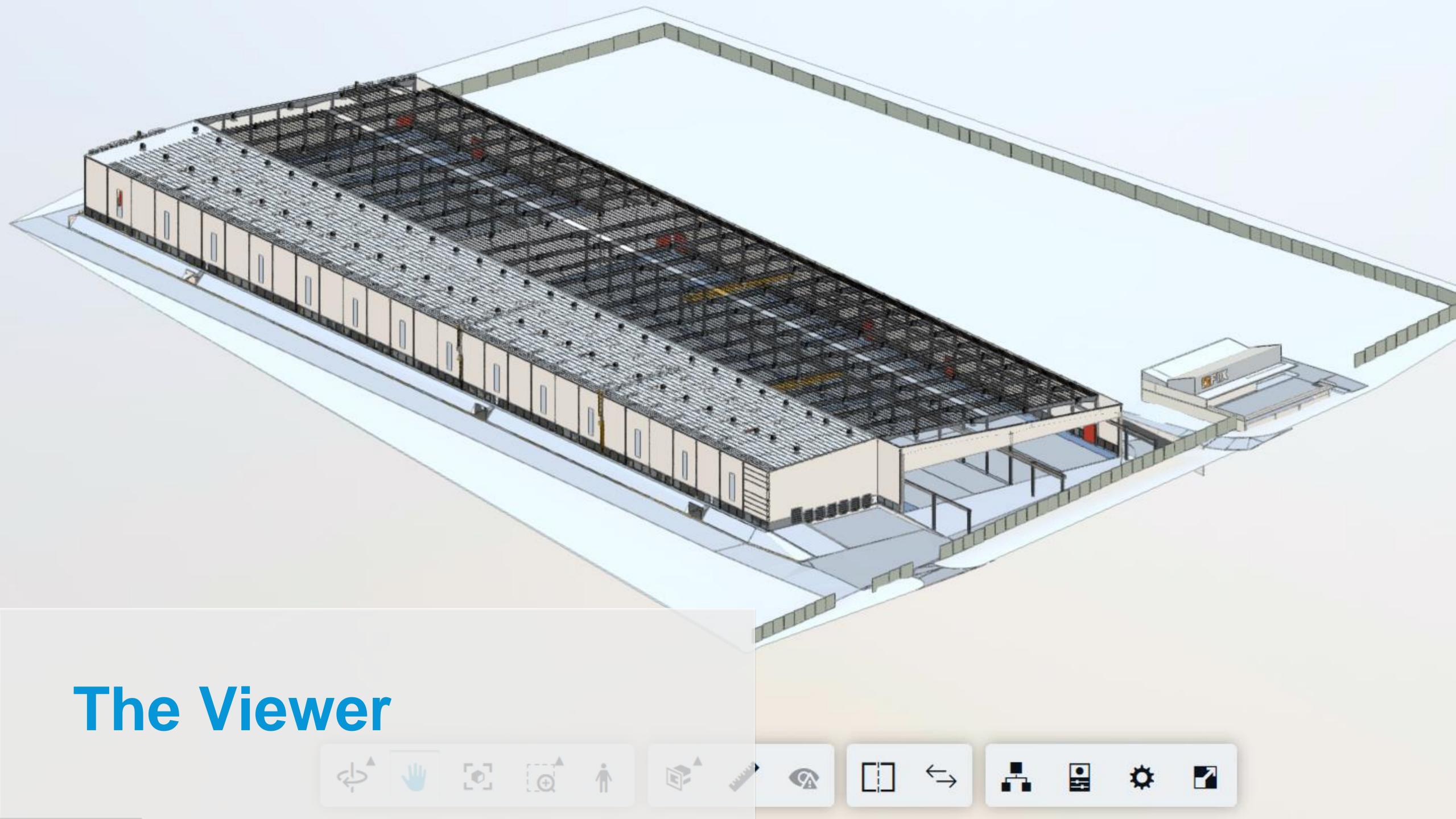


Learn how to combine Forge modules to link visual reference with project data



Getting started with Forge





Q Search for documents Size Version Last updated Updated by Oct 14, 2019 3:35 PM Jorge Abog Oct 14, 2019 3:37 PM Jorge Abog Oct 14, 2019 3:36 PM Jorge Abog May 21, 2019 11:18 AM Jorge Abog V1 675.3 KB Oct 15, 2019 6:17 PM Jorge Abog

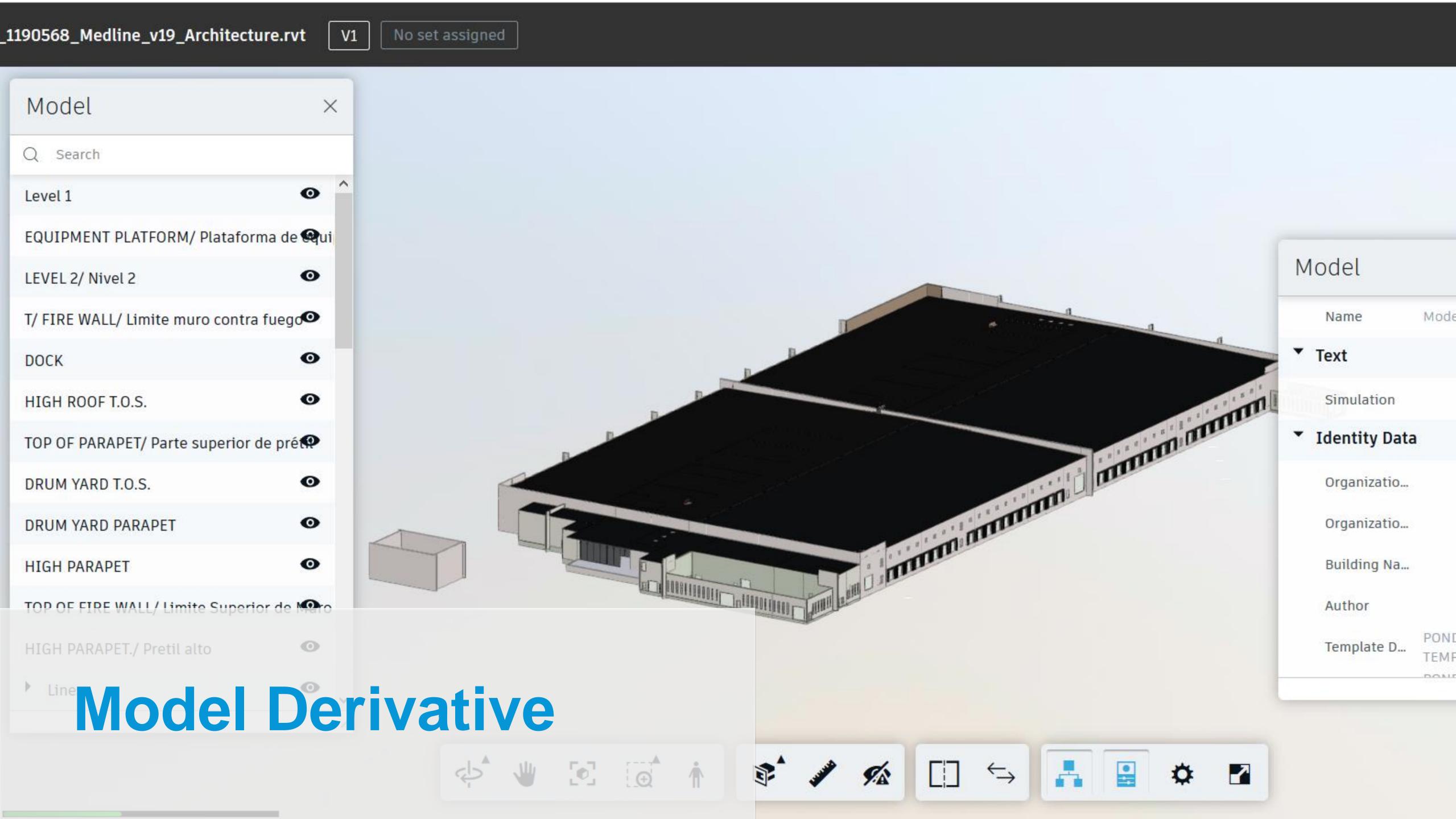
DataManagement

Cartas de No Adeudo

Project Files

Client Documents

Contrato Y Ordenes de Compr...





