AUTODESK UNIVERSITY

Solving the clash between Model Coordination and Navisworks

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Agenda

Solving the clash between Model Coordination and Navisworks

- Model Coordination and/or Navisworks
- Clash avoidance
- Clash standards and processes
- Reporting and dashboarding

Model Coordination and/or Navisworks

Functionality overlap

Model Coordination and Navisworks

Model Federation

Model Viewer

***Issues**

Clash Detection

Reporting

Combinations of how we use the tools today

Model Coordination, Navisworks or Model Coordination + Navisworks?

Model Coordination Standalone

Navisworks Standalone
without BIM 360/ACC
(aka old school Navisworks)

Model Coordination + Navisworks

How we decide what tool combinations to use?

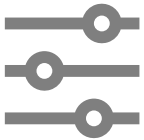
Features overlap, what key drivers are there in the decision on which tool combinations to use?

Size and complexity

(What are the sizes of models, file formats and quantity of models? Are there lots of project stakeholders?)

Reporting & dashboarding requirements

(Does the team or client want reporting and dashboarding? How detailed does this need to be?)



Need for Customizability

(Does the team need to customise things permanently and use pre-set templates with; Clash Rules, Clash tests, Search Sets and Tolerances?)

Team Setup

(**Roles & responsibilities** - Who will do the clash detection?

(**Skills** - Does the skills level of the team require a low-tech or higher-tech solution?)

(**Licensing** - Does the team have the required licensing needed?)

Projects – Complexity grading

These are the types of projects we have been using these tools on recently!

Type of project	Location	Complexity Score (Models/Project)	Project Clash Requirements
School	South Africa	Low	Low
Museum	Middle East	High	High
Shopping Center	Middle East	High	High
Shopping Center	Middle East	Med	High
Pumpstations	Middle East	Low	Low
Treatment Plant	Canada	High	High
Mixed Use	Middle East	High	High
Data Center	South Africa	High	High No cloud tools allowed…

Project – Basic vs complicated

Tool combinations, model federation techniques and clash tools

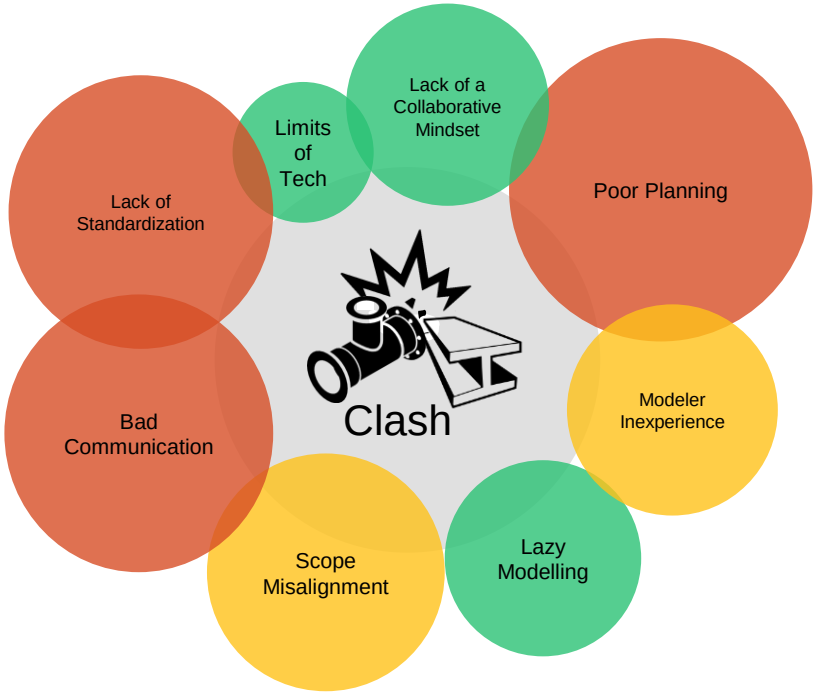
Tool Combinations

Type of project	Model Coordination	Navisworks (Standalone)	Model Coordination + Navisworks
Basic	✓		
Complicated			✓
Very Complicated with conditions (Integrated approach is not practical)		✓	

Clash Avoidance

What causes a clash?

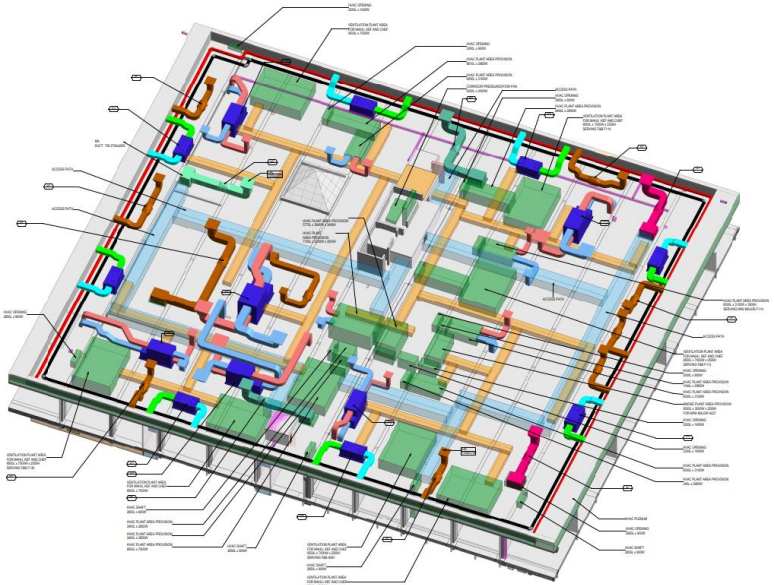
Top reasons why clashes occur!



