IFC 4.3 brukt i infrastrukturprosjekter

ba-nettverket 2024

Jan Erik Hoel

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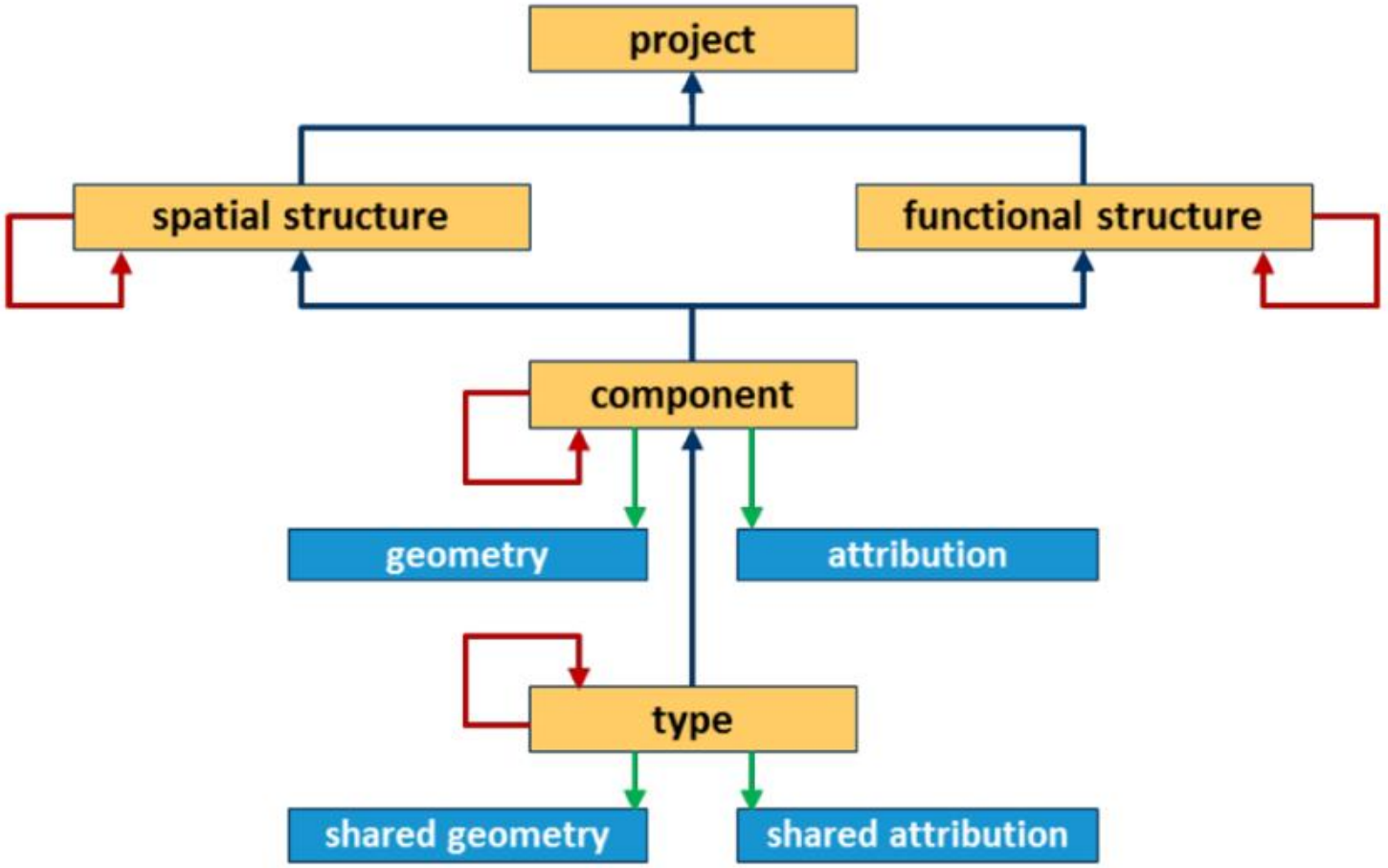
Hovedstrukturene i IFC



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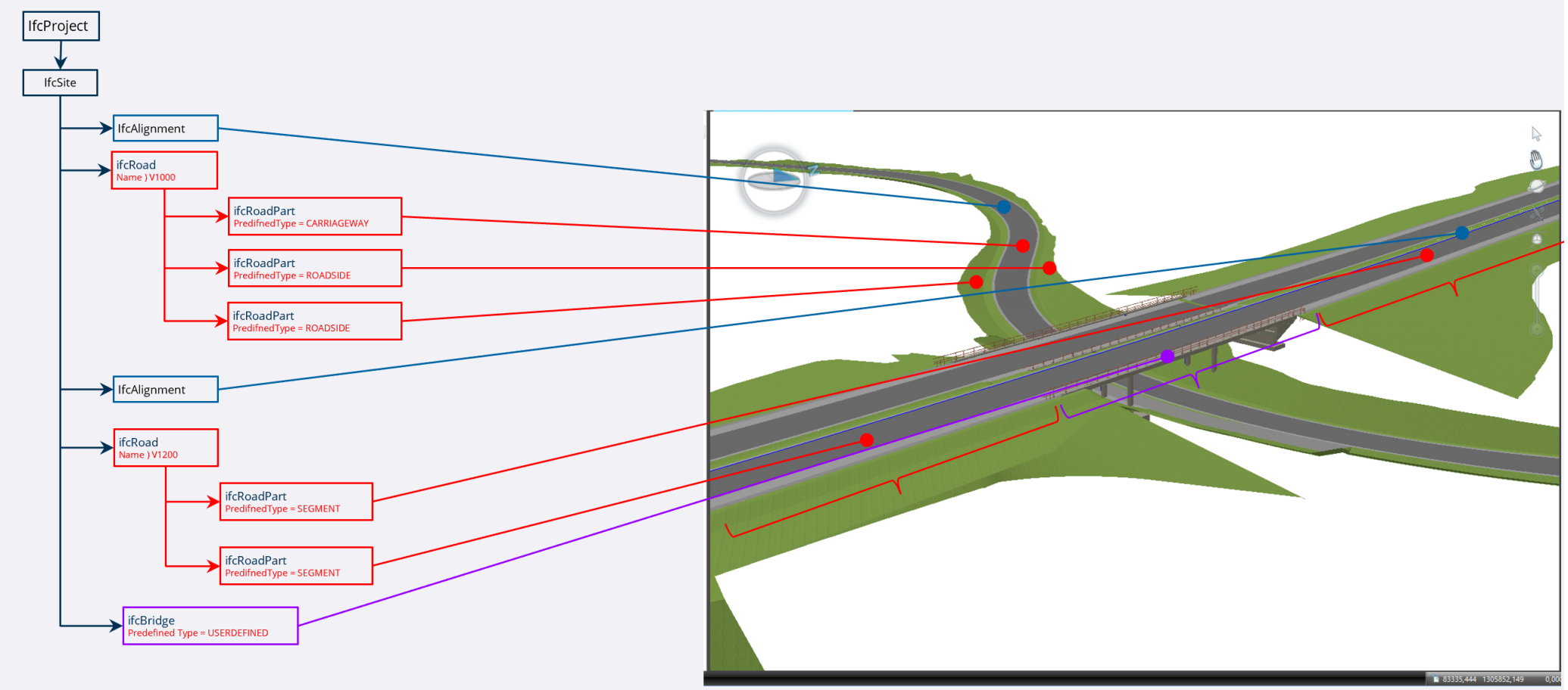
Romlig nedbrytningstruktur (“spatial structure”)



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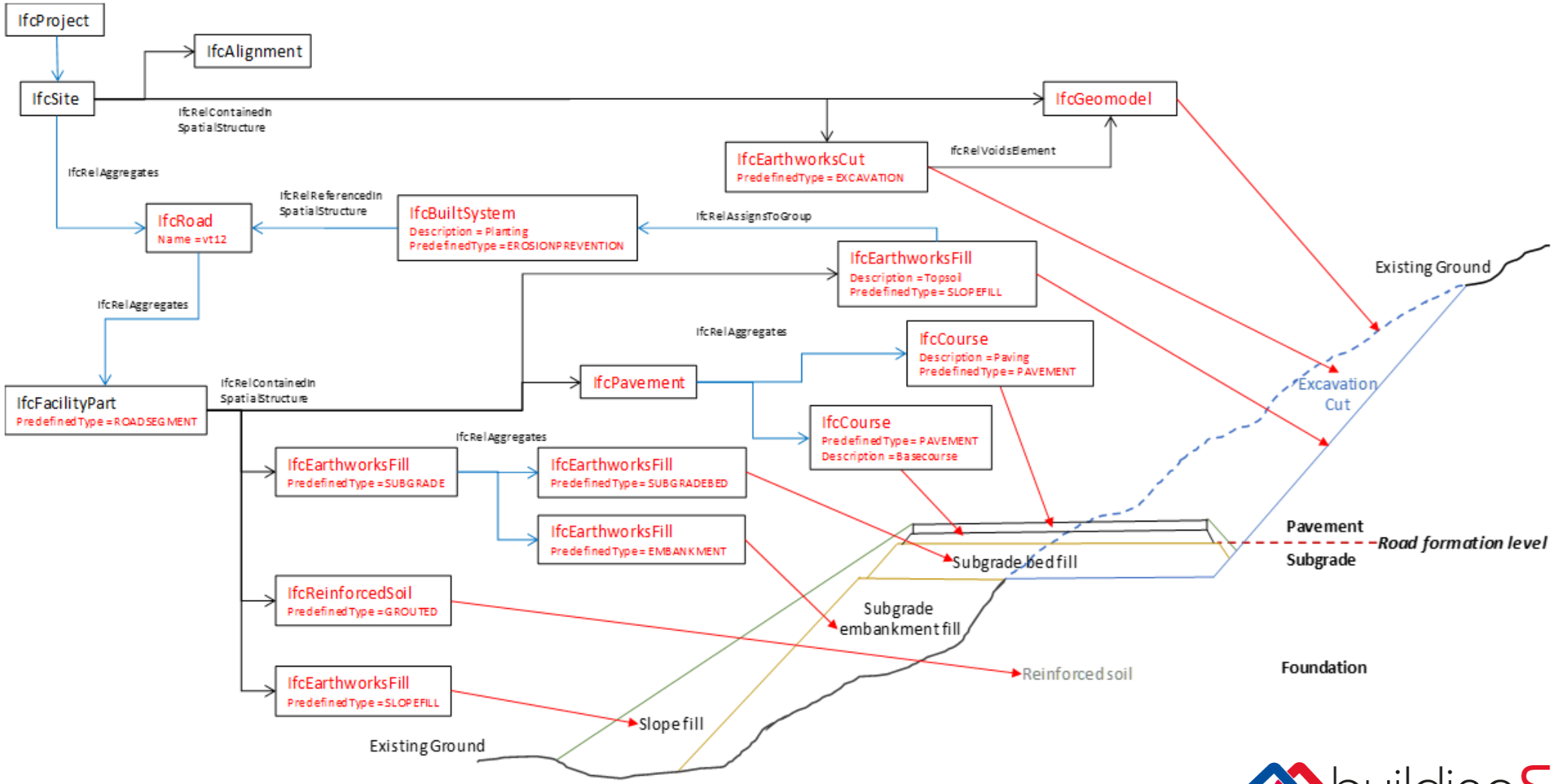
Romlig nedbrytning ("spatial structure")



Illustrasjon fra IR-ROAD-WP3_ConceptualModelReport - Annex I - Example instance diagrams_2_0