iii Document Management

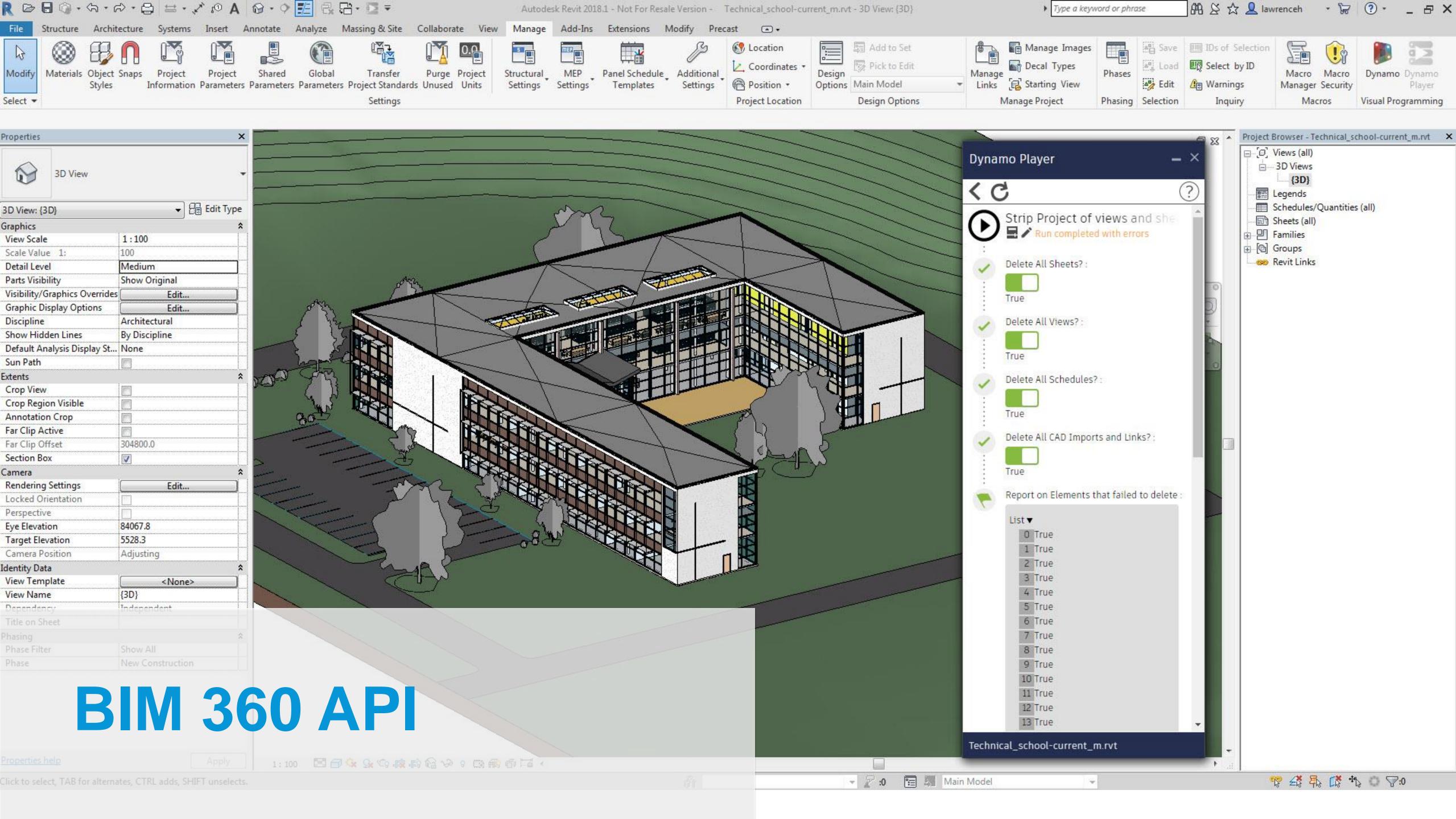
FOLDERS

REVIEWS

TRANSMITTALS

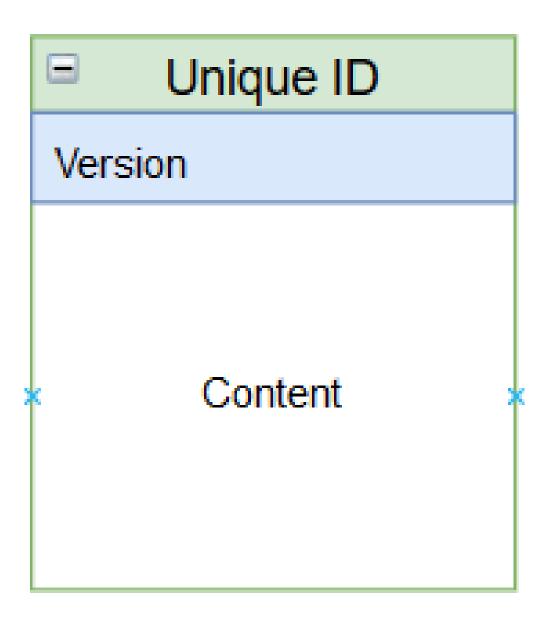
ISSUES

| T | Q Sear | rch | | | | | | | | | Expor |
|----------|--------|--------------|-----------------|--------------------------|----------|-----------------|------------|--------------|-----------------|---|-------|
| I | D 🗸 | Туре | Sub-type | Title | Location | Assigned to | Company | Due date | Linked document | J | |
| 1 | 0 | Design | Work to Comple | Not enough toilettes | _ | _ | _ | Dec 8, 2019 | DA-701rea B | 0 | 0 |
| g |) | Design | Work to Comple | Delay in construction of | _ | _ | _ | Nov 10, 2019 | 🗅 A-101Drea D | 0 | 0 |
| 8 | 3 | Quality | Quality | Wrong type of concrete | - | Julio Ojeda | Hermosillo | Nov 25, 2019 | 🗅 A-101Drea D | 0 | 0 |
| 7 | • | Design | Requirement C | Conference Room chan | _ | _ | _ | Dec 4, 2019 | 🗅 A-101Drea D | 0 | 0 |
| 6 | 5 | Design | Requirement C | Unsafe stairs | _ | _ | _ | Nov 25, 2019 | 3D_119056e.rvt | 0 | 0 |
| 5 | 5 | Coordination | Clash | Size of the windows | - | Camila Saavedra | Hermosillo | Nov 17, 2019 | 3D_119056e.rvt | 0 | 0 |
| 4 | | Design | Work to Comple | Lack of downspouts | _ | _ | _ | Nov 30, 2019 | 3D_119056e.rvt | 0 | 0 |
| 3 | B | eW 3 | Report C. | Ong color of the doors | _ | Julio Ojeda | Hermosillo | Nov 22, 2019 | 3D_119056e.rvt | 0 | 0 |
| 2 | | Design | Client Feedback | Quantity take offs model | _ | Diana Gasca | Hermosillo | - | - | 0 | 0 |
| Showin | | | | | | | | | | | |

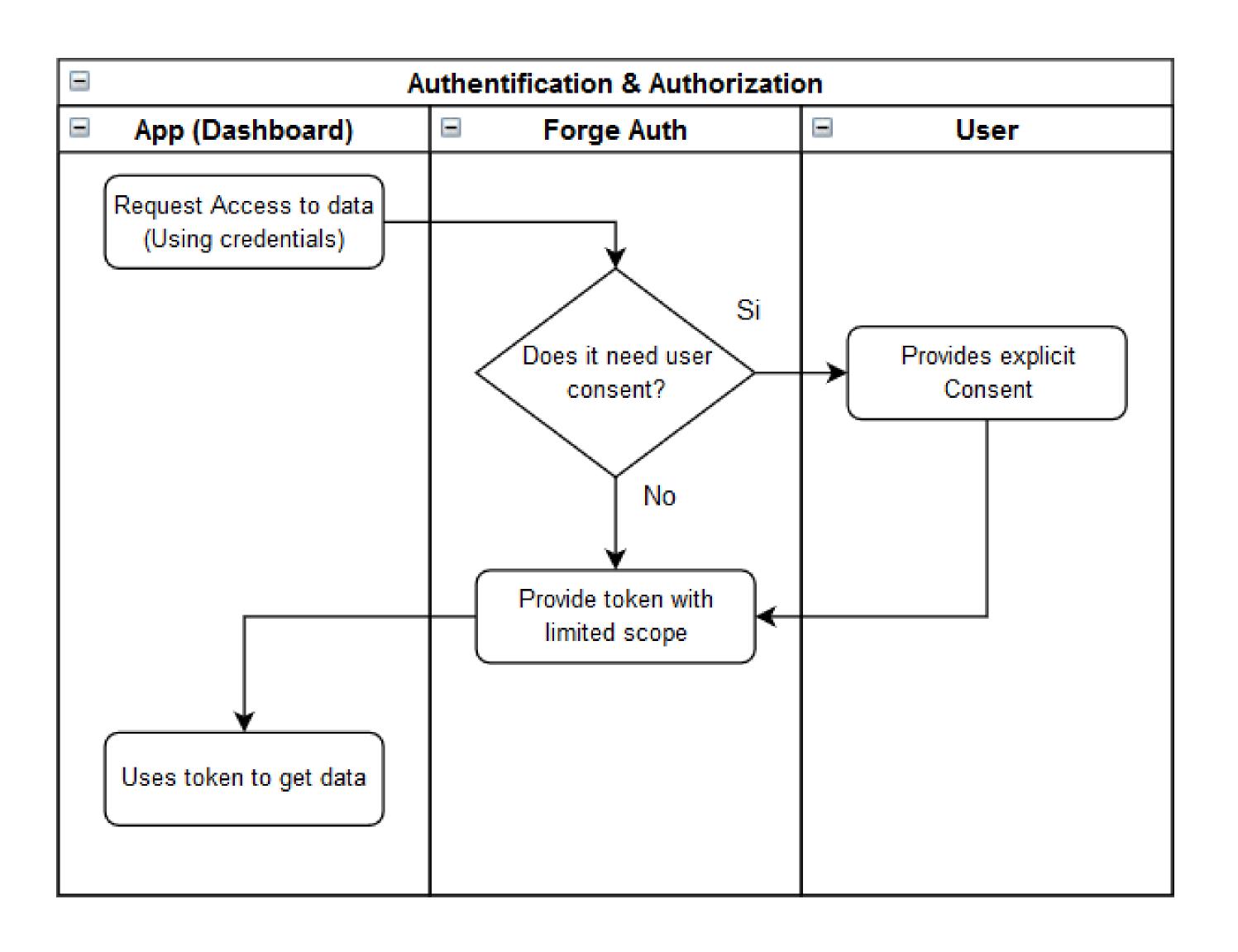


How does it work?

