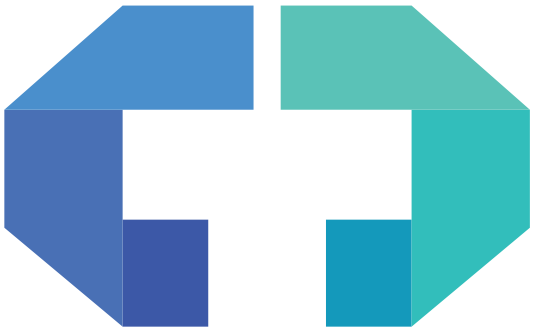

CTC Project Analytics Logger Data and Reporting Guide

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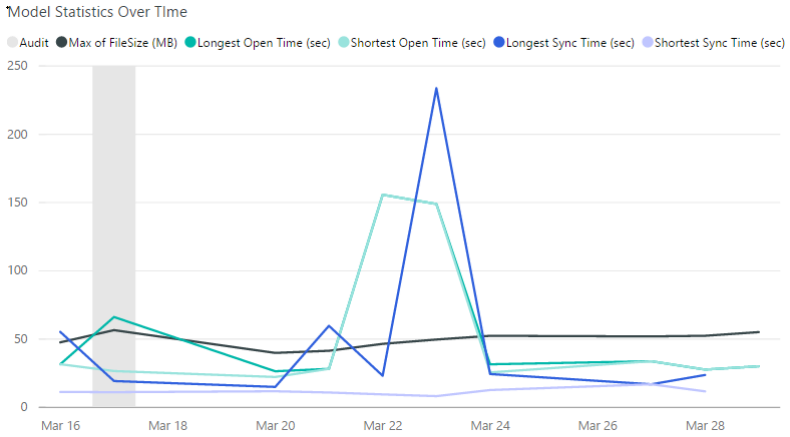
Project Analytics Logger (PAL) Overview

The Project Analytics Logger is a Revit Add-in that runs silently in the background while a person is editing a Revit model. Model properties and user activity is captured when application and document events occur (i.e. open, close, save, etc.).

The captured data is written continuously to a queue folder on the client machine. A posting application (PAL.Poster) sends the data via a WebAPI service to a database. Should the service be interrupted, the PAL data files will remain un-posted in the client machines queue folder. Once the service becomes available, existing data files will be posted with their original date and time values intact.

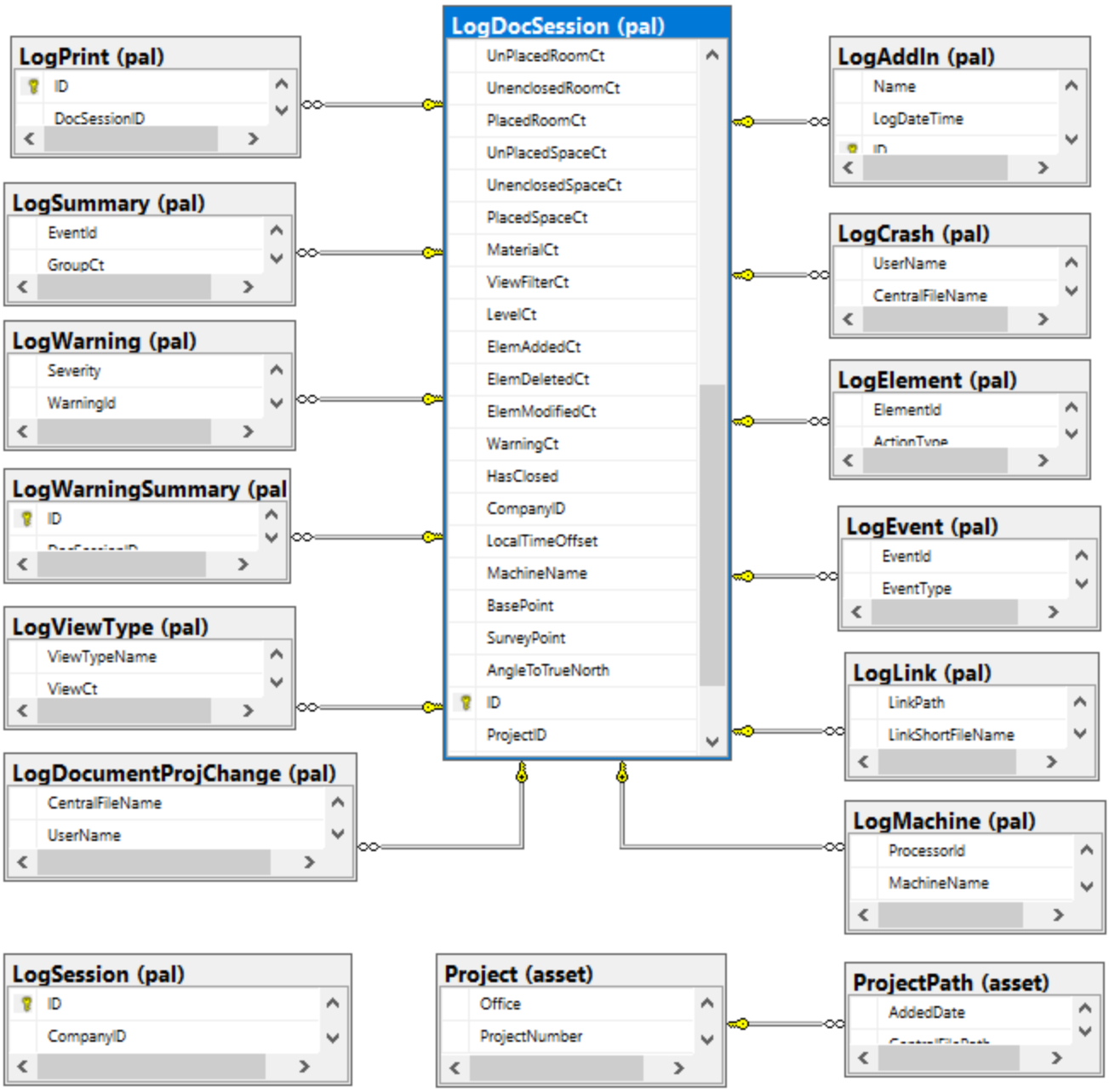
No additional interaction with the system is required by a user. During each Revit editing session, records will be written to the database with detailed information about file properties and user activity. This is described in more detail in the Data Collection Explained section. These records will provide the source for data analysis and visualizations. The line chart below illustrates one type of visualization available in tools such as Power BI or Tableau. Examples of the types of visualizations can be found in Appendix B – Visualization Examples.



