

JUNE 16, 2022

AirTable for Version Tracking of Revit Details

Sean McDonald, Corporate BIM Manager
Dr. Kristopher Dane, Director of Digital Design

Digital Built Week Americas
Anaheim, California

Thornton Tomasetti

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OUTLINE

- **Introduction**
 - Digital Design at Thornton Tomasetti
 - Speakers
- **Problem**
- **Solution**
 - Revit Model
 - Airtable
 - Rest API
 - Dynamo
- **Conclusion**
- **Q/A**

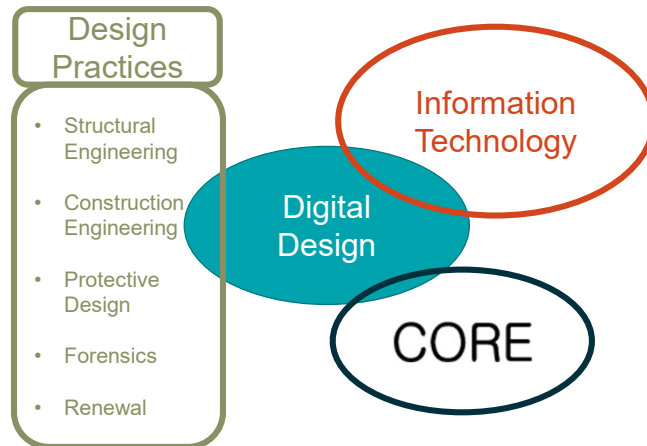
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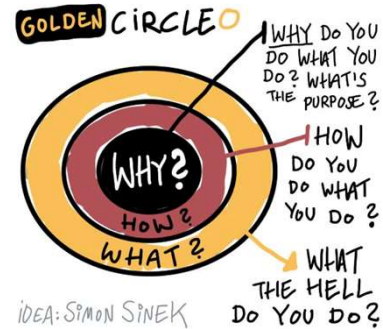
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INTRODUCTION

Digital Design (D2) at Thornton Tomasetti



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Why?

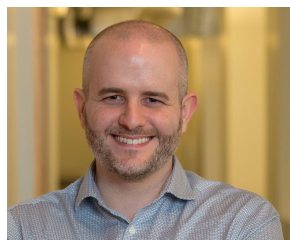
So project teams can do work that is worth their time; to focus on high value, high impact problems rather than the commodity activities.

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INTRODUCTION

Presenters



Dr. Kristopher Dane
Director of Digital Design
Seattle, WA



Sean McDonald
Corporate BIM Manager
Chicago, IL

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THE PROBLEM

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THE PROBLEM

Standards are important but they change

- Standard / Typical Details
 - Important for efficiency and risk management
 - Captures (some of) the institutional knowledge of the firm
- But...they change!
 - On a different timeline than projects

How do I make sure designers are using the current details?

(Oh, and...checking manually stinks)

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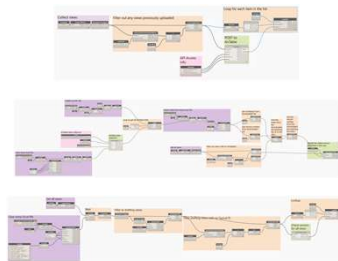
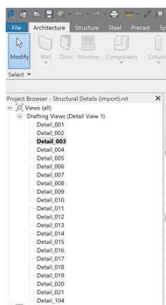
THE SOLUTION

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SOLUTION

Flexible and Accessible

We're providing all of this to you via GitHub!



Request Detail Update

Add a description for this form

Effected Details

Requested By

Comments

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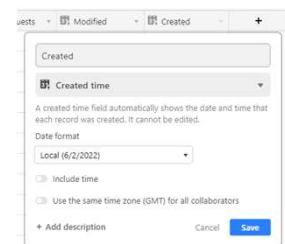
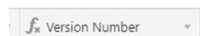
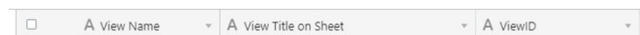
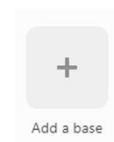
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AIRTABLE

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SETTING UP AIRTABLE

- <https://airtable.com/>
Free signup
- Add a base
- Add columns for what is to be tracked
 - View Name, Title on Sheet, GUID, etc...
Text fields
 - Version Number
Will be calculated
 - Modified, Created
Built in fields



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ADDING THE PROCESS TO AIRTABLE

• Add table for change requests

• Effectuated Detail ID field is a link to the details list

• ChangeID can be calculated

Formula

Compute a value in each record based on other fields in the same record. [Learn more](#)

Formula Formatting

`DATESTR(Created) & " - " & {Effectuated Detail ID}`

Effectuated Detail ID

Link to DetailList

This field will link to records in the DetailList table.