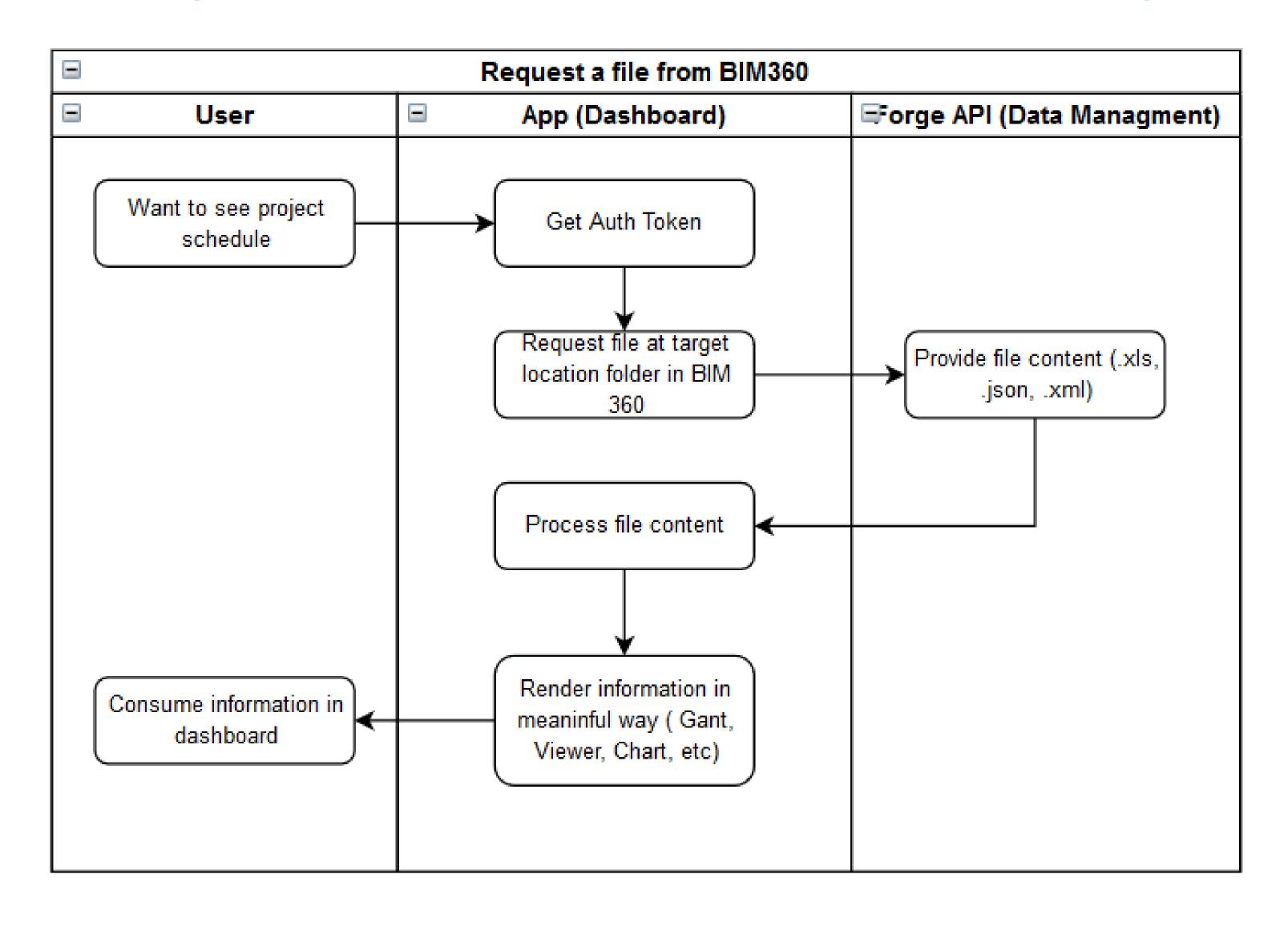
File



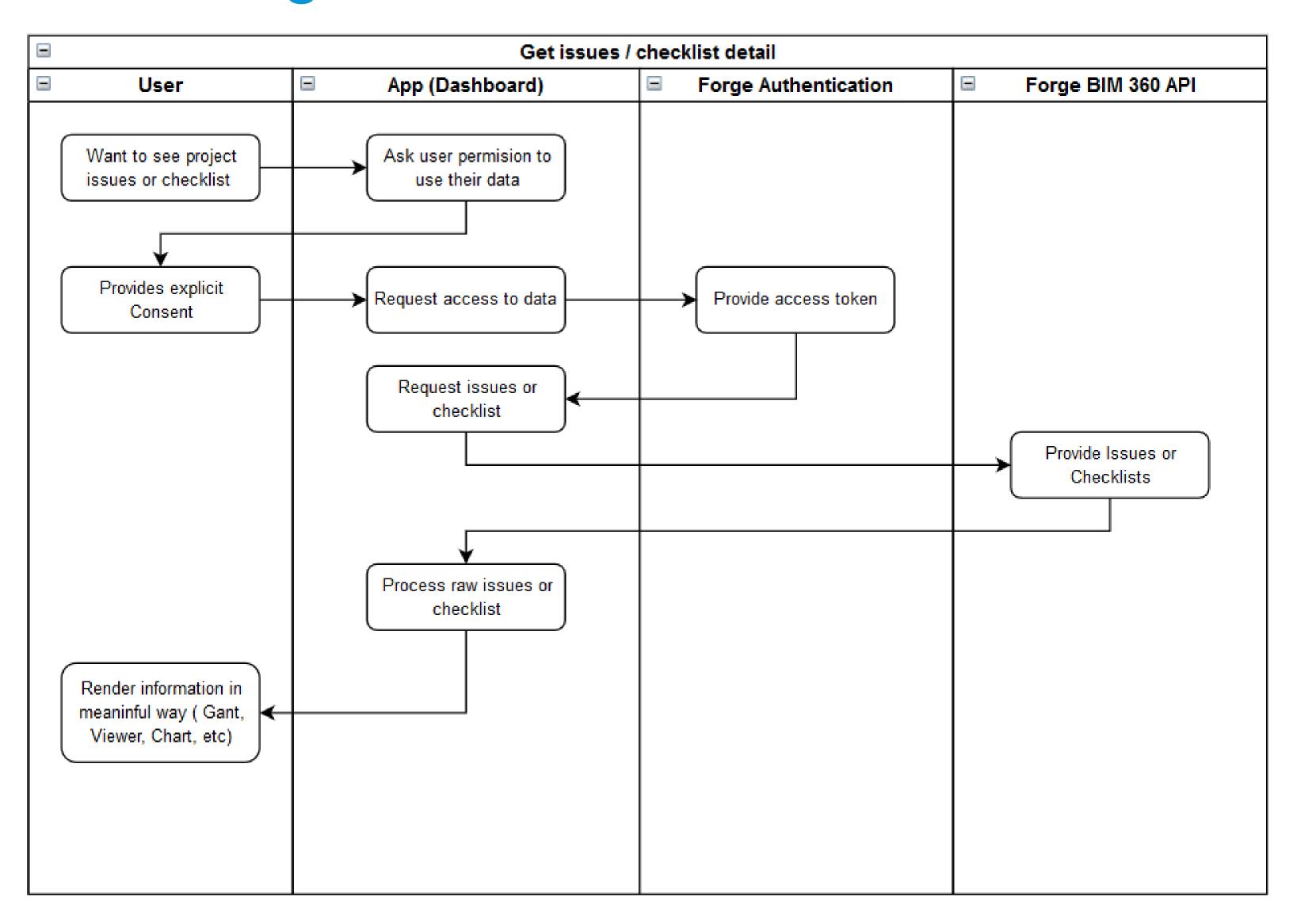
Getting the Authentification



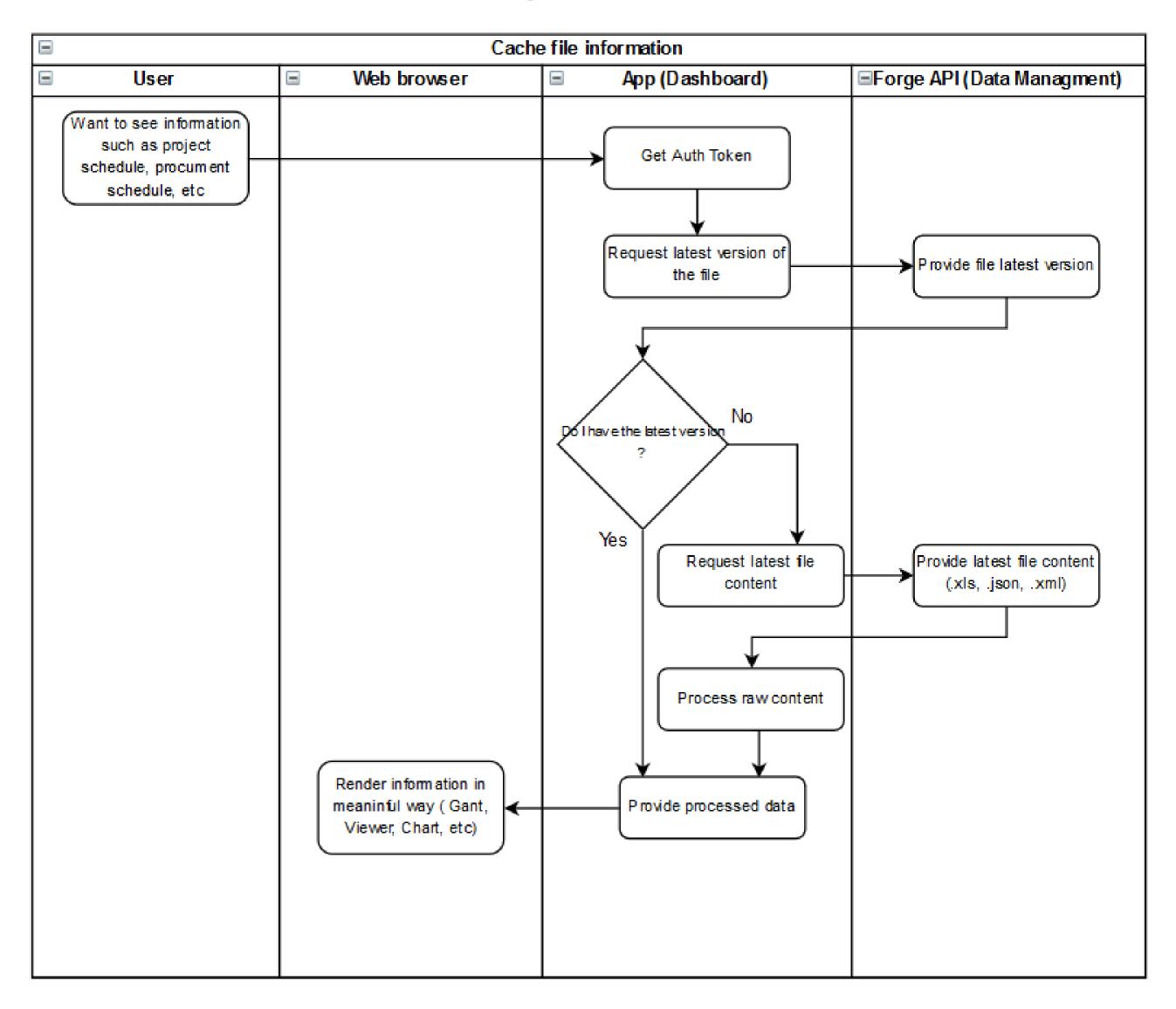
Accesing the information – Data Management



Accessing the information – BIM 360 API



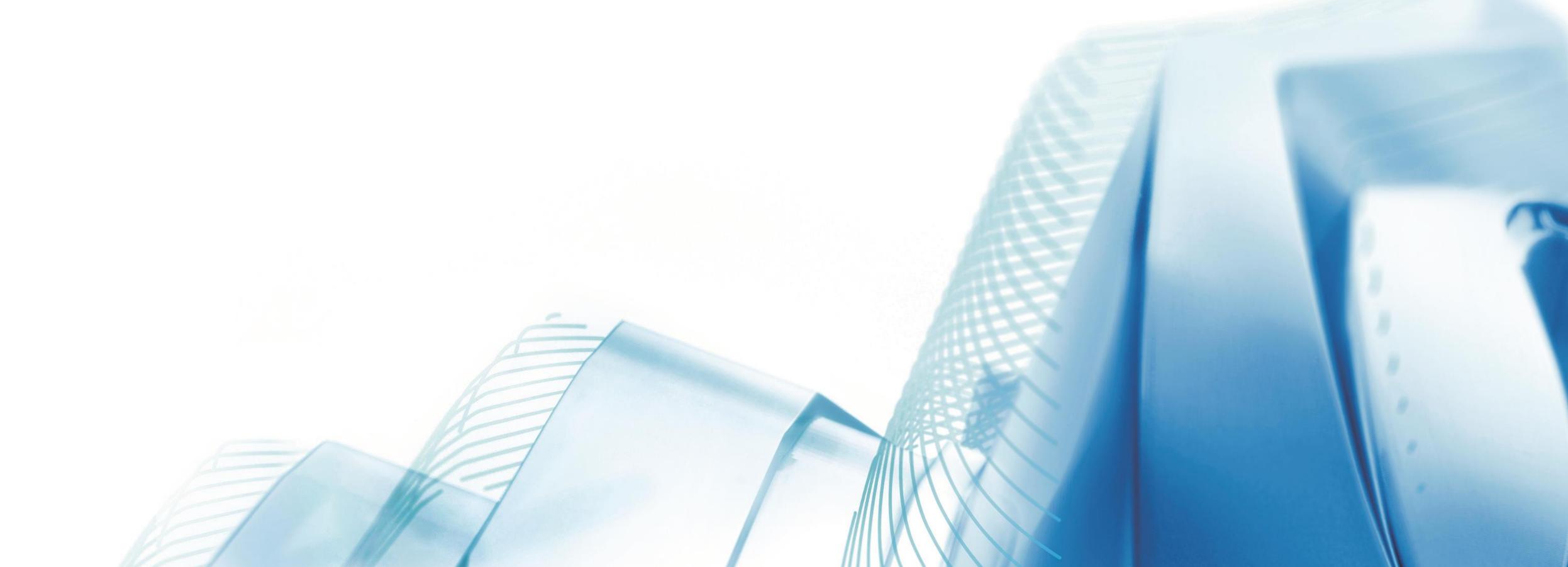
Staying updated



Linking everything within the dashboard

| Section | Element | Visualization | BIM 360 Location | Forge Module | Comments | |
|-------------------|--|--------------------------------------|--|-----------------------------|--|--|
| Indicators | Contract Substantial Completion | DATE | | Tipata Management | Baseline Project End Date | |
| | Projected S.C. | DATE | Construction Schedule | | Project End Date | |
| | Percentage of delay | % | ProjectName/Project Files/Construction ocuments/Reportes de Obra y Avances del Programa | | Porcentage of delay to be obtained by dividing the difference between the Contract SC and the Projected SC by the project duration. | |
| | #of tasks delayed | Pie Chart | | | Number of tasks with on of the following: Task Start Date <current %="/0</td" +="" <="" current="" date="" end="" task="" work=""></current> | |
| | Current Egress Current Ingress Balance Pending Ingress | Bar chart Bar chart Figure Bar chart | Project Client Balance Account ProjectName/Project Files/Construction Documents/Estimaciones y Edos de Cuenta | Data Management | Obtained from XML file | |
| | Pending Egress | Bar chart | Procurement Schedule ProjectName/Project Files/Construction | Data Management | Obtained from XML file. Total Egress - Total Egress Committed | |