Modeler techniques for clash avoidance

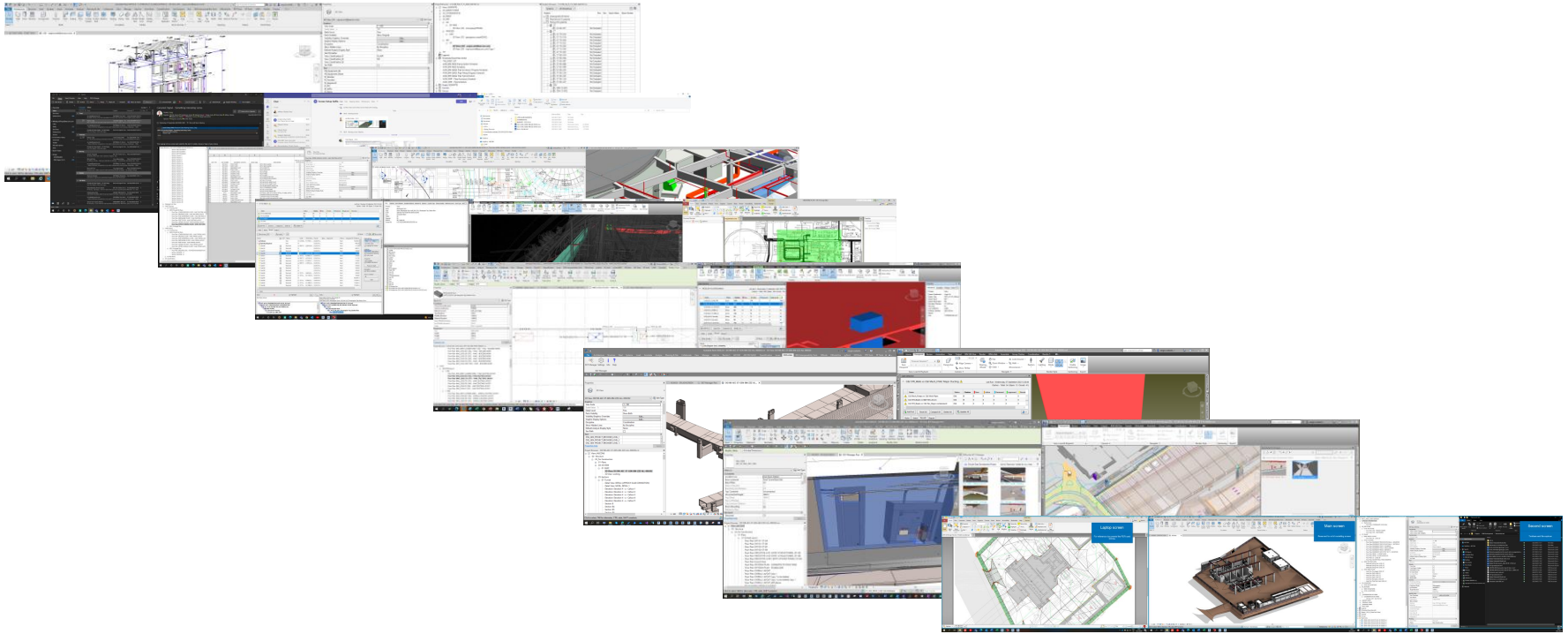
What we consider to be our top techniques to drive clash avoidance habits

- Service zone modelled in the 3D ‘massing’ and then defined and documented in 2D
- Dynamic use of section box tool in Revit or add-ins like COINS (No 1st person option in Revit ☹)
- MEP live linking
- Model segregation
- Screen setup – to drive improved spatial awareness



Screen setup

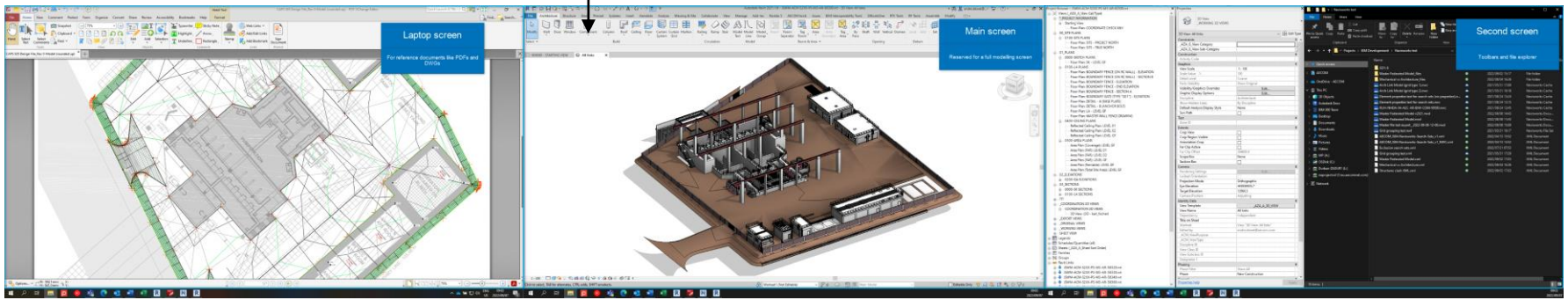
We recently did a ‘screen selfie’ exercise with team members. We asked ourselves can screen setup influence a modelers effectiveness to avoid clashes!



Each screen has a theme

Each screen has a theme was common throughout!