☒ Allow linking to multiple records

☐ Limit record selection to a view

+ Add description Cancel Save

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ADDING THE PROCESS TO AIRTABLE

Update ID

Change Request

Created

Completed By

- Add table for tracking completion of updates
 - Change request is link to change request
- Update ID link gets added to change request table
- Rollup counting Update ID to track complete
Gives a 0 if not complete and 1 if complete

Complete

Rollup

A rollup allows you to summarize data from records that are linked to this table. [Learn more](#)

Rollup Formatting

Find on this table that links to the records you want to summarize

Update ID

Change Complete table field that you'd like to roll up

Update ID

☐ Only include linked records from the Change Complete table that meet certain conditions

Aggregation formula which rolls up the values in each linked record

`COUNTALL(values)`

+ Add description Cancel Save

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ADDING THE PROCESS TO AIRTABLE

- In the Details list table
 - Change Requests is added
 - Number of Requests is a count of requests
Count of Change ID from request table
 - Complete Requests is a sum of values from complete rollup in request table.
A total of all complete requests to a detail
 - Incomplete requests is Number of Requests – Complete Requests
 - Version number is Complete Requests + 1
So we start at version 1 instead of 9

The image shows two screenshots of the Airtable field configuration interface. The top screenshot is for a 'Change Requests' field, showing a rollup configuration where the 'Change Request table field that you'd like to roll up' is 'Change ID'. The aggregation formula is 'COUNTALL(values)'. The bottom screenshot is for a 'Complete' field, showing a rollup configuration where the 'Change Request table field that you'd like to roll up' is 'Complete'. The aggregation formula is 'SUM(values)'.

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ADDING THE PROCESS TO AIRTABLE

- In change request
 - Add a new view for incomplete requests
Filter by complete = 0
- In change complete
 - Limit the change request field to the incomplete requests view

The image shows a screenshot of the Airtable interface. At the top, there are tabs for 'DetailList', 'Change Request', 'Change Complete', and 'Add or import'. Below the tabs, there are view filters: 'Incomplete Requests' (selected), 'All Requests', and 'Request Detail Update'. A 'Filtered by Complete' filter is applied, showing 'Where: Complete = 0'. Below this, there are options to 'Add condition', 'Add condition group', and 'Copy from another view'.

The image shows a screenshot of the Airtable field configuration interface for a 'Link to Change Request' field. It shows a dropdown menu with 'Link to Change Request' selected. Below this, there are checkboxes for 'Allow linking to multiple records' (checked) and 'Limit record selection to a view' (checked). A dropdown menu shows 'Incomplete Requests' selected. At the bottom, there are buttons for '+ Add description', 'Cancel', and 'Save'.

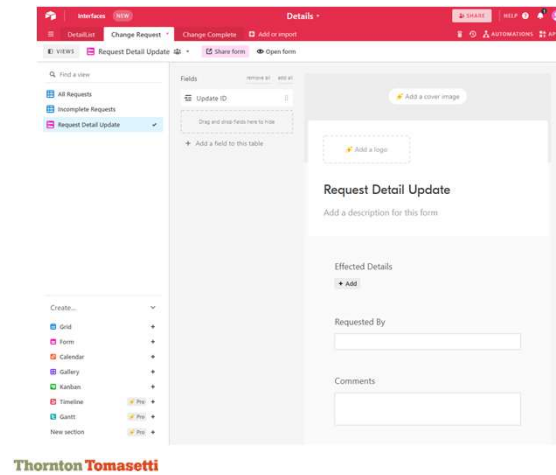
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ADDING THE PROCESS TO AIRTABLE

- Add and share Forms for both the Request and Complete tables



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REST API

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ACCESSING AIRTABLE API

- <https://airtable.com/api>

- Get table ID

AUTHENTICATION

DETAILLIST TABLE

Fields

List records

Retrieve a record

DETAILLIST TABLE

The id for **DetailList** is **tbl14pMpU5J8R0aA8j**. Table modifications to your API request.