Data Collection Explained

PAL Schema Diagram

The following image shows the tables in the database which are related to project activity logging. Child tables are shown to the right and left of the main LogDocSession and Project parent tables. These tables are described in greater detail later in this document. The LogDocSession table receives one record per document editing session, while its child tables may receive multiple entries relating to it.



Data Collection Sequence

Data is collected by the client add-in application as events fire in the Revit editing session.

- Application Open
    - Add LogSession record.
    - Document Open
        - Add LogDocSession record.
        - Add LogEvent record.
        - Add LogMachine record.
        - Add LogAddIn records.
        - Add LogSummary record.
        - Add LogViewType records.
        - Add LogLink records.
    - Save
        - Add LogEvent record.
    - Sync-To-Central
        - Add LogEvent record.
        - Add LogSummary record.
        - Add LogViewType records (if any changes since last written record)
        - Add LogWarning records (if any changes since last written record)
    - Print
        - Add LogPrint record.
    - View Change
        - Add LogEvent record.
    - Close
        - Update LogDocSession record.
        - Add LogElement records.
        - Add Write to the LogEvent record.
- Application Close
    - Update LogSession record.

PAL Tables

LogSession Table

A record of the duration of each Revit session by Revit version. If a user has Revit 2018 and 2019 open with several documents open in each session, only two records will be written to the database. A session record is updated with the session close time once all documents are closed

.

Column Name	Description
ID	Primary key.
CompanyID	ID of the company.
UserName	Windows username.
MachineName	Computer name.
StartDateTime	Revit open date and time.
EndDateTime	Revit closed date and time.
RevitVersion	Revit version (i.e. 2017, 2018, 2019, 2000, etc.).

LogDocSession Table

The LogDocSession table provides the base information for each unique document editing session. If a user opens the same file twice on a given day, there will be two different records identifying each session. All tables that are prefixed with 'Log' (i.e. LogEvents) are related to the LogDocSession table. The DocSessionId column found it these tables is a foreign key that references the LogDocSession primary Id column.

Column Name	Description
ID	Primary key.
CompanyID	ID of the company.
ProjectID	ID of the associated project.
GUID	unique identifier.
UserName	Windows username.
Server	Server name. This is only resolved if the central model resides on a network share.
CentralFileName	Central model full name.
ShortFileName	Central model name with the path stripped.
LocalFileName	Local model full name.
LocalFileSize	File size of the local file.
RevitVersion	Revit version and build.
IsAudit	File opened for auditing.
DocDateTime	Open date and time.
LoadTime	Opening duration in seconds.
STCDuration	Longest save-to-central duration during this document session.
STCDateTime	Date and time of the longest save-to-central duration during this document session.
SessionHours	Duration of the effective editing session. (Last STCDateTime - DocDateTime)
PhaseCt	Phase quantity.
DesOptCt	Design option quantity.
WorksetCt	Total workset quantity.
WorksetEditCt	Worksets selected to edit at document open.
WorksetOpenCt	Worksets selected to open at document open.
ViewCt	View quantity.
GroupCt	Group quantity.
FamilyCt	Loaded families.
InstanceCt	Actual placed 'instances' of families.
UnplacedFamilyCt	Loaded families with no placed instances.
InPlaceCt	In-place Family quantity.
UnPlacedRoomCt	Unplaced room quantity.
UnenclosedRoomCt	Unenclosed room quantity.
PlacedRoomCt	Room quantity.
UnPlacedSpaceCt	Unplaced space quantity.
UnenclosedSpaceCt	Unenclosed space quantity.
PlacedSpaceCt	Space quantity.
MaterialCt	Material quantity.
ViewFilterCt	View filter quantity.
LevelCt	Levels quantity.
ElemAddedCt	Elements added during document session.

ElemDeletedCt	Elements deleted during document session.
ElemModifiedCt	Elements modified during document session.
WarningCt	Warnings quantity.
HasClosed	Central model 'has closed' flag.
LocalTimeOffset	obsolete.
MachineName	Computer name.
BasePoint	Base point as reported by Revit.
SurveyPoint	Survey point as reported by Revit.
AngleToTrueNorth	The angle to true north.
SiteLatLong	Site latitude and longitude.

LogEvent Table

Logs the event name, duration, current active view, and the number of open views. This is where you would be able to find the length of time (EventDuration column) a specific event took (e.g. save to central, or document open).

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
EventId	ID of the event.
EventType	Event type: (Open, Close, View, Save, STC)
EventName	Event name: (Open, Close, ViewInit, ViewComplete, SaveInit, SaveComplete, SyncInit, and SyncComplete
ViewName	Current view name.
OpenViewCt	Open views at event time.
EventDateTime	Event date and time.
EventDuration	Event duration (event complete - event Init).
ActionCt	Total of added, modified, and deleted ElementIds.
ActiveWorksetName	Active workset name.
FamilyWorksetOpenCt	Open Family workset quantity.
FamilyWorksetEditCt	Edit Family worksets quantity.
StandardWorksetOpenCt	Open standard worksets quantity.
StandardWorksetEditCt	Edit standard worksets quantity.
UserWorksetOpenCt	Open user worksets quantity.
UserWorksetEditCt	Edit user worksets quantity.
ViewWorksetOpenCt	Open view worksets quantity.
ViewWorksetEditCt	Edit view worksets quantity.

LogSummary Table

Logs common properties which may affect a model's performance. These properties include the counts of phases, design options, work-sets, groups, families and rooms.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
EventId	ID of the event that triggered the record.
GroupCt	Group quantity.
InPlaceCt	In-place family quantity.
UnPlacedRoomCt	Unplaced room quantity.
UnenclosedRoomCt	Unenclosed room quantity.
PlacedRoomCt	Room quantity.
UnPlacedSpaceCt	Unplaced space quantity.
UnenclosedSpaceCt	Unenclosed space quantity.
PlacedSpaceCt	Space quantity.
ViewCt	View quantity.
PhaseCt	Phase quantity.
DesOptCt	Design option quantity.
WorksetCt	Total workset quantity.
FamilyCt	Loaded families.
InstanceCt	Actual placed 'instances' of families.
MaterialCt	Material quantity.
ViewFilterCt	View filter quantity.
SummaryDateTime	Record date and time.
UnplacedFamilyCt	Loaded families with no placed instances.
LevelCt	Level quantity.
WarningCt	Warnings quantity.

LogAddIn Table

Logs the Revit Addins loaded in the document.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
Name	Addin Name
LogDateTime	Date and time that record was written.

