ScriptRunner User Guide

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Link to application: https://scriptrunner.wevrdmc.com

ScriptRunner is an application designed and built to automate the production of Bills of Materials (BoMs) directly from Revit models using Autodesk Platform Services. See below for details.

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App Overview

Purpose

ScriptRunner is an application designed and built to automate the production of Bills of Materials (BOMs) directly from Revit models using Autodesk Platform Services. This task has two components:

A. A Revit add-in to be executed automatically in a model that extracts BOM information using the Revit API.
B. An external application that allows a user to specify which Revit models to generate BOMs for and submit tasks to be executed on a cloud-hosted computer using the Design Automation API.

The latter (B) is this application, ScriptRunner. It allows a user to specify a target model and run a script in that model without opening Revit. The former (A) is a Revit add-in developed separately from ScriptRunner but available as the primary executable automation: the BOM Generator.

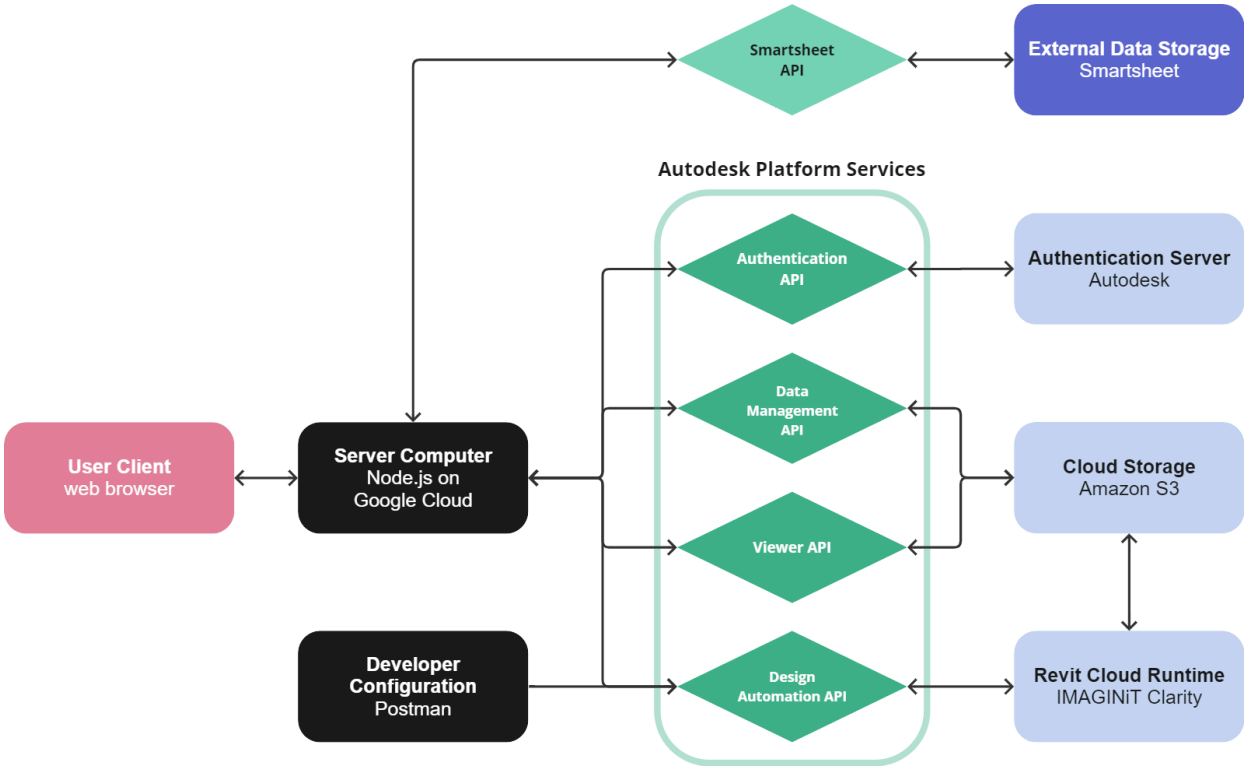
It is important to note that ScriptRunner is highly extensible and can run any Revit add-in formatted for the Design Automation API. If you see an opportunity for ScriptRunner to be useful by executing other scripts than the BOM Generator, please contact Blake Hageman.

Application Architecture

ScriptRunner is a single-page client-server web application that utilizes Autodesk Platform Services APIs and Smartsheet as external services.

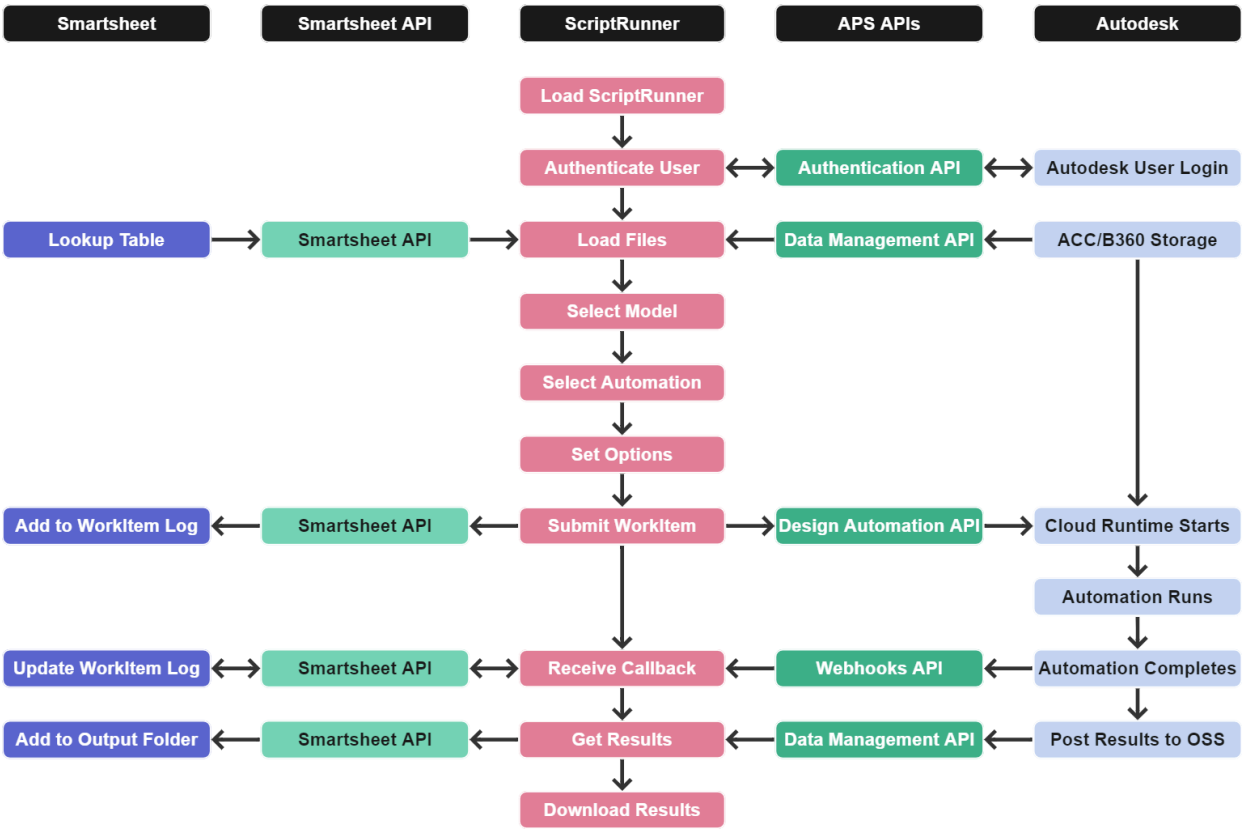
Automations are submitted to Autodesk and executed on Autodesk-managed cloud computers using the Design Automation API. ScriptRunner uses this API to configure automation requests and receive the automation results.