- <https://airtable.com/account>

- Get API Key

API

This is your personal API key. It's required in order to use the Airtable API. Your personal API key has access to all the data in your Airtable bases.

Only share this key with third-party services and applications that you trust.

To limit the access of a third-party service, consider following these instructions to create a read-only API key and sharing that key instead.

..... [Regenerate API key](#) [Delete key](#)

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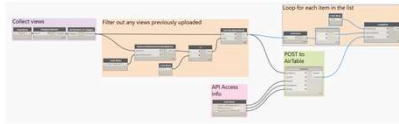
THE DYNAMO SCRIPT

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THREE PARTS

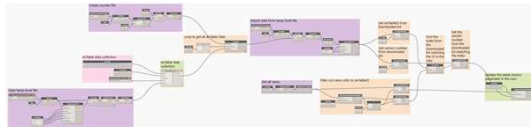
Taking it step by step

We're providing all of this to you via GitHub!



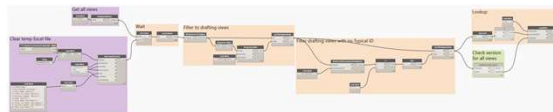
Script 1: Grab from Revit

- Get all details
- Send to AirTable



Step 2: Grab from Airtable

- Get versions from AirTable
- Put in detail views



Step 3: Check

- Check versions in a file vs AirTable

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REQUIREMENTS

- Dynamo Packages
 - DynaWeb (<https://radumg.github.io/DynaWeb/>)
 - JsonData
 - Rhythm
- Revit Version 2022
- Revit file with custom view parameters
 - DetailVersion
 - AirTableID

Packages			
	Name	Path	Version
✓	Rhythm	C:\Users\smcdonald\AppData	2022.4.1
✓	DynaWeb	C:\Users\smcdonald\AppData	1.0.3
✓	JsonData	C:\Users\smcdonald\AppData	2.0.2

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ADDING A VIEW TO AIRTABLE

- Header:

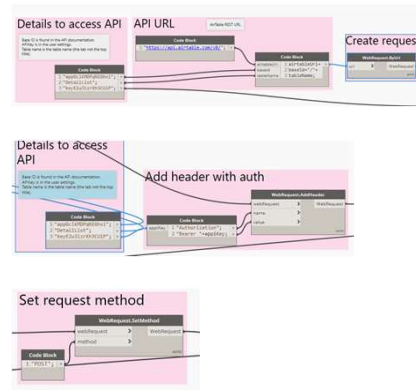
- Request URL

Airtable API address : <https://api.airtable.com/v0/>
 Base ID : get from your <https://airtable.com/api>
 Table Name : plain text name of the table

- Authorization

By bearer key : from <https://airtable.com/account>

- Method
Post



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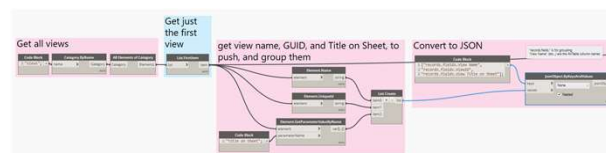
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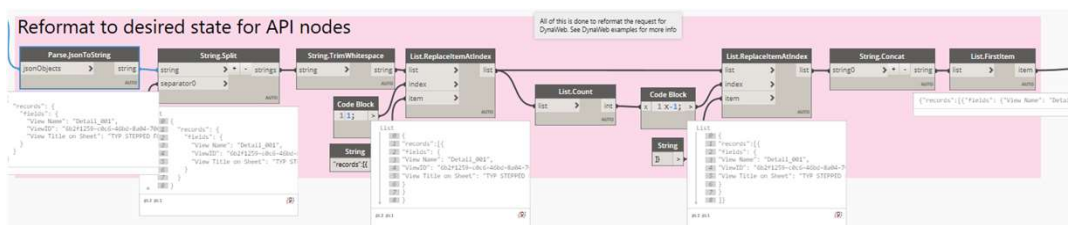
ADDING A VIEW TO AIRTABLE