| | % Completion | Pie Chart | Documents/Suministros/Programa de Compras | | Obtained from XML file Closed PO/Total PO | |
| | Number of issues | Figure | | BIM 360 API | | |
| | Types of issues | Bar chart | | | Retrieved directly from BIM 360 project. | |
| | Open vs Closed issues | Pie Chart | BIM 360 - Issues | | | |
| | % expired issues | Pie Chart | | | | |
| | %Pass checklists | Pie Chart | | | | |
| Time Reference | Tasks Start Date End Date Duration Percentage completed | Gantt Chart | Construction Schedule ProjectName/Project Files/Construction Documents/Reportes de Obra y Avances del Programa | Data Management | Obtained from XML file | |
| | Purchase Order Purchase Order Date Purchase Order Amount | Gantt Chart | ProjectName/Project Files/Construction Documents/Suministros/Programa de Compras | Data Management | Obtained from XML file | |
| | Design Documents | Gantt Chart | Design Schedule ProjectName/Project Files/Design Documents/04_Design Schedule | Data Management | Obtained from XML file | |
| Project | 3D Model | | Federated Model ProjectName/Plans/02_IFC/01_Model | Viewer | Retrieved from BIM 360 project and processed through the viewer. | |
| Reference | Delayed elements Selected elements in schedule | Viewer | Federated Model + Construction Schedule | Viewer + Data Management | Information pulled from construction schedule xml using data management. Viewer filter used for visualization. | |