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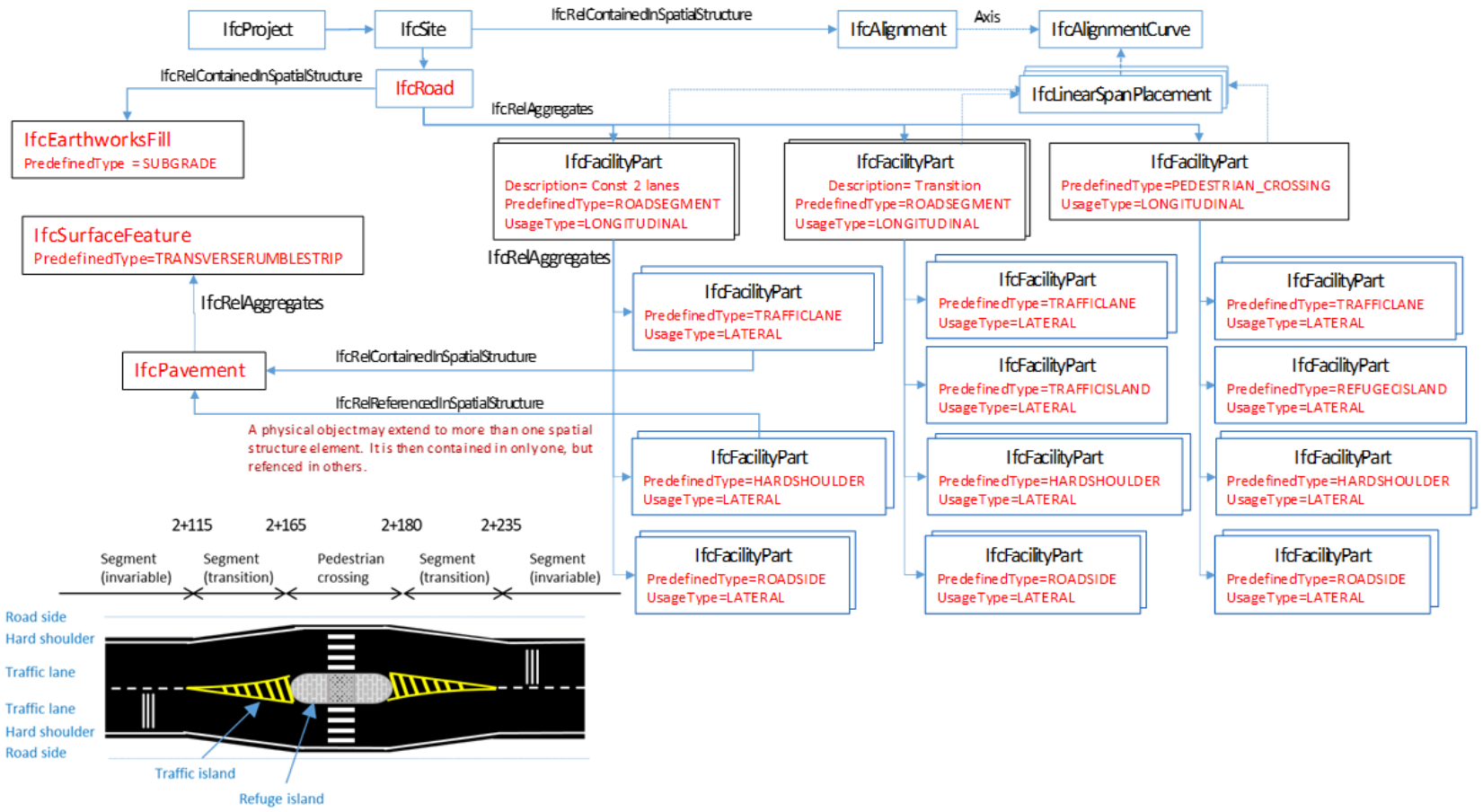
Romlig nedbrytning (“spatial structure”)

Eksempel på “overteoretisert” romlig nedbrytningsstruktur



Illustrasjon fra IR-ROAD-WP3_ConceptualModelReport - Annex I - Example instance diagrams_2_0

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Romlig nedbrytning (“spatial structure”)

	Active	Type	Name	Description
	☑	Project	TRV HDMI	Road project
	☑	IfcAlignment	T616AAC0	
	☑	IfcAlignment	T636AAC0	
	☑	IfcAlignment	GC 636	
	☑	Site	Default Site	
	☑	Infrastructure		
	☑	IfcRoad	Road 636|USERDEFINED	
	☑	IfcRoadPart	Road 636|ROADSEGMENT	
	☑	IfcRoadPart	Road 636|CARRIAGEWAY	
	☑	IfcRoadPart	Road 636|SHOULDER	
	☑	IfcRoadPart	Road 636|ROADSIDE	
	☑	Element Assembly	Road 636|STAKEOUT	
	☑	IfcEarthworksFill	Road 636|SUBGRADE	
	☑	IfcPavement	Road 636|RIGID	
	☑	IfcRoad	Road 616|USERDEFINED	
	☑	IfcRoad	GC 636|USERDEFINED	
√	☑	IfcGeomodel	Geomodel	Description of GeoModel

Romlig nedbrytningstruktur vist i BIMVision

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Funksjonell gruppering (“functional structure”)

Groups

Active	Type	Name	Description
☑	**Systems**		
☑	IfcDistributionSystem	Water and Sewer 1 | WATERSUPPLY	
☑	Element Assembly	Water and Sewer 1, WA1	
☑	Element Assembly	Water and Sewer 1, WA2	
☑	Element Assembly	Water and Sewer 1, WA3	
☑	Element Assembly	Water and Sewer 1, WA4	
☑	Element Assembly	Water and Sewer 1, WA5	
☑	Element Assembly	Water and Sewer 1, WA6	
☑	Element Assembly	Water and Sewer 1, WA7	
☑	Element Assembly	Water and Sewer 1, Trench1 | WATER PIPES	
☑	IfcDistributionSystem	Water and Sewer 1 | STORMWATER	
☑	Element Assembly	Water and Sewer 1, ST1	
☑	Element Assembly	Water and Sewer 1, ST2	
☑	Element Assembly	Water and Sewer 1, ST3	
☑	Element Assembly	Water and Sewer 1, ST4	
☑	Element Assembly	Water and Sewer 1, ST5	
☑	Element Assembly	Water and Sewer 1, ST6	
☑	Element Assembly	Water and Sewer 1, ST7	
☑	Element Assembly	Water and Sewer 1, Trench1 | STORMWATER PIPES	
☑	IfcDistributionSystem	Water and Sewer 1 | SEWAGE	

Funksjonell gruppering vist i BIMVision

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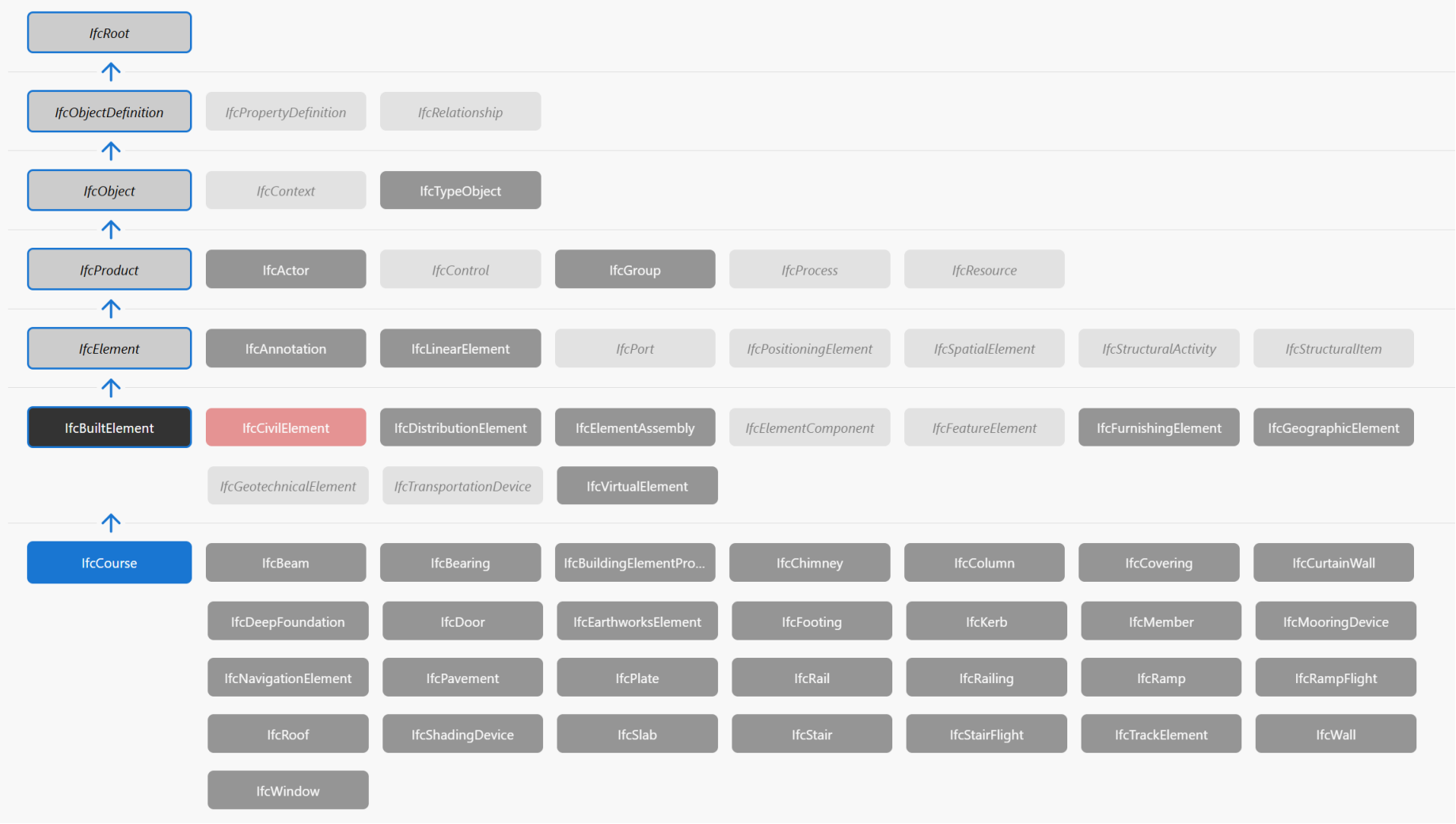
Entiteter – Objekter - Produkter (“components”)



https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcCourse.htm

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PredefinedType & ObjectType

Alle produkter/entiteter (fysiske object) har to attributer som benyttes for å ytterligere spesifisere objekttypen:

- **PredefinedType**: En liste av sub-typer som er definert i IFC-skjemaet
- **ObjectType**: Kan definers av prosjektet og benyttes når PredefinedType er satt til “USERDEFINED”

Eksempel: Liste av definerte verdier for PredefinedType for ifcCourse:

Type	Description
ARMOUR	An Aggregate layer whose primary function is to protect against erosion of the underlying material by water e.g. riprap. NOTE Definition from ISO 21650: protective layer on a breakwater, seawall or other rubble mound structures composed of armour units
BALLASTBED	Layer composed of broken stones under the sleepers.
CORE	A core course is the bulk internal structure of aggregate structures.
FILTER	An Intermediate layer whose primary function is to prevent the washing through of fine materials.
PAVEMENT	A layer within a pavement structure that forms a paved area or road.
PROTECTION	Layer with the primary task to provide protection against erosion and scour.
USERDEFINED	User-defined type
NOTDEFINED	Undefined type.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcCourseTypeEnum.htm