ScriptRunner uses Smartsheet (via the Smartsheet API) as its persistent data storage system. All ScriptRunner related smartsheets are located in the BOM Smartsheet Workspace. See the diagram below for all major components of the application architecture:



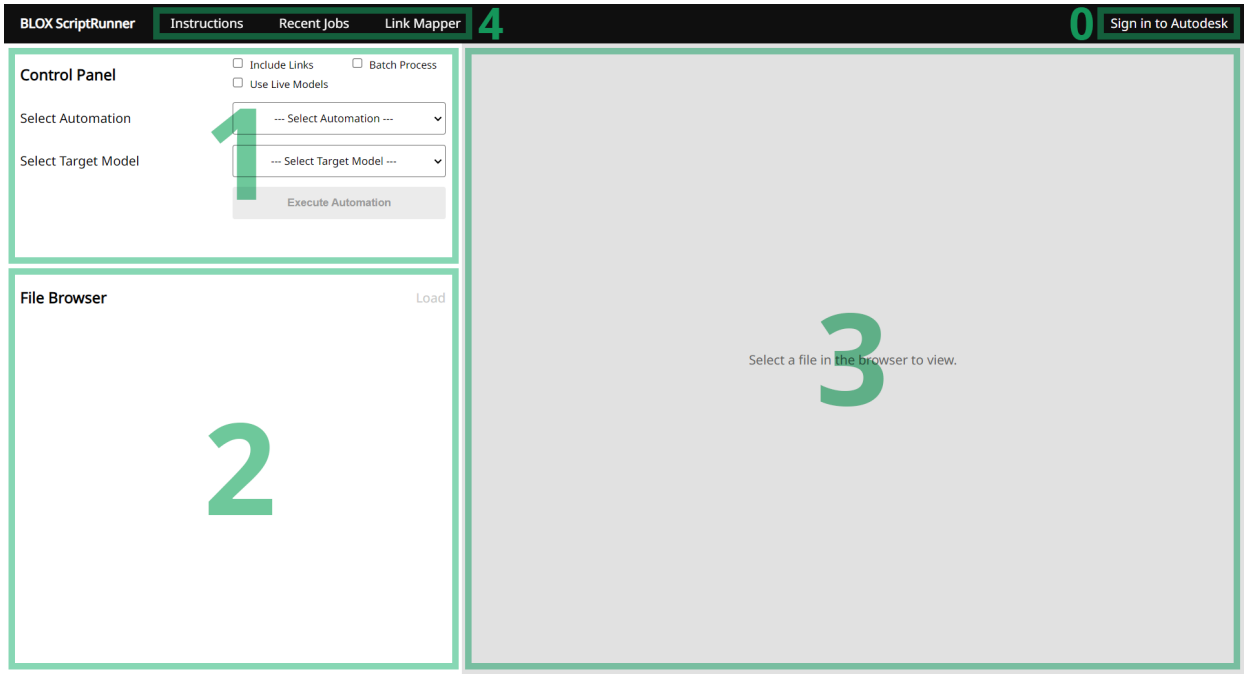
Core Workflow

The image below details the core workflow of generating automation results using ScriptRunner. Note that no distinction is made between the ScriptRunner client and server to simplify the diagram.



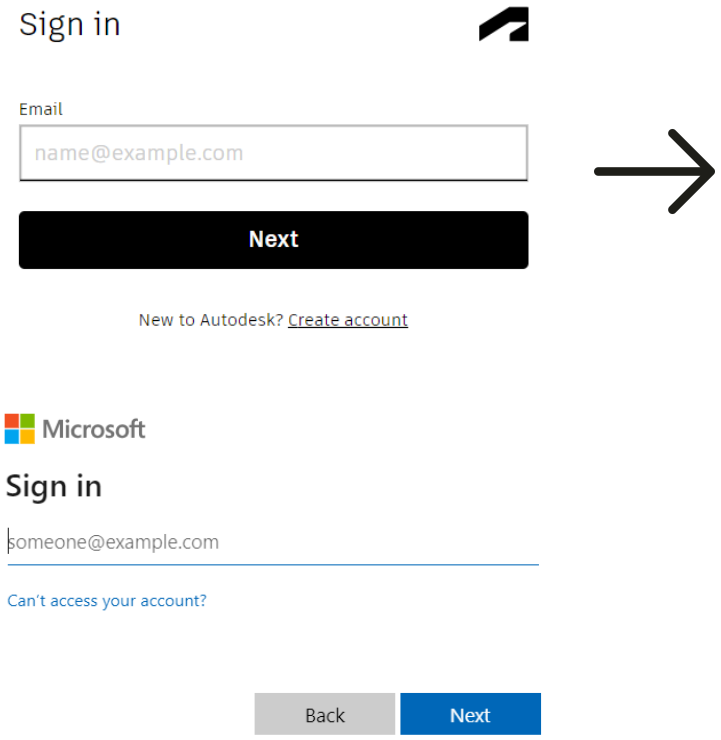
User Interface

The user interface for ScriptRunner is designed for large format screens such as laptops and desktop monitors. As shown in the image below, the interface is divided into three major sections and a top toolbar; the use of each of these sections is detailed below.

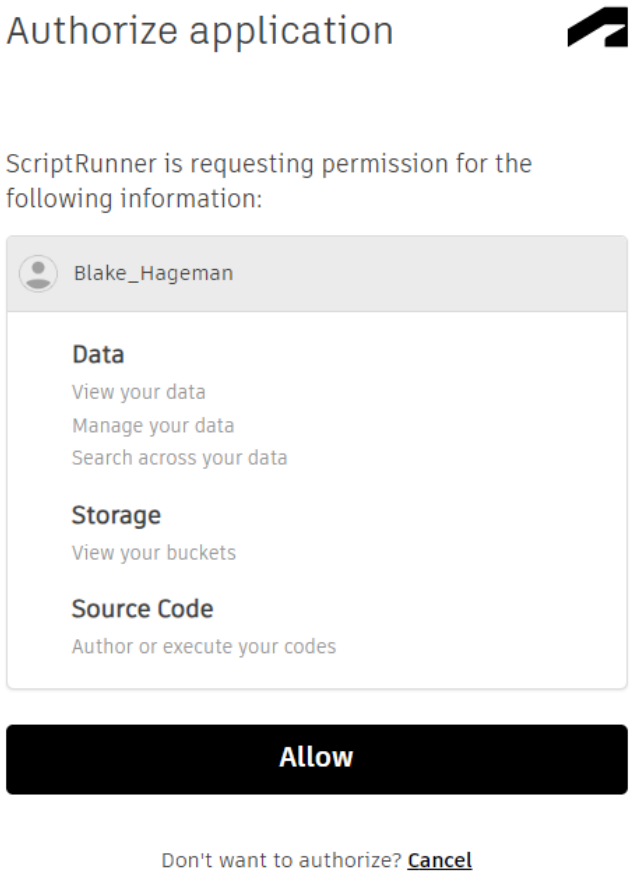


0. Signing In

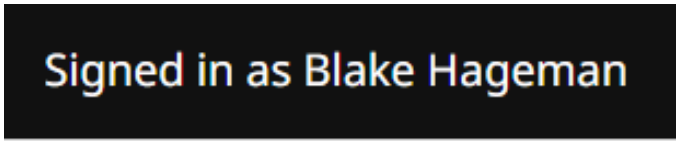
ScriptRunner takes advantage of BLOX's existing Single Sign On (SSO) workflow, which means you can sign in to ScriptRunner using your BLOX/GA email account. When you click to sign in, you will be redirected to the Autodesk sign in page, then to Microsoft upon entering your email.



Once signed in, you'll be asked to authorize ScriptRunner's access to your Autodesk data. This is required for ScriptRunner to work properly.



After you sign in, you should see your name in the upper right-hand corner. This “signed in” text serves as the log out button as well.

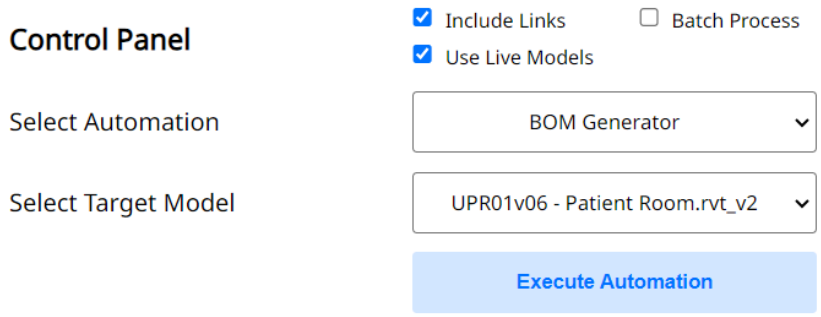


Behind the scenes, ScriptRunner uses Autodesk’s Authentication API to manage user authentication. ScriptRunner stores your authentication information in your browser cookies to keep you signed in across multiple browser tabs/sessions. If you have cookies blocked, this will interfere with ScriptRunner’s ability to work properly.

1. Control Panel

The control panel is where you can configure and submit automations. When sufficient selections are made to submit an automation, the “Execute Automation” button will change

from gray to blue. There are several options within this panel; the use of these are detailed below.



Select Automation

Automations are essentially Revit add-ins that have been packaged to run automatically within an instance of Revit on a remote computer. These add-ins are preconfigured in ScriptRunner and developed separately from the ScriptRunner application. Any automations available in ScriptRunner will be included in the associated dropdown box in the Control Panel.

More information on the automations in ScriptRunner can be found in the Submitting an Automation section of this document.

Select Target Model

Automations must be run on a Revit model, or a set of Revit models. When you load a model in the file browser, it will appear in the Target Model dropdown.

Note: only published models ***with version numbers*** will load in the dropdown. More information on versions can be found in the File Versions section of this document.

Include Links

A whole building/project is typically represented by a set of interlinked Revit models. Running automations separately on a model and all of its links can be a long and tedious process to track and manage.

