

Navisworks Plugin Development Design Document

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❖ **Title & Overview**

❖ **Title: Asite Navisworks Plugin**

- ❖ **Overview:** Asite an open, cloud-based platform makes it easier for users to plan, design & seamlessly share the information across the entire supply chain.

❖ **Introduction**

- ❖ Asite Navisworks Plugin is a collaborative platform that allows all parties working on a project to have access to the 3D models.
- ❖ Through this they can effectively communicate any information across the project in real-time, like if an issue needs attention, creating an issue in Issue manager with priority.

❖ **Functional Requirement**

❖ **Features:**

- Communicate and track issues across BIM authoring platforms, including between different versions of Navisworks
- Create issue pinpoints from any given location in your 3D models
- Interactive clash pinpoint display in Navisworks models with focusing filter to better visualize your clash.

● **Use Case:**

- User can identify the issues and add them in Issue Manager with priority
- The Clashes to Issues feature publishes clashes detected by Navisworks directly to Issue manager
- Clashes to Issues workflow gives the ability to quickly share clashes with all the users involved in the project possibly using different platforms.
- This eliminates the need to exchange complicated Excel sheets and clash reports sent by email. Clash information can be quickly recovered in any connecting software such as Revit

❖ Technology Stack

- Programming Language: C#
- Frameworks/Libraries: .NET Framework 4.8.1
- APIs/Interfaces:
 - Autodesk Navisworks APIs
 - Autodesk Windows Library (AdWindows)
 - Newtonsoft.Json
 - RestSharp
 - Microsoft.Web.WebView2

❖ Asite CDE

- Common Data Environment (CDE) is a digital information platform that centralizes project data storage and access, typically related to a construction project and building information modeling (BIM) workflows.
- Asite CDE is an online platform that provides a centralized location to store, access, share, and collaborate on all documents related to a project, giving you visibility into your project's risks ahead of time.
- Asite Common Data Environment (CDE) controls your data and enables BIM compliance.

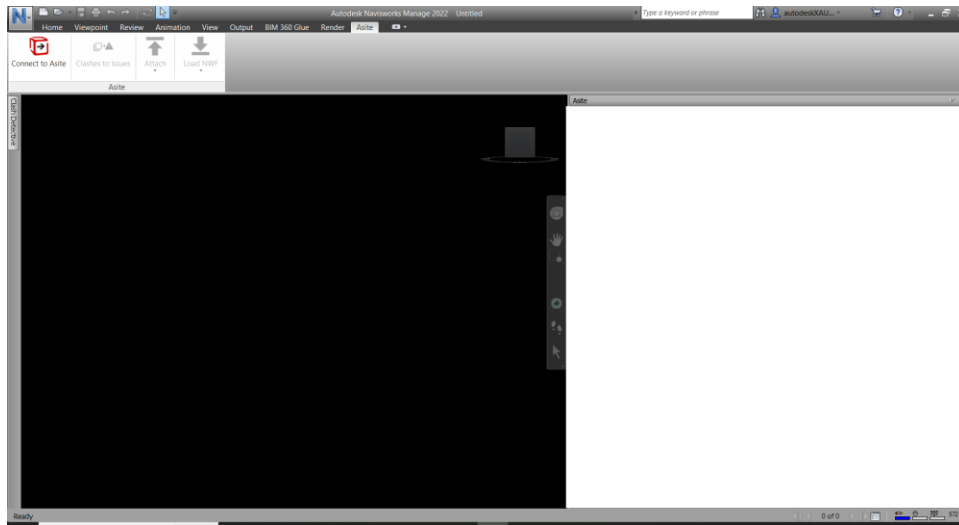
❖ Project Setup Guide

- Install Visual Studio 2017/2019/latest & Autodesk Navisworks
- Clone and pull the bitbucket repo of plugin: [git@bitbucket.org:asitesol/bcf-plugins.git](https://bitbucket.org/asitesol/bcf-plugins.git)
- Open the solution in visual studio in Administrator mode