- Body:

- Collect elements and convert to JSON



- Reformat for DynaWeb



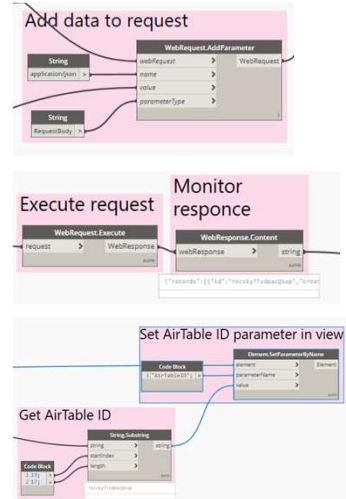
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ADDING A VIEW TO AIRTABLE

- Generate Request and execute:
 - Create request:
Header + Body Type + Body + Parameter
- Execute and monitor response
- Grab ID and pass to Revit View



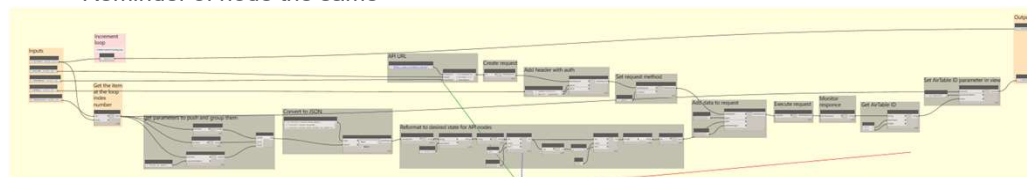
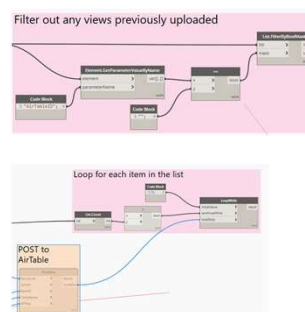
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ADDING ALL VIEWS TO AIRTABLE

- Loop
 - Filter out previously added views
 - Loop the request for each view
- Grab current loop number for index
Increment loop number
- Reminder of node the same



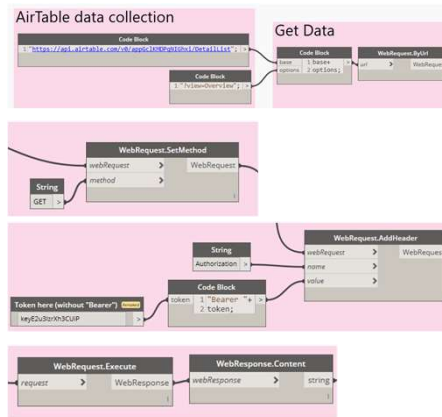
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DOWNLOAD DATA FROM AIRTABLE

- Header
 - Build URL
 - Method
Get
 - Authorization
(same as previous)
- Execute request



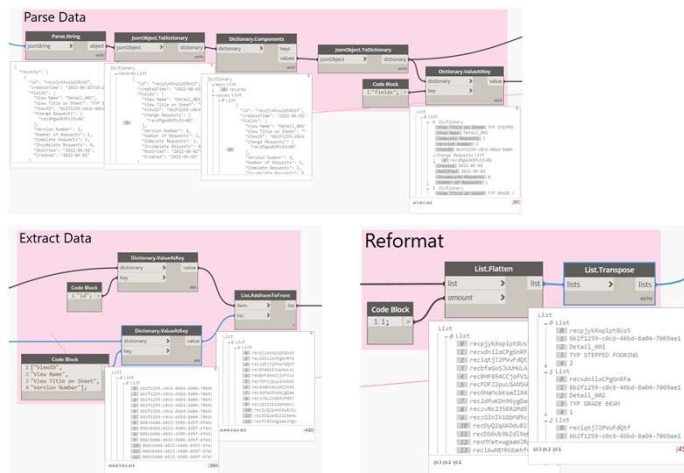
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DOWNLOAD DATA FROM AIRTABLE