If the “Include Links” option is selected, the automation will run on the selected model ***and all of its model links***. This includes any links nested into the file via Attachment linking.

This option is designed to help generate a maximally complete output, but can dramatically increase processing time for files with many links.

Use Live Models

By default, ScriptRunner runs on published versions of Revit models designated by their version number. These published versions are best understood as snapshots of the "live" version of the model as a specific moment in time. Opening published models only requires **view** permissions since the published model trails behind the live model content. Behind the scenes, ScriptRunner downloads the published model as a ZIP file (akin to downloading directly from within BIM360/ACC) and then sends that ZIP to the cloud machine as input for the automation.

Selecting the "Use Live Models" option will load the model directly from the live central model stored in BIM360/ACC, ***ignoring the specified version number*.** Using live models allows changes to be synchronized back to the central model and thus requires **edit** permissions. Typically, only design team members contributing to the model content in that project will have edit permissions on Revit models.

Using live models can be much faster than using published models since opening models in this way is more efficient for the Design Automation environment. It is recommended to use this option by default if you have edit permissions on the models you want to run automations on. However, ***if you do not have edit permissions and select "Use Live Models", the automation will fail.***

Batch Process

"Batch Process" allows you to run a single automation on a set of Revit files. These automations are independent processes submitted as a set but returned one at a time. Once all the results are received, you will be able to download the results using the Results button (which is hidden until an automation is submitted). Individual responses are available to download through the Recent Jobs panel.

Note: there is a rate limit imposed by Autodesk of 100 automations per minute (summed across all users).

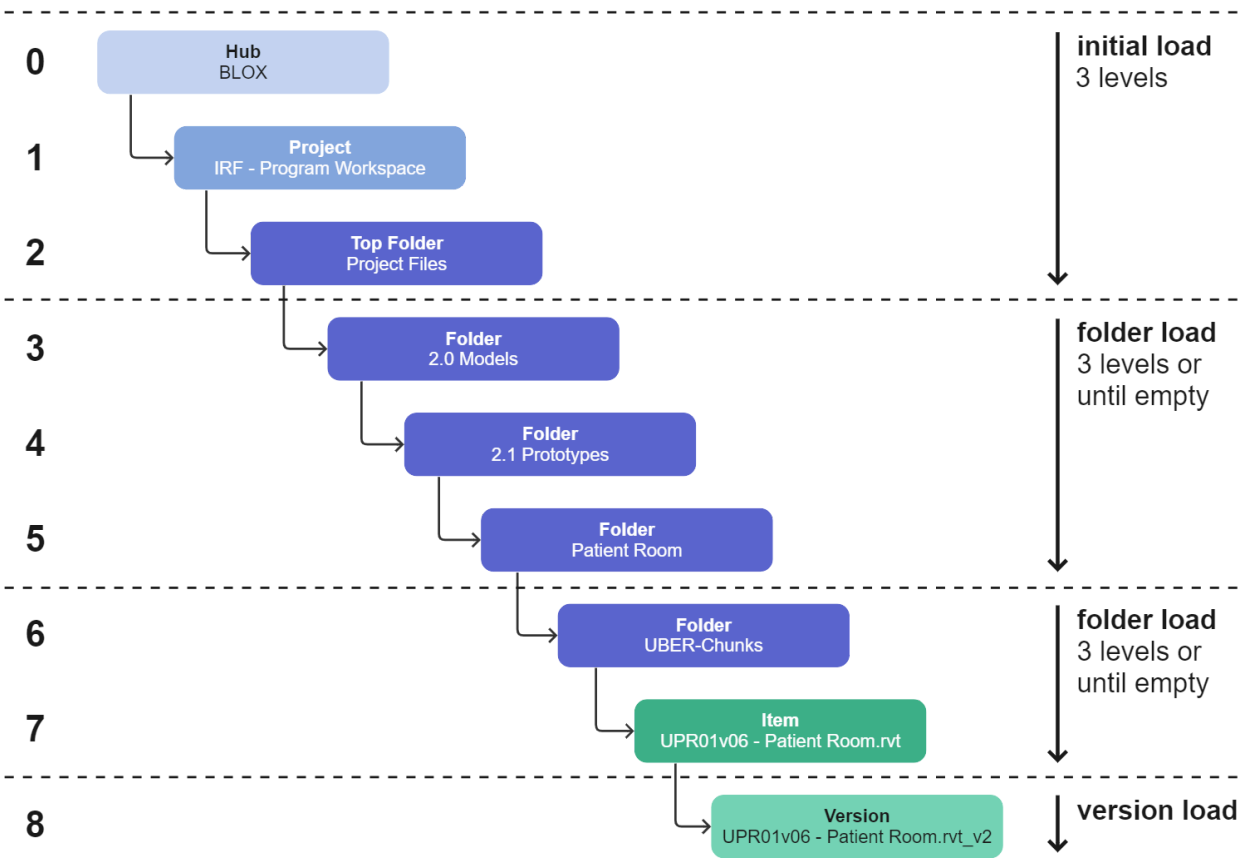
2. File Browser

The file browser is linked to your BIM360/ACC data. This panel allows you to locate models for viewing and running automations. Refreshing the page will reset the file browser.

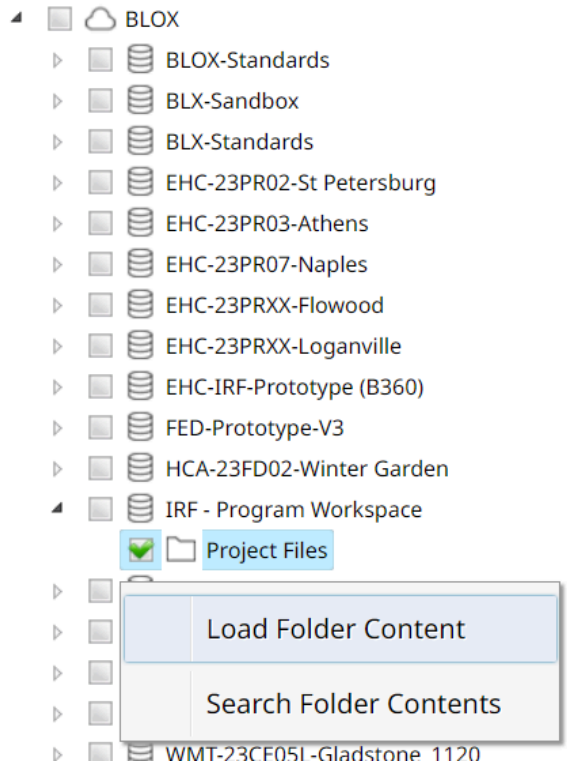
ScriptRunner loads this file tree using Autodesk's Data Management API.

Progressive Loading

A complete BIM360/ACC file tree can be quite large. Autodesk limits the amount of the file tree you can load at once by enforcing rate limits on the Data Management API. As a result, the File Browser uses progressive loading to populate the browser tree; locating a specific model for automating may require several "load" operations. See the example below:



If you right-click on a folder or item in the browser, a context-aware menu will appear; you can use this menu to load folder contents. Double-clicking an unloaded folder will also load the folder contents (double-clicking a loaded folder opens/collapses it in the browser).



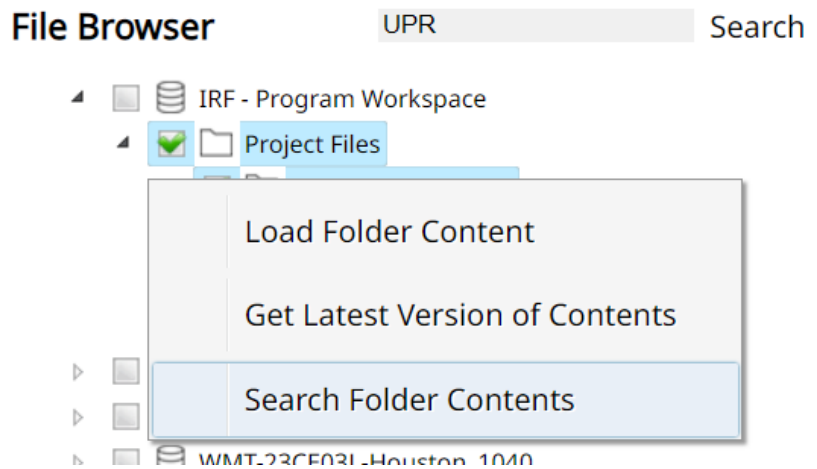
Folder Search

It is often difficult to know where the file you're looking for is stored. The progressive loading aspect of the file browser can make it difficult to search for what you need.

