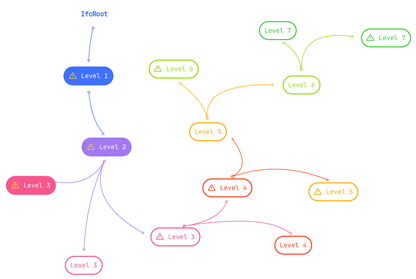
Visual Key: IFC Class Hierarchy & Syntax Indicators

Hierarchy Level

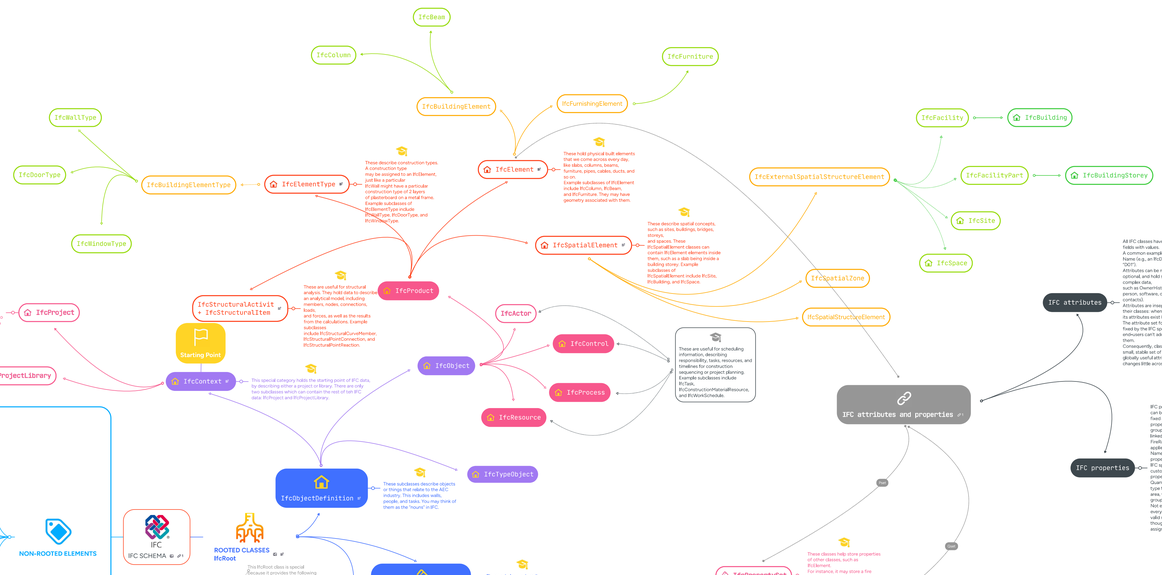


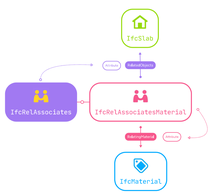
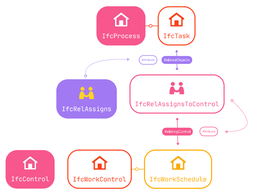
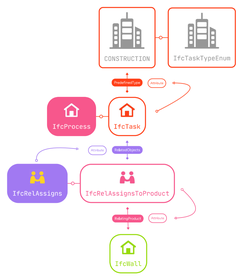
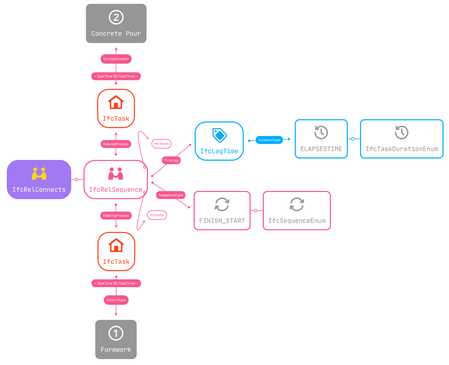
IfcClass — Coloured background + Gold Icon = Abstract Class

IfcClass — White background + Level colour Icon = Concrete Class (Instantiable

External Link — Wiki OSArch: IFC attributes and properties — https://wiki.osarch.org/index.php?title=IFC_attributes_and_properties

