

AUTODESK UNIVERSITY

# The Benefits of Automated Model Checking in the Cloud

**Brendan Dillon**

Digital Facilities & Infrastructure Manager | @socialmedia

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# Session Details

## Description & Learning Objectives

In this timely panel discussion, hear how building owners, large and medium design firms, and the industry as a whole is using and benefitting from automated model checking. Learn, specifically, how they are reviewing their Revit models in BIM 360 software, generating reports on fidelity issues, and utilizing that data in dashboards. This panel will include a building owner (Denver International Airport) that manages all its design and construction projects in BIM 360; a large design firm (Jacobs) that works with DEN and other owners; a small design firm and how it works on BIM 360 projects; and the product development team responsible for Model Checker for Revit and Model Checker for Forge (CADD Microsystems). Facilitated by an architect on the Autodesk team, you will see and hear about all the great benefits these different project stakeholders have gained by implementing automated model checking on their projects.

- Learn about how automated model checking is being used in the industry
- Discover how building owners with modeling requirements are benefitting from working with their consultants
- Discover how large consulting firms are benefitting from working with building owners and their modeling requirements

# Host



**Eddy Krygiel**

Senior Principal  
Major Projects  
Autodesk

# Your Speakers

90

**Chuck Mies**

Senior Principal  
Major Projects  
Autodesk



**Jason Kunkel**

Senior Practice  
Manager  
CADD Microsystems



**Brendan Dillon**

DFI Manager  
Denver  
International  
Airport

90

**Chris Pittman**

Project Architect  
Jacobs



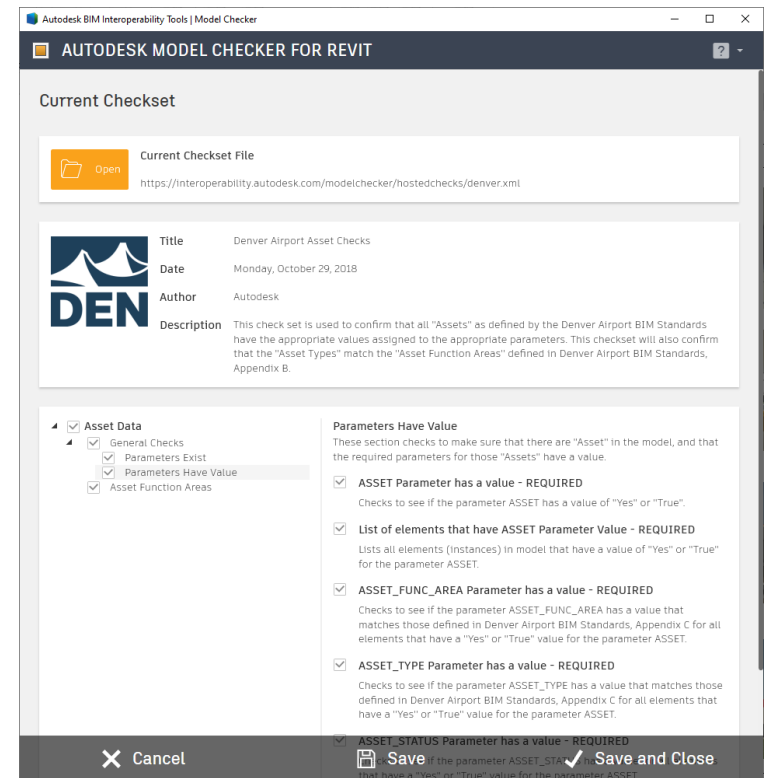


# **Get to Know Model Checker on Forge**

# Model Checker for Revit

## Overview

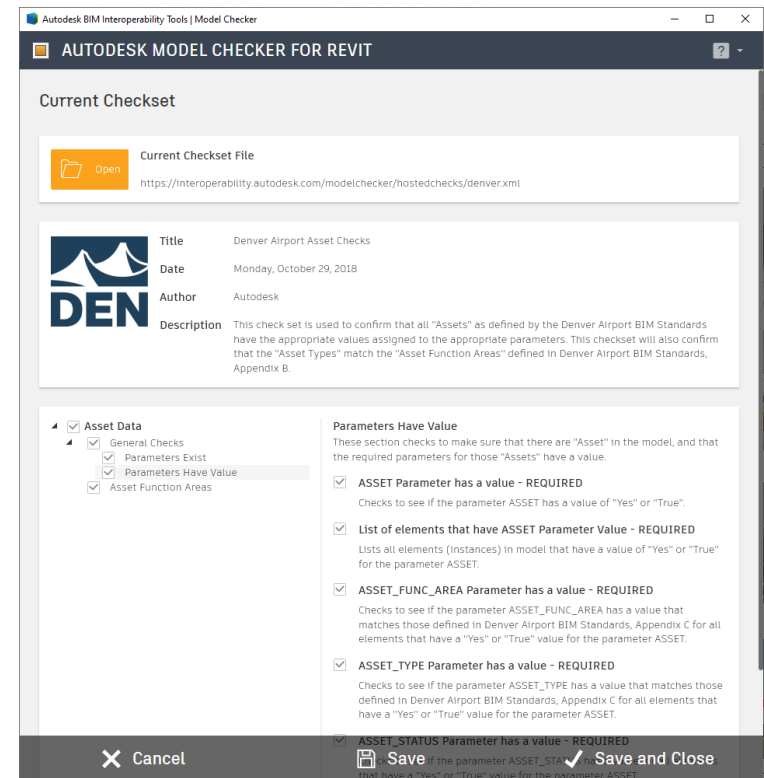
- Desktop version been around for years
- Review Revit model elements and validate data
- Export reports
- Custom checksets
- Use pre-built checksets



# Model Checker for Revit

## Limitations

- Runs inside Revit
- Challenging to automate
- Scaling can be an issue
- Maintaining consistency across checksets