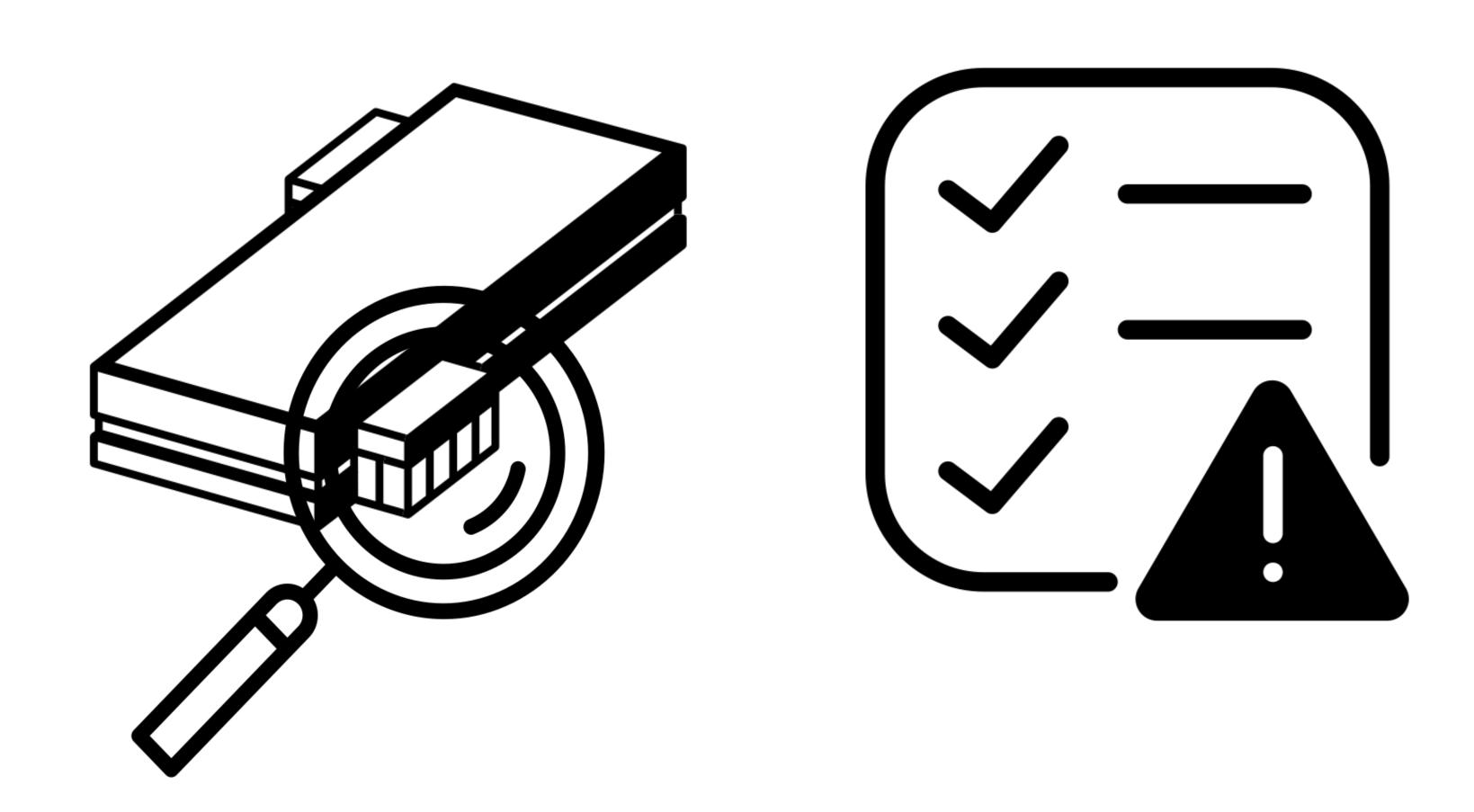
Learn how to use the information in BIM 360 Docs for risk analysis.



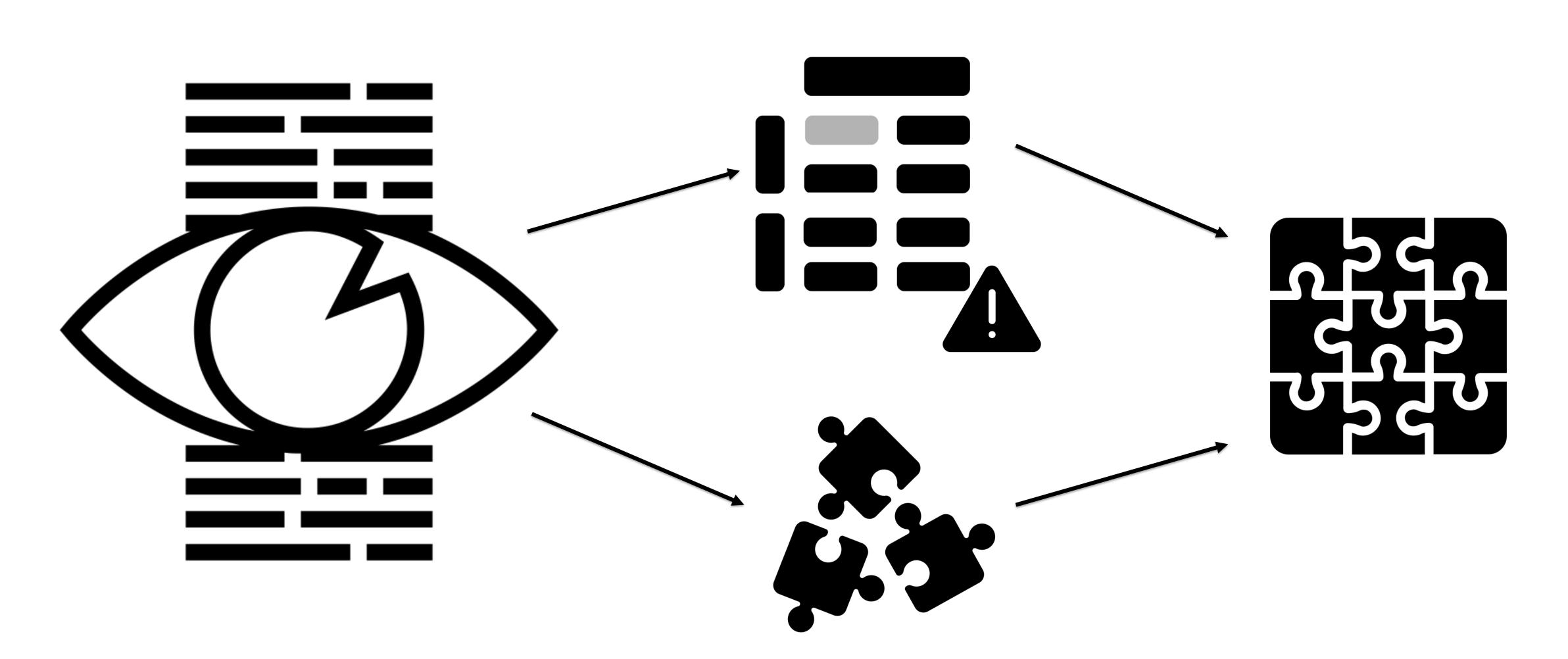
Risk management Process

- 1.Identify the risk
- 2. Analyze the risk
- 3. Evaluate or rank the risk
- 4. Treat the risk
- 5. Monitor the risk