- Parse data
- Extract Data
- Reformat



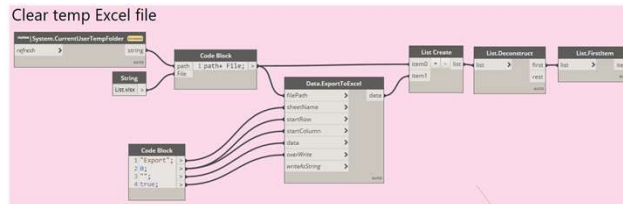
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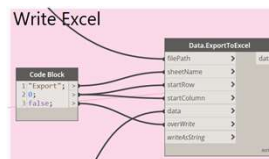
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DOWNLOAD DATA FROM AIRTABLE

- Clear temp file



- Write data to excel



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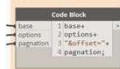
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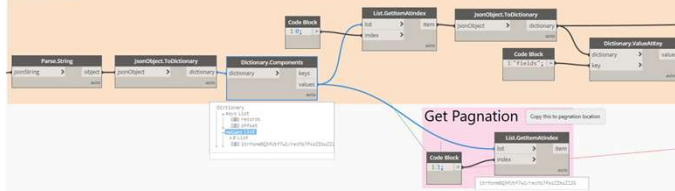
DEALING WITH PAGINATION

- Adding to header
- Extract pagination value
- Remainder is the same

Request URL w/ pagination



Parse Data



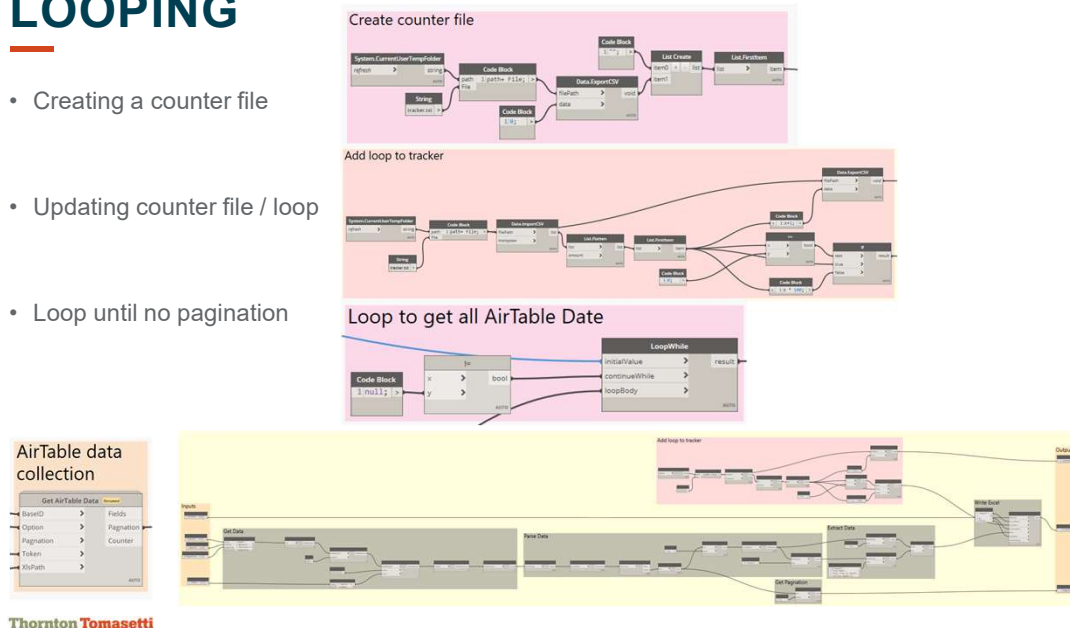
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LOOPING

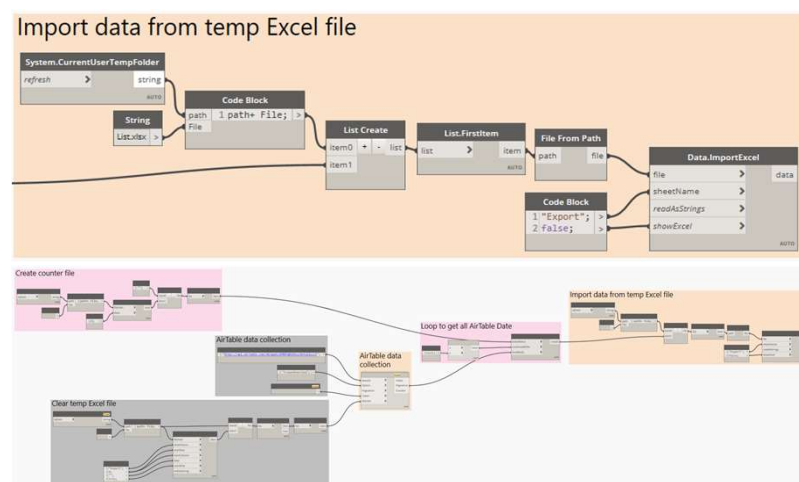
- Creating a counter file
- Updating counter file / loop
- Loop until no pagination



