Content in Revit - Families

Bill Knittle
About Me

Bill Knittle, Synergis Engineering Design Solutions, AEC
Bill has a bachelor’s degree in Architectural Engineering from the University of Hartford. Bill has over 13 years of AEC and Autodesk AEC experience, including seven years of field expertise helping design, document, and in some cases, manage a variety of residential, commercial, municipal, and institutional projects. Bill has been training, supporting, and implementing the Building Solutions offered from Autodesk which include AutoCAD, AutoCAD Architecture, Revit and Navisworks applications. On June 16th, Bill will be blissfully married with 3 children for 12 years.
Overview

Three Kinds of Revit Families

- **System:** These are the families that are pre-defined families specific to a Revit Project. Their parametric, graphical, and documentation requirements already exist. They can not be created in, deleted from, loaded into, or saved out of the current project.

- **Loadable:** These are the families that are user-defined families built in an editing mode called the Family Editor using family templates. Their parametric, graphical, and documentation requirements can be defined from scratch. They can be created and loaded into a project as well as, deleted or saved from a project.

- **In-Place:** These are the families that are user-defined families created to represent one-of-a-kind element unique to project. Like System families they cannot be loaded into or saved out of a project but, they can be created within the context of the project using familiar Family Editor tools.
Overview

Revit Element Hierarchy

**Category:** A Category controls the organization, visibility, graphical representations, and scheduling options of Families within the Project.

**Family:** A Family is a grouping of 2D and/or 3D information that serves to represent a discrete building or documentation element in the Project. It defines parametric, graphical, and documentation requirements.

**Type:** A Type is a specific representation in a Family defined by distinct parametric, graphical, and documentation characteristics which makes it unique from other Types in the Family.

**Instance:** An Instance is an individual representation of a Type in the Project defined by unique parametric, graphical, and documentation characteristics which makes it unique from other Instances in the Project.
Families are classified into distinct groupings of classes and sub-classes

**Elements:** *Everything in Revit is an Element.*

**Classes:** *Elements are classified into a Model, Datum, or View-Specific class.*

**Sub-classes:** *Model elements are further classified into Hosts & Components and, View-Specific are further classified into Annotations & Detail Items.*
Overview

Model Elements: These are the three-dimensional elements in Revit that are visible in all 2D and 3D model views.

- **Hosts**: These are the model elements that typically represent building elements which are constructed onsite. They can host Component elements.
- **Components**: These are the model elements that typically manufactured building elements which are installed onsite. They can be hosted by Host elements.
Overview

Datum Elements: These are the three-dimensional elements in Revit that are visible in 2D model views only.

- **Levels/Grids:** These are contextual elements that help define specific elevations or nodes in space for Model elements to exist.

- **References:** These are contextual elements that also define contextual work surfaces for Model elements or direct links to other views of the Model elements.
Overview

Annotation Elements: These are the two-dimensional elements in Revit that are specific to the 2D view in which they are placed. Some can appear in 3D model views.

- **Annotations:** These are documentation elements that enhance a view with construction information.
- **Detail Items:** These are documentation elements that can overlay the Model elements or stand alone to describe the finite constructions.
Loadable Model Families

The Anatomy of a Model Family

• Bones:
  • Reference Planes: Infinite planar work planes to model on or reference meant to resolve planar relationships.
  • Reference Lines: Definitive linear references to model on that resolve linear or angular relationships.

• Muscles:
  • Parameters: Mathematical or Logical expression meant to define a characteristic or relationship.

• Skin:
  • Solid Forms: Geometric Volumes meant to create matter that occupy space.
  • Void Forms: Geometric Volumes meant to subtract matter from a Solid Form.

• Nerves: (MEP only)
  • Connectors: Intelligent links that connect information from one point to another in MEP building system distributions.
Loadable Model Families

Considerations

- Which Category will the Family represent?
- Will the Family require Sub-Categories?
- Will the Family need many Types (Sizes or Options)?
- Will the Family require a Host?
- Where is the Family’s Insertion Point?
- How will the Family display at each Detail Level?
- How will the Family display from each View Direction?
- Will the Family need Material control?
- Will the Family’s Parameters appear in Schedules or Tags?
Parameter Types

4 Kinds

- **System Parameter**: Pre-existing Parameters defined inside of every Family. Most System Parameters can appear in Schedules and Tags.

- **Family Parameter**: Parameters created in the Family Editor mode that cannot appear in Schedules or Tags. Family Parameters live inside the Family they were created for.

- **Project Parameter**: Parameters created in the Project environment that can appear in Schedules but not in Tags. Project Parameters live inside the Project they were created for.

- **Shared Parameter**: Parameters created in an external text file that can appear in Schedules and Tags. Shared Parameters are shared to multiple Families and Projects.