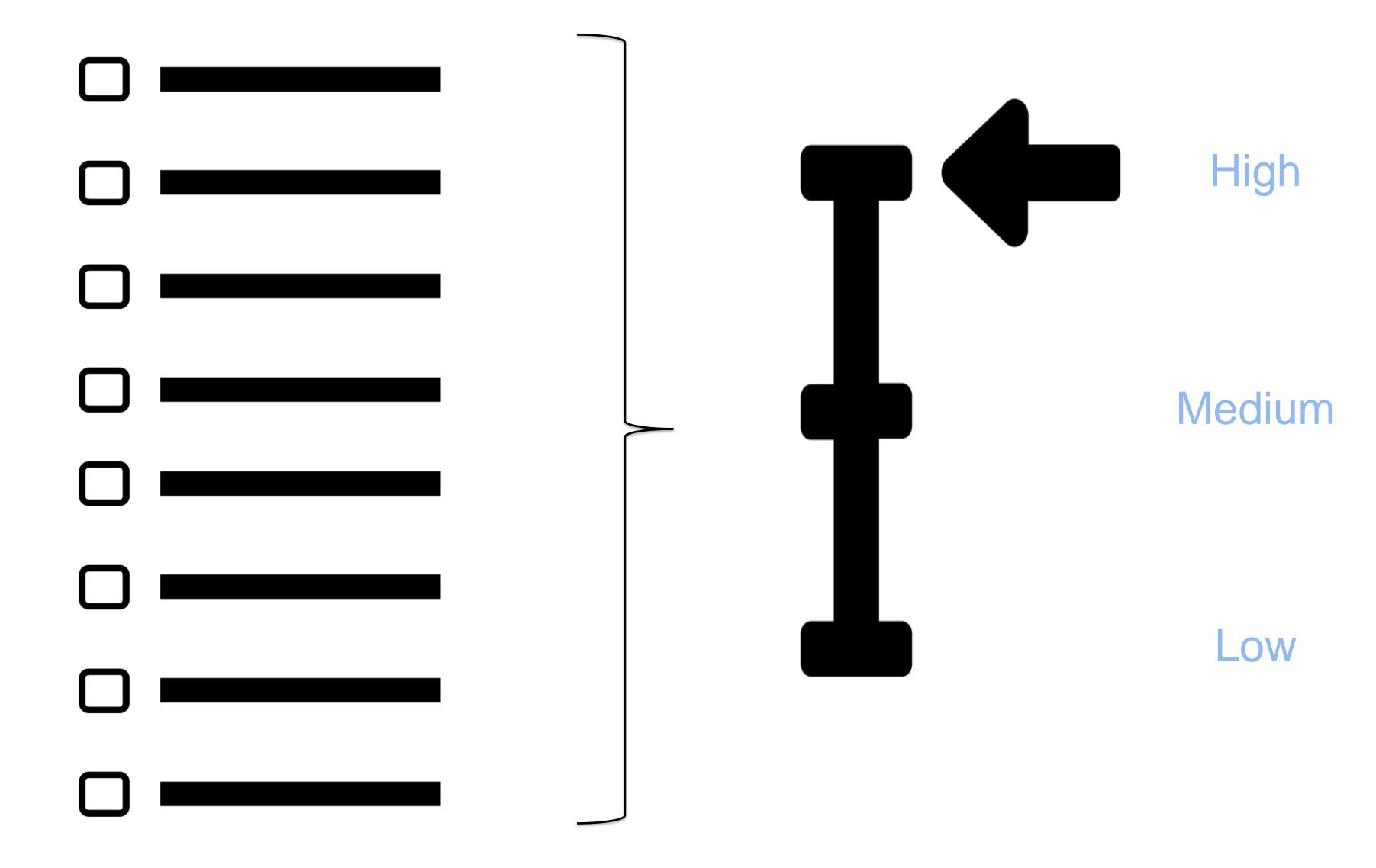
Identify the risk



Analyze the risk



Evaluate or rank the risk

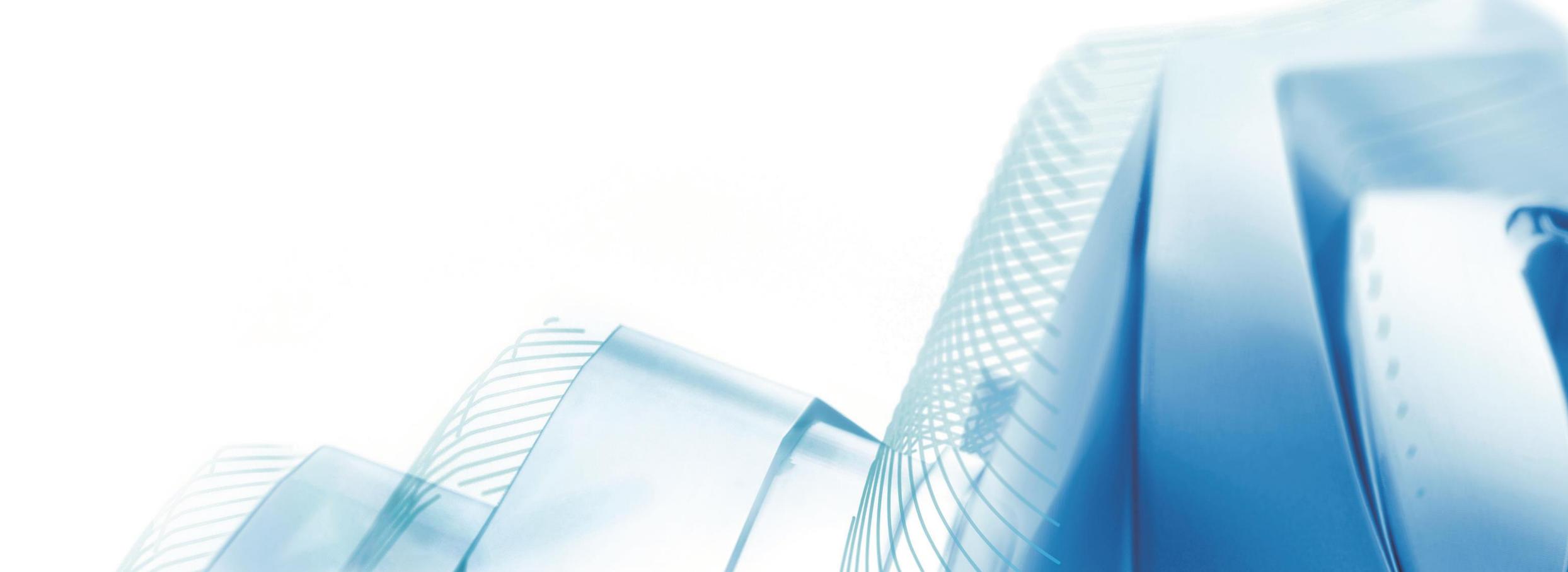




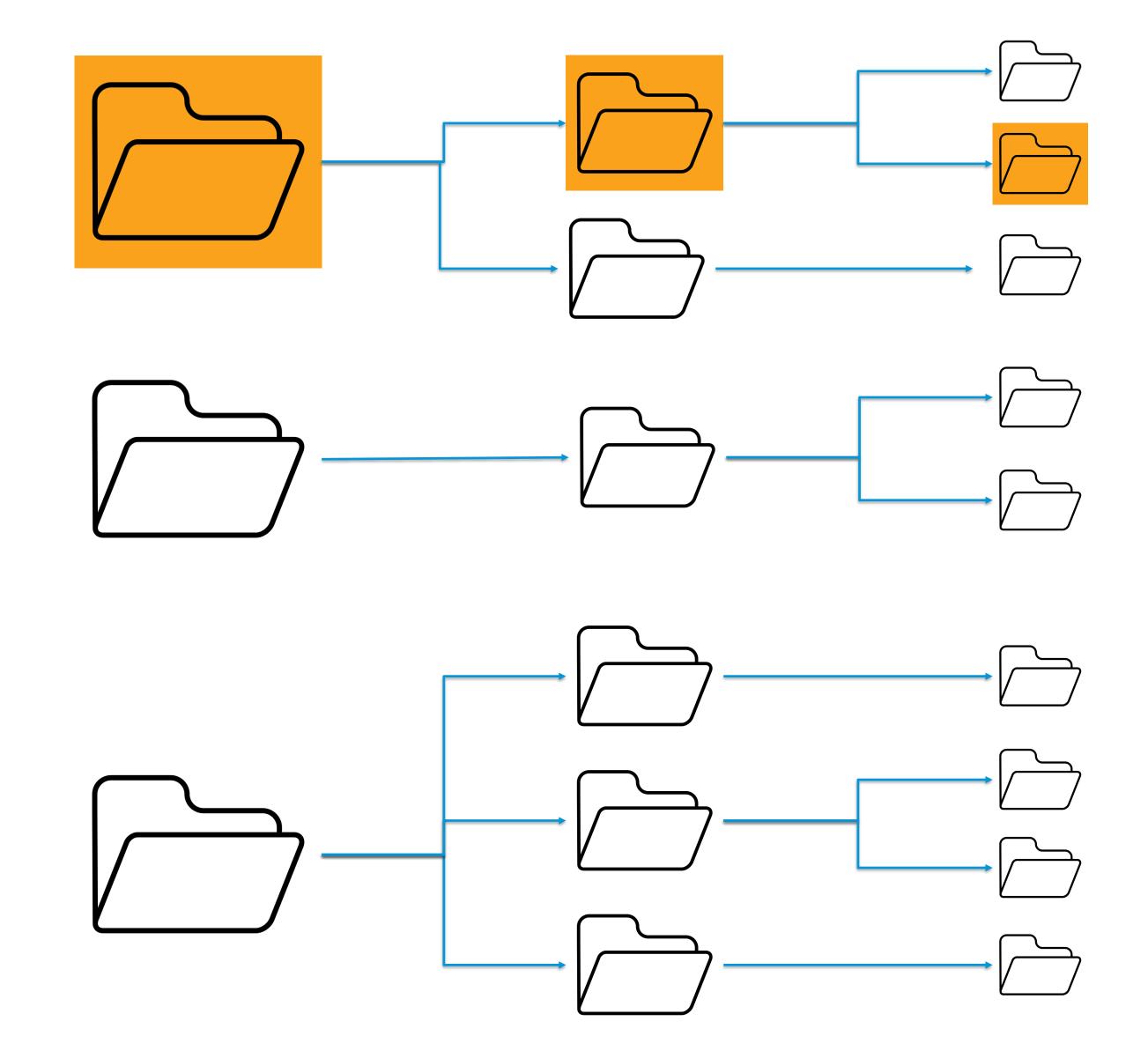
Monitor the risk

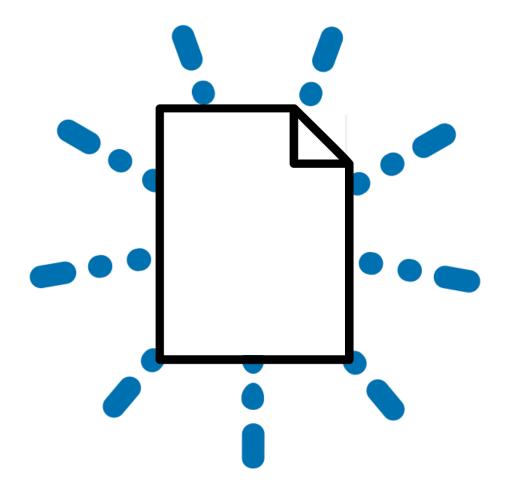


Learn how to track BIM 360 project performance on a daily basis.