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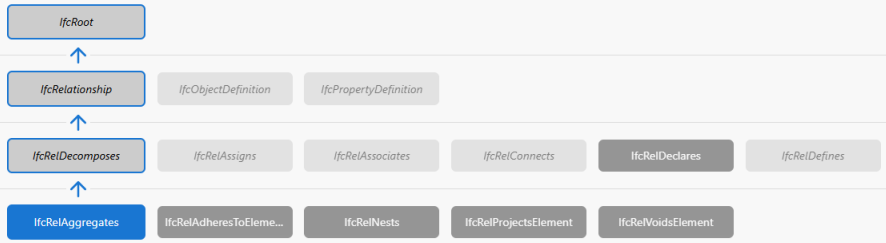
Relasjoner

I IFC er relasjonene entities med egenskaper.
Eksempel: ifcRelAggregates

5.1.3.20.2 Entity inheritance



5.1.3.20.3 Attributes

#	Attribute	Type	Description
IfcRoot (4)			
1	GlobalId	IfcGloballyUniqueId	Assignment of a globally unique identifier within the entire software world.
2	OwnerHistory	OPTIONAL IfcOwnerHistory	Assignment of the information about the current ownership of that object, including owning actor, application, local identification and information captured about the recent changes of the object, NOTE Only the last modification is stored - either as addition, deletion or modification. IFC4-CHANGE The attribute has been changed to be OPTIONAL.
3	Name	OPTIONAL IfcLabel	Optional name for use by the participating software systems or users. For some subtypes of IfcRoot the insertion of the Name attribute may be required. This would be enforced by a where rule.
4	Description	OPTIONAL IfcText	Optional description, provided for exchanging informative comments.
			Click to hide 4 inherited attributes
IfcRelAggregates (2)			
5	RelatingObject	IfcObjectDefinition	The object definition, either an object type or an object occurrence, that represents the aggregation. It is the whole within the whole/part relationship. IFC4-CHANGE The attribute has been demoted from the supertype *IfcRelDecomposes* and defines the non-ordered aggregation relationship.
6	RelatedObjects	SET [1:?] OF IfcObjectDefinition	The object definitions, either object occurrences or object types, that are being aggregated. They are defined as the parts in the whole/part relationship. No order is implied between the parts. IFC4-CHANGE The attribute has been demoted from the supertype *IfcRelDecomposes* and defines the non-ordered set of parts within the aggregation.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcRelAggregates.htm

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Relasjoner

5.4.3.45	IfcRelAdheresToElement
5.1.3.20	IfcRelAggregates
5.1.3.21	IfcRelAssigns
5.1.3.22	IfcRelAssignsToActor
5.1.3.23	IfcRelAssignsToControl
5.1.3.24	IfcRelAssignsToGroup
5.1.3.25	IfcRelAssignsToGroupByFactor
5.1.3.26	IfcRelAssignsToProcess
5.1.3.27	IfcRelAssignsToProduct
5.1.3.28	IfcRelAssignsToResource
5.1.3.29	IfcRelAssociates
5.2.3.2	IfcRelAssociatesApproval
5.1.3.30	IfcRelAssociatesClassification
5.2.3.3	IfcRelAssociatesConstraint
5.1.3.31	IfcRelAssociatesDocument
5.1.3.32	IfcRelAssociatesLibrary
5.4.3.46	IfcRelAssociatesMaterial
5.4.3.47	IfcRelAssociatesProfileDef
5.1.3.33	IfcRelConnects
5.4.3.48	IfcRelConnectsElements
6.1.3.28	IfcRelConnectsPathElements
5.4.3.49	IfcRelConnectsPortToElement
5.4.3.50	IfcRelConnectsPorts
7.10.3.1	IfcRelConnectsStructuralActivity
7.10.3.2	IfcRelConnectsStructuralMember
7.10.3.3	IfcRelConnectsWithEccentricity
5.4.3.51	IfcRelConnectsWithRealizingElements
5.4.3.52	IfcRelContainedInSpatialStructure
6.1.3.29	IfcRelCoversBldgElements
6.1.3.30	IfcRelCoversSpaces
5.1.3.34	IfcRelDeclares
5.1.3.35	IfcRelDecomposes
5.1.3.36	IfcRelDefines
5.1.3.37	IfcRelDefinesByObject
5.1.3.38	IfcRelDefinesByProperties
5.1.3.39	IfcRelDefinesByTemplate
5.1.3.40	IfcRelDefinesByType
5.4.3.53	IfcRelFillsElement
6.2.3.26	IfcRelFlowControlElements
5.4.3.54	IfcRelInterferesElements
5.1.3.41	IfcRelNests
5.4.3.55	IfcRelPositions
5.4.3.56	IfcRelProjectsElement
5.4.3.57	IfcRelReferencedInSpatialStructure
5.3.3.5	IfcRelSequence
5.4.3.58	IfcRelServicesBuildings
5.4.3.59	IfcRelSpaceBoundary
5.4.3.60	IfcRelSpaceBoundary1stLevel
5.4.3.61	IfcRelSpaceBoundary2ndLevel
5.4.3.62	IfcRelVoidsElement

Det er veldig mange ulike relasjonstyper i IFC.
Hver relasjonstype har sitt eget formål.

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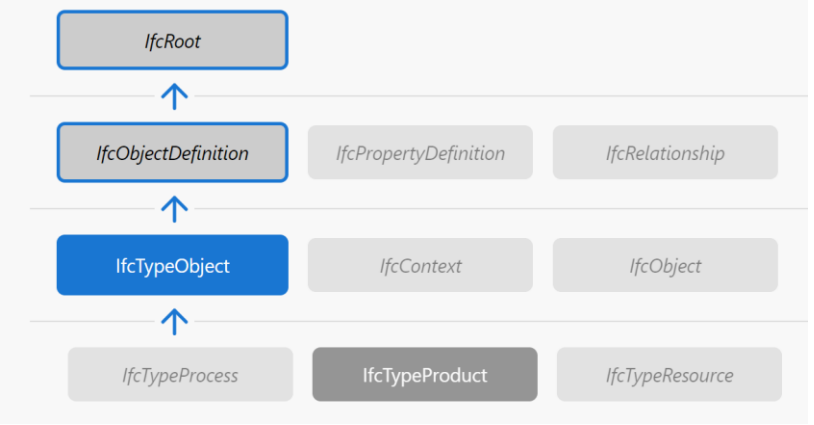
Type objekter

Type objekter er “objektmaler” som objektforkomster kan hente egenskaper og geometri fra.
Forkomstene kan enten benytte alle egenskapene i malen eller et utvalg.

IfcTypeObject (3)			
5	ApplicableOccurrence	OPTIONAL IfcIdentifier	The attribute optionally defines the data type of the occurrence object, to which the assigned type object can relate. If not present, no instruction is given to which occurrence object the type object is applicable. The following conventions are used: — The IFC entity name of the applicable occurrence using the IFC naming convention, CamelCase with "Ifc" prefix — It can be optionally followed by the predefined type after the separator "/" (forward slash), using uppercase — If one type object is applicable to many occurrence objects, then those occurrence object names should be separate by comma "," forming a comma separated string. EXAMPLE Referring to a furniture as applicable occurrence entity would be expressed as 'IfcFurnishingElement', referring to a brace as applicable entity would be expressed as 'IfcMember/BRACE'.
6	HasPropertySets	OPTIONAL SET [1:?] OF IfcPropertySetDefinition	Set of unique property sets, that are associated with the object type and are common to all object occurrences referring to this object type. IFC2X3-CHANGE The attribute aggregate type has been changed from LIST to SET.
	Types	SET [0:1] OF IfcRelDefinesByType FOR RelatingType	Reference to the relationship IfcRelDefinesByType and thus to those occurrence objects, which are defined by this type.



IfcTypeProduct defines a type definition of a product without being already inserted into a project structure (without having a placement), and not being included in the geometric representation context of the project. It is used to define a product specification, that is, the specific product information that is common to all occurrences of that product type.

An *IfcTypeProduct* may have a list of property sets attached and an optional set of product representations. Values of these properties and the representation maps are common to all occurrences of that product type. The type-occurrence relationship is realized using the objectified relationship *IfcRelDefinesByType*.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcTypeObject.htm

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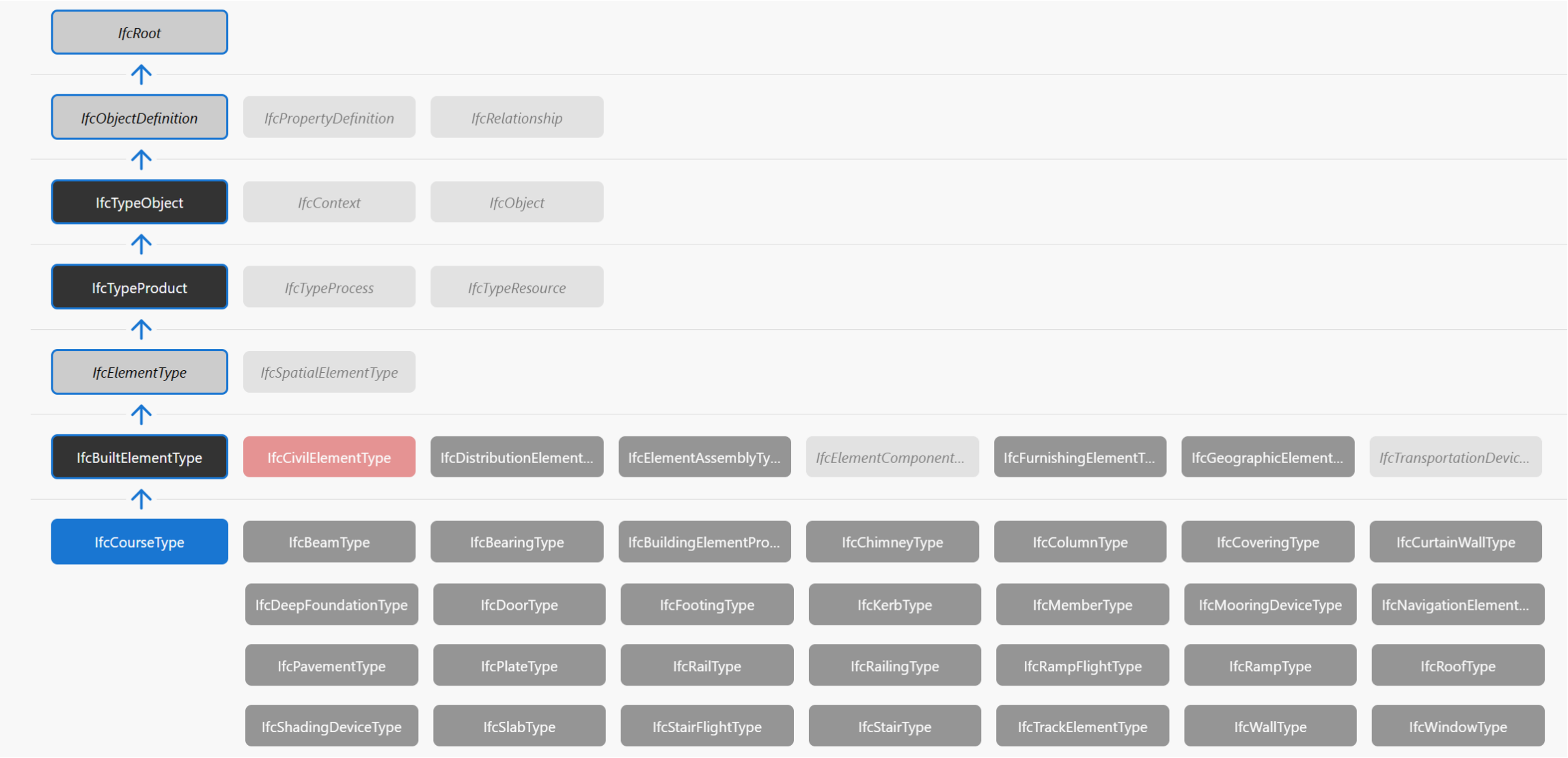
Type objekter



https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcCourseType.htm

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Forskjellen på attributer og egenskaper (“properties”)

Attributter er entitet-egenskaper som er definert i IFC-skjemaet.
Attributtene kan arves fra entiteter lenger oppe i arvehierarkiet.