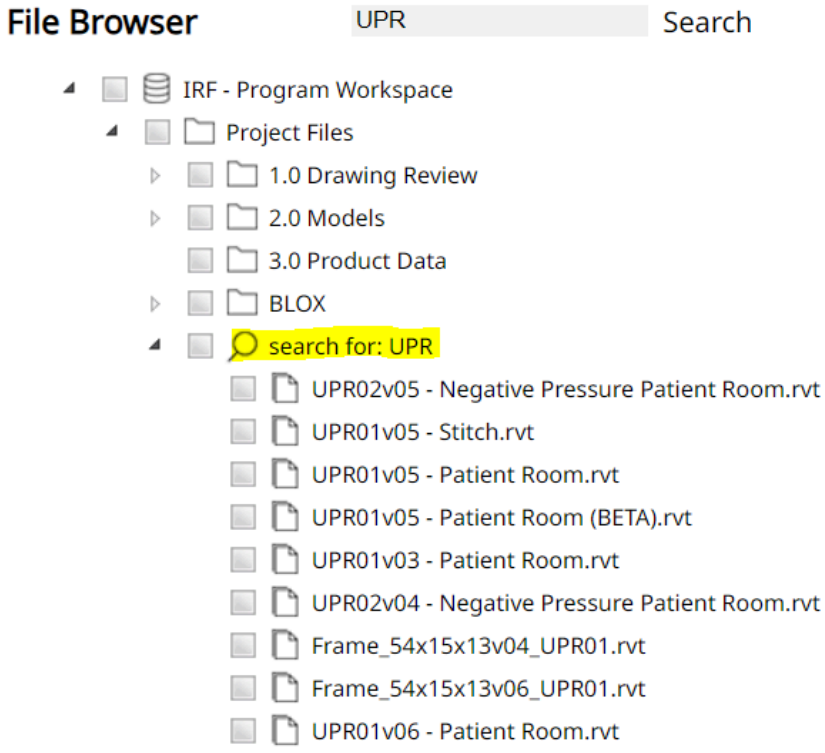
There are two ways to search in the ScriptRunner file browser: **folder search** and **browser search**.

As a shortcut to progressive loading, you can search a folder using the context-aware menu in the browser. Using the Data Management API's folder search endpoint, ScriptRunner will submit a search on the folder using the text in the search bar at the top of the file browser.

Folder Search is case sensitive per the endpoint specifications; this cannot be changed by ScriptRunner.



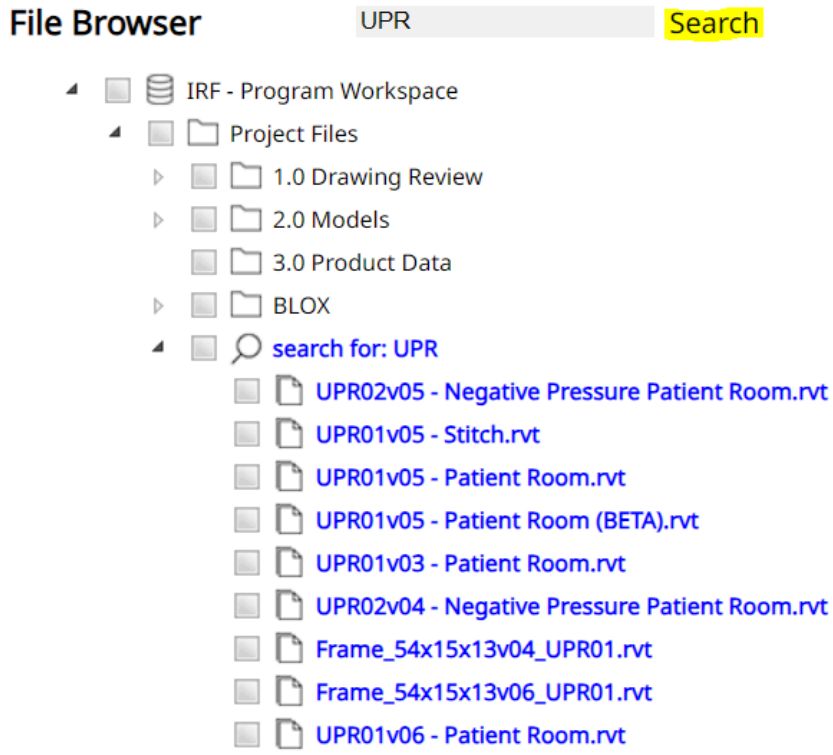
Results from a folder search will be placed in a special search results collection inside the target folder. You should verify that the model returned in a search is actually the model you want to run an automation on. Many versions of models exist across a single project including archived or sandbox versions. ***Using the Folder Search function will not tell you where in the project structure the model came from.***



Browser Search

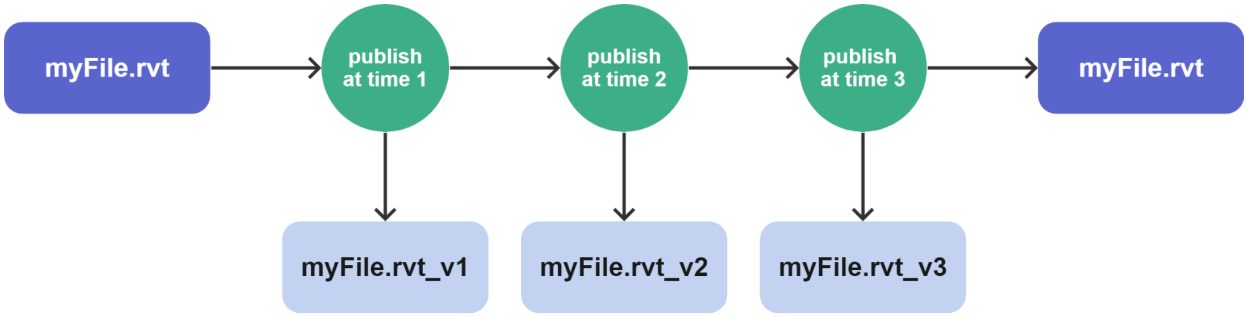
To locate an item within the file browser, the search button at the top of the File Browser will execute a Browser Search. ***Browser Search only works on loaded content in the file tree.*** Browser Search is not case sensitive.

On completing the search, the folder path to the returned items will be opened and the found items will be highlighted in blue text as below.

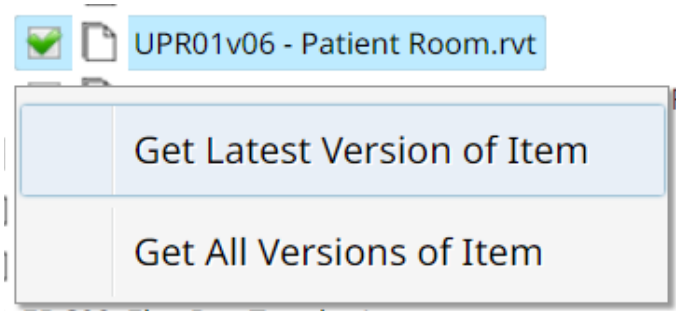


File Versions

For any given Revit model on BIM360/ACC, there is a file history which allows for saving/tracking changes to the file over time. The most recent version of a file is its “live” version; this version is what is actively worked on and edited by the design team. Periodically, this live version is “published” as a detached copy. Published versions of the live file are given sequential version numbers and generally remain unchanged after publishing.



File versions must be loaded within the File Browser for use in the Control Panel or Model Viewer. Double-clicking on an item will load its latest published version. Right-clicking an item will give you a context menu with options to load the latest version or all versions of a file.

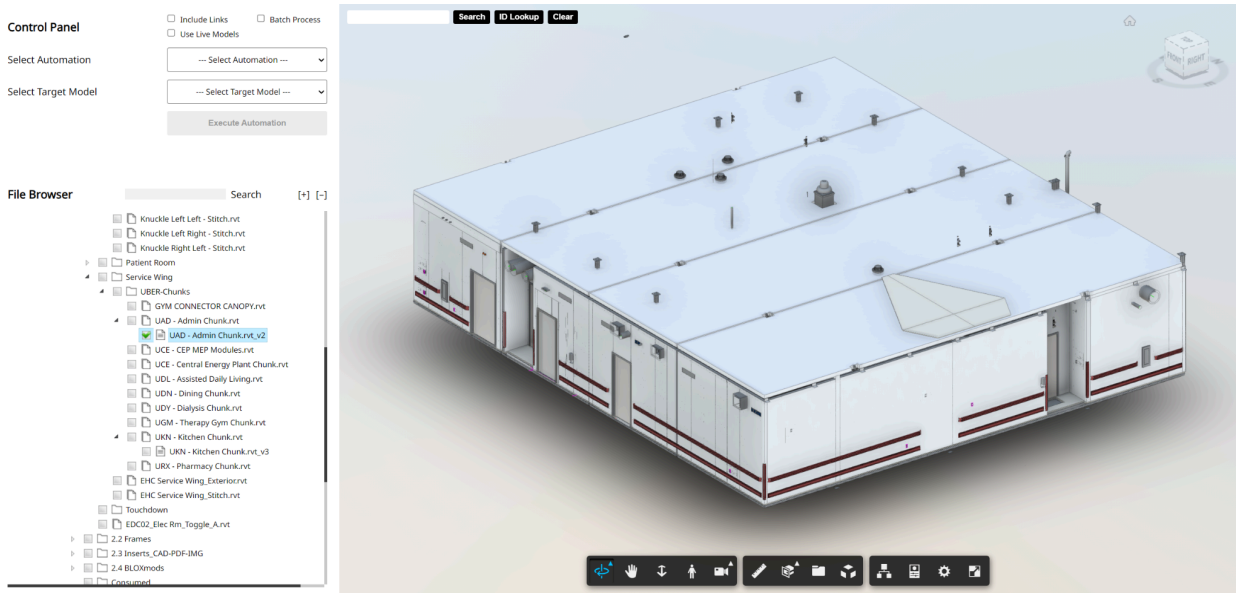


By default, ScriptRunner operates on published versions, although using the live model for automations is possible (see Use Live Models above) with the correct user permissions.