LogCrash Table

Logs the error message in the Revit journal file if Revit crashes.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
UserName	Windows username.
CentralFileName	Central model full name.
LocalFileName	Local model full name.
RevitVersion	Revit version and build
LocalFileSize	File size in bytes.
Description	Exception message from the journal file.
ExceptionDateTime	Exception date and time.
LogDateTime	Date and time that record was written.

LogElement Table

Records the ElementId's of elements modified during the document session.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
ElementId	Revit ElementId
ActionType	Added, deleted, or modified.
LogDateTime	Date and time that record was written.

LogLink Table

Logs the location, type, and status of all the documents linked to the current Revit model.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
LinkPath	Full file name of the linked file.
LinkShortFileName	File name with the path stripped away.
LinkType	RevitLink, CADLink, KeynoteTable, AssemblyCodeTable, etc.
LinkStatus	Loaded, Not Loaded,
UserName	Windows username.
LinksDateTime	Record date and time.

LogMachine Table

Logs information about the computer used to open the Revit document. This information may be useful in analyzing model performance issues. This includes the name, MAC address, IP address, operating system, RAM, and video card information.

Column Name	Description
ID	Primary Key.
DocSessionID	Key ID from the LogDocSession table.
ProcessorId	Computer processor ID.
MachineName	Computer name.
MAC	MAC address.
OperatingSystem	OS version and build.
HDD	Hard drive information.
Motherboard	Motherboard manufacturer.
Bios	Bios version.
RAM	Total installed RAM.
RAM_Slots	Number of RAM slots.
CPU	Processor information.
Video	Video card information.
LogDateTime	Record date time.
IPAddress	IPAddress

LogPrint Table

Logs the start time, end time and sheets printed.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
JobID	print job identifier
UserName	Windows username
Printed	List of the sheet numbers or view names of the successful prints.
Failed	List of the sheet numbers or view names of the failed prints.
PrintCt	Successful print quantity.
FailCt	Failed print quantity.
JobStart	Start date and time.
JobEnd	Completed date and time.

LogViewType Table
Logs the name and a count of views for each ViewType found in the document.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
ViewTypeName	ViewType name.
ViewCt	Quantity of views for this type.
ViewDateTime	Record date and time.

LogWarning Table
Logs the ElementIds of all Elements affected by the warning messages reported by the Revit UI.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
Severity	Severity level as reported by Revit.
WarningId	Unique ID for this warning.
Description	Warning description.
ElementId	ElementId of elements affected by this warning.
ElementName	Element name of element affected by this warning.
LevelName	Level of element (if possible).
Workset	Workset of the element.
WarningDateTime	Record date and time.

LogWarningSummary Table
Logs a summarized warning list.

Column Name	Description
ID	Primary key.
DocSessionID	Key ID from the LogDocSession table.
ElementIds	Delimited list of the elementId's affected by this warning.
Description	Warning description.
LogDateTime	Record date and time.

Project Table

Reporting on a logical grouping of project files is accomplished by creating a 'Project' and associating the project files to them. A Project can be any logical grouping. Typically, it will mirror the actual projects you are working on. However, it could be grouping by discipline, client, Revit version, etc. Project creation is an administrative task performed by a small number of users and requires no action by a Revit user on a client machine. More information can be found in the CTC BIM Data Admin User Guide.

Column Name	Description
ID	Primary key.
Office	Required.
ProjectNumber	Required.
ProjectName	
BuildingName	
ClientName	
StreetAddress	
StreetAddress2	
StreetAddress3	
ProjectPhase	
ProjectIssueDate	
Author	
City	
StateOrProvince	
PostalCode	
CountryName	
OrgName	
OrgDescription	
ProjectImage	
AddedDate	
UpdatedDate	
CompanyID	ID of the company.
AddedByUserID	
UpdatedByUserID	
Status	

ProjectPath Table

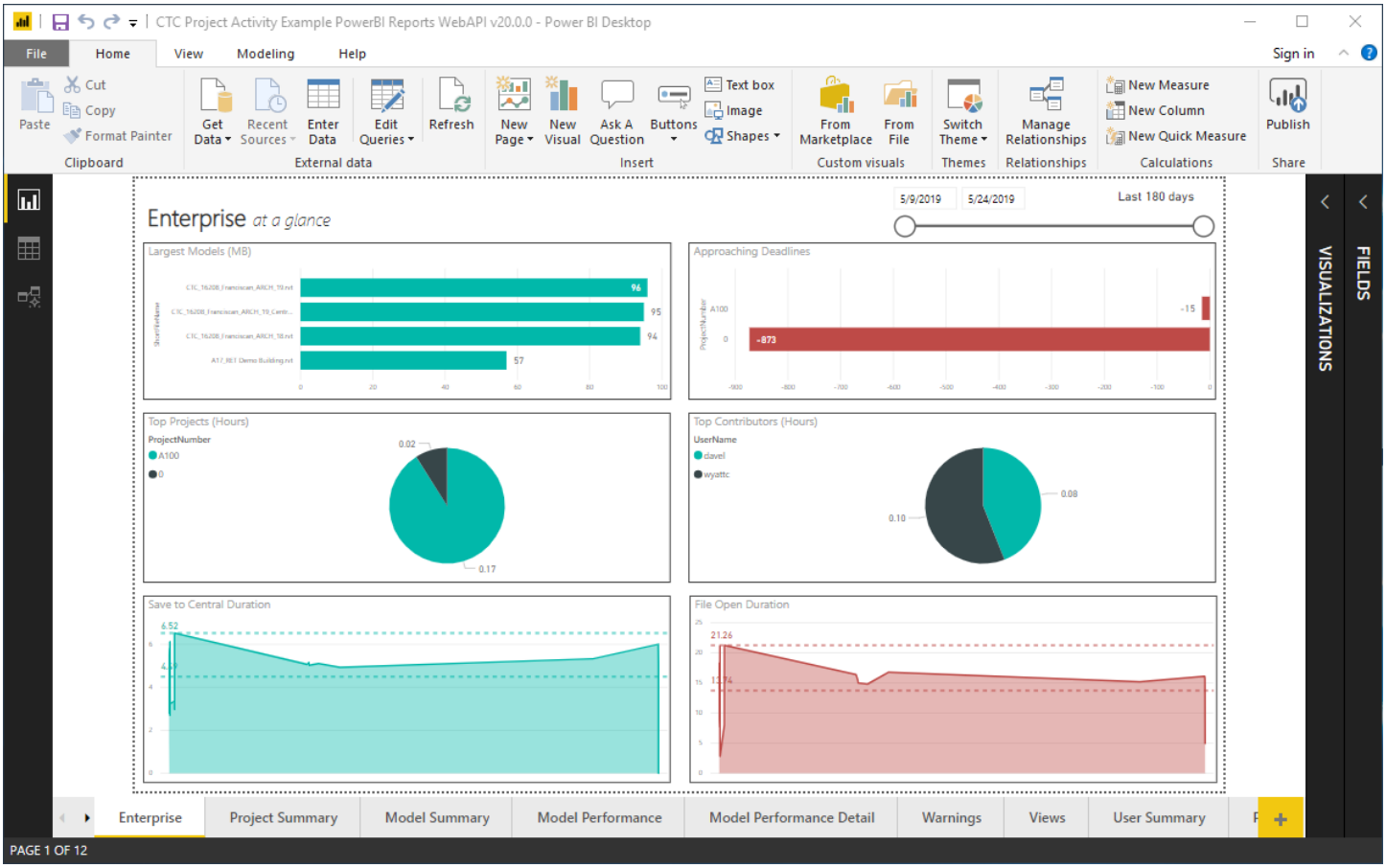
A List of path records that are used to associate LogDocSession records to a project record.

