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International Alliance for Interoperability

IFC As A State of the Art Solution
Tokyo - 6th July 1999

Jeffrey Wix
IFC R2.X Project Manager, UK Chapter Technical Co-ordinator

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AGENDA

- IAI Objectives
- Business Context
- Software Technology
- Modeling History and Technology
  Process, Information and Object Models
- Relationships and Needs
  STEP, Projects, Academic

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International Alliance for Interoperability

Vision

To enable software interoperability in the AEC/FM industries

Mission

To provide a universal basis for process improvement and information sharing in the construction and facilities management industries.

Goal

To Define Industry Foundation Classes

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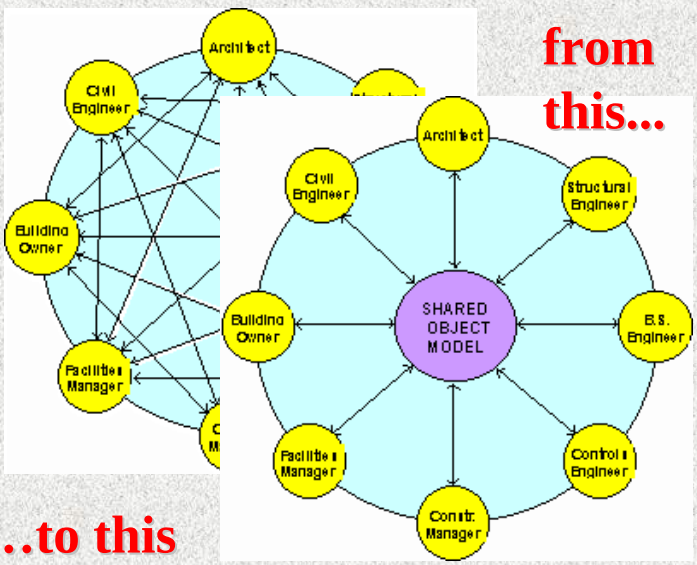
The IAI Objective



…to this

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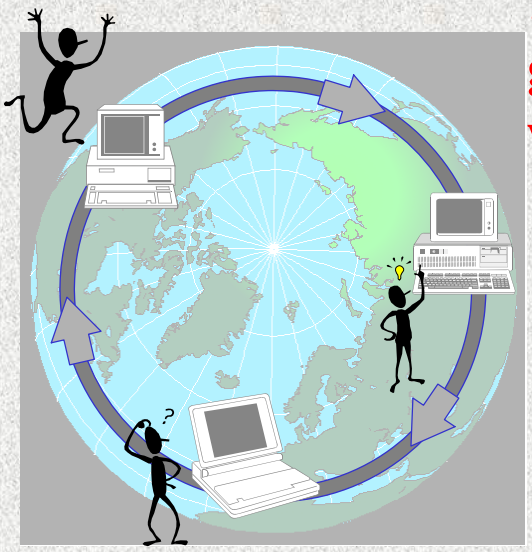
The IAI Objective



…to global working

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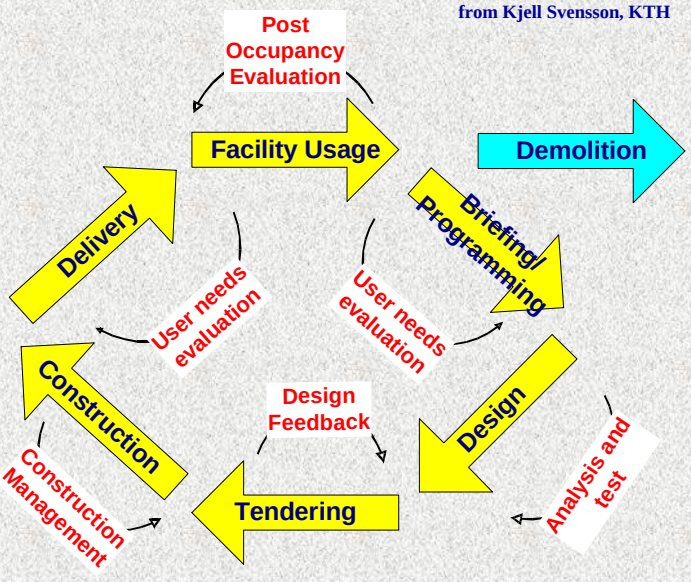
Project Lifecycle