Revit Tabs vs
tiled views



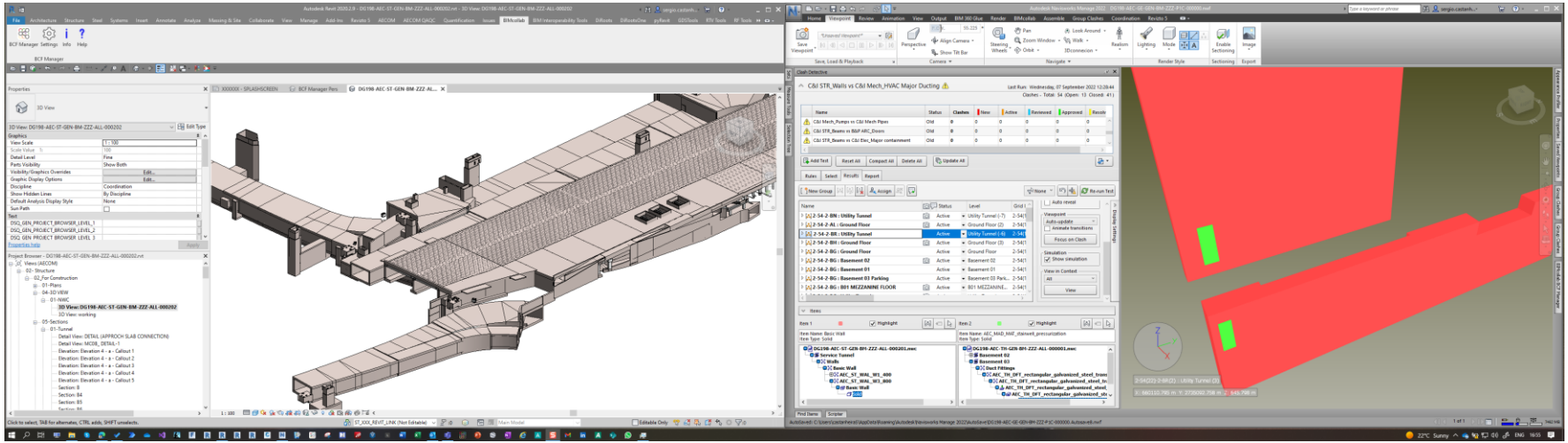
Reference

Modelling

Tools and files

Modelling and coordination models

This is what I was hoping to see!



Tools and modelling

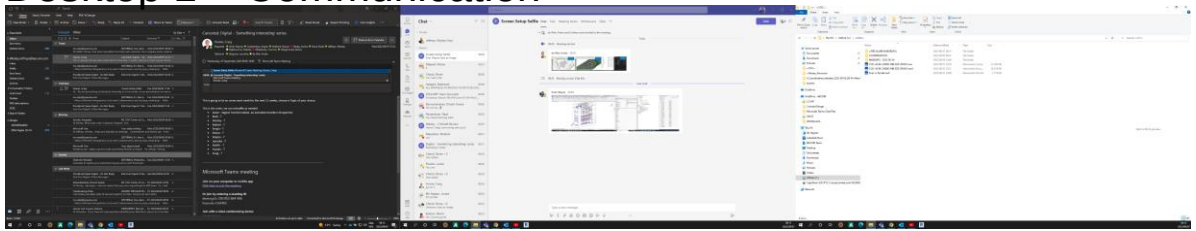
Tools and viewer / coordination tool

Multiple desktop configurations

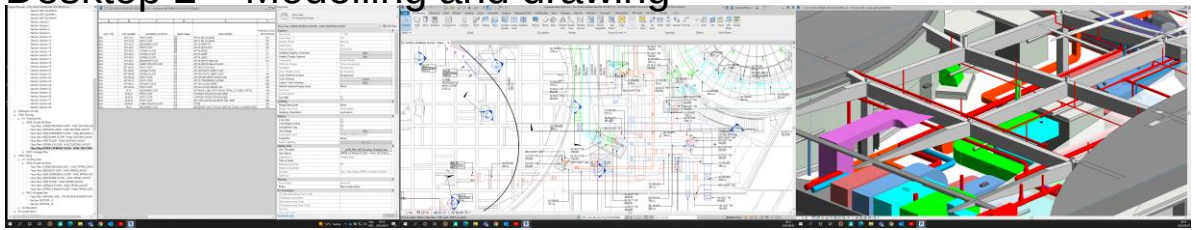
One of our more advanced modelers had not 1 but 3 setups!