6.1.3.41.3 Attributes

#	Attribute	Type	Description
IfcRoot (4)			
1	GlobalId	IfcGloballyUniqueId	Assignment of a globally unique identifier within the entire software world.
2	OwnerHistory	OPTIONAL IfcOwnerHistory	Assignment of the information about the current ownership of that object, including owning actor, application, local identification and information captured about the recent changes of the object, NOTE Only the last modification is stored - either as addition, deletion or modification. IFC4-CHANGE The attribute has been changed to be OPTIONAL.
3	Name	OPTIONAL IfcLabel	Optional name for use by the participating software systems or users. For some subtypes of IfcRoot the insertion of the Name attribute may be required. This would be enforced by a where rule.
4	Description	OPTIONAL IfcText	Optional description, provided for exchanging informative comments.
IfcObjectDefinition (7)			
	HasAssignments	SET [0:?] OF IfcRelAssigns FOR RelatedObjects	Reference to the relationship objects, that assign (by an association relationship) other subtypes of *IfcObject* to this object instance. Examples are the association to products, processes, controls, resources or groups.
	Nests	SET [0:1] OF IfcRelNests FOR RelatedObjects	References to the decomposition relationship being a nesting. It determines that this object definition is a part within an ordered whole/part decomposition relationship. An object occurrence or type can only be part of a single decomposition (to allow hierarchical structures only). IFC4-CHANGE The inverse attribute datatype has been added and separated from *Decomposes* defined at *IfcObjectDefinition*.
	IsNestedBy	SET [0:?] OF IfcRelNests FOR RelatingObject	References to the decomposition relationship being a nesting. It determines that this object definition is the whole within an ordered whole/part decomposition relationship. An object or object type can be nested by several other objects (occurrences or types). IFC4-CHANGE The inverse attribute datatype has been added and separated from *IsDecomposedBy* defined at *IfcObjectDefinition*.
	HasContext	SET [0:1] OF IfcRelDeclares FOR RelatedDefinitions	References to the context providing context information such as project unit or representation context. It should only be asserted for the uppermost non-spatial object. IFC4-CHANGE The inverse attribute datatype has been added.

Eksempel på attributer høyt oppe arvehierarkiet

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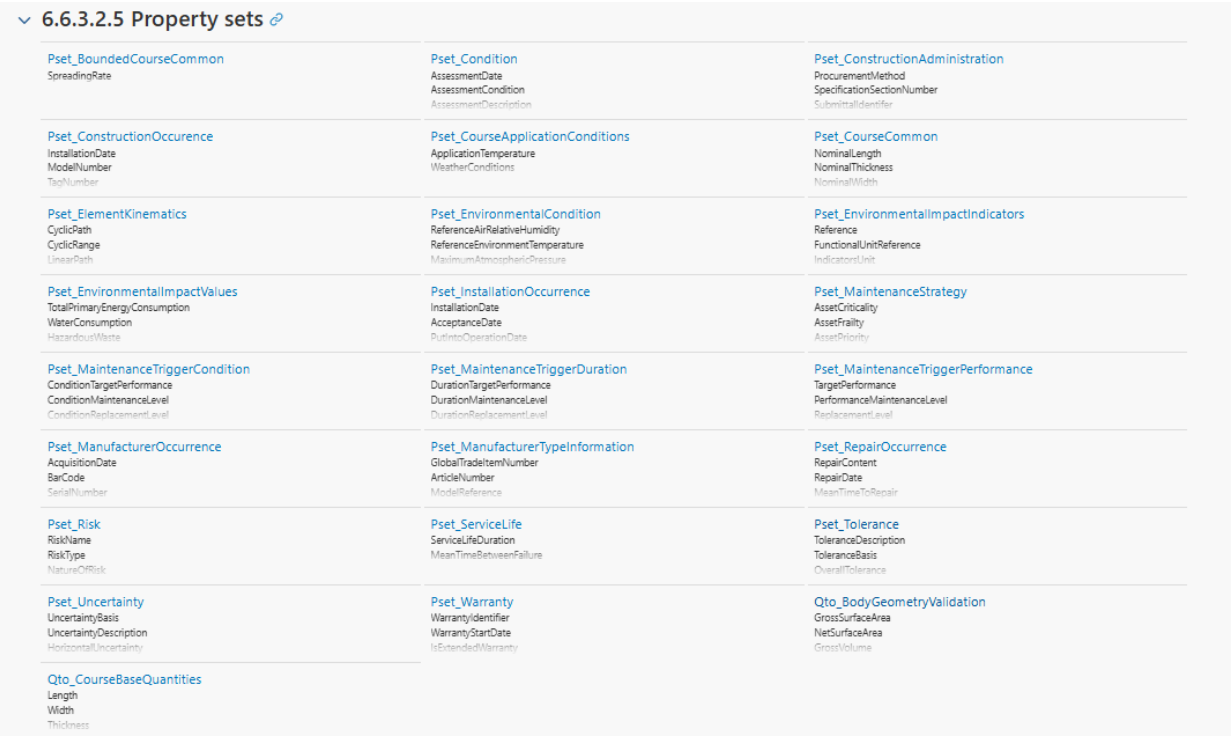
Forskjellen på attributer og egenskaper (“properties”)

- Egenskaper (“properties”) er IKKE definert i IFC-skjemaet.
- Egenskapene samles i egenskapssett (“property sets”).
- En del egenskapssettmaler (“templates”) er definert av buildingSMART International. Disse har alle prefiks “Pset_”
- Organisajoner og prosjekter står fritt til å definer sine egne egenskapssettmaler
- Egenskapssettene er “løst bundet” til entitetene med relasjoner.



Eksempel på egenskapssettmaler definer av buildingSMART International for ifcCourse

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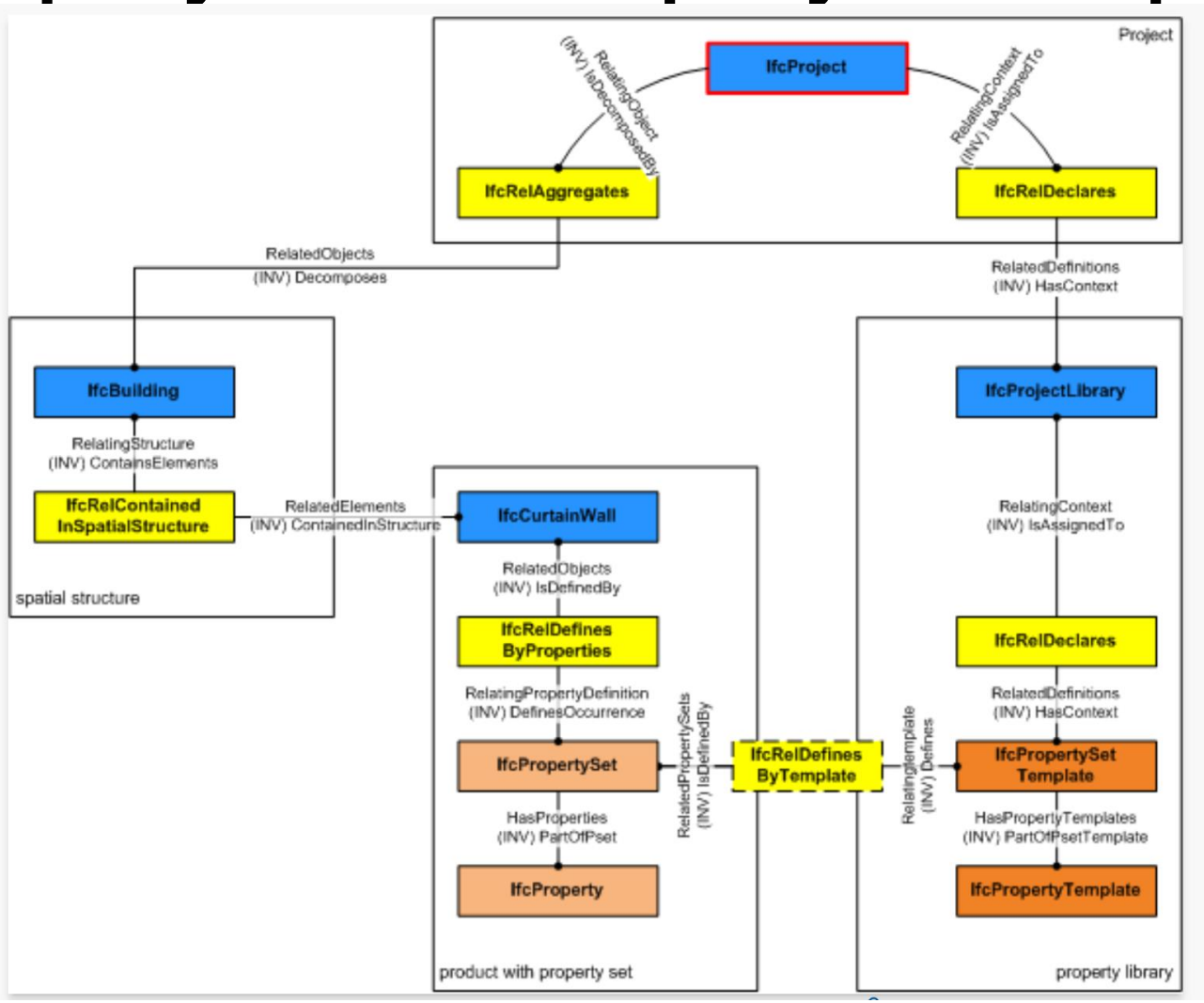
Egenskapssett & Egenskapssettmaler ("Property Sets" & "Property Set Templates")



Sammenhengen mellom ifcPropertySetTemplates and ifcPropertSet

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcPropertySetTemplate.htm#Figure-5.1.3.16.A-Property-set-template-relationships

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Attributter for egenskapssettmalene

5	TemplateType	OPTIONAL IfcPropertySetTemplateTypeEnum	Property set type defining whether the property set is applicable to a type (subtypes of *IfcTypeObject*), to an occurrence (subtypes of *IfcObject*), or as a special case to a performance history. The attribute *ApplicableEntity* may further refine the applicability to a single or multiple entity type(s).
6	ApplicableEntity	OPTIONAL IfcIdentifier	The attribute optionally defines the data type of the applicable type or occurrence object, to which the assigned property set template can relate. If not present, no instruction is given to which type or occurrence object the property set template is applicable. The following conventions are used: — The IFC entity name of the applicable entity using the IFC naming convention, CamelCase with `Ifc` prefix — It can be optionally followed by the predefined type after the separator "/" (forward slash), using upper case

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Egenskapssettmal typer

Type	Description
PSET_MATERIALDRIVEN	The property sets defined by this *IfcPropertySetTemplate* are to be encoded in an IfcMaterialProperties entity and assigned to an IfcMaterialDefinition.
PSET_OCCURRENCEDRIVEN	The property sets defined by this *IfcPropertySetTemplate* can only be assigned to subtypes of *IfcObject*.
PSET_PERFORMANCEDRIVEN	The property sets defined by this *IfcPropertySetTemplate* can only be assigned to *IfcPerformanceHistory*, which is related to the applicable object by means of IfcRelAssignsToControl.
PSET_PROFILEDRIVEN	The property sets defined by this *IfcPropertySetTemplate* are to be encoded in an IfcProfileProperties entity and assigned to an IfcProfileDef.
PSET_TYPEDRIVENONLY	The property sets defined by this *IfcPropertySetTemplate* can only be assigned to subtypes of *IfcTypeObject*.
PSET_TYPEDRIVENOVERRIDE	The property sets defined by this *IfcPropertySetTemplate* can be assigned to subtypes of *IfcTypeObject* and can be overridden by a property set with same name at subtypes of *IfcObject*.