# Model Checker on Forge

## Tasks Panel


- Shows all your active and completed tasks




























### Tasks

Manage your tasks (configure, pause/start, copy, delete)

New Task





Status	Name	Revit Version	Models	Checkset	Schedule	Last Run	Next Run	Actions
Paused	Every Other Day	2019	cloud-model	Model Health Dashboard Sample		Apr 29, 2021, 12:30:00 AM	n/a	   ...
Scheduled	Schedule - MEP Date Issue	2021	-Multiple Selected- ...	Revit 2021 Best Practices		Sep 23, 2021, 2:30:00 AM	Sep 24, 2021, 2:30:00 AM	   ...
Paused	Other Project Export	2019	cloud-model	Model Health Dashboard Sample		Apr 29, 2021, 11:37:00 PM	n/a	   ...
Completed	New Build Copy	2021	BLDG6361_CoreShell_2021	Model Health Dashboard Sample		Mar 8, 2021, 8:50:00 PM	n/a	   ...
Completed	2022 Test	2022	Test Small Model	Model Health Dashboard Sample		Aug 3, 2021, 11:22:00 AM	n/a	   ...
Completed	Excel File Element	2019	cloud-model	Revit 2019 Best Practices		May 19, 2021, 2:09:00 PM	n/a	   ...

# Model Checker on Forge

## New Task

- Name it
- Select Revit Version
- Flag multiple Revit models from a single ACC or BIM 360 project
- Choose Public Library checklist or upload your own
- Tell it when to run
- Deal with reports
- Set it to email results (or not)

The screenshot shows the 'New Task' configuration page for the Autodesk Model Checker. The page is divided into several sections, each with a green checkmark icon indicating a step in the process.


- Task Name:** A text input field containing 'AI 2020'.
- Revit Version:** A dropdown menu set to '2020'.
- Models:** A section with a 'New Models' button and a table of models. The table has columns for 'Name', 'Last Update', and 'Update By'. It lists 'Cloud Model 01' and 'Cloud Workshare 01'.
- Checkset:** A section with a 'Public Library' tab and a list of checksets. A 'Current Selection' panel on the right shows the selected checkset 'Model Health Dashboard of Sample'.
- Trigger:** A section with a 'Recurrence' dropdown and a 'Choose a Start Time' field. It includes a 'Choose a Frequency' dropdown and a 'Days' field.
- Export Reports:** A section with a 'File' dropdown and a 'Location' dropdown.
- Email Settings:** A section with checkboxes for 'Email me when a run completes' and 'Include my report results (Cloud VCL and/or VPM) as attachments'.