*“Using **Windows Task** View to customise desktops daily.”*

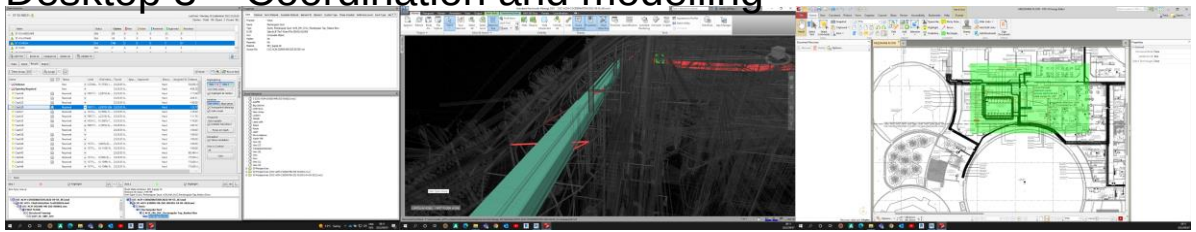
Desktop 1 – Communication



Desktop 2 – Modelling and drawing



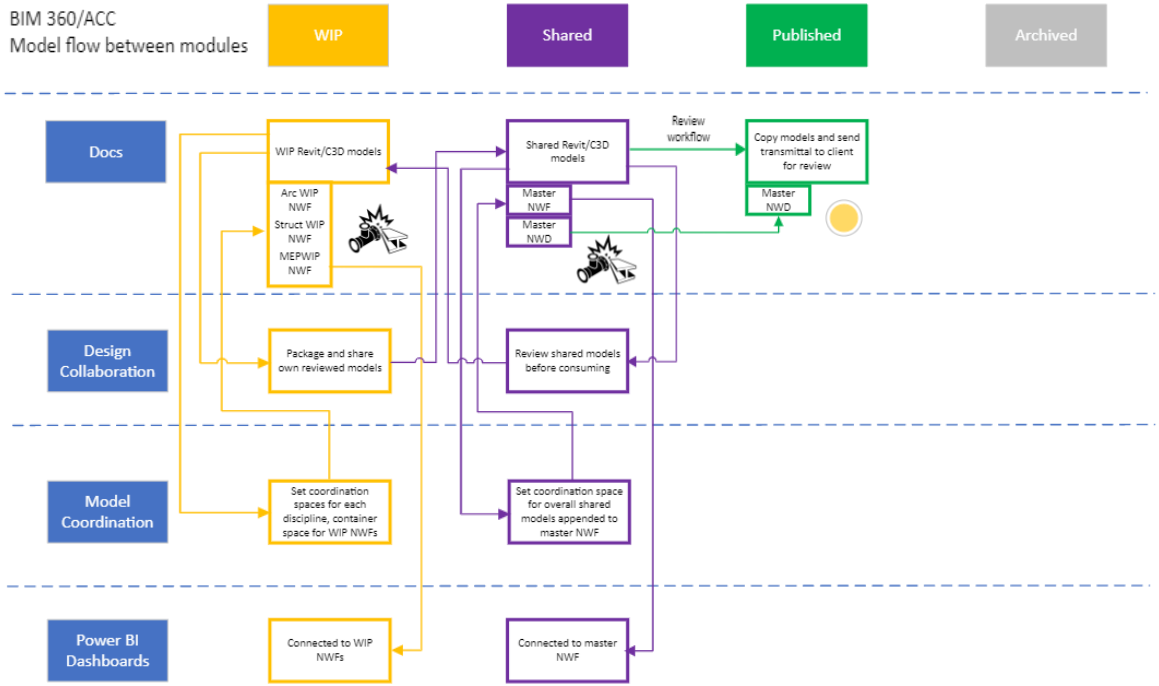
Desktop 3 – Coordination and modelling



Clash Standards & Processes

Setup of BIM 360/ACC & Information flow

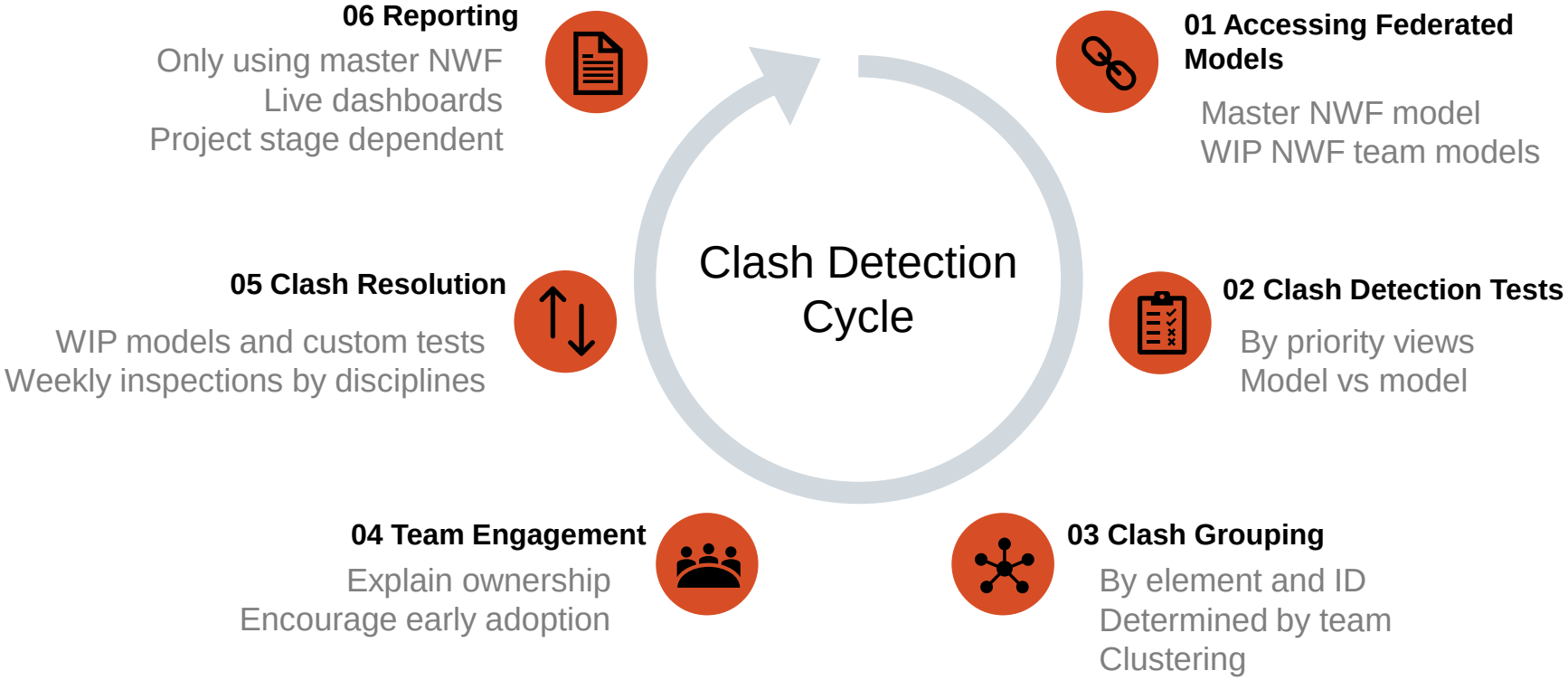
Information Standards (ISO 19650) and information flow!



*This diagram is not intended to be read in series, best reviewed with animations switched on.