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Eksempel på Egenskapssettmal

7.9.4.14 Pset_RoadGuardElement

7.9.4.14.1 Semantic definition

Properties assigned to IfcWall/PARAPET or IfcRailing/GUARDRAIL when assigned as road guard elements.

7.9.4.14.2 Applicable entities

PSET_TYPEDRIVENOVERRIDE The property sets defined by this IfcPropertySetTemplate can be assigned to subtypes of IfcTypeObject and can be overridden by a property set with same name at subtypes of IfcObject.

— IfcRailing/GUARDRAIL
— IfcWall/PARAPET
— IfcRailingType/GUARDRAIL
— IfcWallType/PARAPET

7.9.4.14.3 Properties

Name	Property Type	Data Type	Description
IsMoveable	IfcPropertySingleValue	IfcBoolean	True if element is moveable.
IsTerminal	IfcPropertySingleValue	IfcBoolean	True if element is a terminal. See class Terminal.
IsTransition	IfcPropertySingleValue	IfcBoolean	True if element is a transition. See class Transition.
TerminalType	IfcPropertySingleValue	IfcLabel	Specifies the kind of terminal if IsTerminal is true.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/Pset_RoadGuardElement.htm

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XSD representasjon av “Property Set Definition”

```
<!--  PSD: Property Set Definition XSD, ver. 20131201 -->
<!--  edited by Yoshinobu Adachi, buildingSMART Model Support Group  -->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <script/>
  <xs:element name="PropertySetDef">
    <xs:annotation>
      <xs:documentation>The top node element of Property Set Definition (PSD).</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element name="IfcVersion">
          <xs:annotation>
            <xs:documentation>Version information of IFC release and sub schema.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:attribute name="version" type="xs:string">
              <xs:annotation>
                <xs:documentation>The version information of IFC, i.e., "2x3 TC1", "IFC4".</xs:documentation>
              </xs:annotation>
            </xs:attribute>
            <xs:attribute name="schema" type="xs:string">
              <xs:annotation>
                <xs:documentation>The sub schema name, i.e., "IfcSharedBldgElements".</xs:documentation>
              </xs:annotation>
            </xs:attribute>
          </xs:complexType>
        </xs:element>
        <xs:element name="Name" type="xs:string">
          <xs:annotation>
            <xs:documentation>The name of property set.</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="Definition" type="xs:string">
          <xs:annotation>
            <xs:documentation>The definition of property set from buildingSMART.</xs:documentation>
          </xs:annotation>
```

https://standards.buildingsmart.org/IFC/RELEASE/IFC4/FINAL/PSD/PSD_IFC4.xsd

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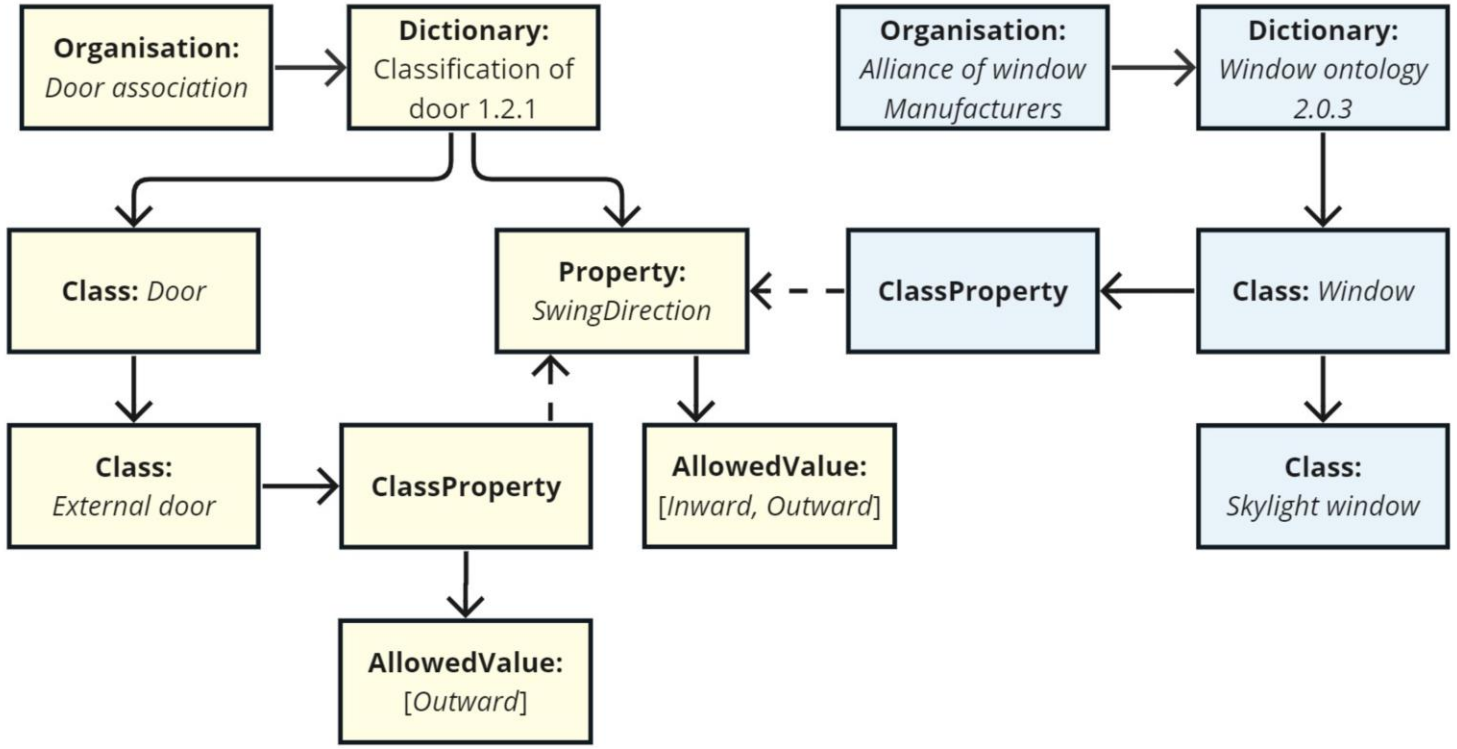
buildingSMART Data Dictionary (bSDD)

Datamodellen i bSDD støtter egenskapssett definisjoner:

- Property: Definerer en egenskap
- ClassProperty: Definerer relasjonen mellom klasser (entities) og egenskaper
- ClassProperty.PropertySet (attributt på ClassProperty) definerer egenskapssett



https://technical.buildingsmart.org/services/bsdd/data-structure/

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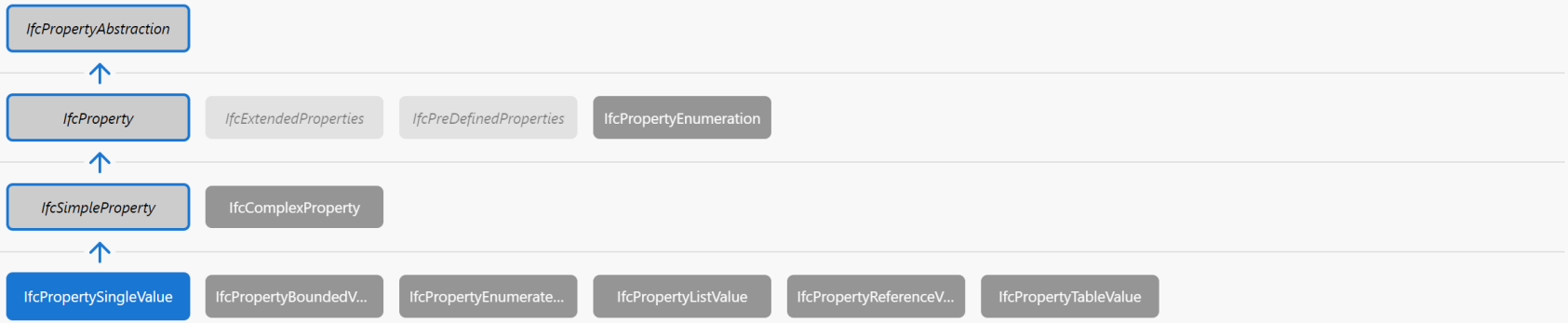
Tilgjengelige egenskapstyper

ifcPropertySingleValue er mest brukt

8.16.3.12.2 Entity inheritance



8.16.3.12.3 Attributes

#	Attribute	Type	Description
IfcPropertyAbstraction (1)			
IfcProperty (8)			
Click to show 9 hidden inherited attributes			
IfcPropertySingleValue (2)			
3	NominalValue	OPTIONAL IfcValue	Value and measure type of this property. NOTE By virtue of the defined data type, that is selected from the SELECT *IfcValue*, the appropriate unit can be found within the *IfcUnitAssignment*, defined for the project if no value for the unit attribute is given. IFC2X3-CHANGE The attribute has been made optional with upward compatibility for file based exchange.
4	Unit	OPTIONAL IfcUnit	Unit for the nominal value, if not given, the default value for the measure type (given by the TYPE of nominal value) is used as defined by the global unit assignment at IfcProject.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcPropertySingleValue.htm

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Tilgjengelige enkle egenskapstyper

Tilgjengelige verdityper

8.11.2.87 IfcSimpleValue

8.11.2.87.1 Semantic definition

IfcSimpleValue is a select type for selecting between simple value types.

SELECT

— *IfcInteger*: Defined type of simple type INTEGER.
— *IfcReal*: Defined type of simple type REAL.
— *IfcBoolean*: Defined type of simple type BOOLEAN.
— *IfcLogical*: Defined type of simple type LOGICAL.
— *IfcIdentifier*: Defined type of simple type STRING for identification purposes.
— *IfcLabel*: Defined type of simple type STRING for naming purposes.
— *IfcText*: Defined type of simple type STRING for descriptive purposes.
— *IfcDateTime*: Defined type of simple type STRING to represent a date and time.
— *IfcDate*: Defined type of simple type STRING to represent a date.
— *IfcTime*: Defined type of simple type STRING to represent a time.
— *IfcDuration*: Defined type of simple type STRING to represent a duration.
— *IfcTimeStamp*: Defined type of simple type INTEGER to represent a point in time by seconds elapsed since 1970.
— *IfcURIReference*: Defined type of simple type STRING to represent a unique sequence of characters that identifies a logical or physical resource used by web technologies.