Column Name	Description
ID	Primary Key.
ProjectID	ID from the Project table.
AddedDate	Record date and time.
CentralFilePath	Path of the central files to group together as a project.
AddedByUserID	Not used.

Appendix A – Example Power BI Files

A sample Power BI file named **CTC Project Activity Example PowerBI Reports WebAPI v20.0.0.pbix** is provided as a starting point for your data visualizations. The file can be found in 'C:\ProgramData\CTC\Project Activity Logger'. Currently, PowerBI is only supported in the Local Database mode (a SQL Server database on your network).

Initially the file only contains some sample data. Once you have configured the file to access your database, Power BI will pull data using the stored procedures in the Project Analytics Logger database.



Example dashboard

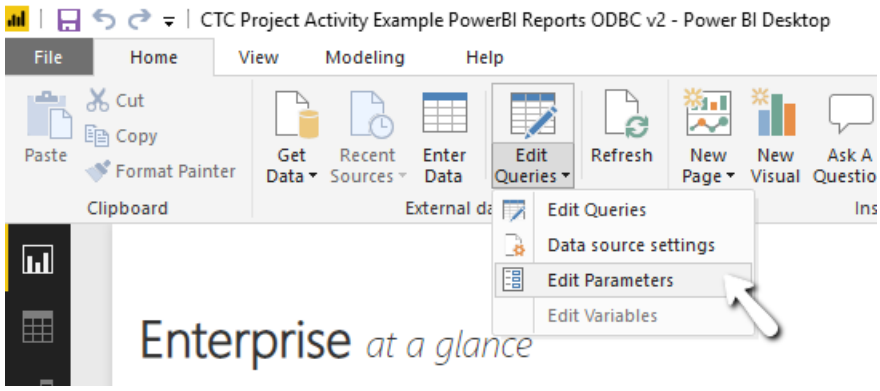
Example Power BI Reports - Configure to Access Your Database

Before proceeding, confirm the exact PAL server name with your administrator. This will be the same server that the PAL workstations were configured to connect and log data.
The following steps must be applied to the Power BI sample file.

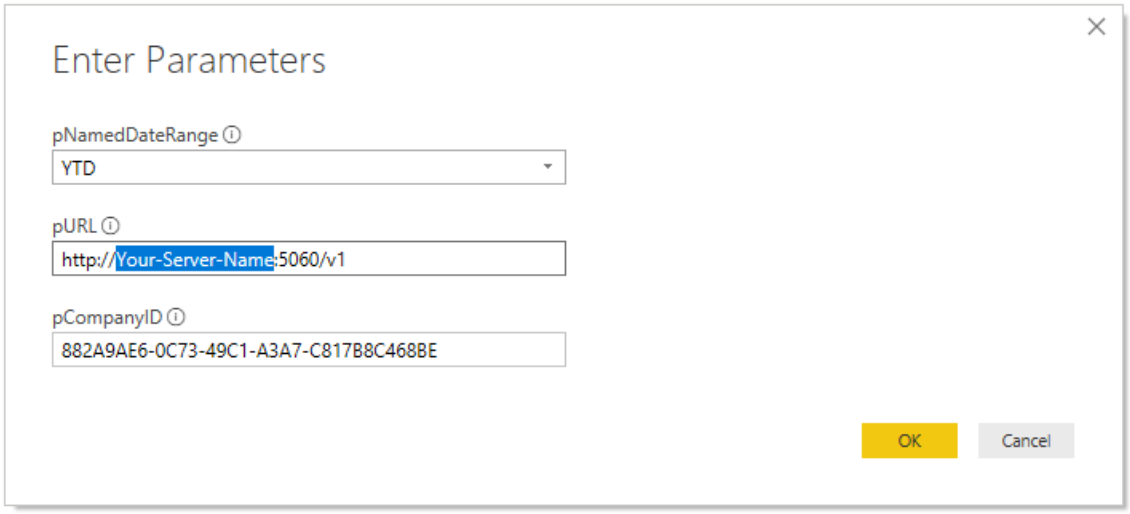
Enter ServerName Parameter

The ServerName parameter (pServerName) must be an exact match to your Project Activity Logger server (where the service was installed).

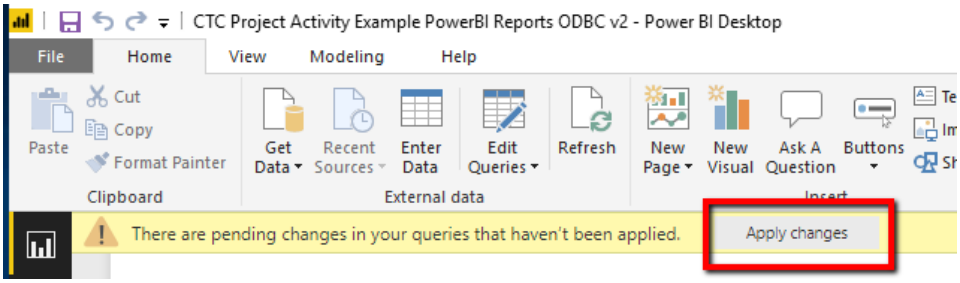
1. Select the 'Home' ribbon panel, then 'Edit Queries / Edit Parameters':



2. Edit the pURL value to contain your Project Activity Logger server name. The finished value should be in the form http://servername:5060/v1, where 'servername' is your server name. The pCompanyID value should not be edited.



