

CS501621

Microsoft Power BI to Maximize BIM and GIS Integration

Mostafa Elashmawy
WSP Middle East

Learning Objectives

- Learn about the benefits of BIM and GIS integration for project management.
- Learn about the use of Power BI to present BIM and GIS information.
- Learn how to link intelligent models and GIS layers to the progress trackers.
Learn about creating an Information Center using Power BI Visuals to present BIM and GIS information.

Description

Building information modelling (BIM) and geographic information system (GIS) integration have become essential for large-scale projects. While a massive amount of information is produced during the project lifecycle, it's sometimes hard to use because it's trapped inside the BIM and GIS software. This becomes an obstacle for non-users of BIM and GIS-especially on decision-maker levels and from project management perspectives. Using business intelligence software, Microsoft Power BI, and the support of other software like Autodesk Forge and VCAD, Power BI will be able to present intelligent models and GIS layers in an interactive way connected with all types of trackers. In this session, the speaker will present how they created an information centre that acts as the single source of truth for their projects using the interactive connection between Power BI, BIM 360 software, ArcGIS, and trackers in Microsoft Excel to give all team members access to up-to-date information.

Speaker(s)



Mostafa Elashmawy is Senior BIM & GIS Manager at WSP Middle East, working for Project Management Services Business Unit, providing Digital Delivery Management for some of the most significant construction projects in the Middle East. Mostafa has a Master's Degree in Global BIM Management and is certified by many respectful information management organisations. He also has a deep academic knowledge of International Standards,

Methods, and Procedures related to Information Management. He uses his knowledge and experience to implement BIM and provide digitisation strategies for his organisation and clients. Mostafa graduated as a Civil/Structural engineer and worked as a coordinator for other disciplines. He has in-depth knowledge of Architectural, Landscape, and MEP works, which helped him work as a global BIM Manager. He worked on many of the most significant construction projects in the Middle East during the last ten years delivering, coordinating, and managing BIM, GIS, and CAD deliverables.

Introduction

Building information modelling (BIM) and geographic information system (GIS) integration have become essential to large-scale projects.

- While a massive amount of information is produced during the project lifecycle, it's sometimes hard to use because it's trapped inside the BIM and GIS software.
- This becomes an obstacle for non-users of BIM and GIS-especially on decision-maker levels and from project management perspectives.
- Using business intelligence software, Microsoft Power BI, and the support of other software like Autodesk Forge and VCAD, Power BI will be able to present intelligent models and GIS layers in an interactive way connected with all types of trackers.

In this session, I will present how I created an information centre that acts as the single source of truth for the projects using the interactive connection between Power BI, BIM 360 software, ArcGIS, and trackers in Microsoft Excel to give all team members access to up-to-date information.

Getting Ready

We will need to have access to some software and platforms. Some are related to BIM & GIS, while others are required for the linking, visualisation and presenting the information.

BIM Software

Navisworks
BIM 360 / Autodesk Construction Cloud
VCAD plugin

GIS Software

ArcGIS Pro
MapShapper

Other Software

Power BI
Excel
Sharepoint

BIM to Power BI

Preparation

Below points need to be considered before using BIM Models for Power BI

- Standards, Methods & Procedures
- QAQC process
- Size of the models to be minimised
- Federation Strategy
- Project Information to include Plot ID
- Geolocation
- Navisworks NWD files
- Models to be saved on BIM 360

Preparation for Clash Detection

- Ensure that elements are defined by GUID
- Export the test result to XML

VCAD Plugin

VCAD is a plugin for BIM 360 issued by a company called Blogic. You'll need to purchase a subscription. The Plugin will give you a specific amount of slots where each slot can have 1 model. The plugin will then provide you with premade Power BI Templates that you can use as it is or edit as needed.



Sample Dashboard for Clash Detection Tracking

BIM Dashboards

The Plugin uses Autodesk Forge, which provides a BIM viewer similar to BIM 360 viewer, where you can link all BIM elements to other external information resources, including excel trackers. Infinite possibilities for dashboards are available. You can use these features to create progress dashboards, Financial Dashboards, existing conditions, etc. You can create a digital Twin dashboard by linking the viewer to information from sensors, detectors, etc.

GIS to Power BI

Preparation

Below points need to be considered before using GIS Database for Power BI

- GIS Layers shall be simplified and exported from ArcGIS Pro.
- Each Layer should have a Plot ID attribute.
- Polygons can touch but don't overlap.

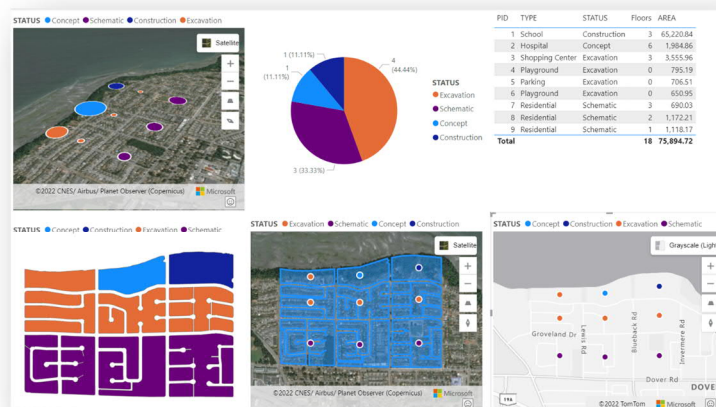
MapShaper

Mapshaper is a free website that converts GIS Layers into other extensions. Some Power BI Visuals only read TopoJson extension. We will use Mapshaper to convert to that extension.

GIS Dashboards

Power BI has a wide range of visuals that can present GIS information and link it with all other information and trackers. Below are the best visuals sorted as per my recommendation:

- Shape Map (Need to be activated at Power BI options)
- Azure Map (Need to be activated at Power BI options)
- ArcGIS Map (Requires ArcGIS Online Account for the viewers)
- Map

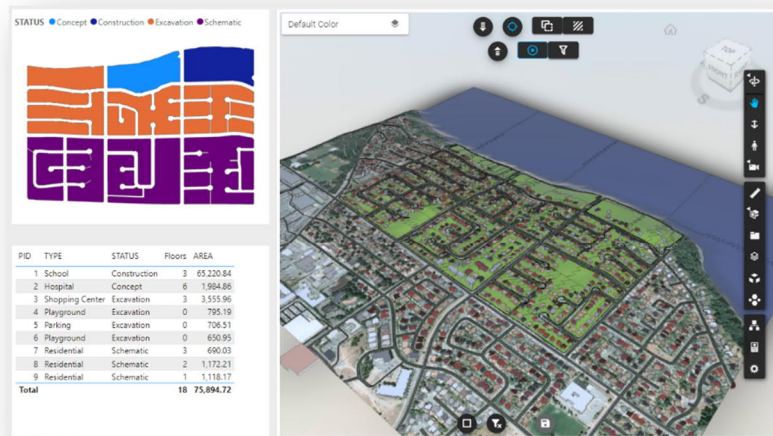


Sample Dashboard using GIS Information

Information Center

Use SharePoint or other platform to host the various types of Dashboards. Below are examples of Dashboards that can be built to support the project.

- Demolition Status
- Cost Control
- Construction Progress
- BIM & GIS Status



Sample Dashboard for BIM & GIS Integration

Recommended Reading

Forge Showroom

<https://forge-showroom.autodesk.io/>

ArcGIS Dashboards

<https://www.esri.com/en-us/arcgis/products/arcgis-dashboards/overview>