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/lexical/IfcSimpleValue.htm

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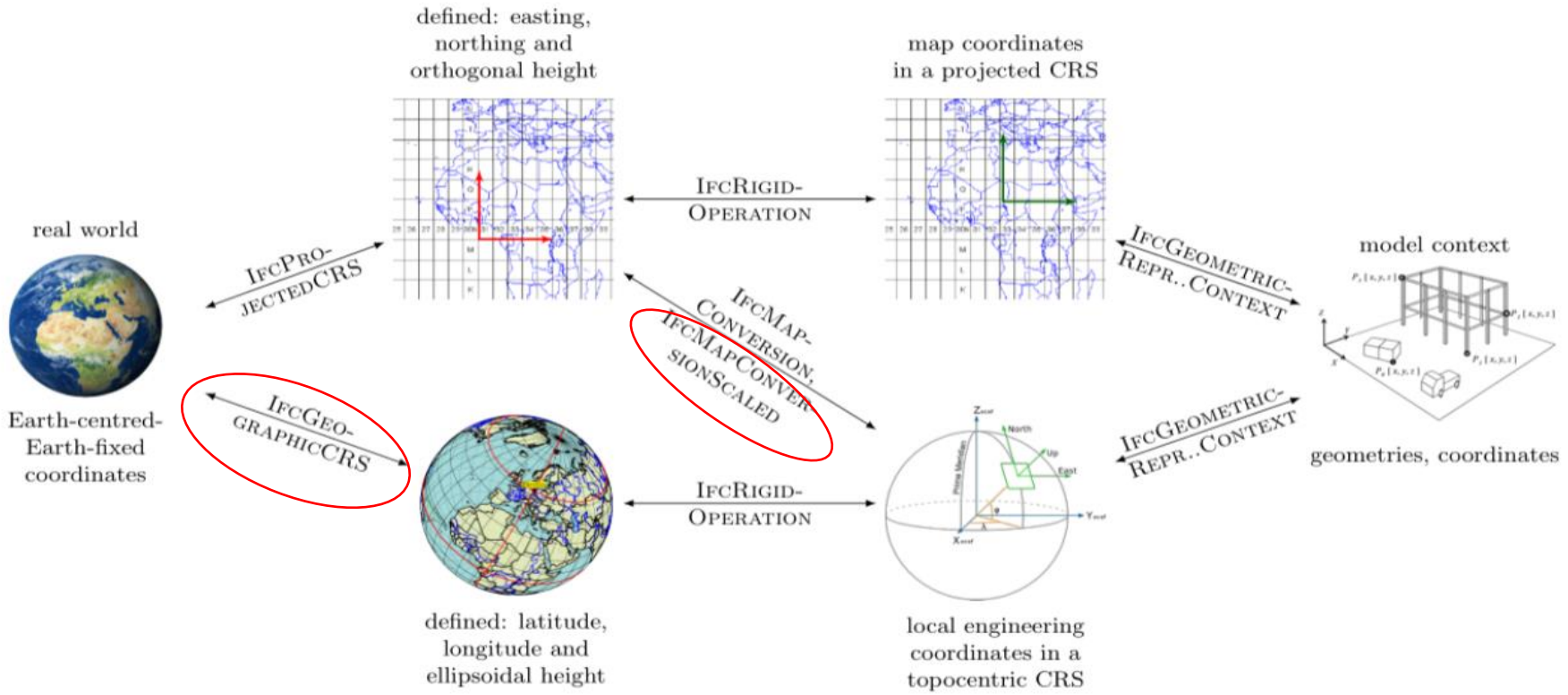
Transformasjoner og translasjoner

Det er full støtte for informasjonsoverføring for både kart-transformasjoner og translasjoner/rotasjoner.



S. Jaud et al., GEOREFERENCING IN IFC: MEETING THE REQUIREMENTS OF INFRASTRUCTURE AND BUILDING INDUSTRIES

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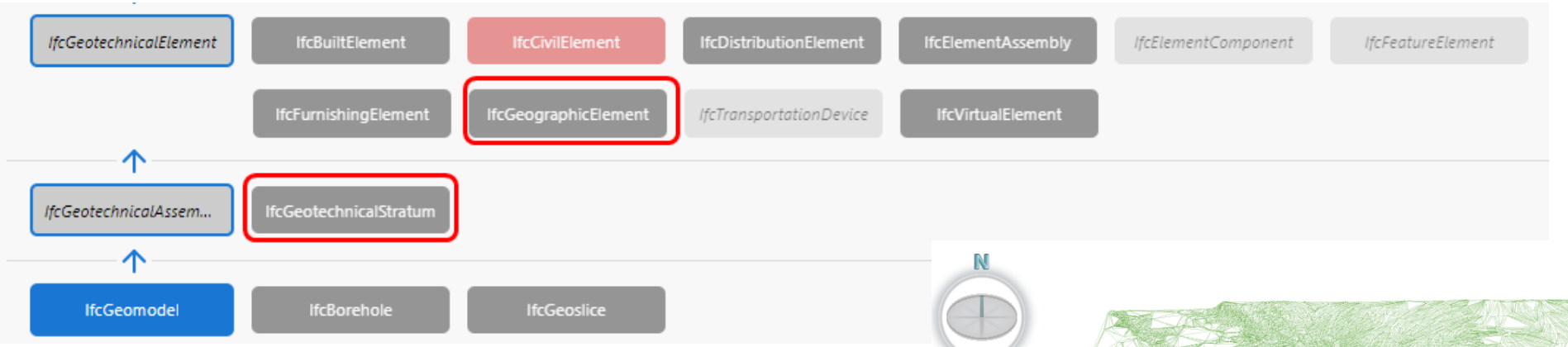
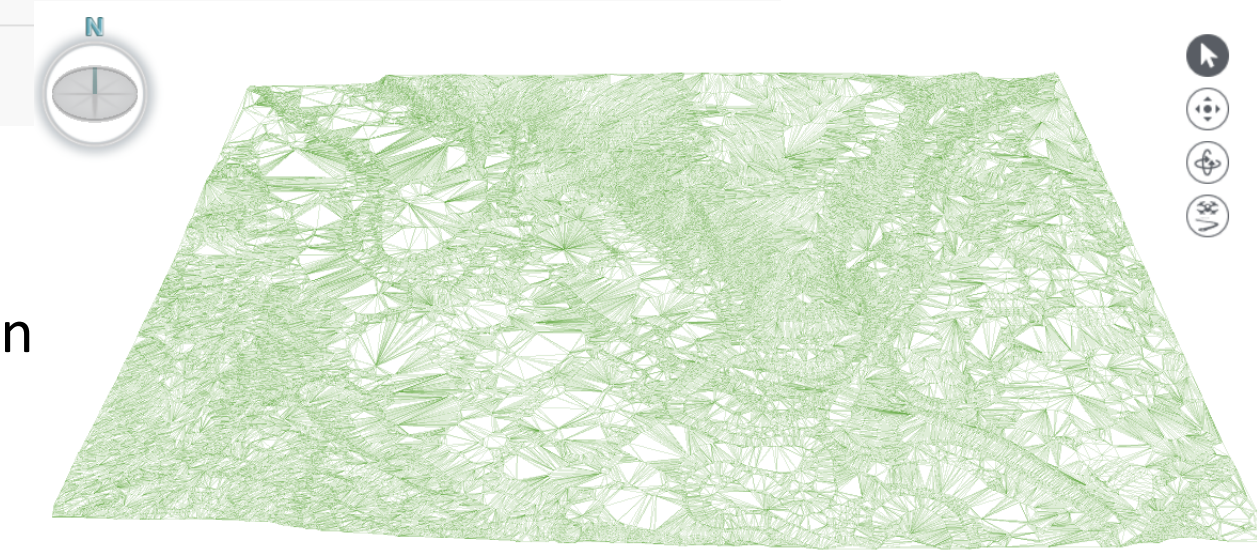
Terrengmodellering

ifcGeomodel — ifcRelAggregates — ifcGeotechnicalStratum





ifcGeographicElement Default objektype for eksisterende terrengobjekter f.eks. vegetasjon

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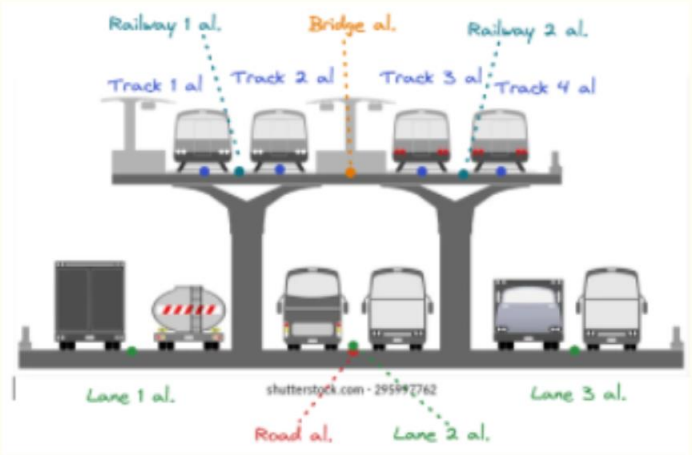
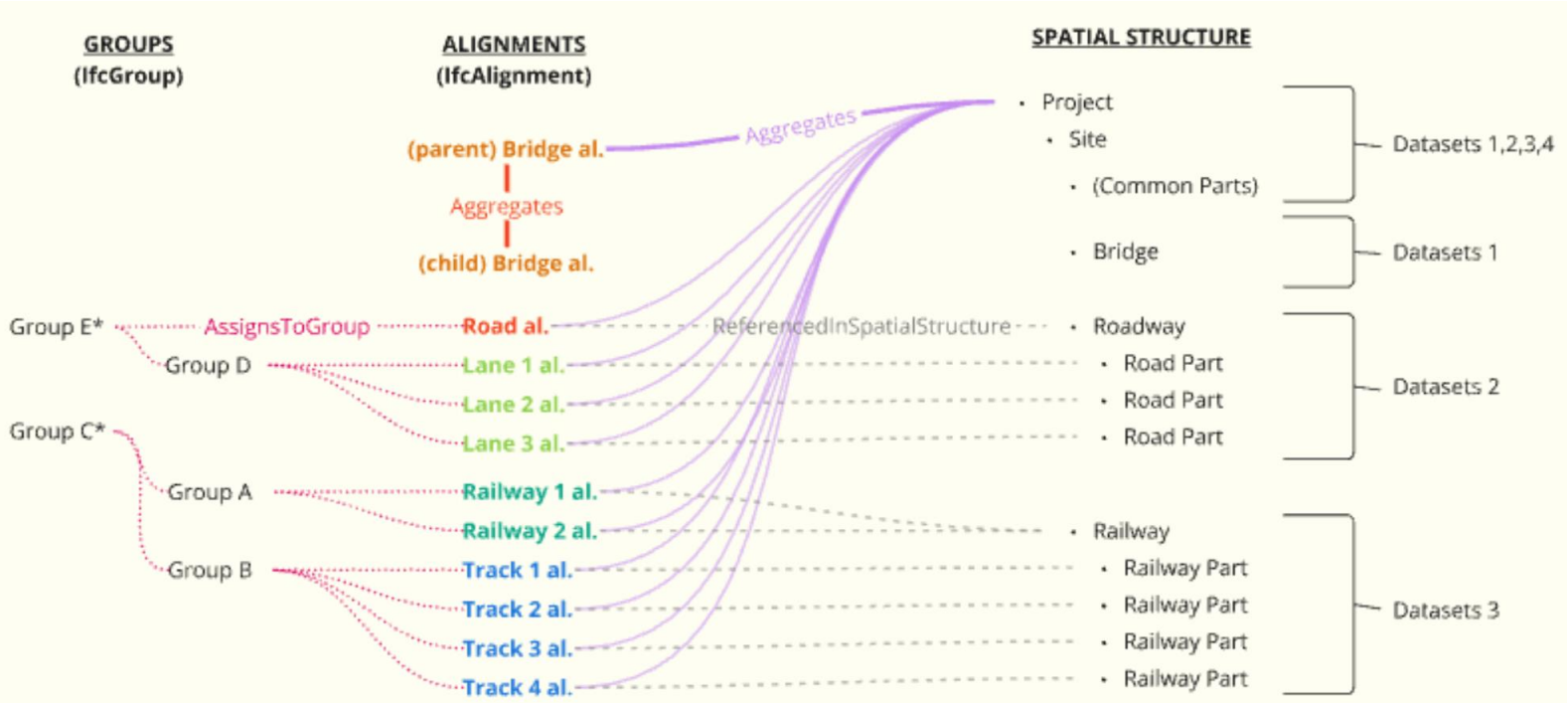
Linjeføring ("Alignments")

Flere ifcSites kan bli plassert langs en eller flere linjeføringer (behov særlig fra jernbane).
Derfor plasseres ifcAlignment rett under ifcProject i den romlige nedbrytningsstrukturen.
Det kan være hensiktsmessig å gruppere ifcAlignment'ene som vist under.