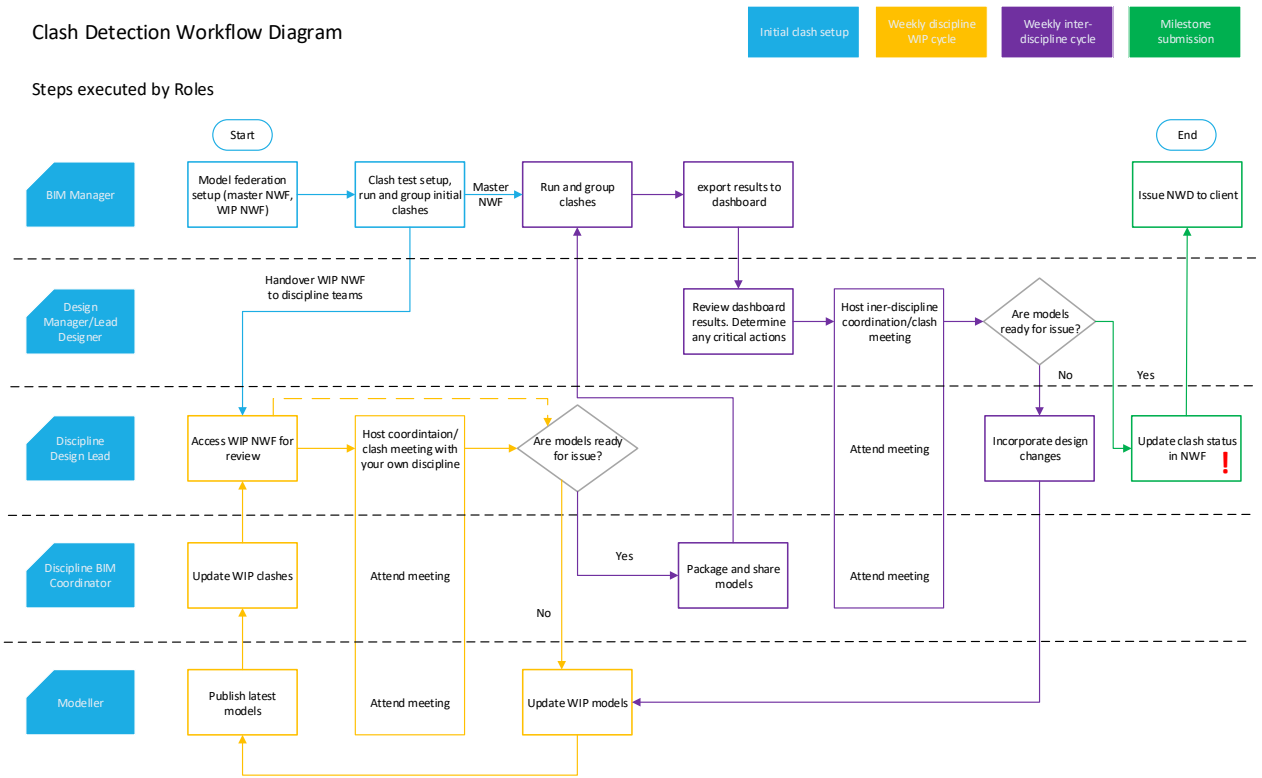
Setup of clash detection standard

Identification of key focus areas, then embedding new features and thinking!



Our current clash detection process

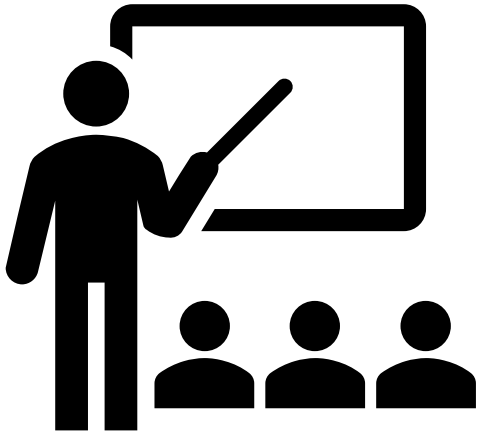
This is our current clash detection process for more ‘complicated’ projects!



Lessons learnt

Lessons learnt so far with Model Coordination and Navisworks!

- Publish times can take a while, so allow for this in your process
- *Do not publish sheets if not completely essential (It takes longer)
- Turn off clashes in Model Coordination if you are using Navisworks for clash detection (It takes longer)



Reporting & Dashboarding

to make the clash process much more productive

Data export options

No Code
No Code-Low Code
High Code

- In-Product Reporting
  - Issue Reports
  - Data Connector
  - Insight

AUTODESK Construction Cloud

- Autodesk Forge
  - Individual services API
  - Data Connector API

AUTODESK Forge

- Export from Navisworks

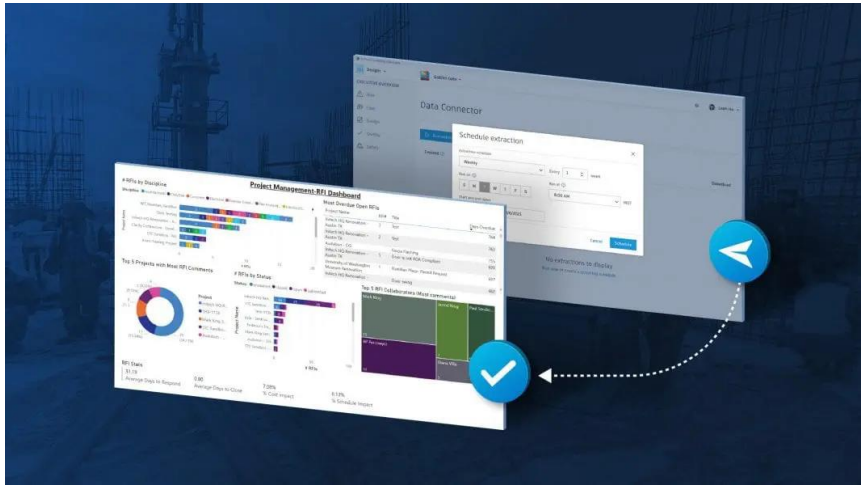
AUTODESK Navisworks

Before we get to data connector…

AUTODESK® BIM 360™	AUTODESK Construction Cloud
No option to import issues	Bulk Import issues using excel sheets
Reference options are limited	Add additional references to the issues can be added
Not possible to Publish/Unpublish Issues	Publish/Unpublish Issues
Not possible to delete issues	Issues can be deleted
No customization is possible	Customize company logo in reports

In-product reporting
Data Connector

Data connector allows project administrators and members to extract data from projects by running or scheduling data extractions. Requires Executive Overview access.



