

Flow of Events for Use Case – Define GIS Flow Segment Representation

Change Log	
19/06/2004	Renamed Renamed in lower case form from UC-DefineGISFlowSegmentRepresentation.
17/10/2004	Removed reference to IfcRelConnectsPathElements
02/11/2004	Finalized for pre-integrated model

Overview

Specifically intended to consider the situation where an element of a distribution system (of whatever type) is to be represented in a map.

This Use Case considers that the representation of a flow element (and ultimately, it's grouping within a system) has somewhat different requirements to the specification of a flow segment within a building CAD representation.

In particular, GIS representations are significantly topological rather than geometric. That is, they show the path and point connection of system elements and not their geometry.

However, this Use Case also considers the situation where a flow segment in GIS terms also has to relate to flow segments in AEC/FM terms since the distribution system and the actual flow segments concerned are physically the same.

Process

Preconditions

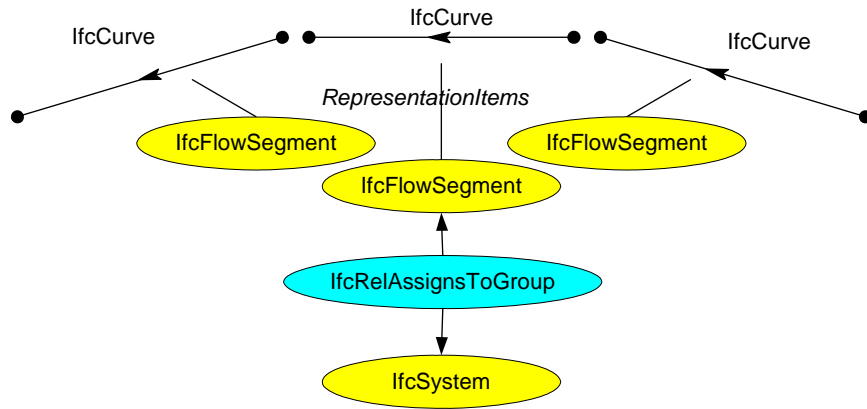
None. This use case defines generic requirements

Actors

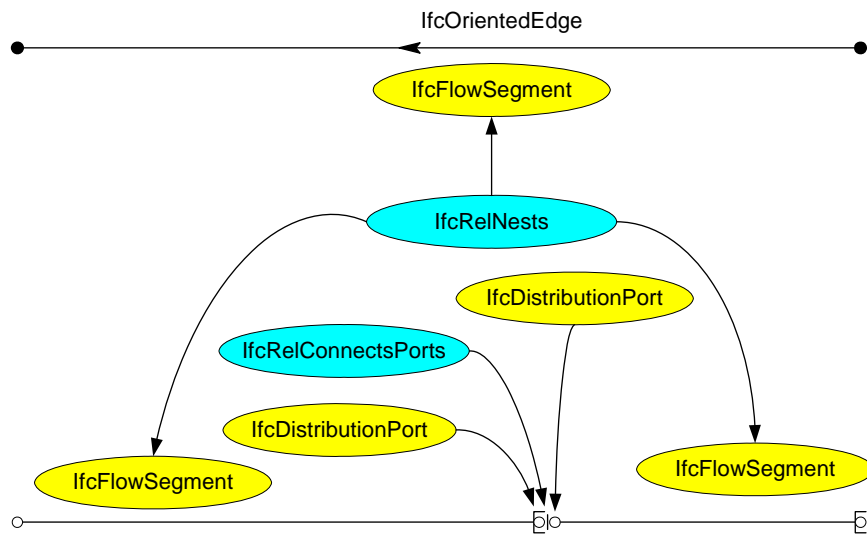
Applicant

Main Flow

Flow	Entity
1. Note that this Use Case deals with representations in a generic way and therefore considers only the flow segment instances. More specific handling of types of flow segment are possible through the normal definition of the type used by an instance through IfcRelDefines in the form normally adopted by IFC.	IfcRelDefinesByType
2. The illustration below is indicative of the way in which a system might be represented in a GIS system. It is defined as a set of IfcFlowSegment instances. Each instance of IfcFlowSegment has a representation that is defined as an IfcCurve.	IfcFlowSegment IfcCurve (subtypes)



<p>3. Since instances of IfcFlowSegment and IfcSystem are being used, properties can be assigned through property sets as necessary.</p>	<p>IfcFlowSegment IfcSystem IfcRelAssignsToGroup</p>
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<p>4. Flow segments represented topologically may need to be decomposed into several other flow segments in order to describe the actual physical items that are brought together to form the system. This can be achieved using an instance of IfcRelNests</p>	<p>IfcRelNests</p>
<p>5. Note that in the nesting relationship, only instances of IfcFlowSegment are used. This is considered to be sufficient to describe the relationship. Instances of IfcDistributionPort are ignored for this purpose (they are required to determine connectivity of the physical or logical items but not of the path based topological entities). Instances of IfcRelConnectsPorts cannot be included in an aggregation anyway since they are not subtypes</p>	<p>IfcFlowSegment</p>

of IfcObject.	
6. Instances of IfcDistributionPort, IfcRelConnectsPorts and IfcRelConnectsPortToElement are required to enable the complete system description at the level of building CAD and are implicitly referenced by the GIS representation therefore since they act to connect otherwise nested elements.	IfcDistributionPort IfcRelConnectsPorts IfcRelConnectsPortToElement
7. Note that flow segment nesting/aggregation may be handled at several levels such that level of detail required at each level can be considered.	

Post Conditions

A distribution system of the type required is defined in GIS terms and can participate in other Use Cases.

IFC Usage and Extension Requirements

Existing Entity/Class Usage

<i>Entity Class Name</i>	<i>Usage</i>
IfcDistributionPort	Used for connectivity of physical / logical items most typically at the AEC/FM level
IfcFlowSegment	Defines the occurrence of a segment of a flow distribution system that is typically straight (although not necessarily so) and contiguous
IfcCurve	The path of a point moving in its coordinate space
IfcRelAggregates	Used to aggregate entities where aggregated entities may be of different type to the aggregating entity
IfcRelConnectsPorts	Defines the relationship that is made between two ports at their point of connection. Most typically used at the AEC/FM level
IfcRelConnectsPortToElement	Defines the relationship that is made between one port to the IfcElement (in this case, most typically, an IfcFlowSegment) in which it is contained. Most typically used at the AEC/FM level.
IfcRelAssignsToGroup	Handles the assignment of objects (subtypes of IfcObject) to a group (subtypes of IfcGroup, in this case an IfcSystem).
IfcRelNests	Defines the relationship between the topological system elements (IfcFlowSegment) at the GIS level and the physical / logical systems elements (IfcFlowSegment) at the AEC/FM level.
IfcSystem	

Issue List

<i>Question</i>	<i>Answer</i>