Enumeration — enum — enum-type


IfcBeam
IfcColumn
IfcFurniture
IfcBuildingElement
IfcFurnishingElement
IfcWallType
IfcDoorType
IfcWindowType
IfcBuildingElementType
IfcElementType
These describe construction types. A construction type may be assigned to an IfcElement, just like a particular product may be assigned a particular construction type of 2 layers of plasterboard on a metal frame. Example subclasses of IfcElementType include IfcWallType, IfcDoorType, and IfcWindowType.
IfcElement
These hold physical built elements that we come across every day, like slabs, columns, beams, walls, pipes, cables, ducts, and terminals. Example subclasses of IfcElement include IfcColumn, IfcBeam, and IfcFurniture. They may have geometry associated with them.
These describe spatial concepts, such as sites, buildings, bridges, storeys, and spaces. These IfcSpatialElement classes can contain IfcElement elements inside them, such as a slab being inside a building storey. Example subclasses of IfcSpatialElement include IfcSite, IfcBuilding, and IfcSpace.
These are useful for structural analysis. They hold data to describe the physical model, including members, nodes, connections, loads, and forces, as well as the results from the calculations. Example subclasses include IfcStructuralCurveMember, IfcStructuralPointConnection, and IfcStructuralPointReaction.
IfcProduct
IfcExternalSpatialStructureElement
IfcFacility
IfcBuilding
IfcFacilityPart
IfcBuildingStorey
IfcSite
IfcSpace
IfcSpatialZone
IfcSpatialStructureElement
IfcStructuralActivit
IfcStructuralItem
IfcProject
This is the most common "container" of IFC data, used to store information specific to a particular project.
Starting Point
IfcProjectLibrary
this can store BIM data that is project agnostic, to be reused between multiple projects
IfcContext
This special category holds the starting point of IFC data, by describing either a project or library. There are only two subclasses which can contain the rest of teh IFC data: IfcProject and IfcProjectLibrary.
IfcObject
IfcActor
IfcControl
IfcProcess
IfcResource
These are useful for scheduling and controlling the responsibility, tasks, resources, and timelines for construction sequencing or project planning. Example subclasses include IfcTask, IfcConstructionMaterialResource, and IfcWorkSchedule.
IfcTypeObject
These subclasses describe objects or things that relate to the AEC industry. This includes walls, people, and tasks. You may think of them as the "nouns" in IFC.
IfcObjectDefinition
IFC
IFC SCHEMA
ROOTED CLASSES
IfcRoot
IfcRoot
This IfcRoot class is special because it provides the following four attributes:
- GlobalId (required) – A unique identifier of the object, generated by a computer. This is usually created automatically by the BIM authoring tool.
- OwnerHistory – This special attribute can store names, dates, organizations, software vendor, and contact details of people who are responsible for this object. This is usually created automatically by the BIM authoring tool.
- Name – This can contain a short text that names the object.
- Description – A sentence or two to describe the object.
IfcPropertyDefinition
These subclasses describe properties of objects and things. They themselves are not an object but instead a property or quantity: like fire rating, energy usage, or volume
IfcPropertySet
These classes help store properties of other classes, such as IfcElement. For instance, it may store a fire rating associated with an IfcWall. Some common property sets values are standardized within IFC, but endrusers can also create their own properties. See IFC attributes and properties for more information.
IfcPropertySetDefinition
IfcPreDefinedPropertySet
For some reason, some properties to do with door and window linings are given a special status in the IFC scheme and have their own classes. This will likely disappear in the future and merge into IfcPropertySet.
IfcQuantitySet
This is similar to IfcPropertySet but focuses on calculated quantities (length, areas, volumes, weights, etc). Some quantity names and values are standardised within IFC, but endrusers can also create their own quantities. See IfcQuantities and properties for more information.
IfcPropertyTemplateDefinition
If you don't want to actually to store the value of a property but instead want to describe a template of what properties exist, which are required, and what data is valid for the properties to satisfy company requirements or company standards, then this template subclass allows you to do so.
IfcRelationship
These subclasses describe relationships between objects themselves, between properties, or between objects and properties. The relationships can be objects that contain other objects, connect to objects, have system inputs or outputs, or are assigned a property or quantity.