CSV Download (on demand/schedule)

Connect to Microsoft® Power BI (Live sync)

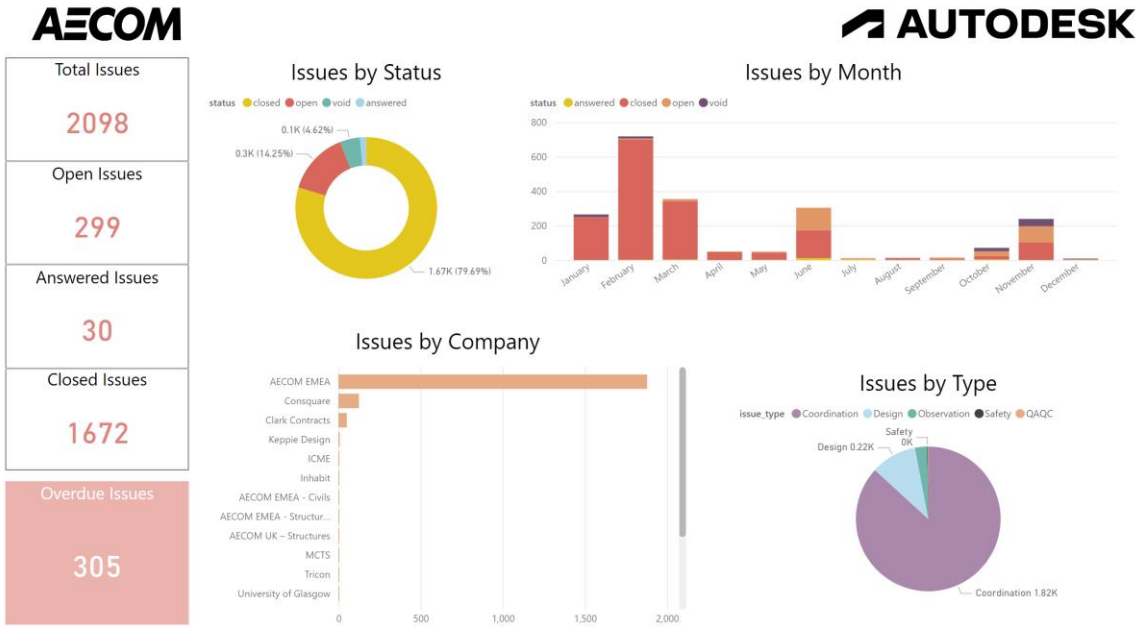
Account-level Insights

Project-level Insights

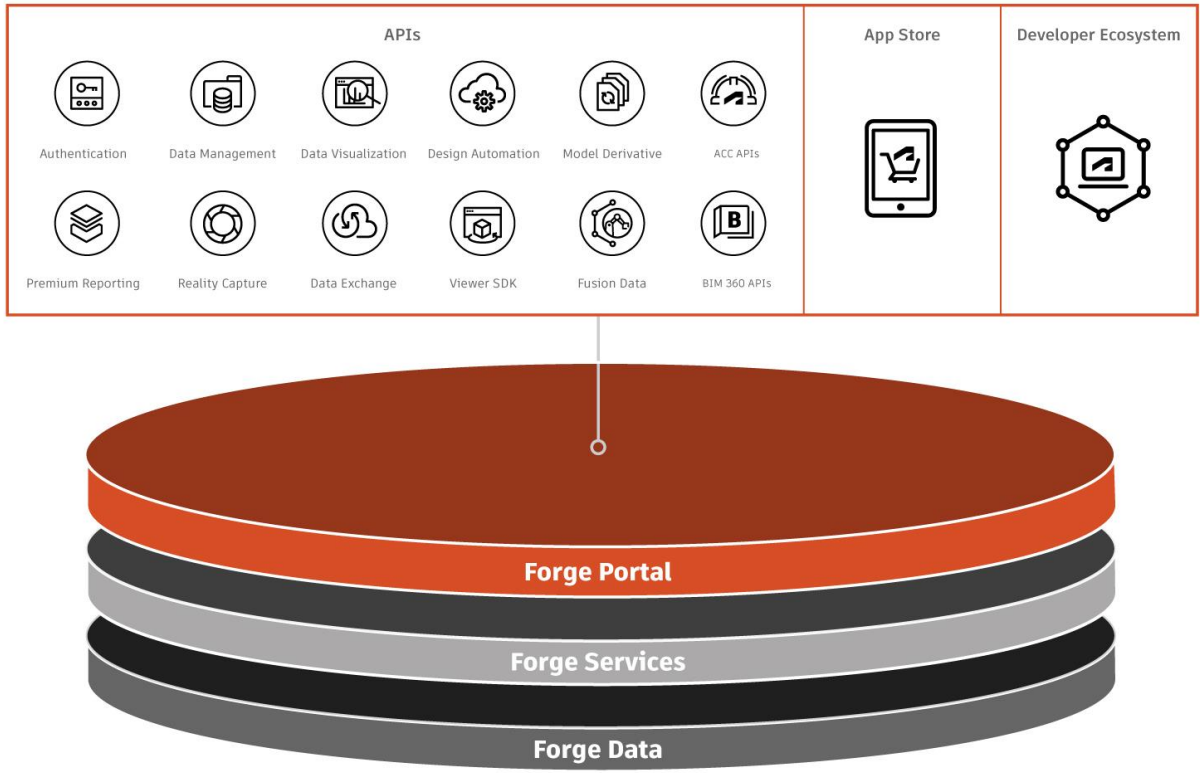
AUTODESK Forge **Data Connector API available**

In-product reporting
Data Connector

- Overview of issues across all projects in the account
- Visualization for Issues by company, type and status
- Timeline of creation date with status
- Filters to select project, type, company, etc.
- Live PowerBi Integration