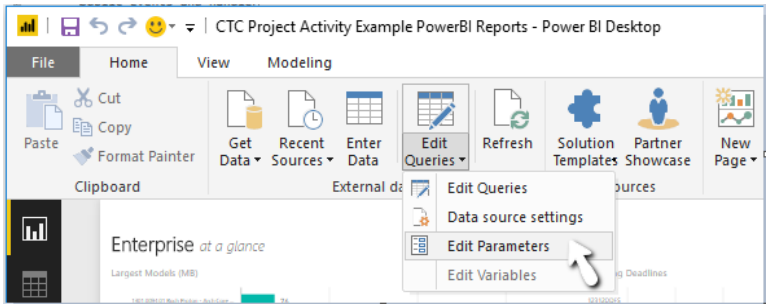
3. Press 'Apply Changes' to retrieve data:



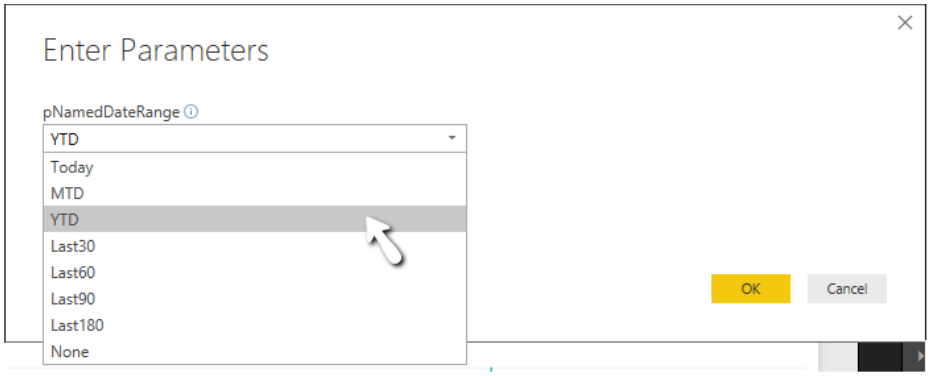
Connect Your Dashboard

To connect to the data, you must provide two parameter values, a date range and the name of the Project Activity Logger server in the form of an HTTP URL. Power BI will then retrieve data using stored procedures in the CTCBIMData database and populate the pre-defined tables.

1. Select 'Edit Queries / Edit Parameters':

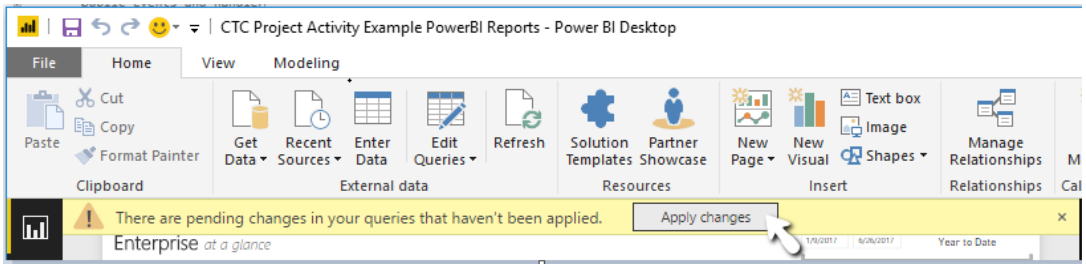


2. Enter a date range for the data to be retrieved:



- Today – Today.
- MTD – Month to date.
- YTD – Year to date.
- Last30 – Last 30 days.
- Last60 – Last 60 days.
- Last90 – Last 90 days.
- Last180 – last 180 days.
- None – All records.
-

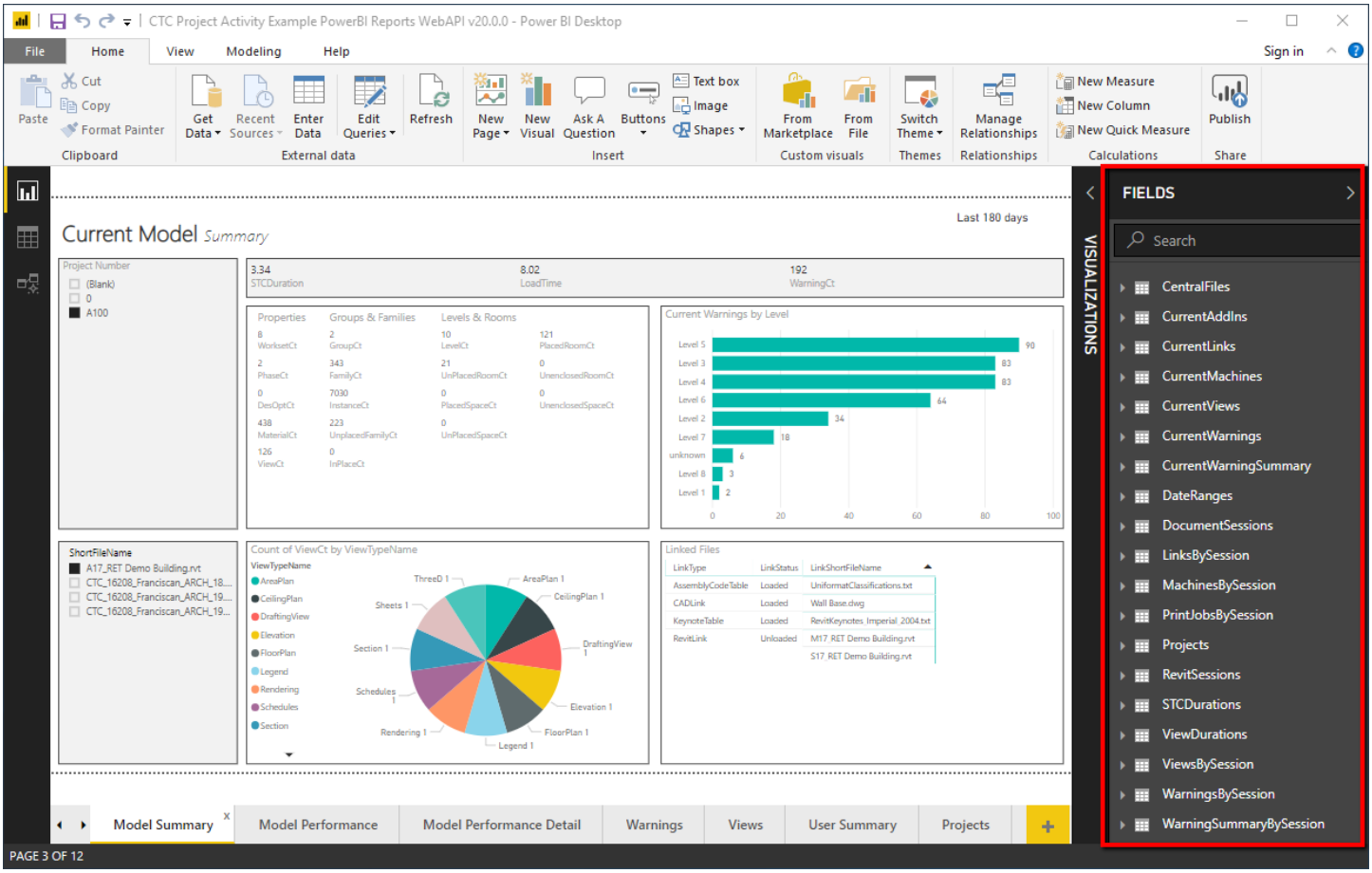
3. Apply your changes:



The first time you retrieve data you will be prompted to the query changes, press OK for each of the queries run. This will not be required on subsequent data refreshes.

Example Power BI Reports - Report Queries

The report queries found in this file are populated by stored procedures and customized views in the Project Analytics Logger database. Stored procedures are used because they provide the ability to filter results by a date range when retrieving records from your database. The views were built to aid in the creation of the visualizations. However, the Power BI tool is also capable of creating the same visualizations by querying raw tables in the database. To view the report queries, expand the 'Fields' pane:



Queries - Current Data

These contain the records associated with the last LogDocSession record for each project file. For example, if a central file has been accessed by ten people, there will be 10 LogDocSession records in the database. A current data query will only return a single record based on the last save to central time.

CentralFiles

The most recent record from the LogDocSession table for each unique project file name. It also contains the following three fields from the Project table:

- ProjectNumber
- ProjectName
- ClientName

CurrentAddins

The most recent addin records by MachineName and RevitVersion.

CurrentLinks

The LogLink records added during the last editing session of each document.

CurrentMachines
The most recently created LogMachine record.

CurrentViews
The LogViewType records added during the last editing session of each document.

CurrentWarnings
The LogWarning records added during the last editing session of each document.

CurrentWarningSummary
The LogWarningSummary records added during the last editing session of each document.

Queries – All Data by Date Range
These views contain data for all document sessions within a specified date range. The date range is a pre-defined string that is used to filter the number of records returned. Valid date ranges are:

- YTD – Year to date.
- MTD – Month to date.
- Today
- Yesterday
- ThisWeek
- Last30 – Last 30 days.
- Last60 – Last 60 days.
- Last90 – Last 90 days.
- Last180 – Last 180 days.
- None – No filter, return all records.

DocumentSessions
All LogDocSession records by the specified date range.

LinksBySession
All LogLink records by the specified date range.

MachinesBySession
All LogMachine records by the specified date range.

PrintJobsBySession
All LogPrint records by the specified date range.

Projects
All Project records.

RevitSessions
All LogSession records by the specified date range.

ViewDurations
All LogEvent records by the specified date range with EventName = 'ViewInit'.

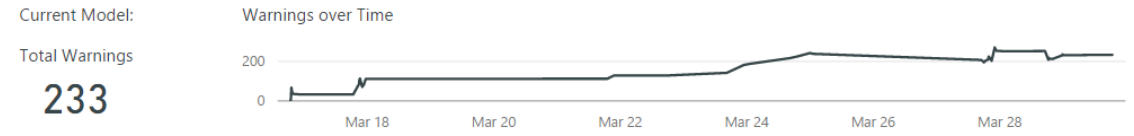
ViewsBySession
All LogViewType records by the specified date range.

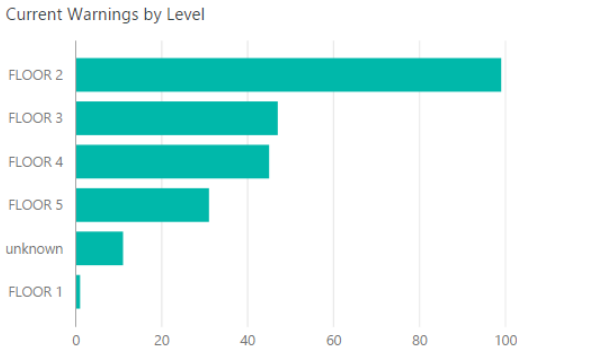
WarningsBySession
All LogWarning records by the specified date range.

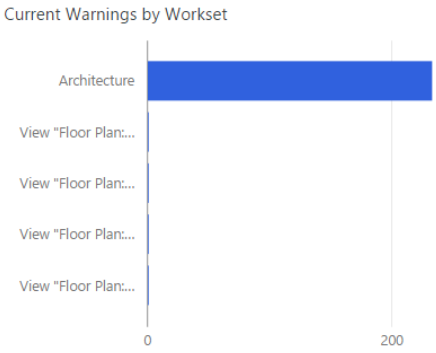
WarningSummaryBySession
All LogWarningSummary records by the specified date range.

Appendix B – Visualization Examples

Reporting or visualization requirements vary greatly by organization. Today's issue requiring analysis and/or presentation will quickly change. Flexible tools such as Power BI and Tableau allow you to quickly create reports and visualizations from many different viewpoints (e.g. by model, project, user, or workstation). Several examples are provided below.