from Kjell Svensson, KTH



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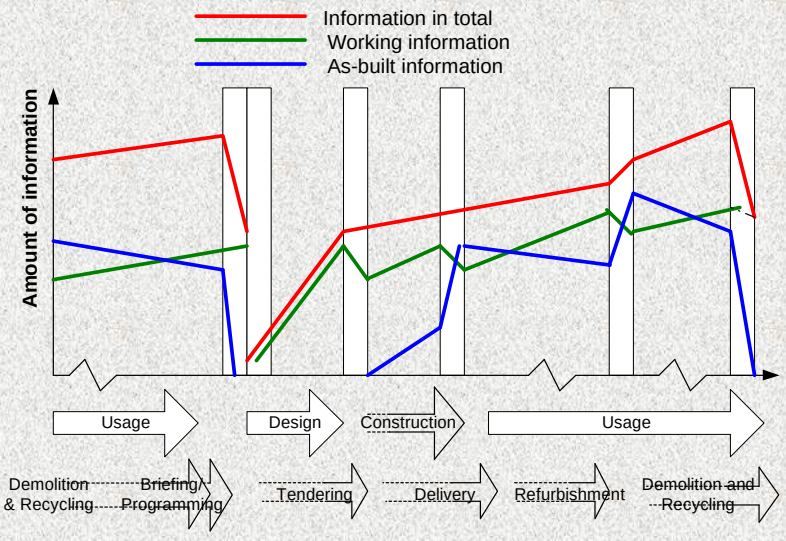
Information in the Project

from Kjell Svensson, KTH



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Information in Drawings

from Kjell Svensson, KTH

- **A medium-sized (about 5000 sq. m.) office building requires 500-600 drawings to be completed.**
- **+ geographical maps and surveys.**
- **During the life-time of a building, smaller refurbishments generate about fifty new drawings every ten years.**
- **At least twice a century, major conversions are required which add about another 250 drawings.**

Drawing type (discipline)	***Total No.***	***No. to archives***
Architecture	100	50
Construction	100	100
Mechanical Services (HVAC)	150	60
Electrical and control systems	200	60
Total number	***550***	***270***

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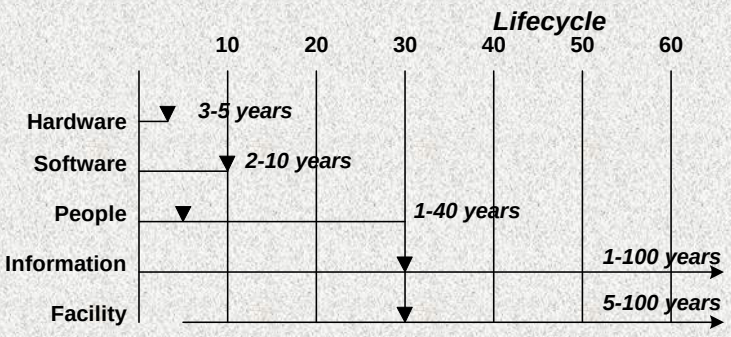
Information Lifecycle



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Business Benefit

"A common complaint heard from academics and software vendors is that those involved in the construction industry are resistant to change. I feel that this is wrong. Many professional people are realists. They will not take on technology because it is new, but because it is beneficial."