IfcRelAssigns
This relationship is used when a particular object supplies a resource or fulfills a task for another object. Commonly used for resource management and construction sequencing, determining processes, resources, and actions performed by people. Example subclasses include IfcRelAssignsToResource, IfcRelAssignsToProcess, and IfcRelAssignsToProduct.
IfcRelAssociates
This relationship is used when a particular object has a source of information associated with it, such as an external document, classification system like Uniclass, project library, or material database. Commonly used for facility management. Example subclasses include IfcRelAssociatesDocument, IfcRelAssociatesClassification, and IfcRelAssociatesMaterial.
IfcRelDefines
This relationship is used when a particular object can be defined by a common set of definitions, such as properties, manufacturer / construction types, or a template of definitions. This relationship is very commonly used in IFC files to define properties (both buildingSMART standard properties, and custom user properties) to objects, and define construction types. Example subclasses include IfcRelDefinesByProperties, IfcRelDefinesByType, and IfcRelDefinesByTemplate.
IfcRelDecomposes
This relationship is used when a particular object (physical or virtual) is built up of smaller object parts. Smaller parts may be simple or complex, from into a larger whole, or projecting from a object, or embed itself within another object. Example subclasses include IfcRelAggregates, IfcRelProjectsElement, and IfcRelFillsElement.
IfcRelConnects
This relationship is used when a particular object is joined physically or virtually to another object. This is usually used in analytical models, such as structural analysis, energy analysis, or building services analysis. MEP systems analysis where ports join together, or environmental analysis, where spaces have boundaries and are covered by particular material layers. Example subclasses include IfcRelConnectsStructuralMember, IfcRelConnectsPorts, and IfcRelSpaceBoundary.
IFC attributes and properties
Yes
Yes
IFC attributes
All IFC classes have attributes—named fields with values. A common example is the inherited Name (e.g., an IfcDoor named "001"). Attributes can be mandatory or optional and hold simple text or complex data, such as OwnerHistory (responsible person, software, organization, contacts). Attributes are inseparable from the class and always exist, but its attributes exist (filled or empty). The attribute set for each class is fixed by the IFC specification; endusers can't add or remove attributes. Consequently, classes expose a small, stable set of globally useful attributes that changes little across IFC versions.
IFC properties
IFC properties are IFC entities that can be attached to classes. Unlike fixed attributes, properties are optional attributes and are grouped into Property Sets (Psets) linked to many elements; e.g., FireRating in Pset_WallCommon applied to multiple IfcWalls. Names of standard properties/Psets are defined in the IFC spec, but users can create custom properties and Psets. Quantities are a special property type for measurable values (length, area, volume, count) grouped into Quantity Sets (Qto). Not every Pset/Qto applies to every class; the spec prescribes valid mappings, though custom Psets may be assigned.
NON-ROOTED ELEMENTS
IfcMaterial
A material may be named, and then have further non-rooted classes assigned to it, such has simple RGB colours, finishes, and material properties for environmental simulations.
IfcCartesianPoint
As you might expect, IFC can store 2 or 3 dimensional Cartesian coordinates. This is one of the building blocks of many other non-rooted classes, such as the ability to locate an object in space, or build up geometric representations.
IfcFacetedBrep
A huge variety of geometric forms may be described in IFC. One commonly known format is a faceted BREP, or series of polygons that describe the surface of an object.
IfcPerson
Information about people and organisations can be recorded, which is especially useful as some countries have legislation that requires this to be stored.
IfcPropertySingleValue
This commonly used class can define a single property in terms of a property name and its associated value. In addition, there are other classes that allow more complex properties in tabular or calculated form to be stored.
IfcObjective
This little-known class can store design intentions, strategies, and objectives to be then associated with objects or portions of the BIM model.
IfcRegularTimeSeries
When scheduling, events may occur at predictable time intervals, which may be stored.

Hundreds of available concepts

Material Association