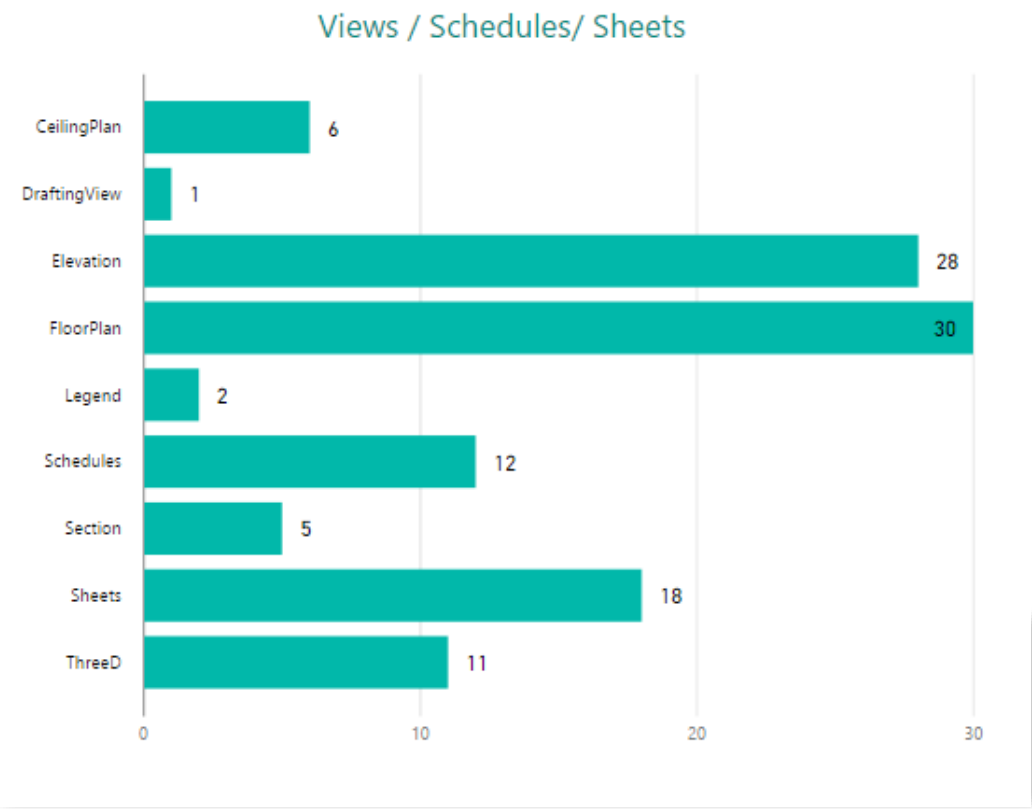


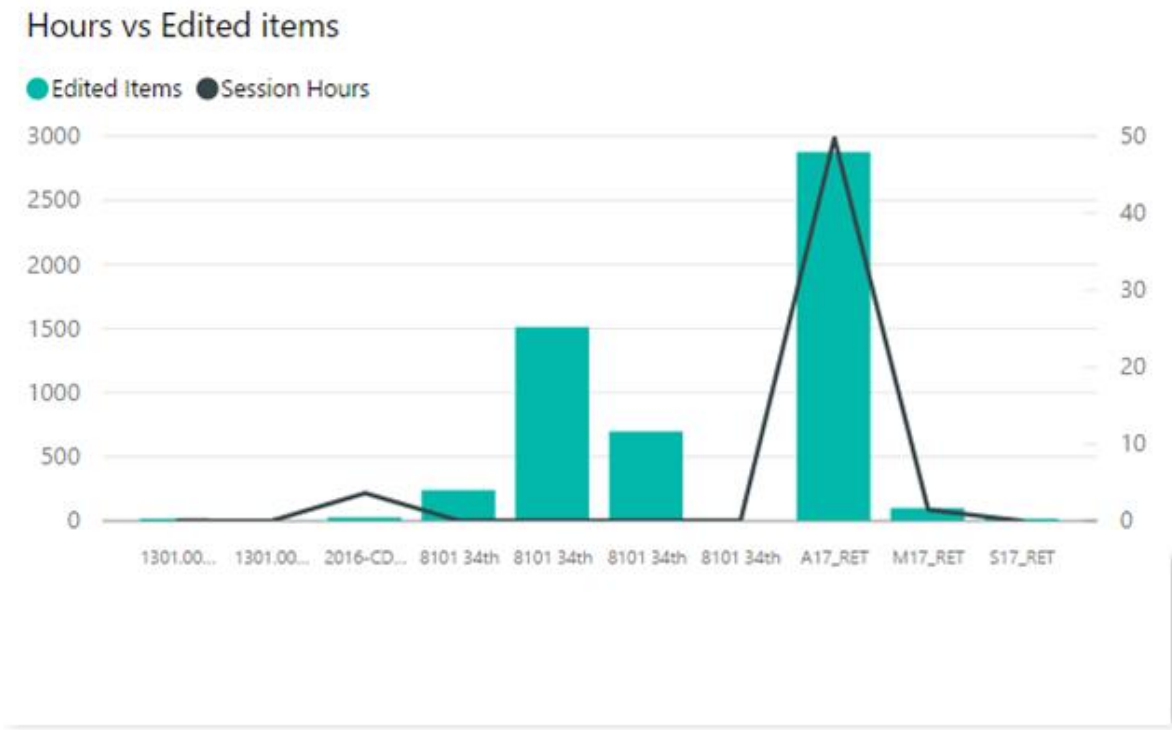




Current Warnings

Easy to Address?	WarningType	Current Warnings
yes	Highlighted walls overlap	200
	Multiple Rooms are in the same enclosed region	2
	Two elements were not automatically joined because one or both is not editable	2
	Highlighted room separation lines overlap	1
	Room separation line is slightly off axis and may cause inaccuracies	1
	Room Tag is outside of its Room	1
	Total	**203**
	Line in Sketch is slightly off axis and may cause inaccuracies	11
	A wall and a room separation line overlap	7


Views / Schedules/ Sheets
CeilingPlan
6
DraftingView
1
Elevation
28
FloorPlan
30
Legend
2
Schedules
12
Section
5
Sheets
18
ThreeD
11
0
10
20
30


Hours vs Edited items
Edited Items
Session Hours
3000
2500
2000
1500
1000
500
0
50
40
30
20
10
0
1301.00...
1301.00...
2016-CD...
8101 34th
8101 34th
8101 34th
8101 34th
A17_RET
M17_RET
S17_RET

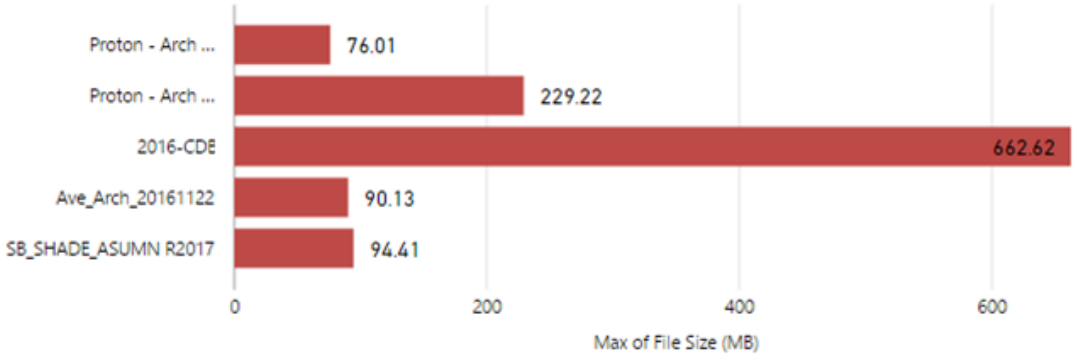
Models with > Warning per MB

FileName	Warnings/MB
HT_Central_2017	2.80
H ED Lobby Study_CENTRAL_r16	2.22
MC Lab_CENTRAL_R16	1.11