Autodesk Forge

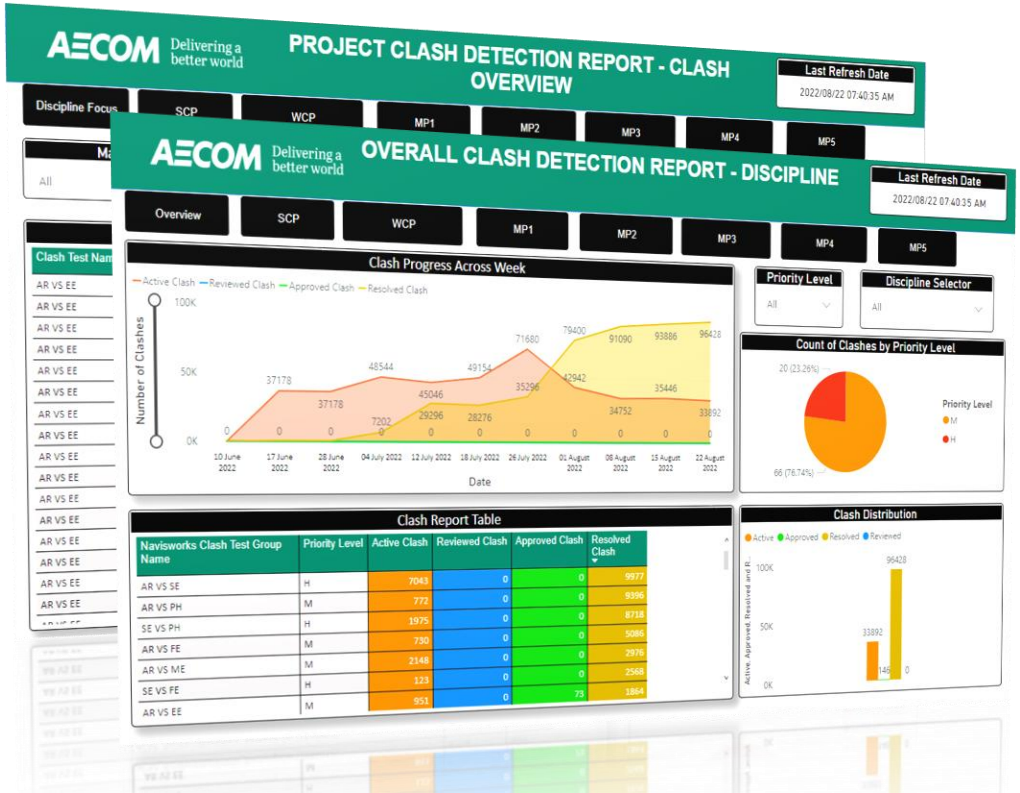


- Account Admin
- Model Coordination
- Issues
- ..and a lot more!

Autodesk Forge
Model Coordination APIs

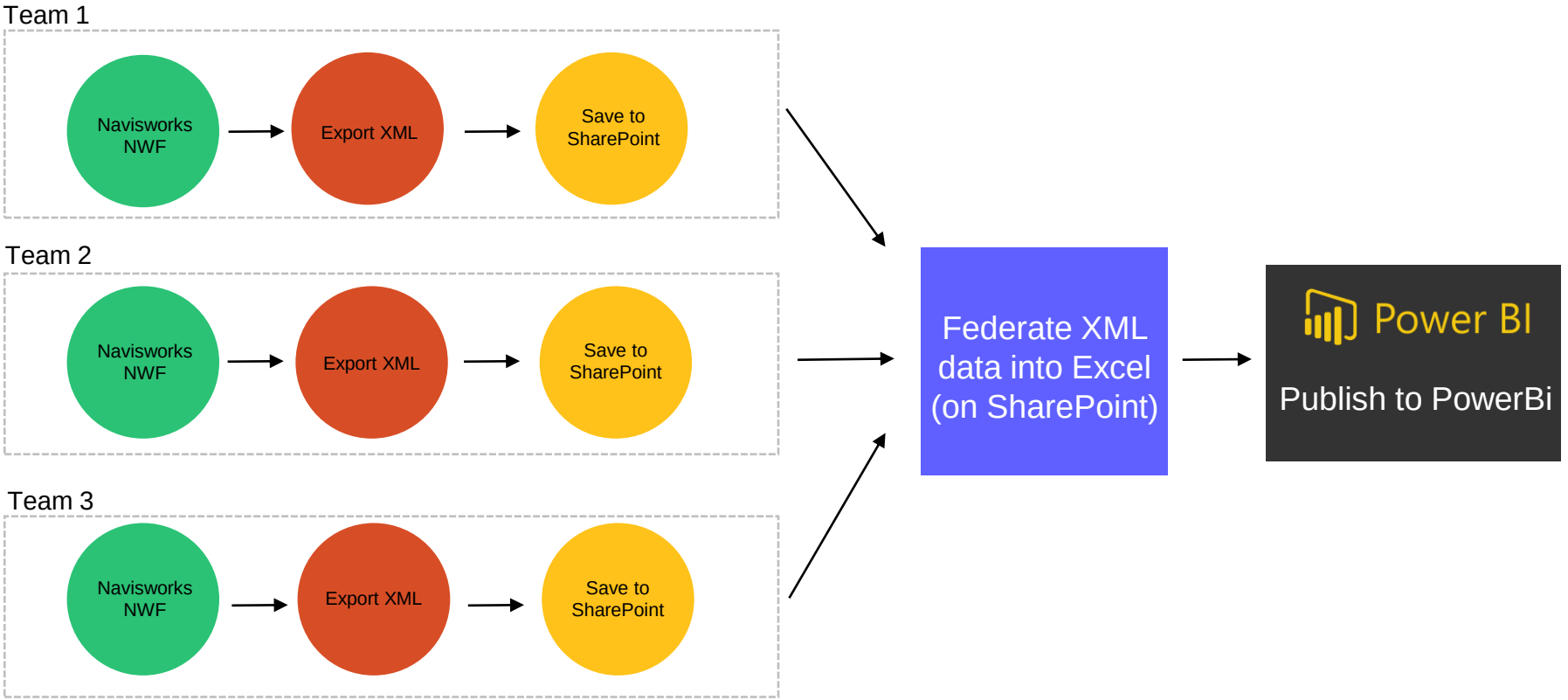
- Proof of concept dashboard to provide an overview of clashes in the selected project
- Visualization for Clash progress, distribution, categories and resolved clashes vs. total
- Timeline of clashes with status
- Filters to select project, type, company, roles, etc.
- Realtime Integration & scheduled update