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IMPORTING DATA

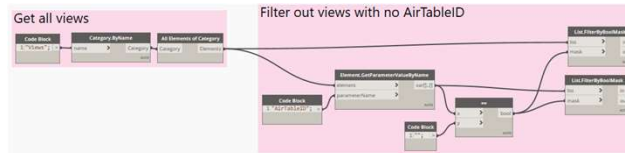
- Import data
- Remainder script same



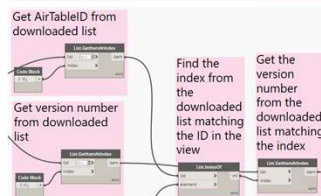
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UPDATING VIEWS

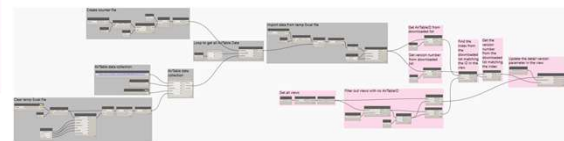
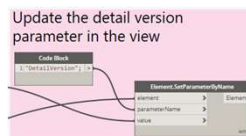
- Get all views with AirTable ID



- Get Airtable ID
Get Version Number
Match ID
Align Version



- Update parameter



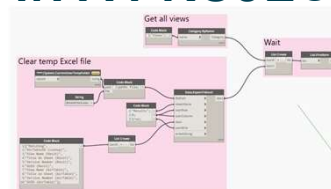
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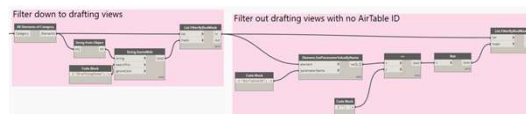
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CHECKING A VIEW IN A PROJECT FILE

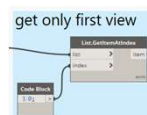
- Prep the local Excel file



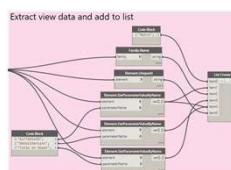
- Filter to drafting views with AirTable ID



- First only for this run



- Extract data from view



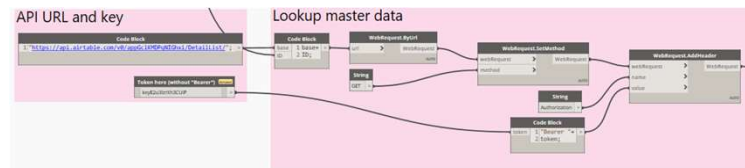
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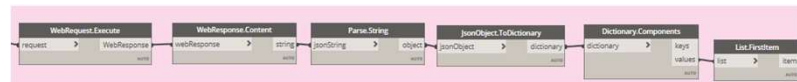
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CHECKING A VIEW IN A PROJECT FILE

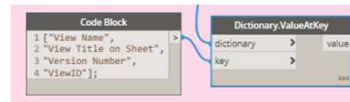
- Build the header



- Execute the request & parse response



- Extract Data



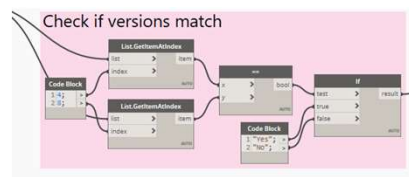
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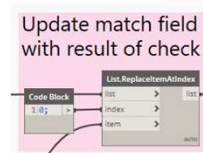
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CHECKING A VIEW IN A PROJECT FILE