At the bottom of the page, there are 'Save and Cancel' buttons and a footer with links to 'Autodesk.com', 'Contact Us', 'Help', 'Privacy Policy', 'Terms of Service', and 'Feedback'.

# Model Checker on Forge


## Reports Panel


- Shows result summary from completed tasks




















### Reports

Manage your reports






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Task	Run Date	Summary	Model	Duration	Actions
Schedule - MEP Date Issue Copy	Mar 24, 2021, 2:30:29 AM	97 Checks, 8 (42%) Pass, 11 Fail, 77 Count/List, 1 Error	BLDG6361_Electrical_2021	1m 50s	  ...
Bad Folder	Apr 28, 2021, 3:36:19 AM	25 Checks, 19 Count/List, 6 Not Run	cloud-model	1m 3s	  ...
Schedule - MEP Date Issue Copy	Mar 27, 2021, 2:30:22 AM	97 Checks, 8 (42%) Pass, 11 Fail, 78 Count/List	BLDG6361_Mechanical_2021	1m 18s	  ...
Languages 01	May 4, 2021, 4:24:03 PM	25 Checks, 19 Count/List, 6 Not Run	Nametest-éâöçÇ	1m 42s	  ...
Excel Not Changing	May 4, 2021, 9:56:48 AM	25 Checks, 19 Count/List, 6 Not Run	RAC_basic_sample_project	0m 22s	  ...
Schedule - MEP Date Issue	Aug 25, 2021, 2:30:20 AM	97 Checks, 7 (37%) Pass, 12 Fail, 78 Count/List	BLDG6361_Plumbing_2021	5m 47s	  ...
Schedule - MEP Date Issue	Aug 13, 2021, 2:30:20 AM	97 Checks, 8 (42%) Pass, 11 Fail, 77 Count/List, 1 Error	BLDG6361_Electrical_2021	1m 29s	  ...
Languages 01	May 4, 2021, 4:24:04 PM	25 Checks, 19 Count/List, 6 Not Run	Nametest-電費红长	0m 45s	  ...

# Model Checker on Forge

## View Panel

- Displays and exports active Report



### View

View and export your reports

[Back to Top](#)

[Export to Excel](#)[Export to HTML](#)

# 72%

**Check Summary** 96 Checks, 13 (72%) Pass, 5 Fail, 77 Count/List, 1 Not Run

**Report Date** May 6, 2021, 11:45:05 AM

**Revit Filepath** 05\_Big Links

**Checkset File** <https://interoperability.autodesk.com/modelchecker/hostedchecks/bestpractices-2019.xml>

▼ **Revit Model Best Practices**

**Model Performance**

8 Checks, 8 Count/List

► Checks in this section help monitor the result of actions taken over the course of a model's development, which can directly impact the model's performance. Proper management of these items can improve model performance.

**Project Settings**

10 Checks, 0 (0%) Pass, 2 Fail, 8 Count/List

► Checks in this section are related to settings that can be configured at a project level, which may need to be verified for compliance with standards defined for the project.

**External Files**

8 Checks, 1 (50%) Pass, 1 Fail, 6 Count/List

► A series of checks related to linked and imported files in the model.

**Datum and Location Elements**

17 Checks, 7 (88%) Pass, 1 Fail, 9 Count/List

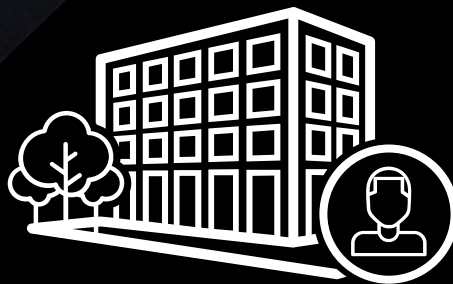
► A series of checks related to datum and location elements in the model.