3. Model Viewer

Loading a Model

To load a model in the Model Viewer, click on any file version in the browser. The model will load the primary published view using the Viewer SDK. Note that a “viewable” model is created as part of the publishing process, and thus ***only published model versions can be loaded in the Model Viewer.*** Read more on File Versions above.

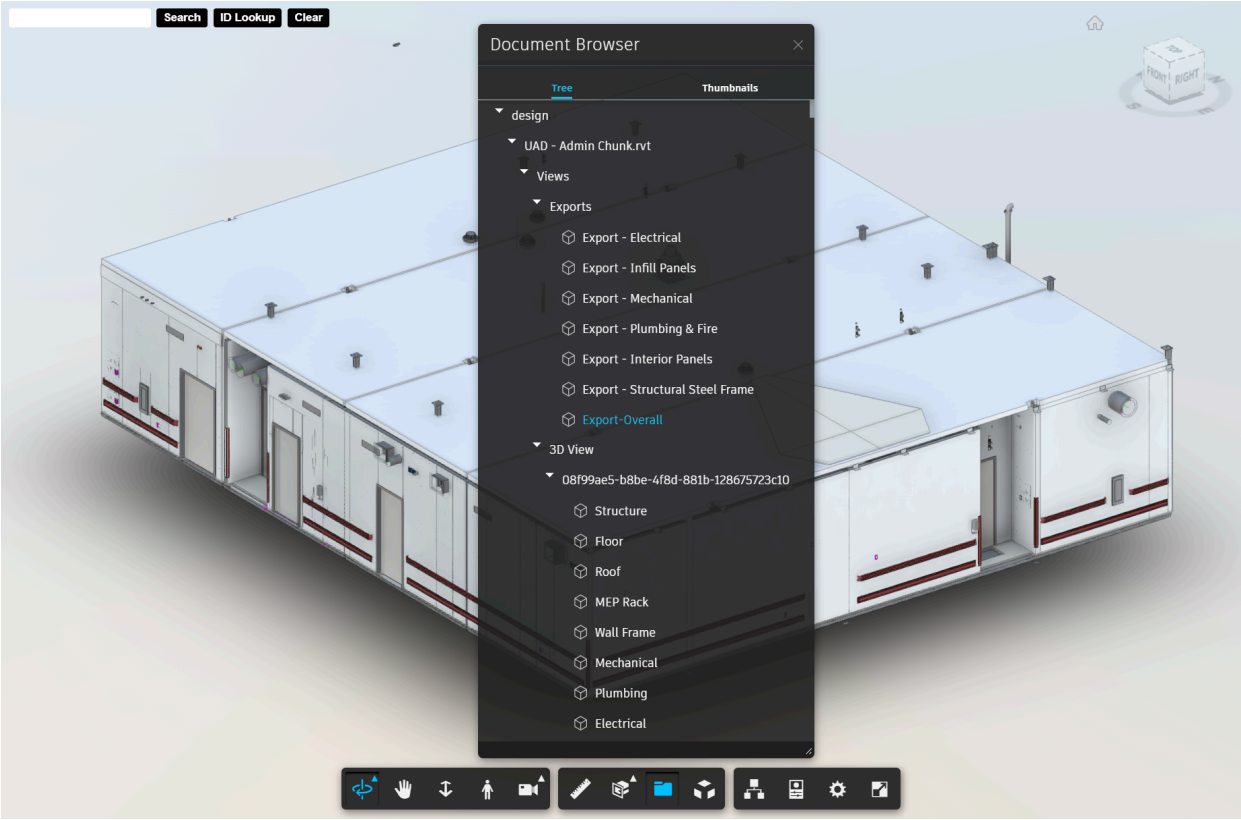


Selecting the Right View

When a model is published, a set of views from within the model are published as well. These views are set with specific phase and category filters that determine which elements are accessible for viewing. The primary published view of a model is often not a view with all model elements visible at once.

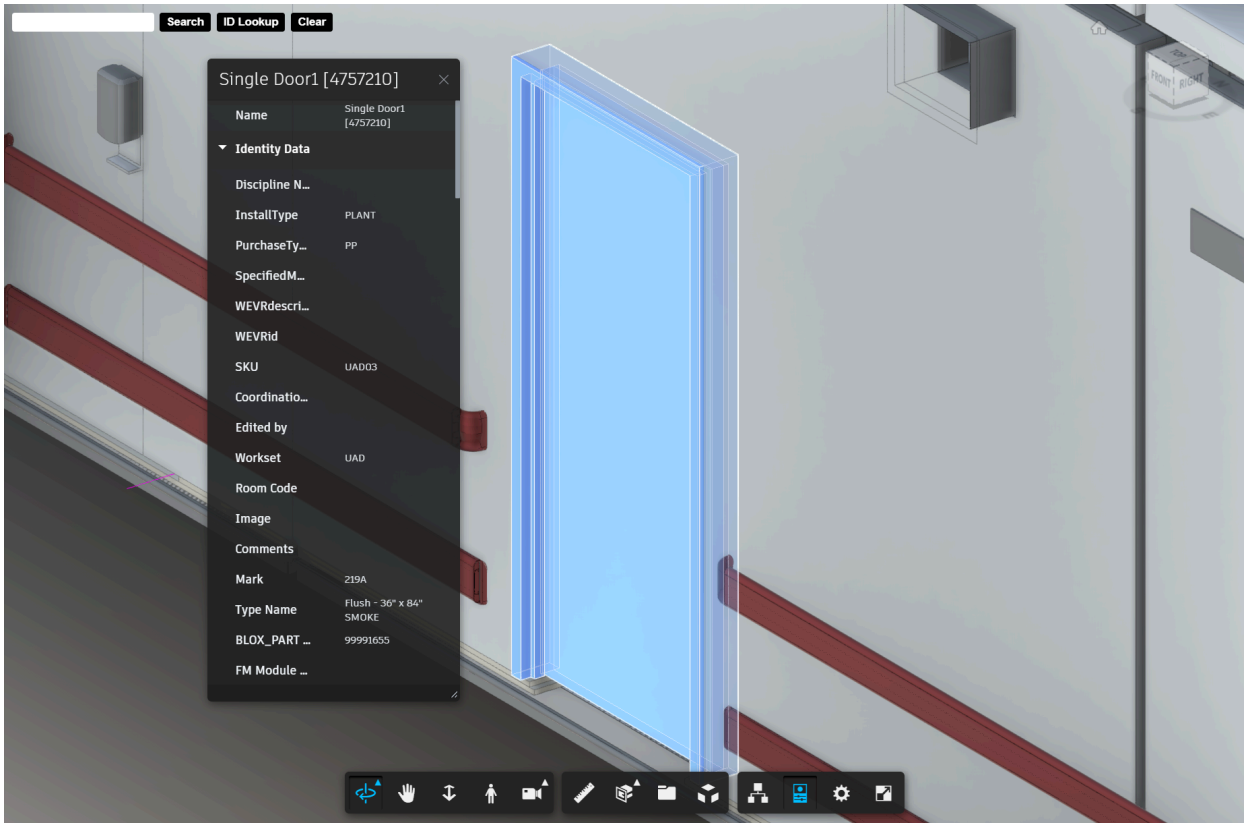
To switch between published views, select the document browser icon on the bottom toolbar and select an alternative view to load. If it is available, ***it is best practice to use the "Export-Overall" view***.

An important note: ***linked models are not published in views.*** Linked content (such as structural frames) will not display in the model viewer.