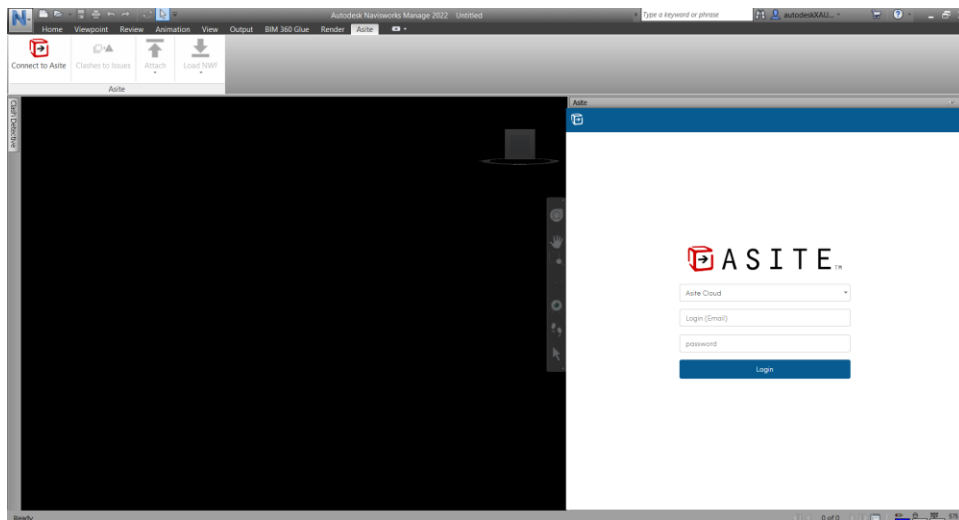
- Add the required packages from Manage NuGet
- Navisworks Plugin has support for Navisworks versions from 2019 to 2024.
 - Check the version of Navisworks installed on your system and accordingly change the build path (eg:For Navisworks 2022)
- Right click on project, open the properties, under build change the output path to: “C:\Users\UserName\AppData\Roaming\Autodesk\Navisworks Manage 2022\Plugins\Asitenwsplugin”.
- User can now build the project/solution
- Build the project NwsAsiteBCFPlugin_2022 from the Solution Explorer, until successful builds

Plugin Login Component

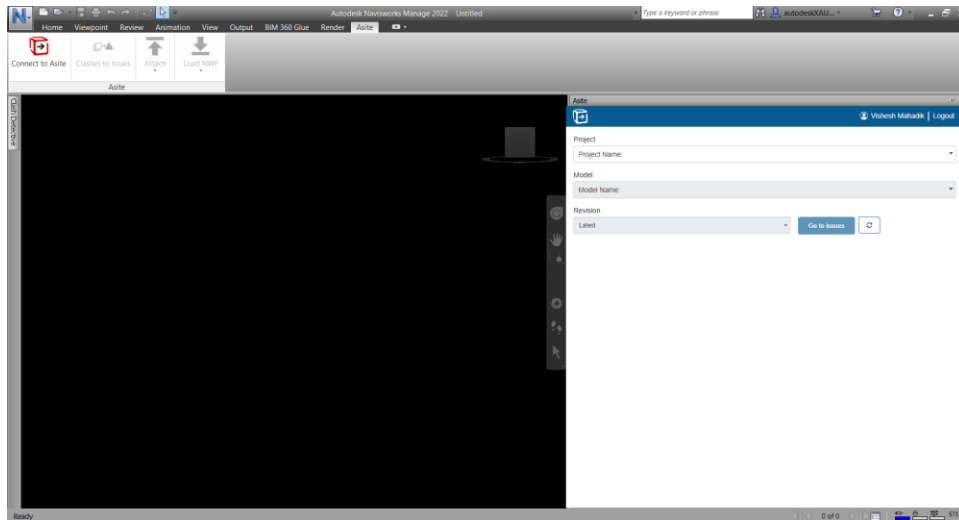
- Launch the Navisworks application after successful build of project.
- Check the Asite Ribbon tab which include the Connect to Asite, Clashes to Issues, Attach & Load NWF buttons as below:



- Clicking on Connect to Asite loads the Login Component (Login web Page) as below:



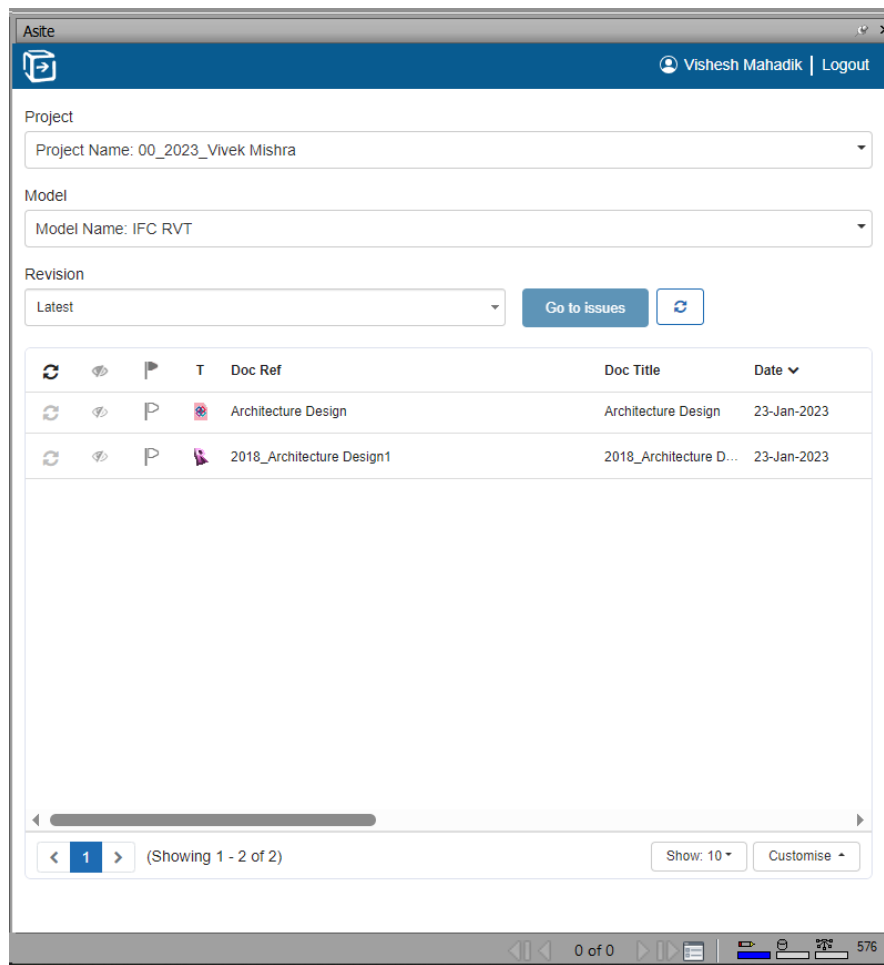
- Clicking on Connect to Login gives the call to doLogin() function from MasterFormPlugins.cs file in solution explorer.
- Cloud data is the platform on which user is working on: QA/STG/SB/LIVE (Passed through doLogin() function from MasterFormPlugins.cs)
- Provide the valid credentials: UserName & Password based on the platform
- Validated credentials redirects to onLoginSuccess() function, response from Asite CDE with cloud details, Stored File User Id & SessionId.
- After validating the credentials, the user is redirected to download page as below:



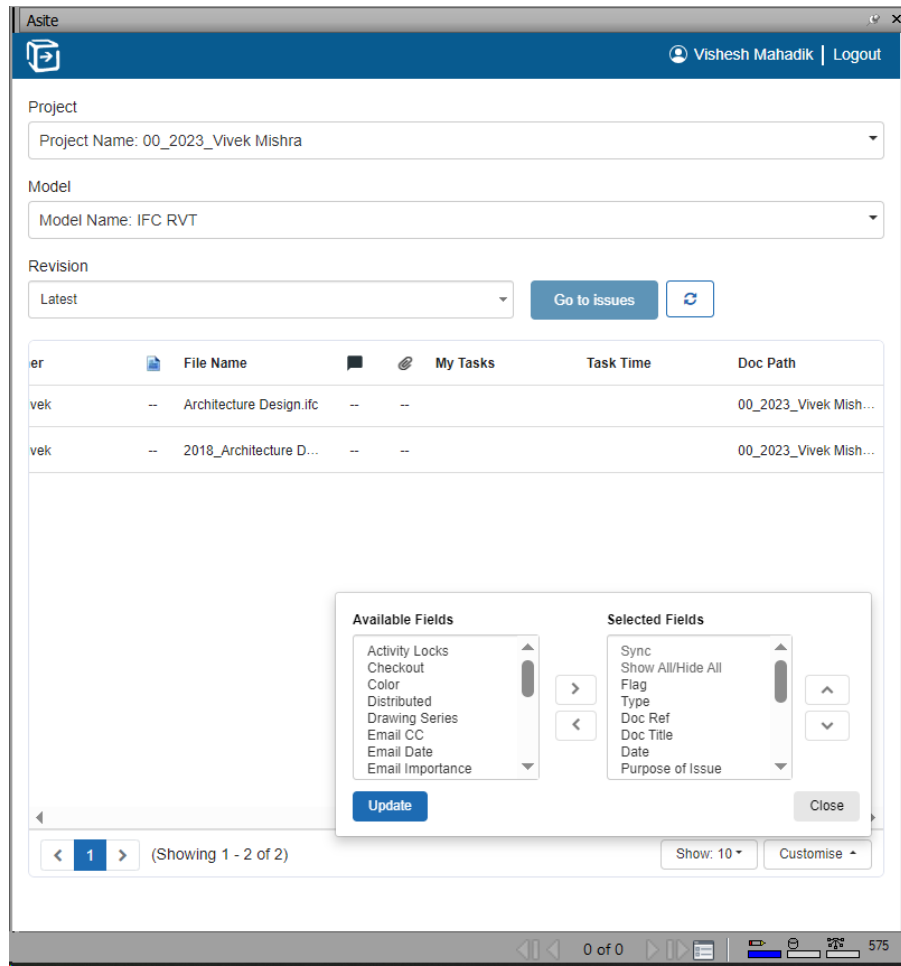
Plugin Components

1) Download Component

- a. The Download Page includes the first selection of Project that enables selection of model from the list.
- b. Selection of model from list displays the list of all ifc, rvt & rfa files with sync & view icon



- c. While loading the list of files of model the `getDownloadStatus()` function is called to check the state of file (already synced or not). If already synced the grey sync icon turns green and the eye icon is enabled to operate.
- d. If not synced, clicking on sync icon gives a call to `startDownload()` which includes call back event of `DownloadFileCompleted()`. Users can stop ongoing download of file by clicking on grey sync icon which calls `stopDownload()` function.
- e. Once the download is completed the grey sync icon turns green and the eye icon is enabled to operate.
- f. Clicking on the eye icon opens the file which is handled in `openFiles()` function & we can close the opened file by clicking on same opened eye icon which is handled in `closeFiles()` function.
- g. Customizing the columns within the file listing can be done using the customize dropdown as below:



Note: Opening of higher version file in lower version of Navisworks is not supported by Navisworks. This is handled in `CheckVersionOfSyncedFile()` function in `MasterFormPlugins.cs` file