**Views**

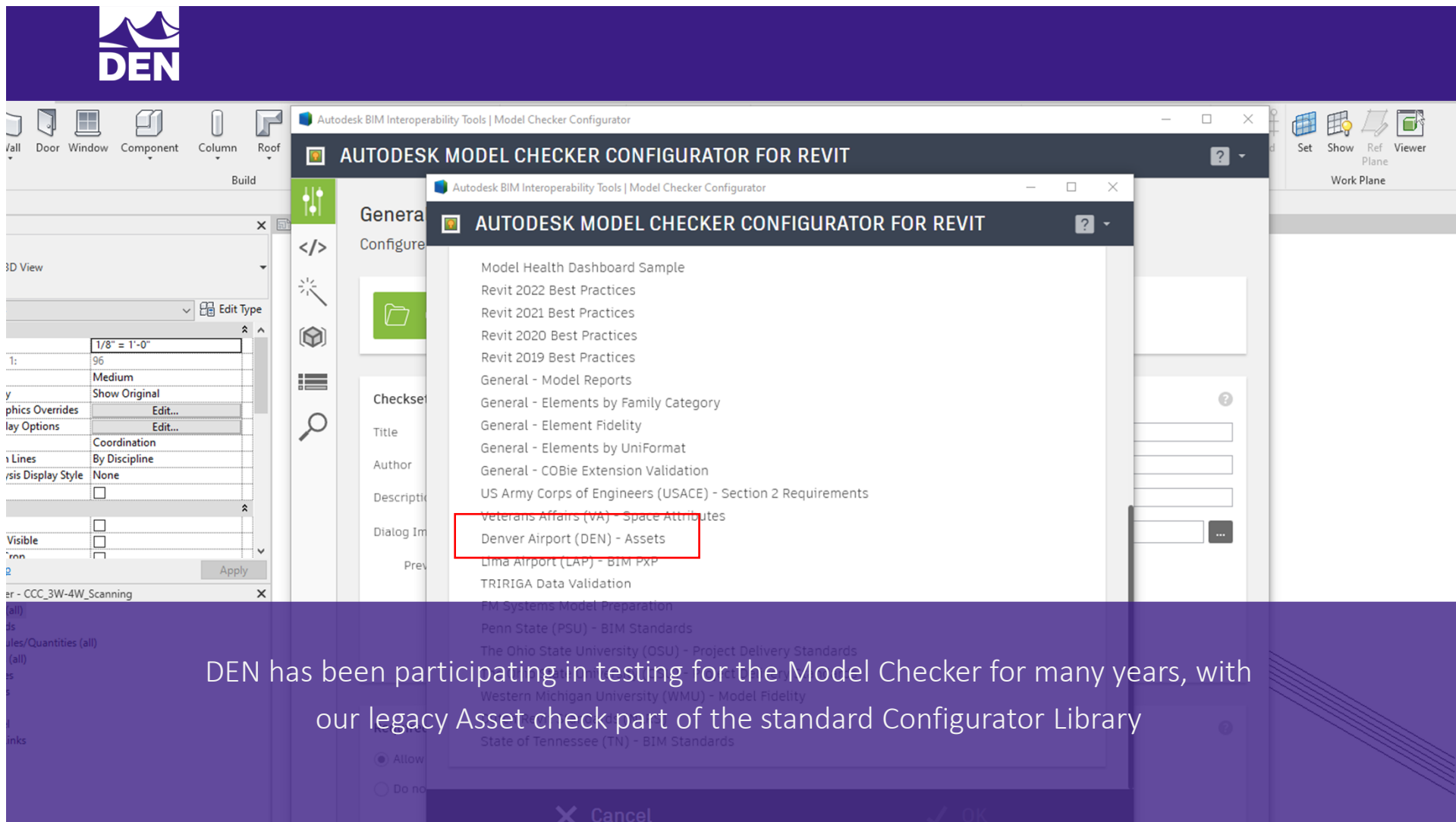
12 Checks, 0 (0%) Pass, 1 Fail, 11 Count/List

► A series of checks related to views in the model.