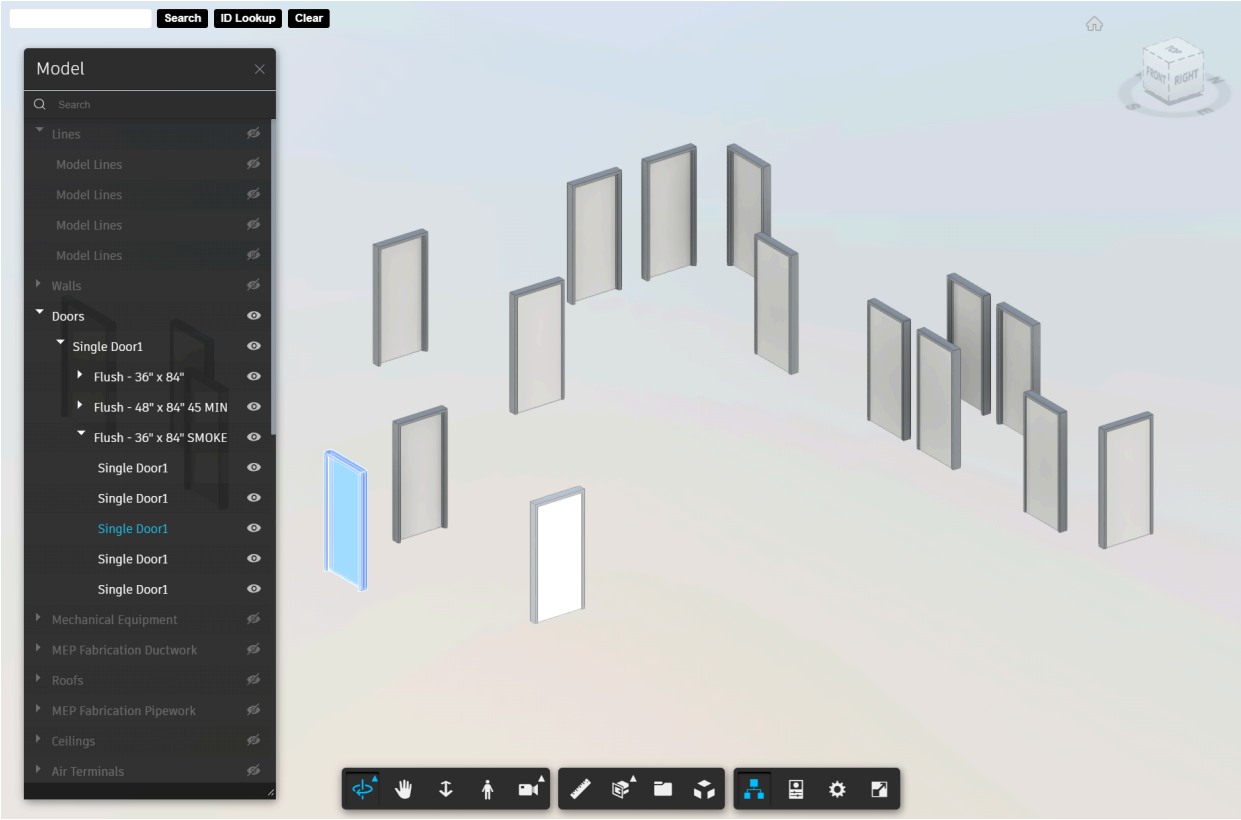
Element Properties

The model viewer is rich with parameter data from the source Revit model. You can view the parameter data for any item in the viewer by selecting an element and opening the properties panel.



Model Filtering

Elements in the Viewer are organized hierarchically by Revit Category, Family, Type, and Instance. Use the model browser panel to isolate and select elements by their hierarchical grouping.

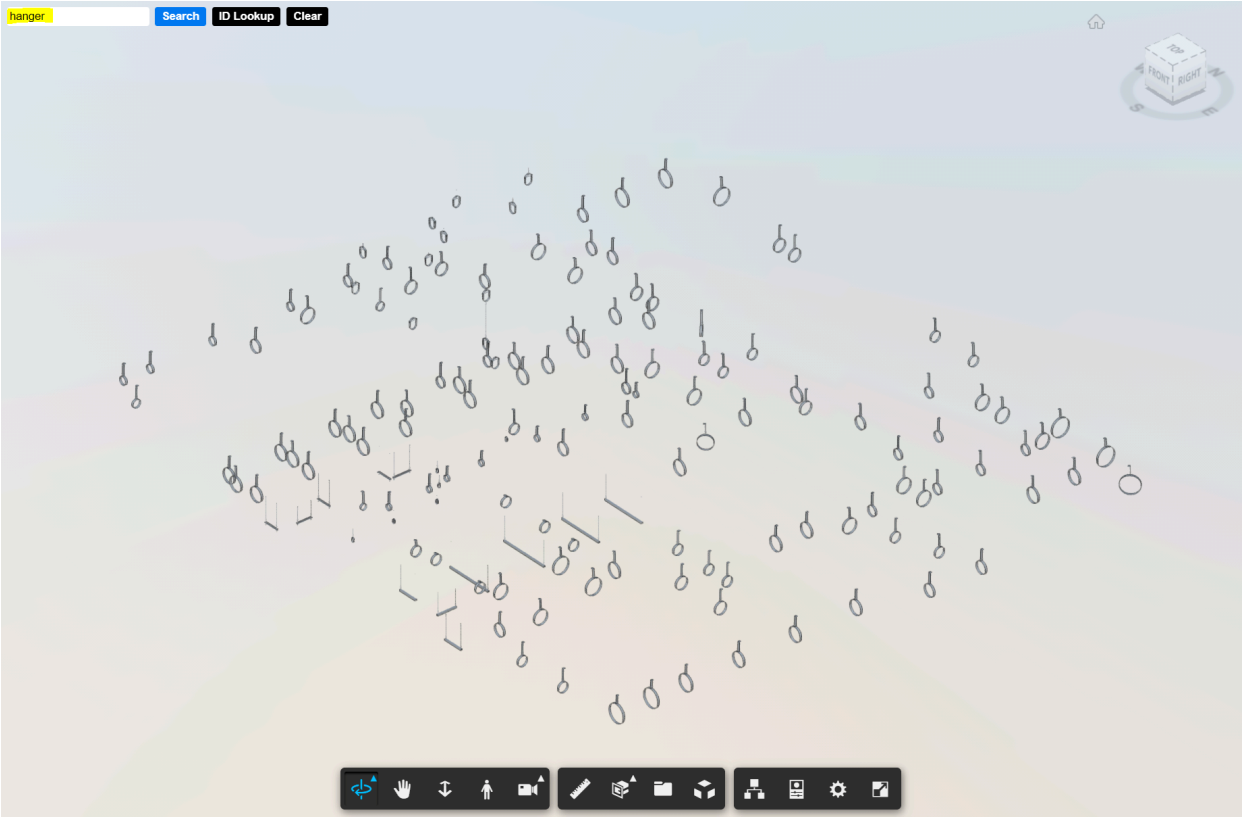


Model Search

The top-left of the viewer panel has functions which allow you to search the active view for model elements. There are two ways to search the model: **Properties Search** and **ID Lookup**.