Comment to the ISFAA Email Conference 1997 by Andrew Crowley

(Steel Construction Institute. CIMsteel model developer)

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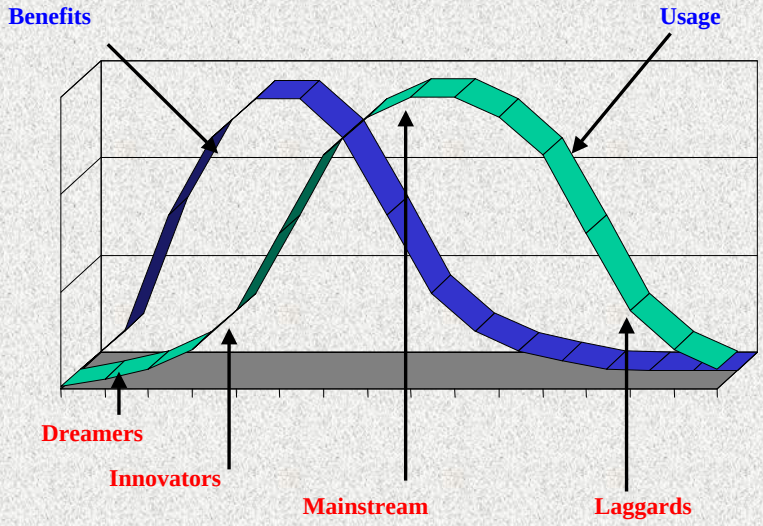
Business Benefit



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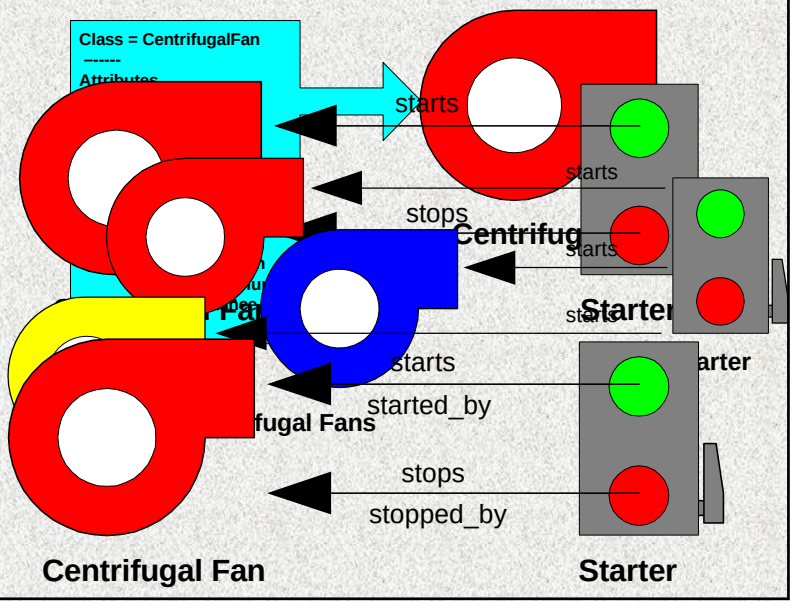
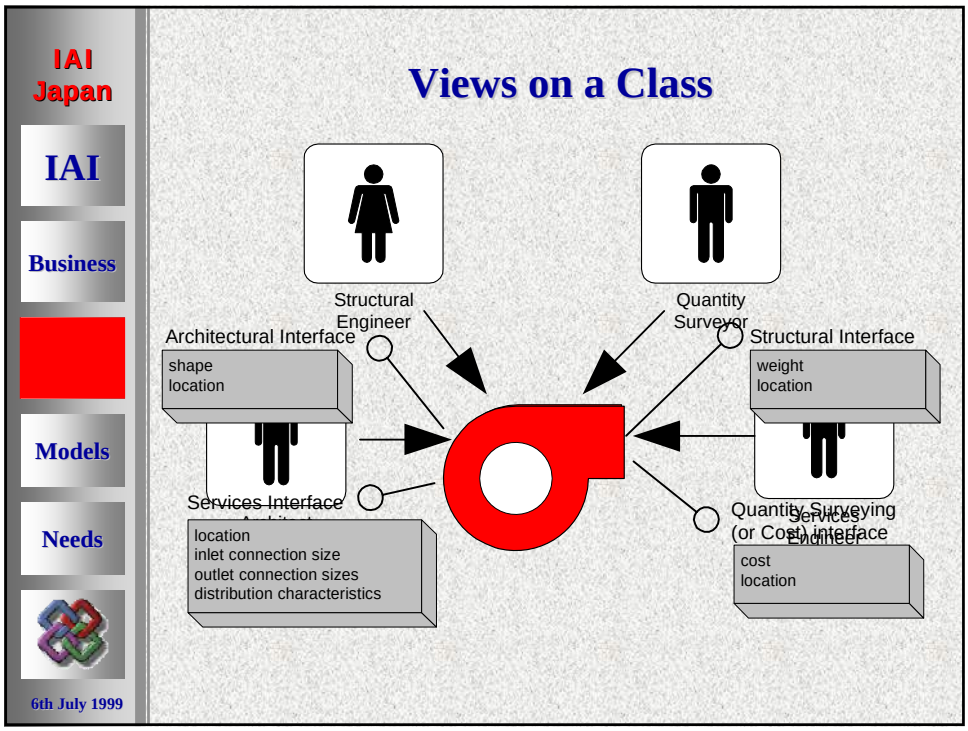
Classes and Relationships