# **DENVER INTERNATIONAL AIRPORT**



DEN has been participating in testing for the Model Checker for many years, with our legacy Asset check part of the standard Configurator Library



AUTODESK CONSTRUCTION CLOUD



Account Admin



Denver International Airport



Brendan Dillon

PROJECTS

MEMBERS

COMPANIES

ROLES

ANALYTICS

SETTINGS

APPS

Go to unified projects

## Project Directory












The Project Directory lists all projects in your account.



Add

Search project by name

339 Current Projects | View Archived

Name	Platform	Members	Companies	Project Status	Last Sign In
 03-SP-TML GHP Completion-201735867	B	450	84	Active	Sep 22, 2021
 03-FAC-CCB East Expansion	B	357	132	Active	Sep 22, 2021
 03-FAC-CCA West Expansion	B	346	124	Active	Sep 22, 2021
 03-FAC-CCC East Expansion-Construction	B	256	125	Active	Sep 22, 2021
 04-FAC-CCB West Expansion-Design	B	217	28	Active	Sep 22, 2021
 03-FAC-CCC East Expansion-Design	B	195	64	Active	Sep 22, 2021
 04-FAC-CCB West Expansion-Construct	B	180	28	Active	Sep 22, 2021
 02-TEN-CC Expansion Renewal	B	153	32	Active	Sep 22, 2021
 02-FAC-AMERICAN AIRLINES RELOCATION	B	113	14	Active	Sep 22, 2021
 01-TEN-UAL DEN Club program	B	112	13	Active	Sep 22, 2021
 03-FAC-Central Utility Plant Rollers 1, 2 & Phase 1	B	106	18	Active	Sep 22, 2021

Filters

STATUS

Active

334

Inactive

5

300+ Active projects on BIM360 ranging from Define phase to Warranty Management, plus our AIM CDE



## AUTODESK MODEL CHECKER CONFIGURATOR FOR REVIT



### Structure



Change the structure of your checkset



#### Checkset Structure

Add Heading... | Add Section...

- 2021 DEN Revit Model Checker X
  - 1. Model Setup X
    - 1.3 Phasing X
    - 1.4 Worksets X
    - 1.5 Correct Project Information X
    - 1.6 Linked CAD/Revit X
    - 1.10 Design Options X
    - 1.11 Project Location X
    - 1.12 Model Levels X
    - 1.x Additional Model Setup Checks X
  - 2. Modeling X
    - 2.4 Model Content from DEN Library X
    - 2.6 No Unapproved in-Place Models X
    - 2.7 No Unapproved Generic Models X
    - 2.9 Minimize Use of Groups X
    - 2.10 Rooms & Spaces X
    - 2.x Additional Model Element Checks X
  - 3. Data & Parameters X
    - 3.1 All Assets Identified X
    - 3.2 Existing Assets Identified X
    - 3.3 Asset Design information Complete X
  - 4. Model Views X
    - 4.1 Number of Views X
    - 4.2 Number of Views not on sheets X
    - 4.3 Roomer Organization X

#### Heading Configuration

Title 2021 DEN Revit Model Checker

Run Default ☒

Description This Model Checker is arranged to align with the DEN 2021 DFI DSM. It is INFORMATIONAL ONLY and is neither comprehensive of all items checked by DEN nor does it guarantee a passing model compliance review from DEN overall or on any given line item.

#### Unused Checks

New DEN Model Checker: 102 checks  
24 Pass/Fail, 78 List checks

# ACTIVE APPLICATIONS



AIM asset data verification for  
Maximo population via Forge



AIM model checking for  
compliance with DEN  
standards



Automated PIM model  
checking for compliance with  
DEN standards and report  
distribution



## AUTODESK MODEL CHECKER

Built on Forge



### Tasks

Manage your tasks (configure, pause/start, copy, delete)