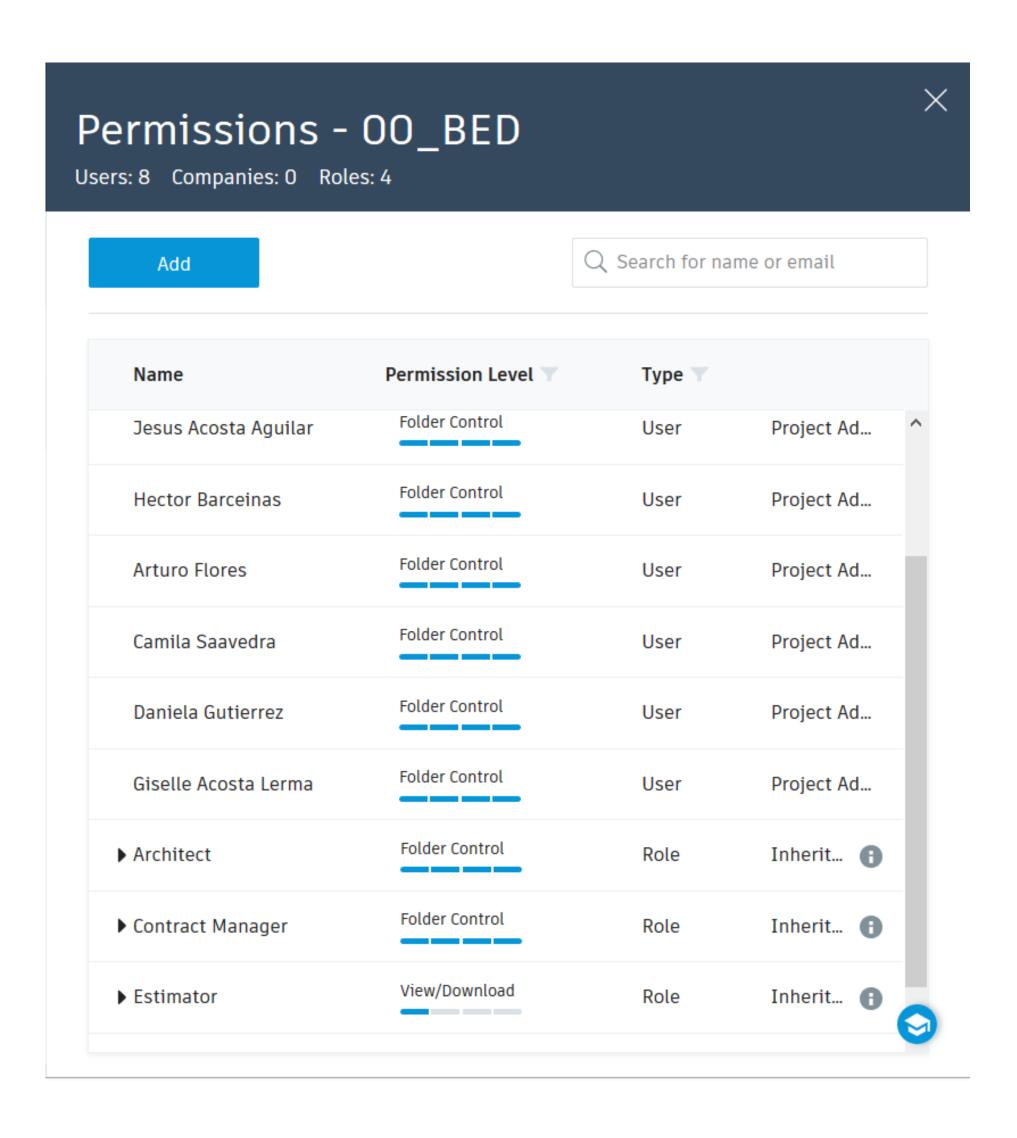
Intuitive Structure





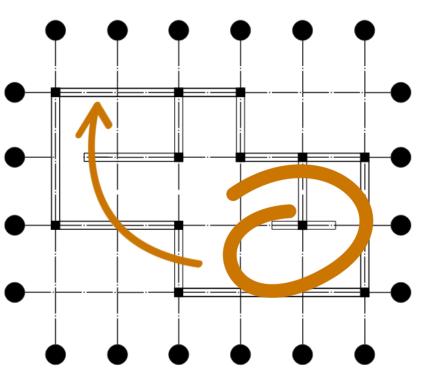


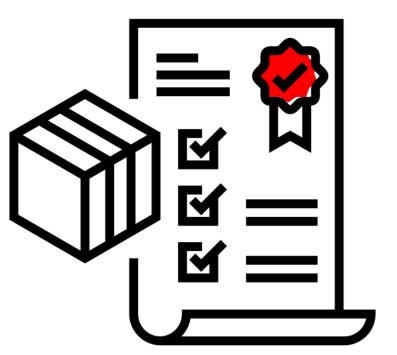
Permissions to personalize



Get mobility going



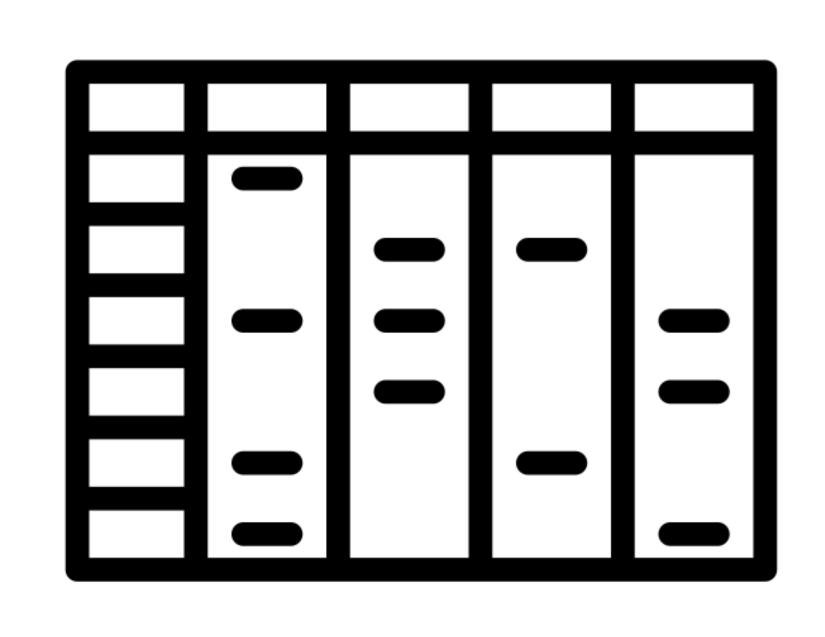




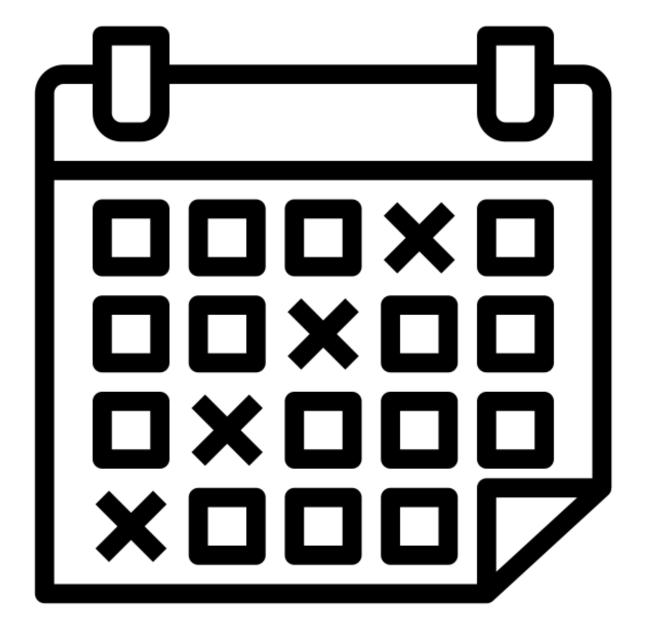