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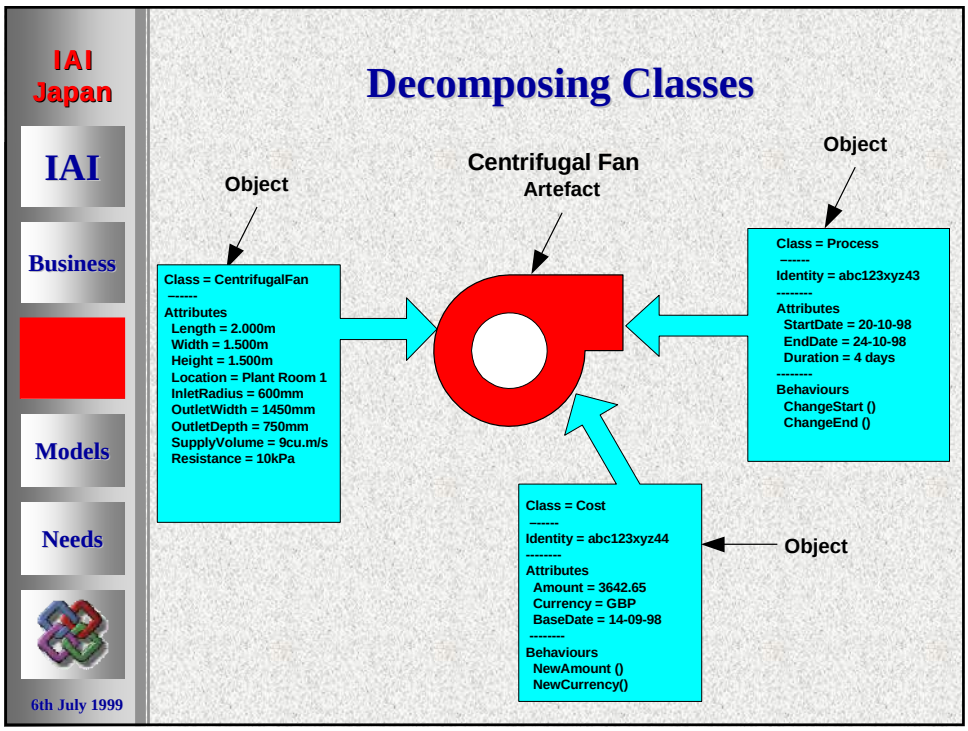
Views on a Class
Structural Engineer
Quantity Surveyor
Architectural Interface
shape
location
Structural Interface
weight
location
Services Interface
location
inlet connection size
outlet connection sizes
distribution characteristics
Quantity Surveying (or Cost) Interface
cost
location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Decomposing Classes
Object
Centrifugal Fan Artefact
Object
Class = CentrifugalFan
Attributes
Length = 2.000m
Width = 1.500m
Height = 1.500m
Location = Plant Room 1
InletRadius = 600mm
OutletWidth = 1450mm
OutletDepth = 750mm
SupplyVolume = 9cu.m/s
Resistance = 10kPa
Class = Process
Identity = abc123xyz43
Attributes
StartDate = 20-10-98
EndDate = 24-10-98
Duration = 4 days
Behaviours
ChangeStart ()
ChangeEnd ()
Class = Cost
Identity = abc123xyz44
Attributes
Amount = 3642.65
Currency = GBP
BaseDate = 14-09-98
Behaviours
NewAmount ()
NewCurrency()
Object