New Task



Search

Status	Name	Revit Version	Models	Checkset	Schedule	Last Run	Next Run	Actions
Post Processing	DEN CCC Expansion - Model Dashboard Multi	2020	-Multiple Selected-	***	Revit Model Dashboard	n/a	Sep 17, 2021, 9:14:00 AM	⚙️ 📄 ⋮
Partially Complete	DEN - AA Club - DEN Check	2020	-Multiple Selected-	***	DEN Revit Model Checker v2021-2	Sep 17, 2021, 8:07:00 AM	n/a	⚙️ 📄 ⋮
Running	DEN CCB - Model Dashboard Report - SINGLE	2020	CCBE_JA-A_201733061_Central-2020	Revit Model Best Practices_r20	⚙️	n/a	Sep 27, 2021, 8:41:00 AM	⚙️ 📄 ⋮
Completed	BWI AB - Model Delivery - Heath Check	2021	-Multiple Selected-	***	General - Model Reports	Sep 9, 2021, 12:29:00 PM	n/a	⚙️ 📄 ⋮
Scheduled	DEN CCB - Model Dashboard Report - SINGLE Copy	2020	CCBE_JA-A_201733061_Central-2020	Revit Model Best Practices_r20	⚙️	n/a	Sep 27, 2021, 8:42:00 AM	⚙️ 📄 ⋮
Completed	DEN - V1.2 - CCC	2020	-Multiple Selected-	***	DEN Revit Model Checker v2021-2	Sep 15, 2021, 2:29:00 PM	n/a	⚙️ 📄 ⋮



### Reports

Manage your reports

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Search



Task	Run Date	Summary	Model	Duration	Actions
AA Club - DEN STDS Check - V1	Sep 8, 2021, 2:53:29 PM	97 Checks, 11 (55%) Pass, 9 Fail, 76 Count/List, 1 Error	CCC_JAC-E_201733061-AA Relocate Club_Central	9m 56s	📄 📄 ⋮
BWI - P1/P3 Delivery	Sep 9, 2021, 9:03:35 AM	97 Checks, 9 (47%) Pass, 10 Fail, 77 Count/List, 1 Error	MDOT_MAA-8702_R21_F	3m 4s	📄 📄 ⋮
BWI - P1/P3 Delivery	Sep 9, 2021, 9:03:36 AM	97 Checks, 11 (58%) Pass, 8 Fail, 77 Count/List, 1 Error	MDOT_MAA-8702_R21_BHS	8m 21s	📄 📄 ⋮
BWI AB - Model Delivery - Heath Check	Sep 9, 2021, 12:29:34 PM	19 Checks, 18 Count/List, 1 Error	MDOT_MAA-8702_R21_P	0m 59s	📄 📄 ⋮
AA Club - DEN STDS Check - V1	Sep 8, 2021, 2:53:29 PM	97 Checks, 5 (25%) Pass, 15 Fail, 76 Count/List, 1 Error	CCC_JAC-A_201733061-AA Relocate Club_Central	23m 46s	📄 📄 ⋮
DEN - AA Club - DEN Check	Sep 17, 2021, 8:07:35 AM	102 Checks, 18 (75%) Pass, 6 Fail, 78 Count/List	CCC_PXE-T_201733061-AA Relocate Club_IFC	4m 25s	📄 📄 ⋮
BWI AB - Model Delivery - Heath Check	Sep 9, 2021, 12:29:34 PM	19 Checks, 18 Count/List, 1 Error	MDOT_MAA-8702_R21_F	2m 17s	📄 📄 ⋮

# Model Checks

TASKS REPORTS VIEW

Automated weekly model checks provide key insights into the health of project models allowing team to respond quickly to negative trends





Demonstrated use on 2 large expansion projects at Denver International Airport – weekly reports provided insight into all discipline models to ensure no model downtime in 2+ years.

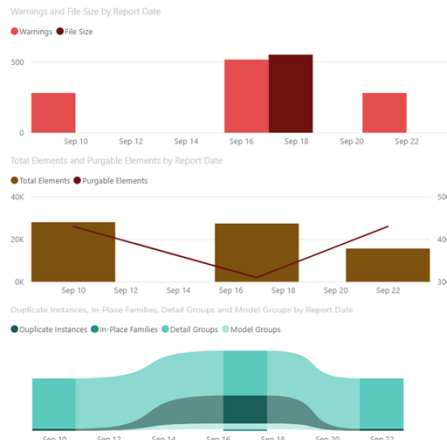
Customized reports to check models against client specific standards