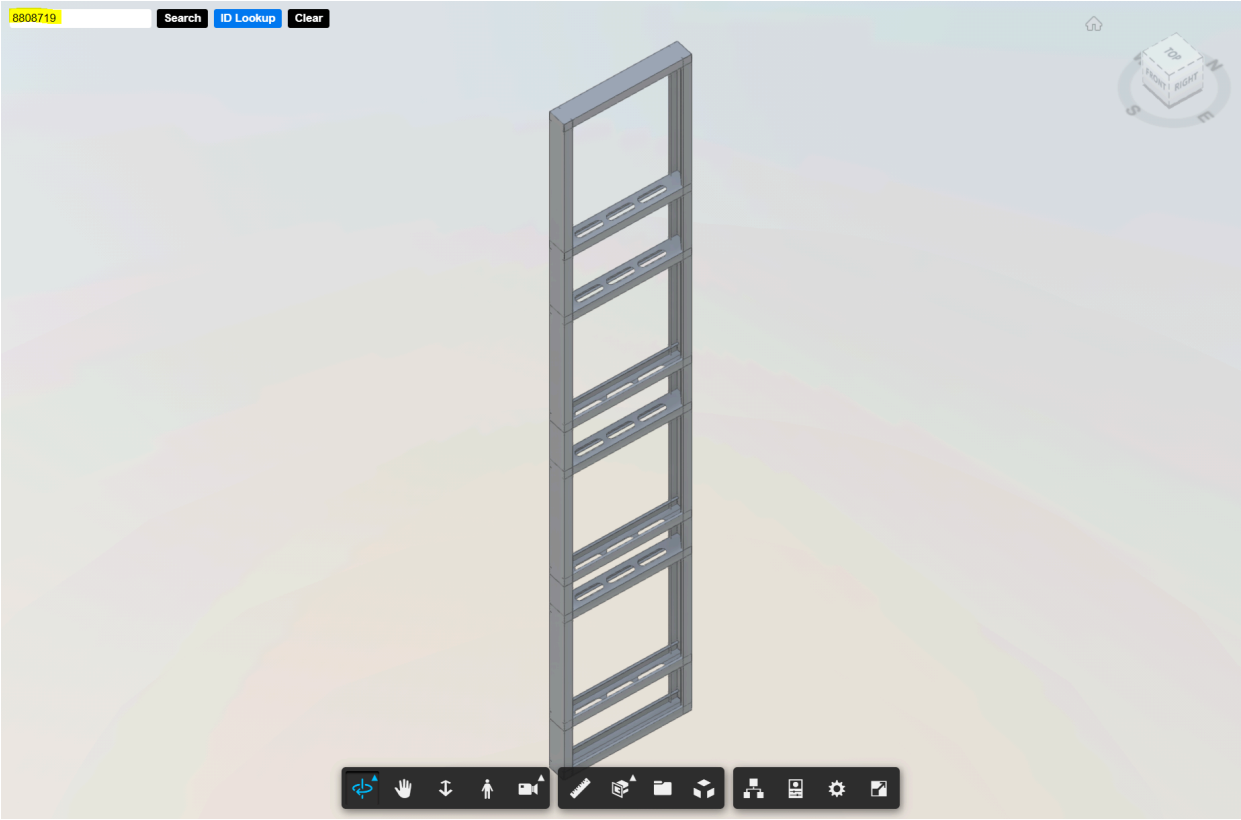
Properties Search

The Search button on the top-left of the viewer will isolate all elements in the active view that have a parameter value matching the search text. This search box can be extremely useful for creating “custom” filtered views or quickly navigating to the elements of interest.



ID Lookup

Published views retain all original ElementIDs from Revit. This can be very useful for verifying automation outputs by tracing back results to source elements. The ID Lookup button will attempt to find and isolate the element with ElementID matching the search text.



4. Toolbar Panels

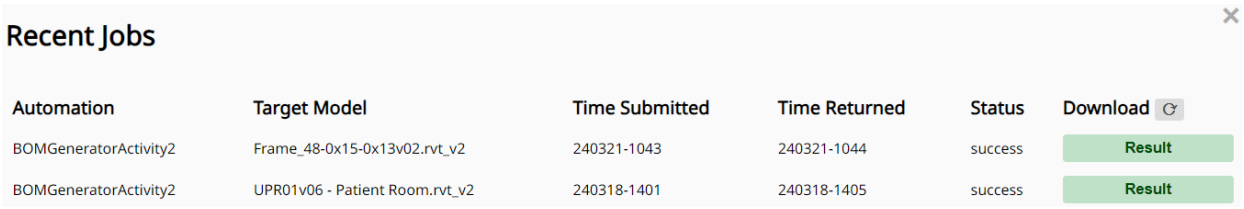
Instructions

The Instructions panel has information regarding how to use and interact with ScriptRunner. In addition to a link to this document, this panel contains basic information about the automations available in ScriptRunner.

This panel also links to the Change Request Form, which is how improvements to the ScriptRunner app are requested, prioritized, and completed.

Recent Jobs

ScriptRunner logs and tracks every submitted automation. The Recent Jobs panel allows you to review any automations submitted by you within the last 7 days, including the option to re-download results.

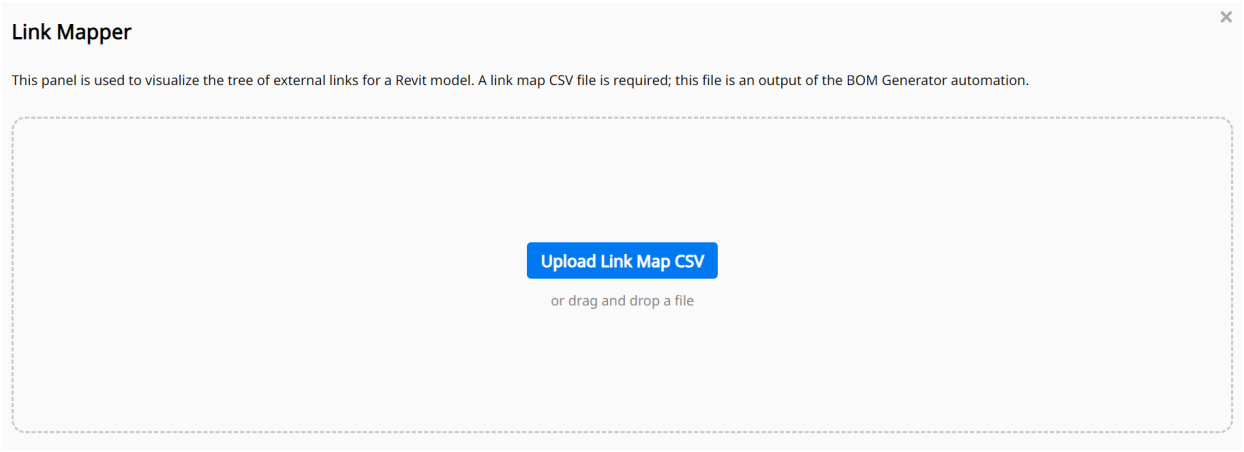


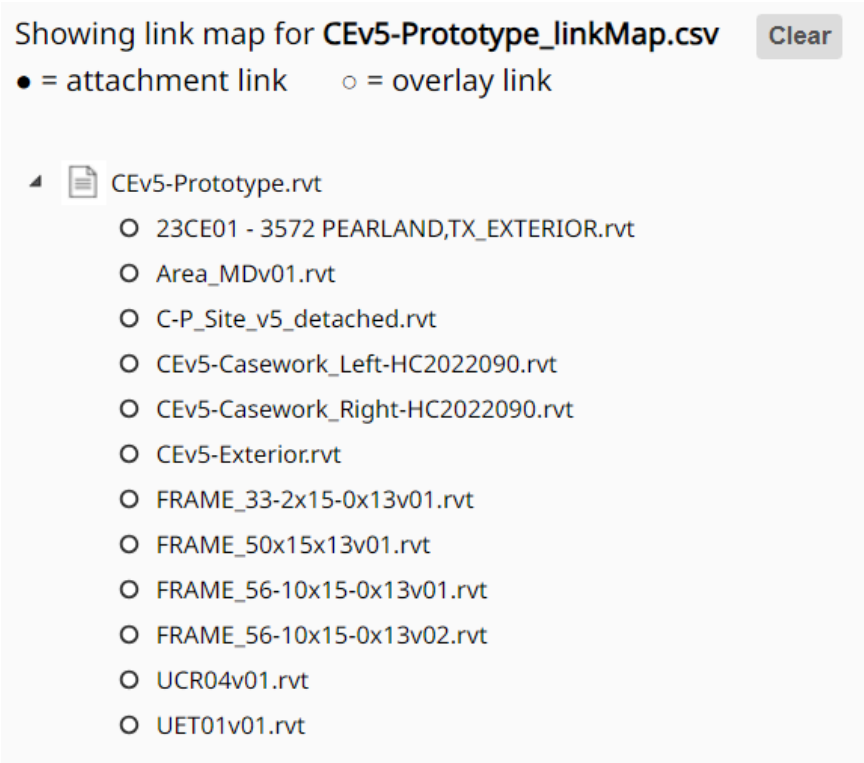
Download links are generated by Amazon S3 (via the Data Management API's signed S3 download endpoint). ***Download links expire after one hour*****,** so refreshing links (via the refresh button) may be necessary.

Link Mapper

Since many interlinked Revit models are needed to describe a typical BLOX project, the BOM Generator automation outputs a fileName_linkMap.csv file that describes all links included in the model.

This link map CSV file is not in an intuitive format for exploring model links/structure; however, the Link Mapper panel can take this CSV as an input and format it in an easy-to-read way. Once the panel is open, click the button to upload the CSV or drag-and-drop from elsewhere on your computer. The Link Mapper will read the CSV file and reconstruct the file tree from the CSV contents.