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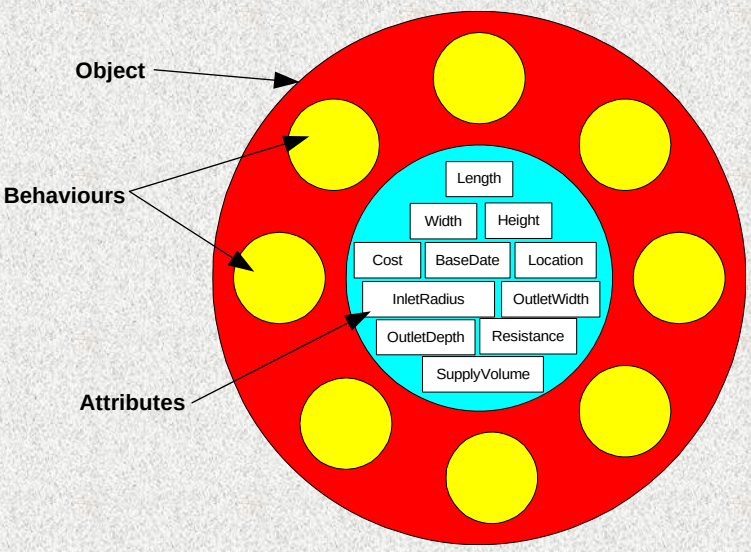
Class Behaviors



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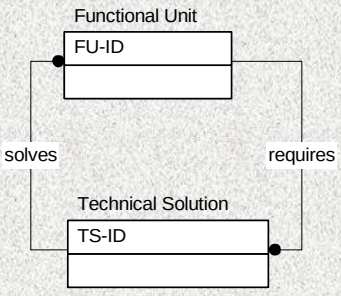
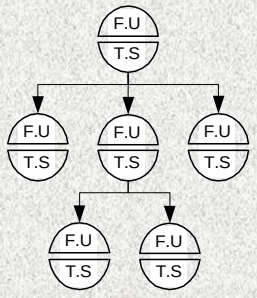
General AEC Reference Model (1986)



GARM Basic Model



FU/TS Decomposition

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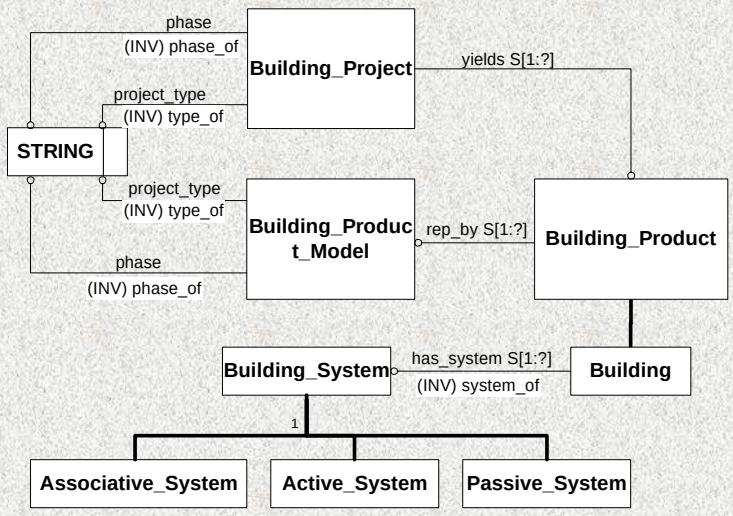
Building Systems Model (1988)