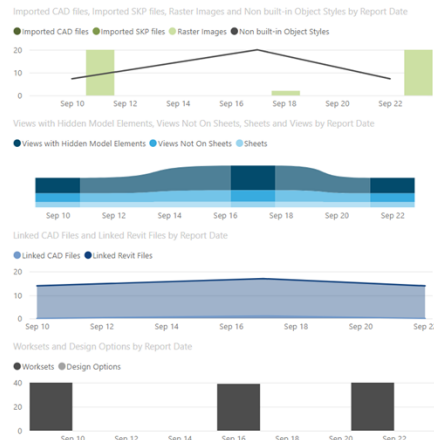
# Model Dashboards

Utilizing PowerBI to quickly convert the native output to an easy to understand graphical interface.

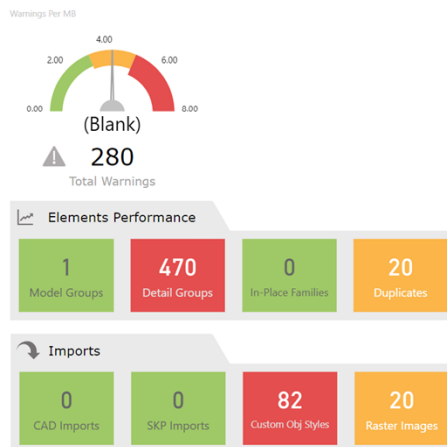
DEN CCB - ARCH FILE  
Model Health Trend Dashboard



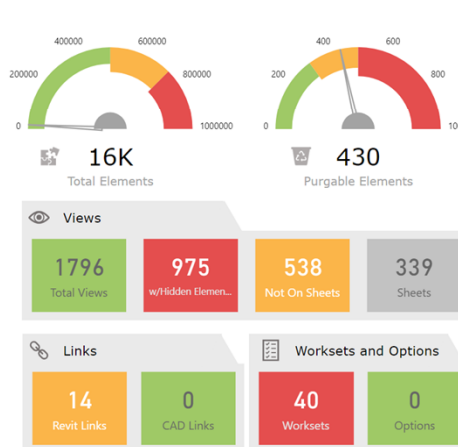
Last run report  
Wednesday, September 22, 2021



DEN CCB - ARCH FILE  
Model Health Latest Dashboard



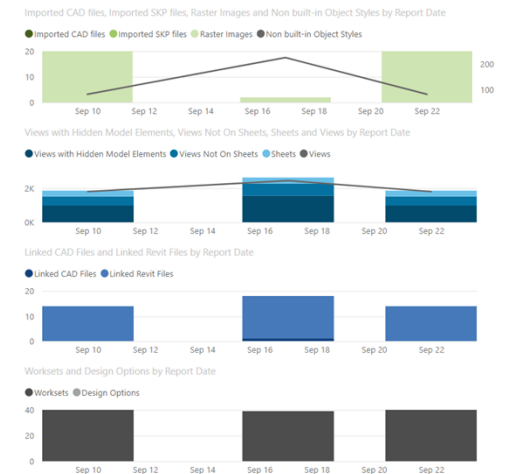
Last run report  
Wednesday, September 22, 2021



DEN CCB - ARCH FILE  
Model Health Trend Dashboard



Last run report  
Wednesday, September 22, 2021





**Q: WHY DID WE MAKE THIS  
TOOL?**

(JASON / CHUCK - 3 MIN ea)

**Q: WHAT KIND OF DATA ARE  
YOU GETTING? HOW ARE  
YOU USING IT?**

(Brendan / Chris- 3 MIN ea)

# **Q: WHAT ARE OTHER CUSTOMERS DOING WITH THE DATA**

(Chuck / Jason - 3 MIN ea)

**Q: HOW WILL THIS CHANGE  
YOUR WORK WITH A/Es?  
WILL YOUR EXPECTATIONS  
FOR DELIVERABLES  
CHANGE?**

(Brendan- 3 MIN ea)

**Q: WILL THIS CHANGE HOW  
YOU WORK WITH OWNERS?**

(Chris - 3 MIN ea)

**Q: ANY 'AH-HA' MOMENTS?**

(Brendan / Chris / Chuck - 2 MIN ea)