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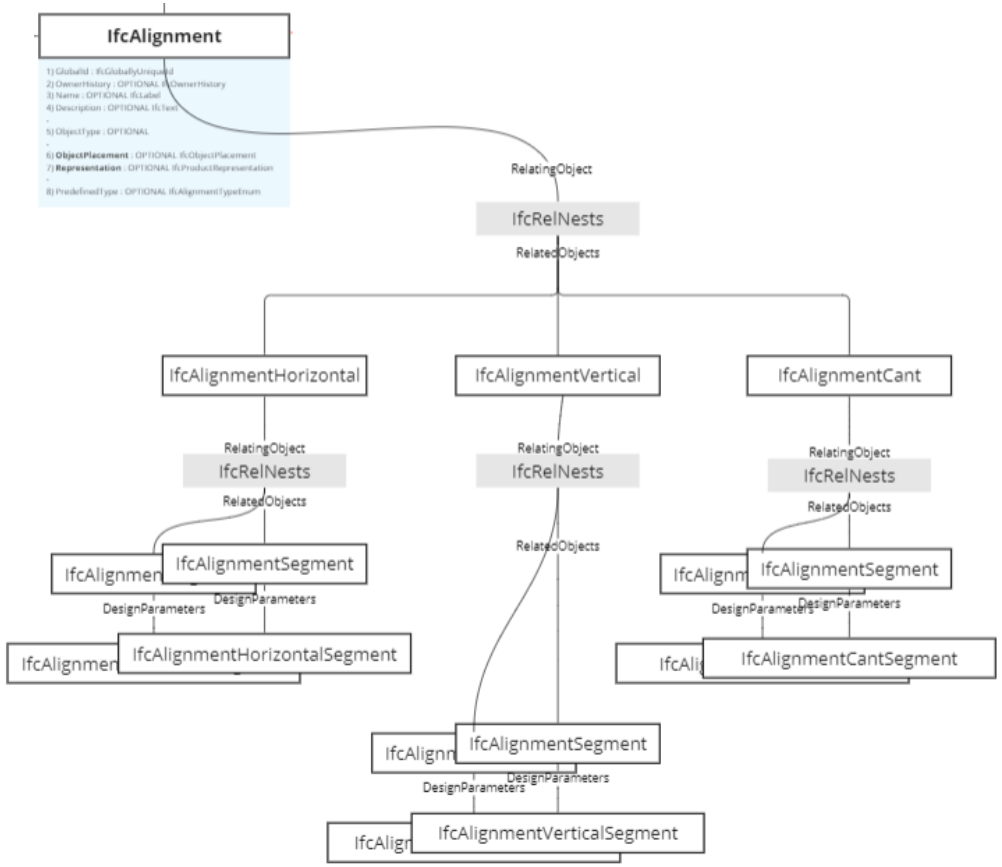
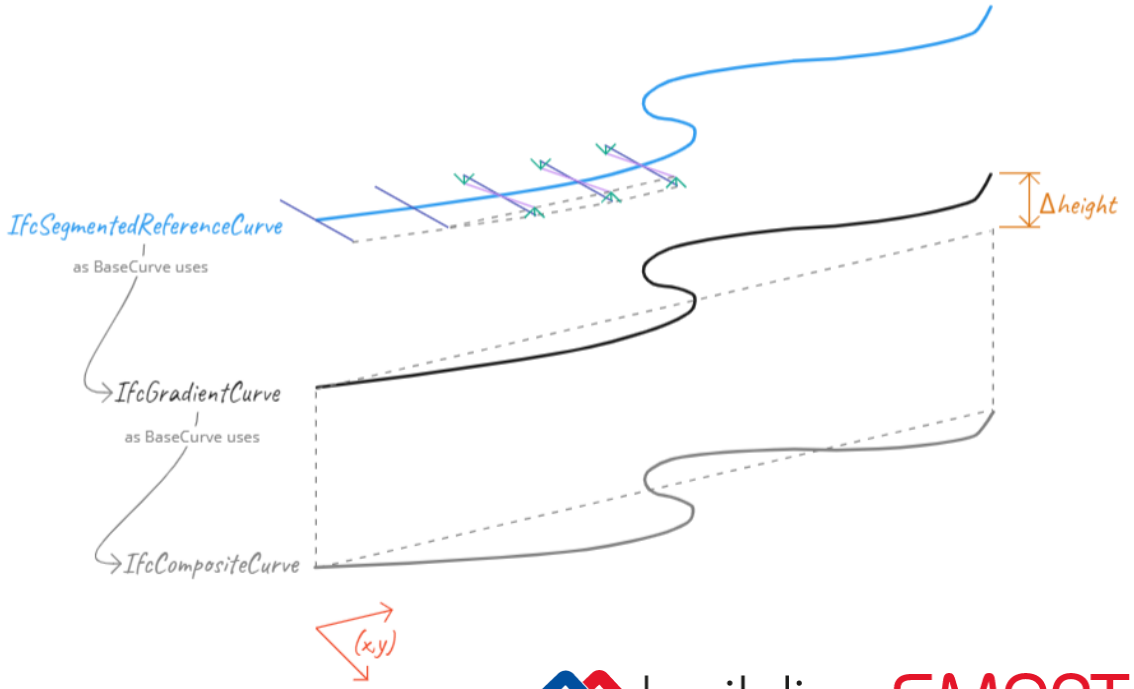
Linjeføring

Semantisk representasjon <-> Geometrisk representasjon

Semantisk representasjon:



Geometrisk representasjon:



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Linjeføring - Profilnummerering

ifcReferent

Benyttes for å spesifisere profilnummer/stasjonering (Ny i IFC 4.1, revidert i IFC 4.3)

Støtter bl.a:

- Kjedebrudd, inkludert negative kjedebrudd
- Profilnummer forskjellig fra null i starten av linjeføringen, inkl. negativt profilnummer
- Profilnummerering i motsatt retning av geomtridefinisjonen
- Egenskapssett plassert langs linjeføringen
- Objekter plassert langs linjeføringen

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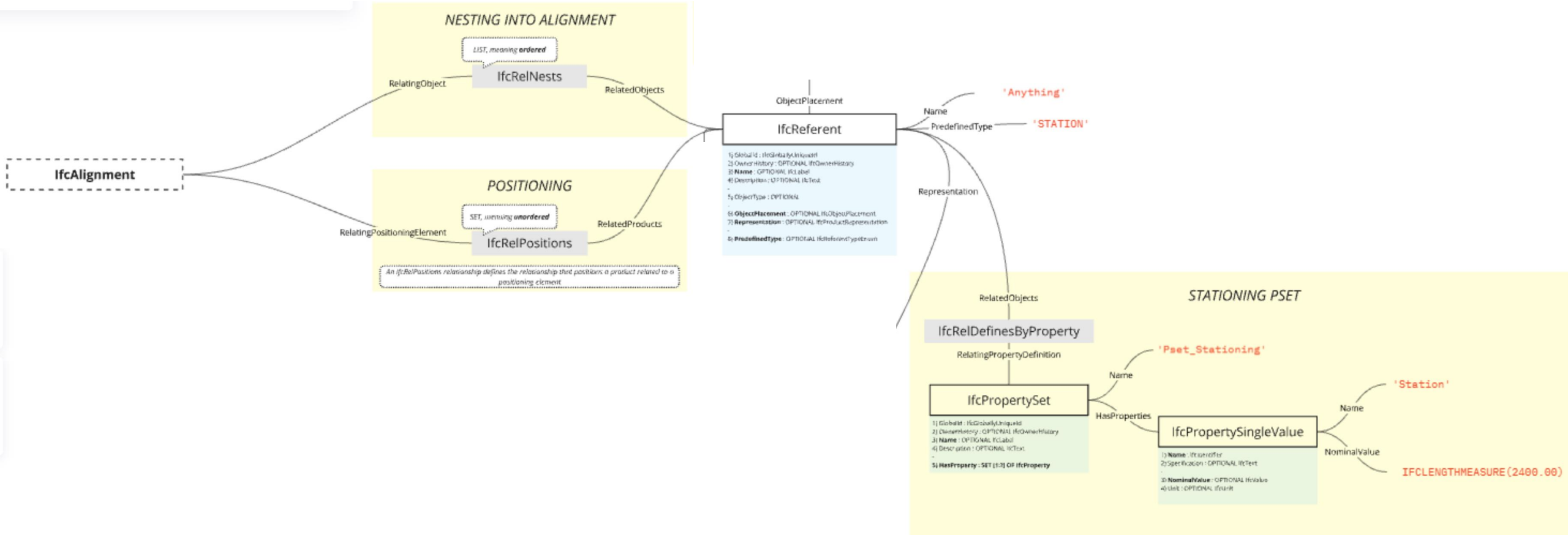
Linjeføring - Profilnummerering



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Landmålingsdata

Landmålingdata håndteres med ifcAnnotation

4.1.7.1.2 Annotation Geometry
- 4.1.7.1.2.1 Annotation 2D Geometry ✓ AbRV
- 4.1.7.1.2.2 Annotation 3D Geometry ✓ AbRV
- 4.1.7.1.2.3 Set Of Survey Points
- 4.1.7.1.2.4 Single Survey Line
- 4.1.7.1.2.5 Single Survey Point
- 4.1.7.1.2.6 Single Survey Point Linearly Placed