2) Issue Manager

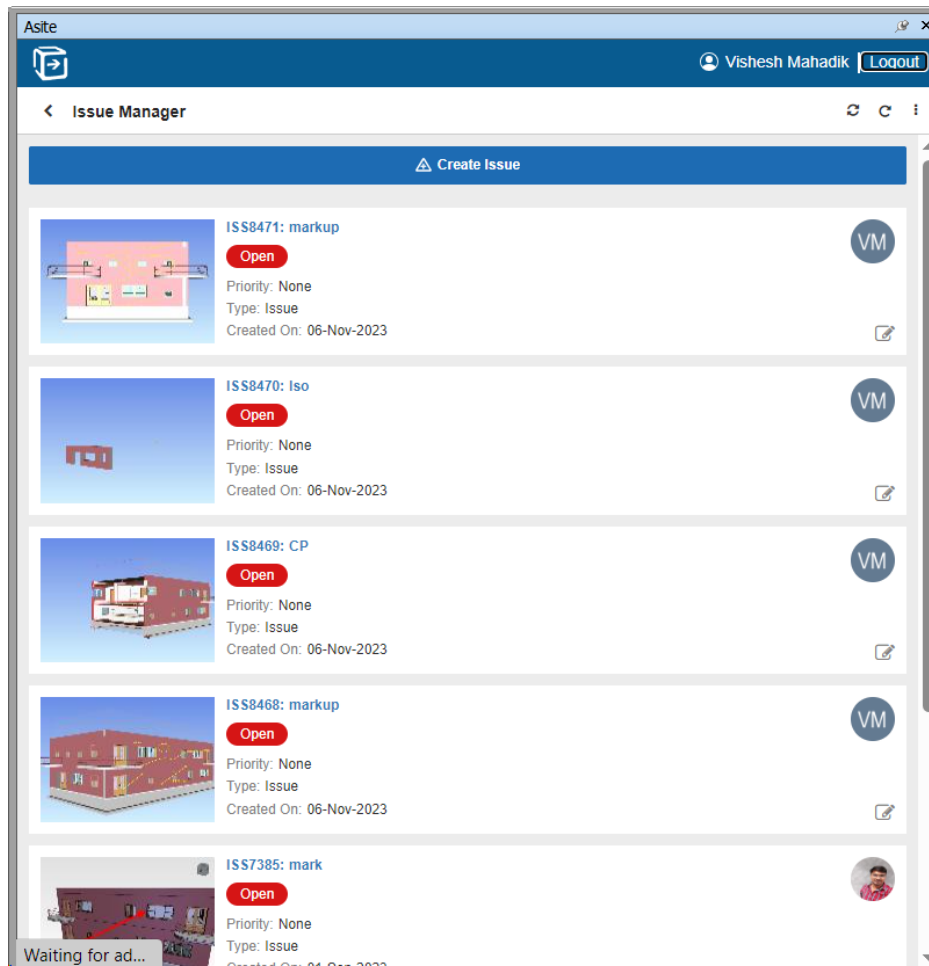
a. Go to issues:

- i. This button is enabled only if atleast 1 model is opened in viewer
- ii. Clicking on this button opens the list of issues in Issue Manager with Create issue button, refresh button

b. Create Issue:

- i. Clicking on create issue calls `CaptureView()` function from `MasterFormPlugins.cs` file and captures the viewpoint data like clipping plane, color, transparent, focus, isolate, Markups & Measurements.

c. View Issue:



- i. Thumbnail: Clicking on thumbnail image of issue loads the issue in the viewer and calls the `RenderView()` from `MasterFormPlugins.cs` file
- ii. Edit Issue: Clicking on edit icon of issue loads the issue in viewer and opens the metadata of the issue, which when updated captures the new the View as link.

Asite

Vishesh Mahadik | Logout

Edit Issue

Assign To

Title *

ISS8471 markup

Select a status

Open In Progress Approved Resolved Closed

Priority

None

Due Date

dd-MMM-yyyy

Type

Issue

Label

Undefined

Description

Submit Cancel

Views 1

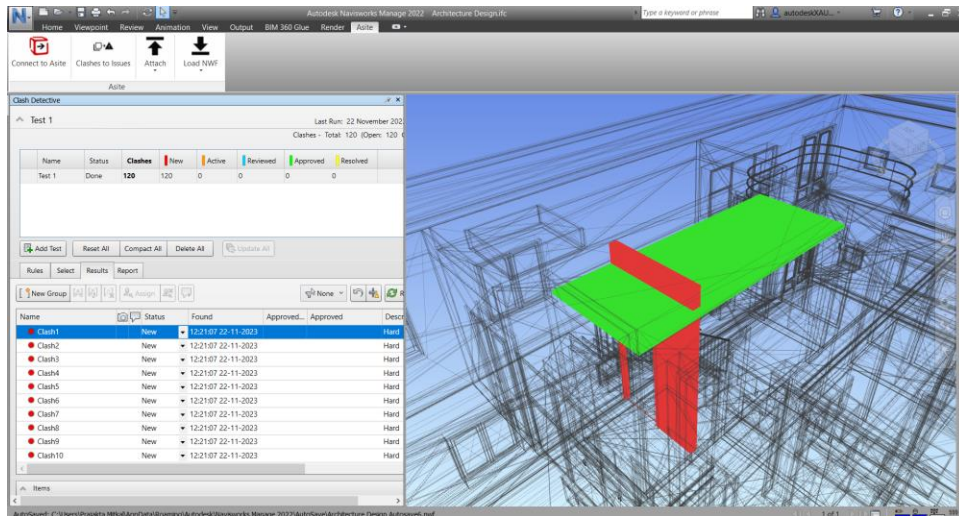
No	Type	View Name	Model Name	Project Name
1		View2059468	IFC RVT	00_2023_Vivek Mishra