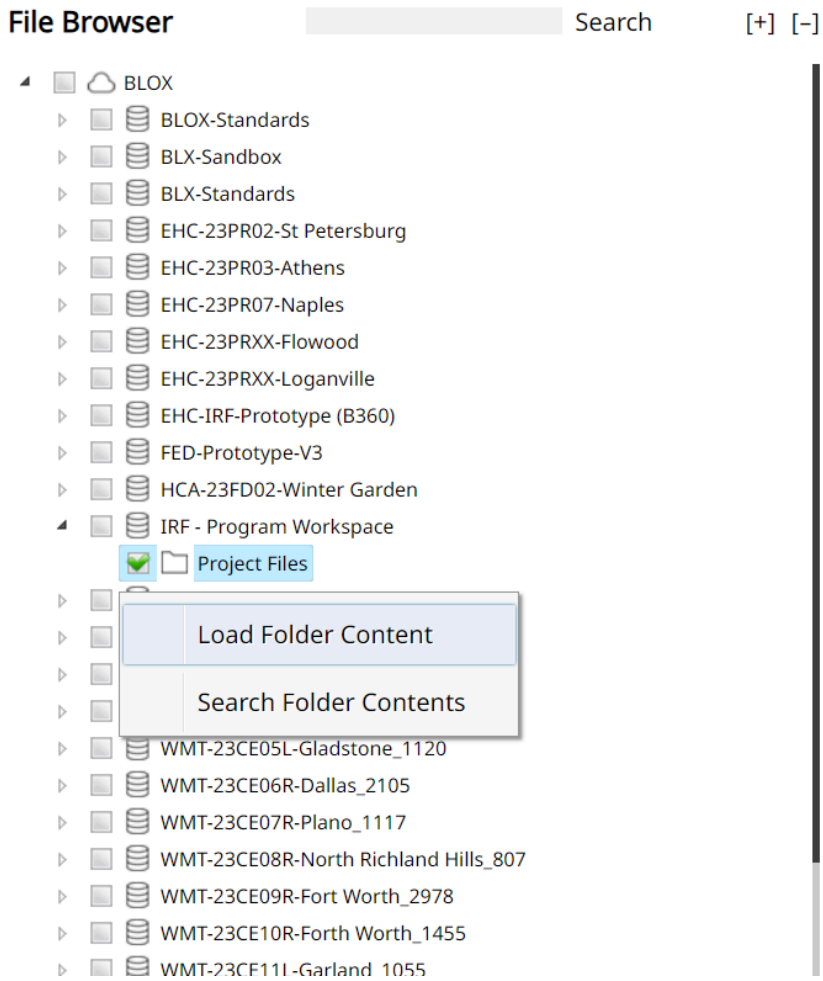


Note that the input CSVs must be in the format created by the BOM Generator automation; any other file may behave unpredictably in the Link Mapper panel.

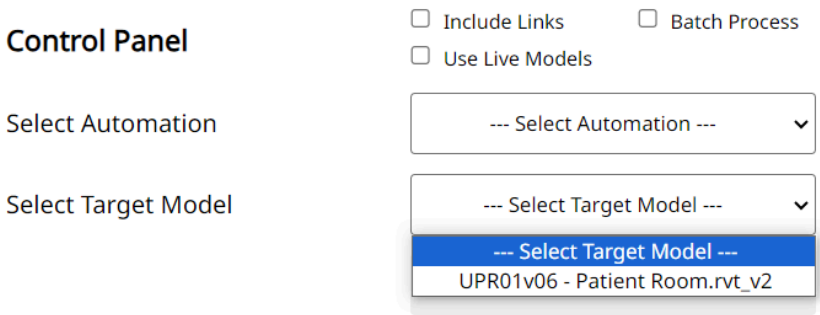
Example Walkthrough

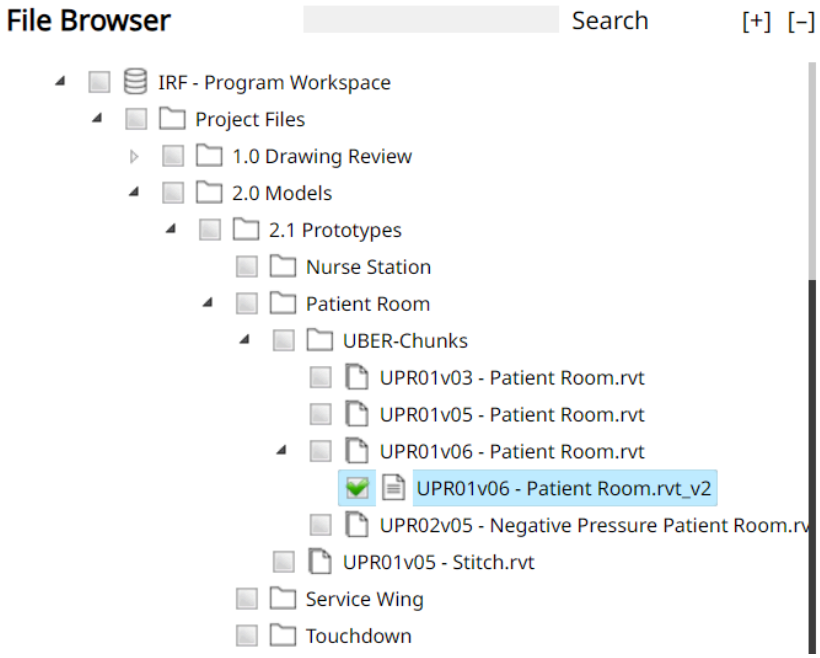
This section of the user guide walks through an example task of generating a BOM from the *IRF - Program Workspace — UPR06v01.rvt* model. For questions about the user interface, please reference the sections above.

1. **Sign in**
    a. Click “Sign in to Autodesk” in the upper-right corner of the screen.
    b. Log in using your BLOX/GA email (redirects to Microsoft SSO)
    c. Authorize application by clicking “allow” on the permissions request page
    d. You will be redirected back to the main page with your name shown as “Signed in as FirstName LastName” in the upper-right corner of the screen.
2. **Load the model**
    a. Click “Load” at the top of the File Browser panel (will be clickable once logged in)
    b. Expand the folders and load contents for *Project Files* in the *IRF - Program Workspace* project

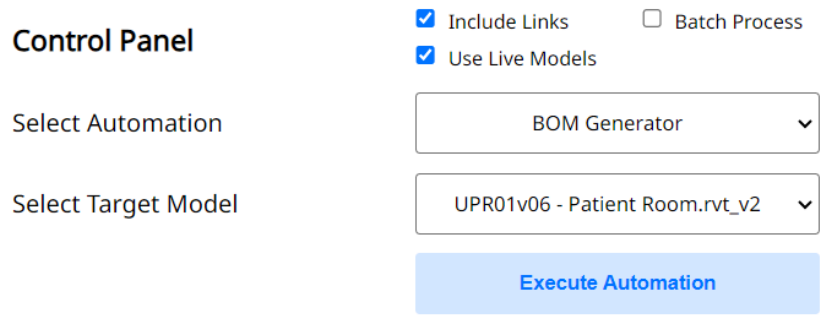


c. Load the desired target model and select it in the Control Panel

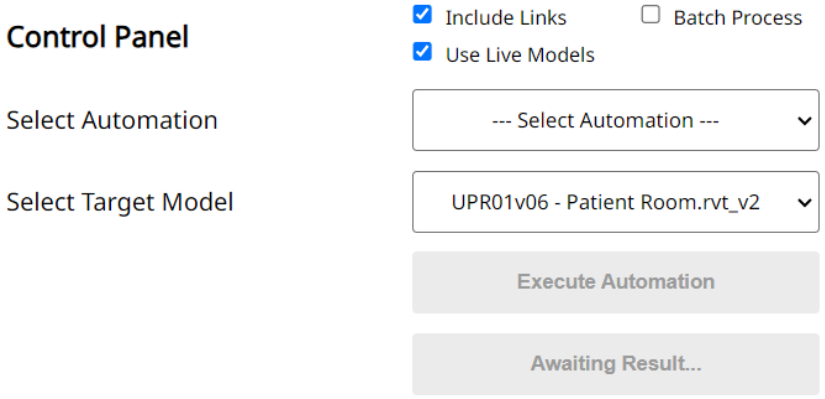




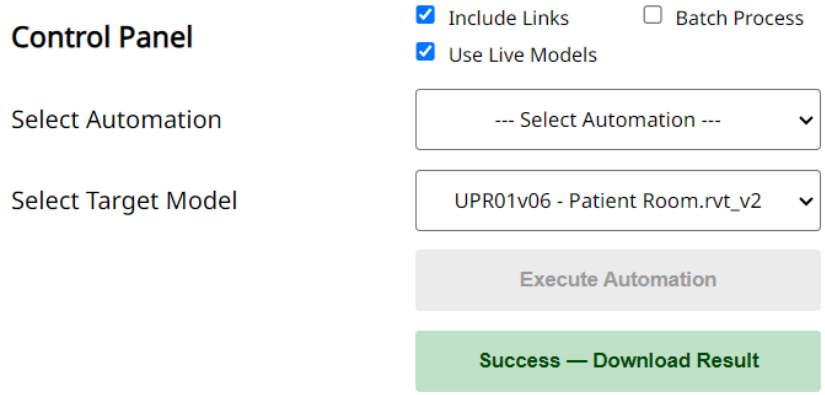
3. **Select your options**
    a. Select your automation from the dropdown
        i. The execute automation button will activate when an automation and target model are selected
    b. Check boxes for options you want applied



4. **Submit the automation**
    a. Click “Execute Automation” and see the results button appear with the text “Awaiting Result…”



5. **Wait for results**
    a. Time for results can vary widely based on the selected model and options.
6. **Download the results**
    a. Click the download button once results return.



b. For batch downloads, you may need to enable pop-ups to prevent the browser from interrupting the download process.

7. **View the results**
   a. Unzip your results file and use the files for whatever you need to do next