Export-Import
Export from Navisworks



- Trend of clashes to provide insights on coordination
- Detailed clash information by package and discipline
- Clashes distributed by status and priority level
- Created using NWF export and refreshing data is a manual process

Export-Import
Export from Navisworks

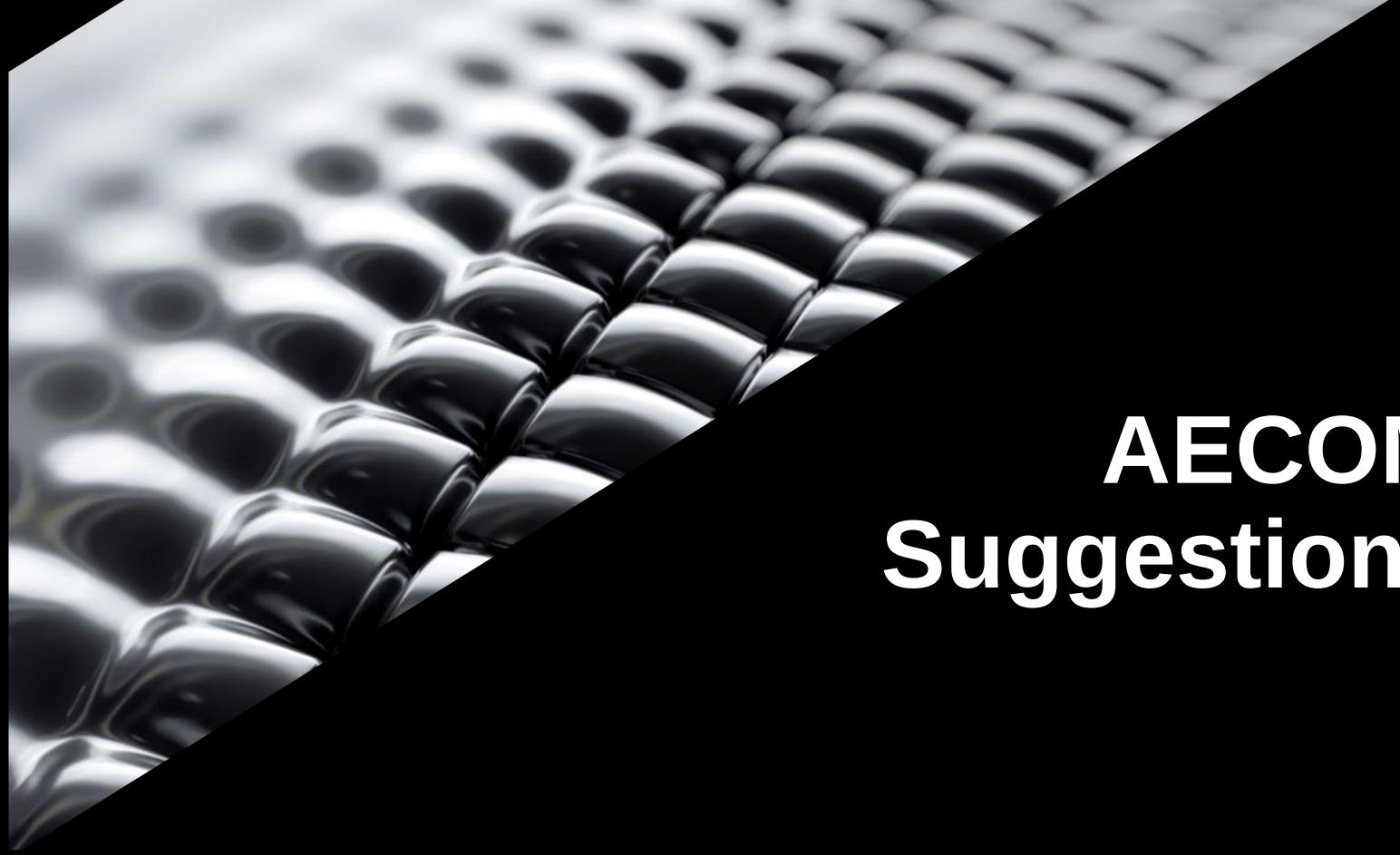


Dashboarding lessons

Lessons learned with dashboards!

- Beware of the danger of chasing numbers and losing focus on design coordination
- Have a plan around what you want to dashboard

- Project insights with minimal human effort
- Transparency – Cannot hide
- Can drive positive team engagement



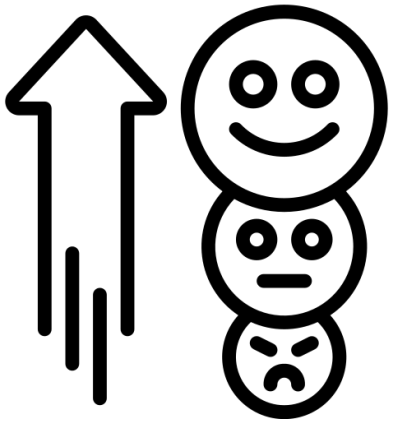
AECOM Suggestions

Improvements with tools

Things we would still like to see improved with tools; product team please listen up ☺

We need:

- A truly multi-user environment for clash and clash status updates
- A UI revamp, Navisworks is not sexy anymore compared to other solutions on the market (Should there be a new desktop-based tool?)
- Revit could handle Publish View setting better
- Better OOTB dashboards



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