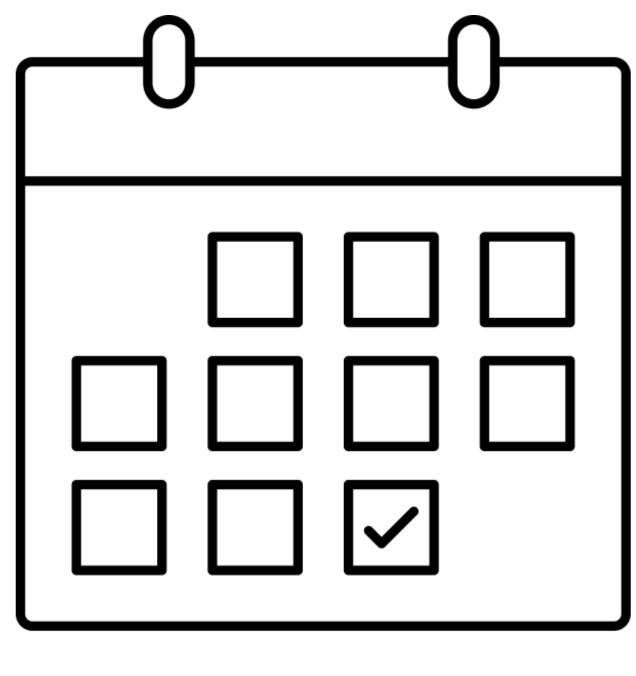
Routines



Daily

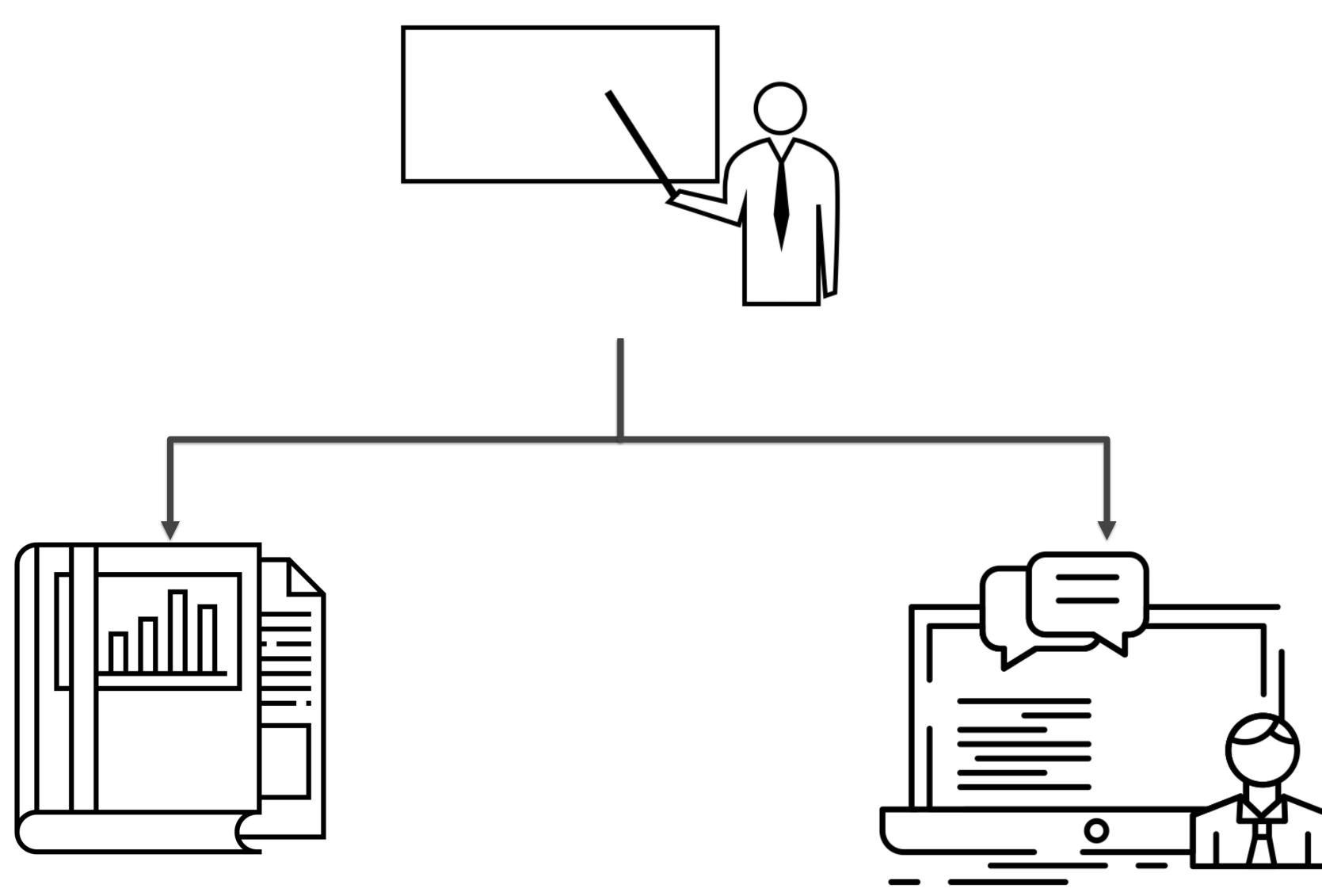


Weekly

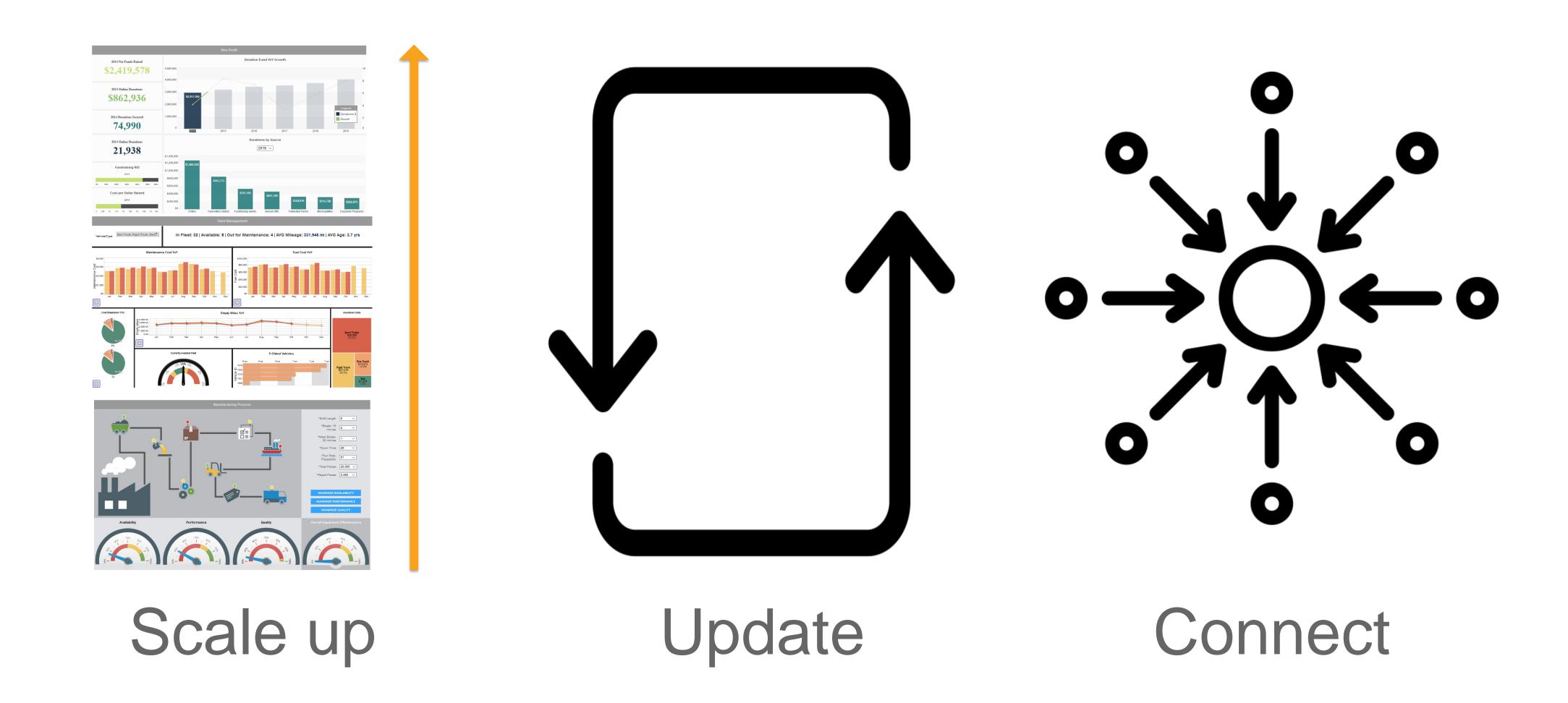


Monthly

Trainings



Conclusions, apply what we've learn into other projects





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