Waiting for ad...

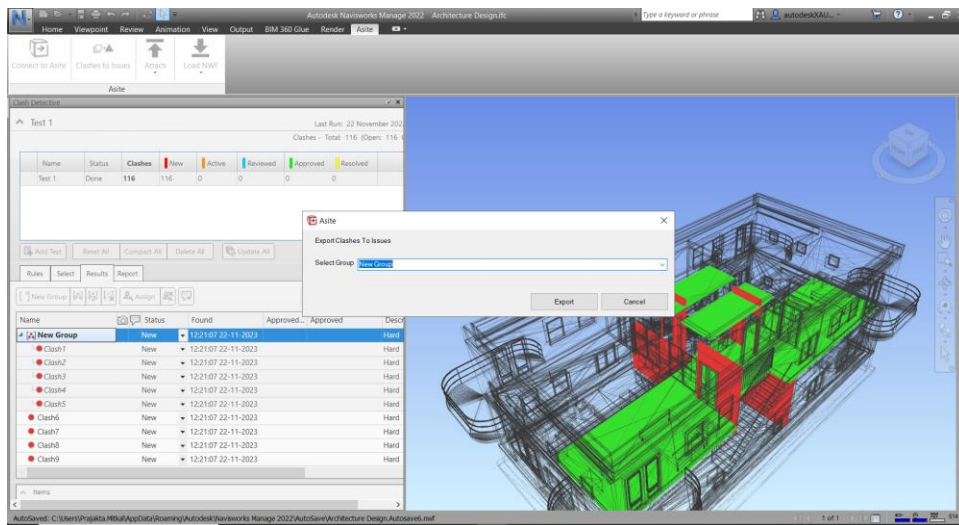
- d. **Reset Issue to default View:** Reset Visibility Button reset the model to default visibility, and this is handled in ResetToDefaultState() function in MasterFormPlugins.cs file.

3) Clashes to Issues:

- a. Clashes to Issues button is enabled after creating the clashes through clash detective (Home tab-> clash Detective->Add test-> Select the files from Selection A & B-> Run test)



- b. Group the issues in the “New group” & click on Clashes to issues which allows user to select the “New group”



- c. Clicking on Export calls the ExportClashesToIssues() function from frmGroupSelector.cs file which leads to export each clash as separate issue in the list of issue manager
- d. User can open the issues by clicking on Go to issues button to view the issues exported for clashes

4) **Attach NWD & NWF:**

- Button is enabled after loading at least 1 model in the viewer
- Selecting Attach NWD leads to export file with .nwd extension & upload as an attachment to model
- Selecting Attach NWF leads to export file with .nwf extension & upload as an attachment to model
- These functionalities are handled in the AttachFileToModel() in CAddin.cs file.

5) Load NWF:

- a. Button is enabled after loading at least 1 model in the viewer
- b. If a user attaches or has already attached the nwf file to the model the name/s is/are added in the dropdown list of Load NWF button else no name item is added under this dropdown.
- c. Clicking on the attached nwf file name from the dropdown gives the call to LoadNWFFile() function from CAddin.cs file.
- d. Through this function the file is downloaded on local system:
C:\Users\UserName\My Drive\ and after complete download the same file is loaded in the Navisworks viewer.