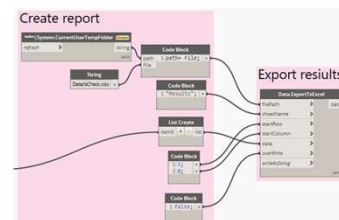
- See if version number match Data



- Report Result of check



- Create report

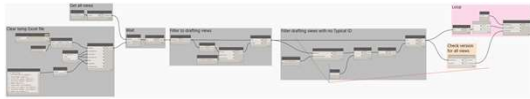


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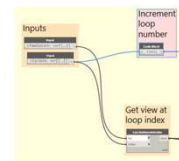
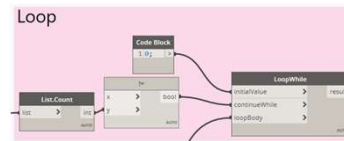
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CHECKING ALL VIEWS IN A PROJECT FILE



- Create Loop based on count of views
- Loop within node same as previous examples
- No other changes



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CONCLUSION

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REVIEW

Standards are important but they change...lets make it easy

How do I make sure designers are using the current details?



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JUST THE START

We started with the basics

- Can layer on more sophisticated moderation and approval checks

Good Start and Typical Details | Introduction

Document created by Kristopher Dene on Oct 14, 2019 • Last modified by Kristopher Dene on May 7, 2022

Content Owner

Digital Design & SE Standards Committee (SESC)

Good Start and Typical Details | Requesting Changes

Document created by Sean McDonald on May 12, 2020 • Last modified by Kristopher Dene on Aug 16, 2021

Content Owner

Digital Design

Last Update

July 7, 2020

This document outlines the process to request a change to the typical details as well as check the status of the current details. To the most recent version is located here [Good Start and Typical Details | Introduction](#)

Documentation

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Request From

Detail Effected *

• Add

Revision Date *

Description of Changes

Critical *

Is the incorporation of this update vital to existing projects?

Requested By *

Change Requests

Good Start and Typical Details | Update Procedures

Document created by Sean McDonald on May 19, 2020 • Last modified by Sean McDonald on Jan 19, 2021

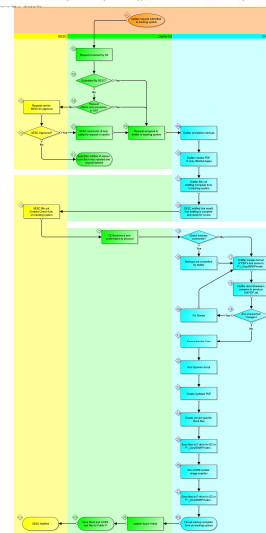
Content Owner

Digital Design

Last Update

January 19, 2021

This document outlines the process to update the Typical and Good Start Details. This process will be used by



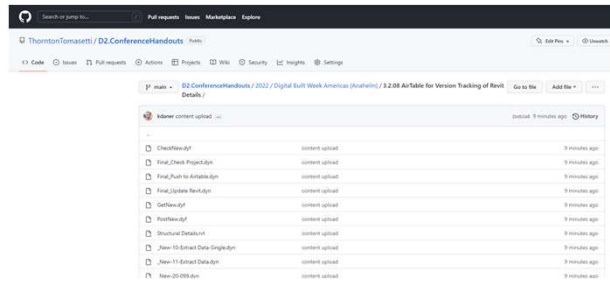
Approval Process

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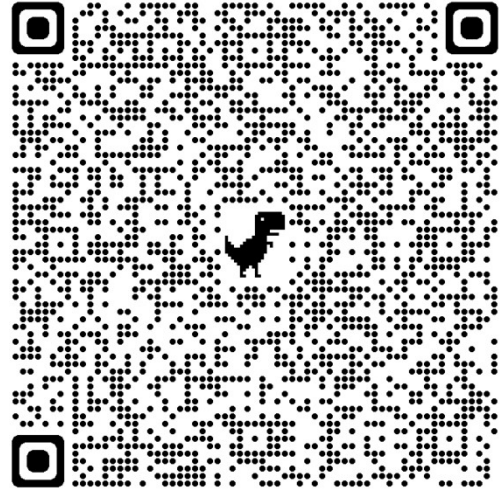
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YOUR HOMEWORK

All our base are belong to you!



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[GitHub Repo](#)

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THANK YOU

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