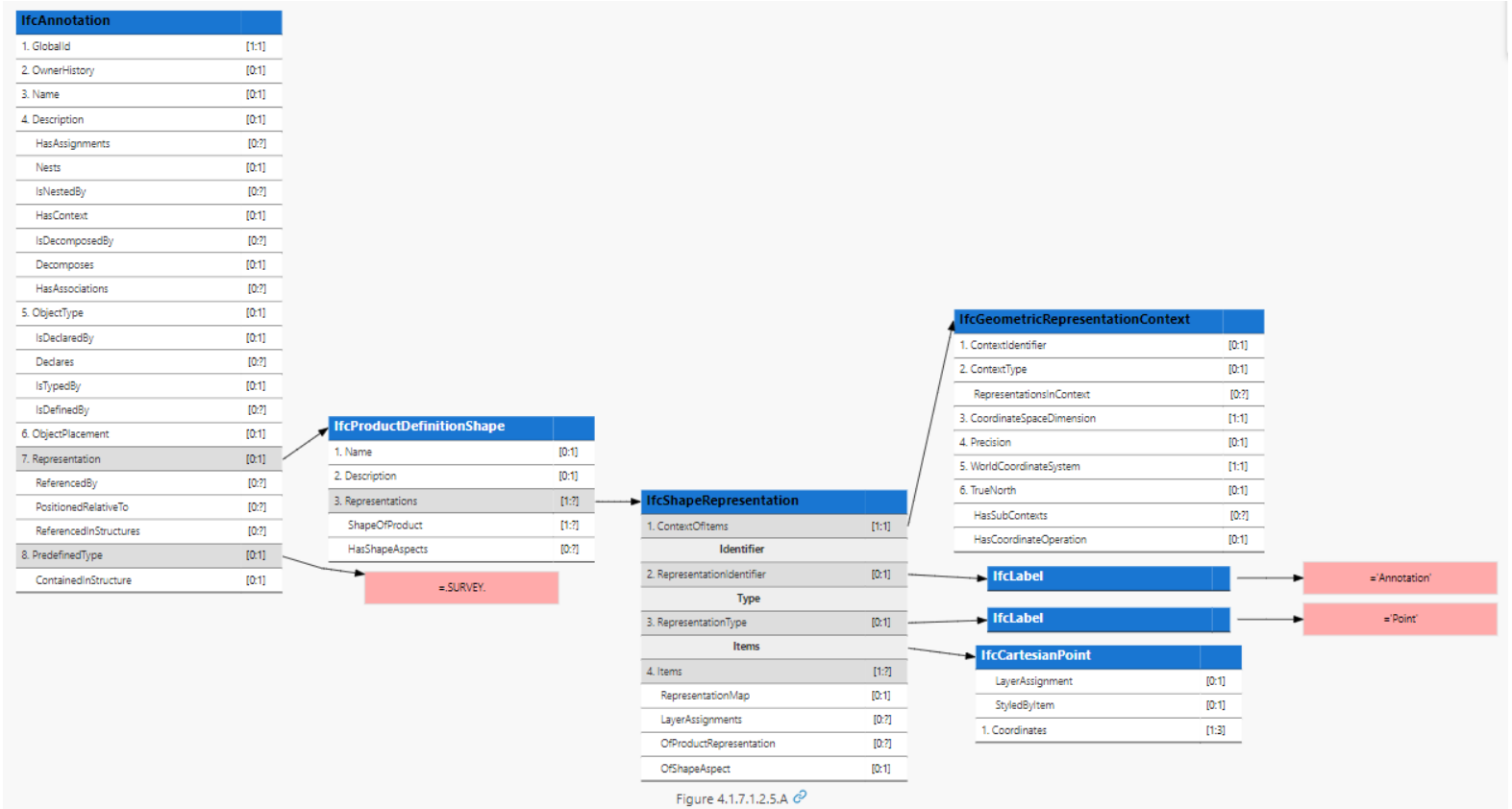

Figure 4.1.7.1.2.5.A

https://ifc43-docs.standards.buildingsmart.org/IFC/RELEASE/IFC4x3/HTML/concepts/content.html

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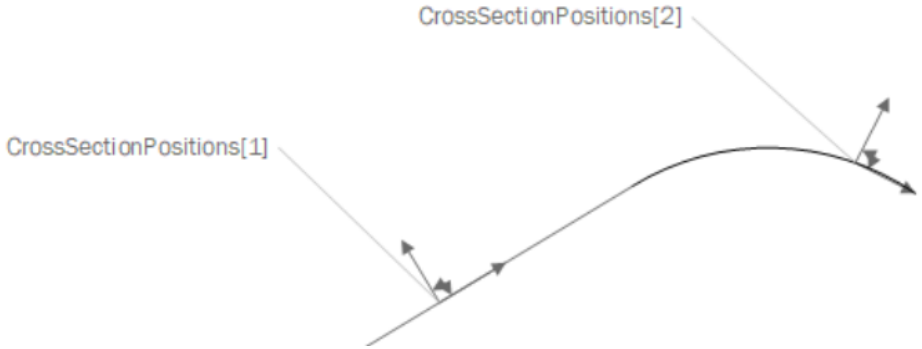
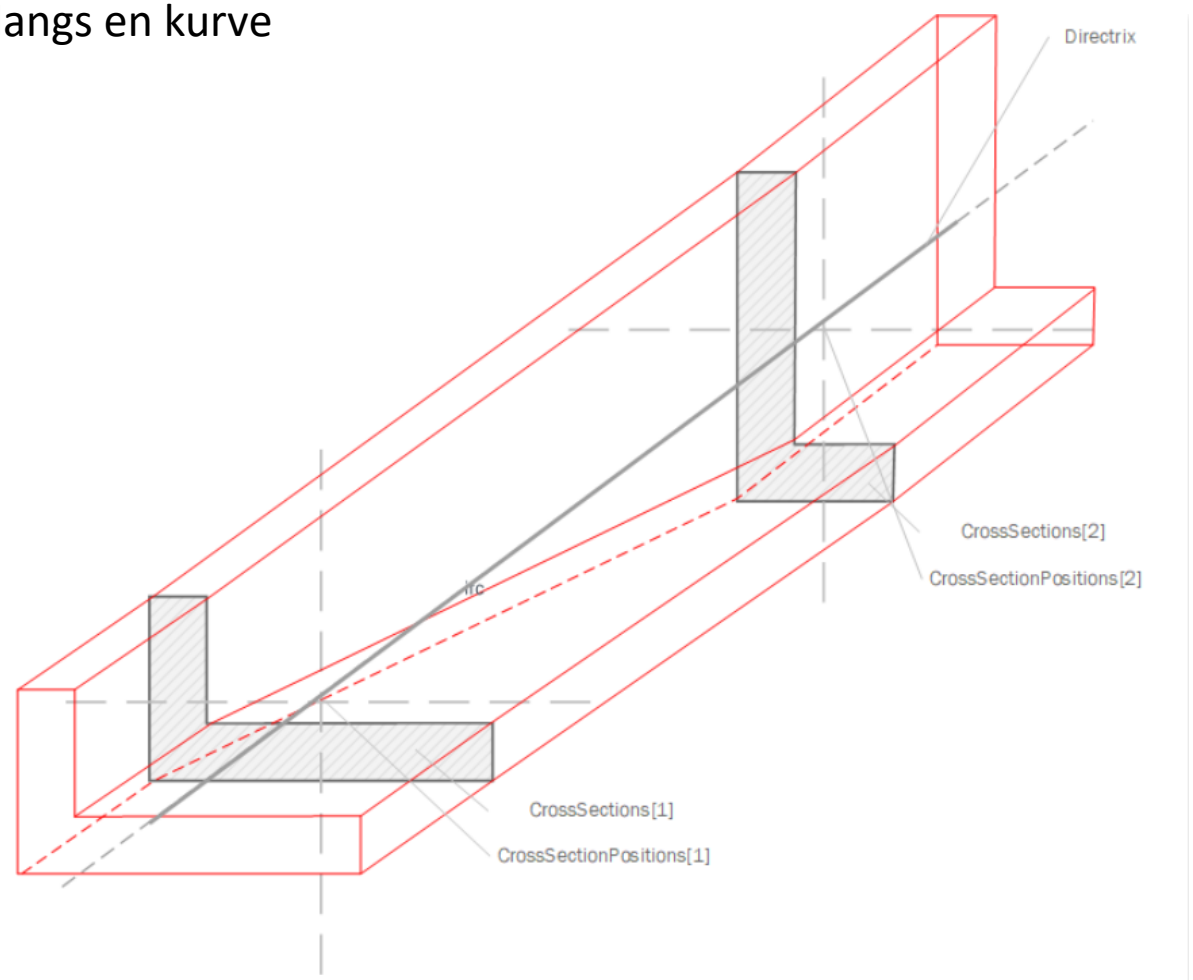
Parametrisk geometri

IfcSectionedSolidHorizontal (Ny i IFC 4.1, revidert for IFC4.3)
Lineærinterpolasjon mellom to vertikale tverrsnitt langs en kurve

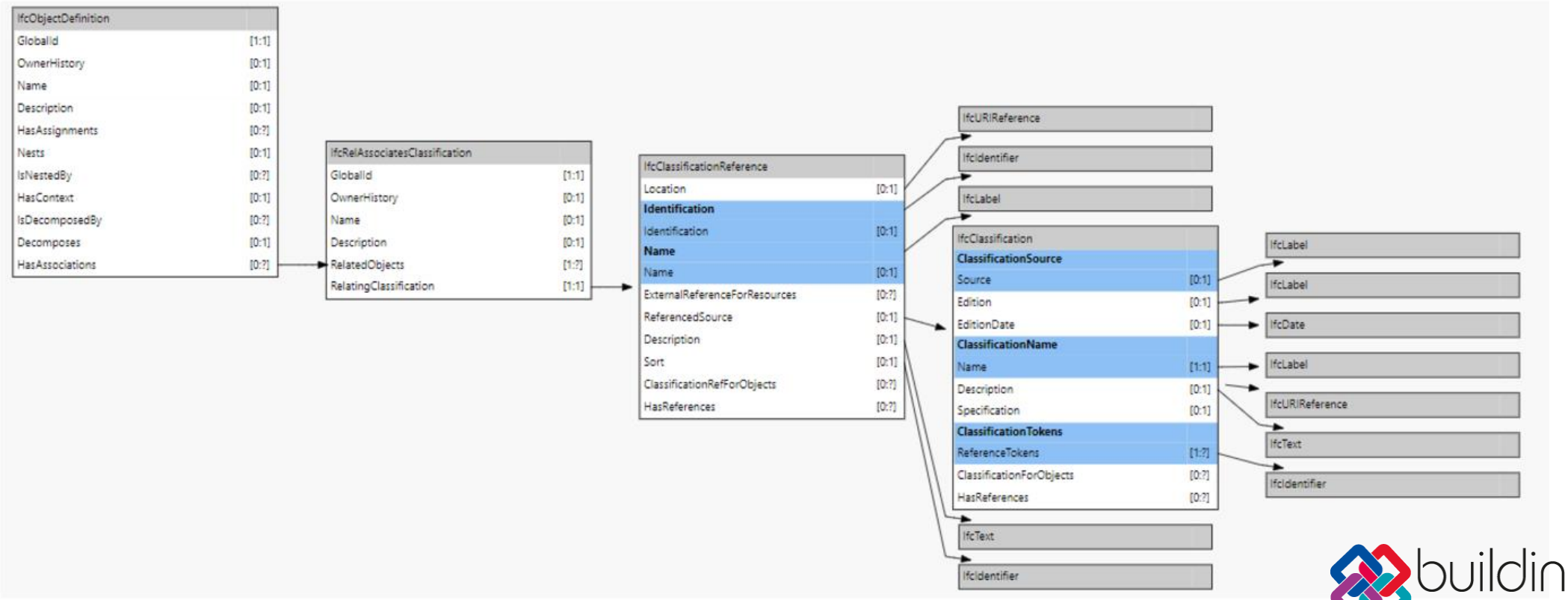




IfcFixedReferenceSweptAreaSolid: Sweeper et tverrsnitt langs en kurve

Klassifisering

- Klassifisering er et eget «system» i IFC, dvs det håndteres ikke som egenskaper.
- En objektinstans kan være knyttet til flere klassifiseringsystemer samtidig, f.eks. både RDS (Nye Veier) og TFM
- Klassifiseringen kan bygges opp i en hierarkisk struktur hvis ønskelig
- **ifcClassification** representerer hele klassifiseringssystemet **ifcClassificationReference** representerer klassifiseringsverdiene knyttet til objektinstans: Kode, Navn, Beskrivelse, URI



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