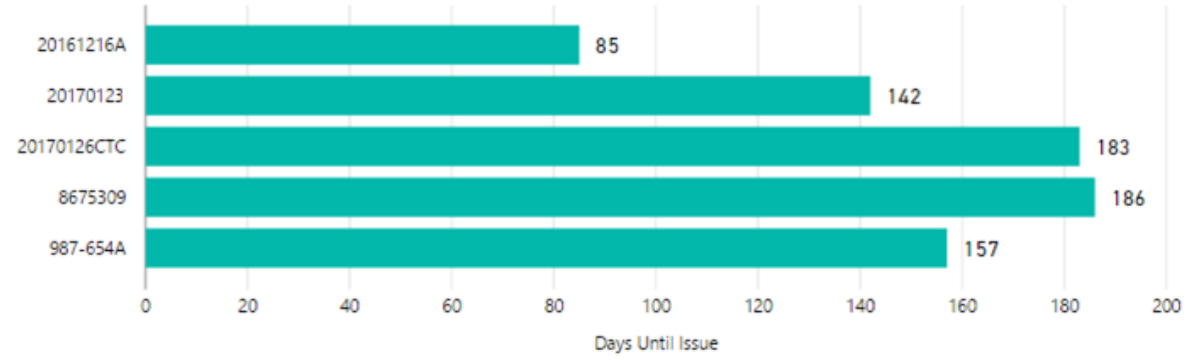
Edit Detail

File Name	Added	Deleted	Modified	Edited Items	Session Hours
Arch Core and Shell - R16	0	0	2	2	0.02
Arch Fit-Up - R16	0	0	0	0	0.01
2016-CDB- NYPAC	9	9	9	27	3.61
8101 34th Ave_Arch_20161122	0	197	44	241	0.04
8101 34th Ave_Elec_2017	0	3	1509	1512	0.03
8101 34th Ave_Mech_20170120	0	0	698	698	0.05
8101 34th Ave_Struc_20170120	0	0	0	0	0.02
A17_RET Demo Building	2586	266	24	2876	49.77
M17_RET Demo Building	85	0	15	100	1.45
S17_RET Demo Building	0	0	2	2	0.01
Total	**2680**	**475**	**2303**	**5458**	**55.02**

Largest Models



Approaching Deadlines



Projects By Office

Office	Project
Boston	Care center
	Children's Hospital Tower
	Hospital ED lobby study
	Hospital NICU Reno
	Hosptial AHUInfra
	University library 02
Houston	Office Reno
Phoenix	High Rise Mixed Use Develoment
	Hospital Tower (jobgetting)
	Medical Campus Lab
	Medical Campus MRI/CT
	Medical Campus Physicians Suite
	Medical Campus Renal studies

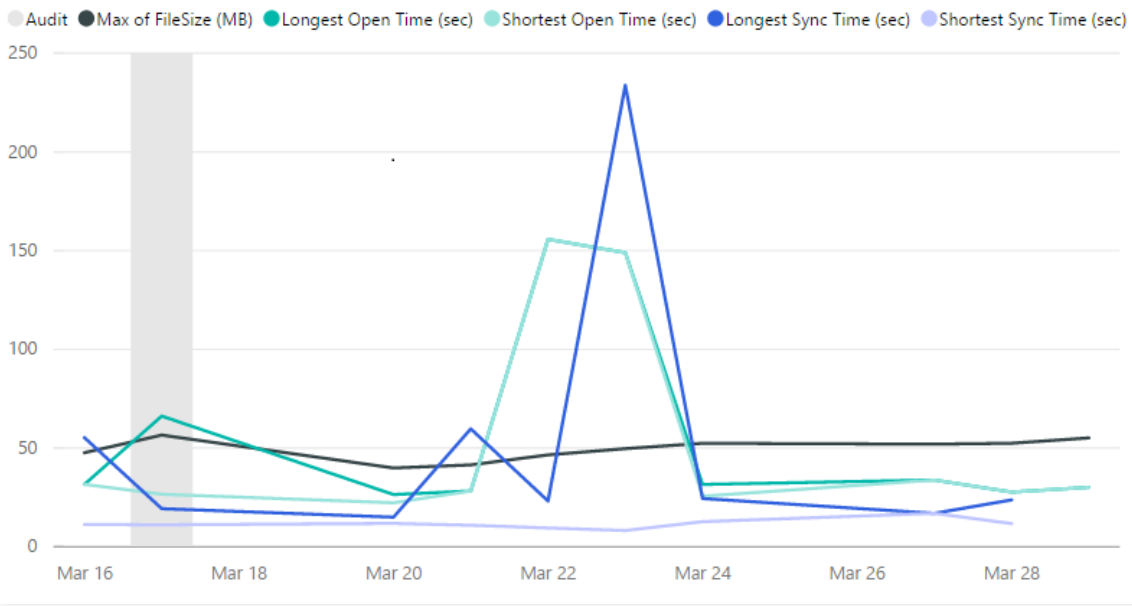
Workstations with Excessive Sync times

MachineName	Longest Sync Time (sec)
hneider3600	613.02

Workstation Details

MachineName	Video	RAM	CPU	Longest Sync ...	Shortest Sync...
salazar9480	Intel(R) HD Graphics Family; RAM:10.18.10.3871 Driver:1GB;	16	GenuineIntel; GHz:2.7	13.52	5.01
wise3600	NVIDIA GeForce GTX 980; RAM:21.21.13.7570 Driver:4GB;	20	GenuineIntel; GHz:3.6	233.72	8.23
wagner9480	Intel(R) HD Graphics Family; RAM:10.18.10.3871 Driver:1GB;	16	GenuineIntel; GHz:2.7	17.72	4.44
orris9480	Intel(R) HD Graphics Family; RAM:10.18.10.3871 Driver:1GB;	16	GenuineIntel; GHz:2.6	102.86	4.53
arner8540	NVIDIA Quadro FX 880M; RAM:9.18.13.783 Driver:1GB;	8	GenuineIntel; GHz:2.7	24.90	5.29

Revit Update Versions

RevitUpdateVersion	MachineName
20150714_1515(x64) - English_USA	arner8540
20151007_0715(x64) - English_USA	orris9480
	guyen9480
20161004_0715(x64) - English_USA	agner9480
	orris9480
	rgsess9480
	HXWORK01
20161117_1200(x64) - English_USA	salazar9480
	wise3600
	arner8540
	hneider360

Model Statistics Over TIme