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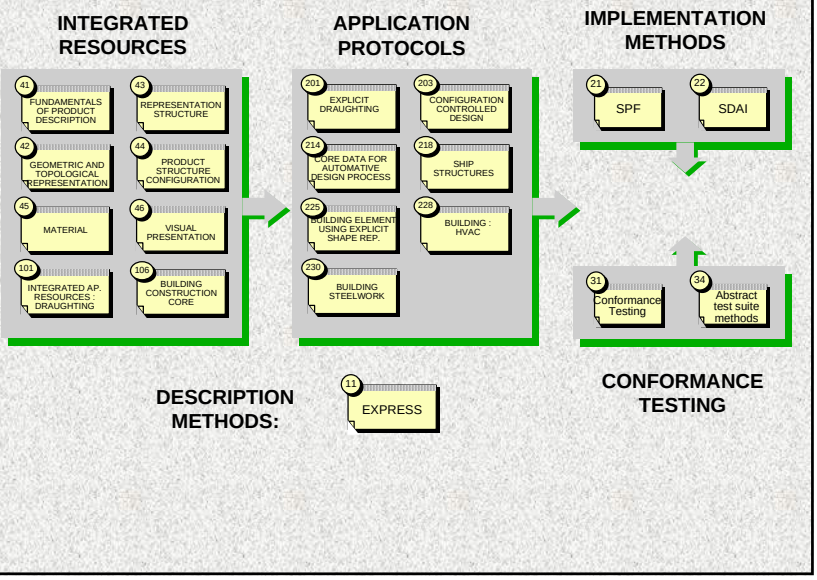
Application Protocols (1993)



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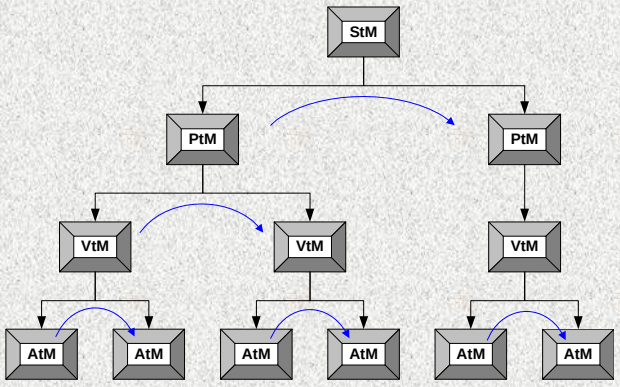
ATLAS Models (1993)

Sector type Models

Part type Models

View type Models

Application type Models



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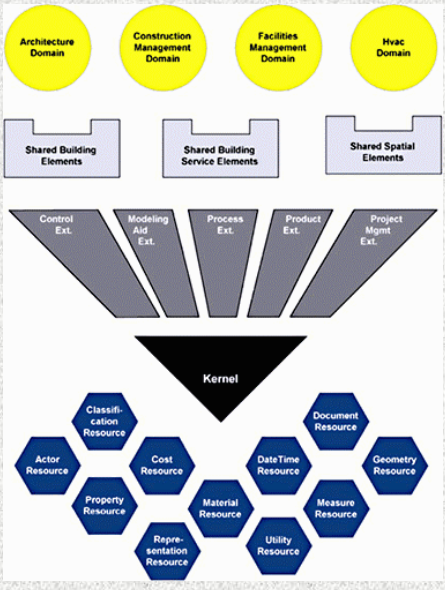
IFC Model (1996+)



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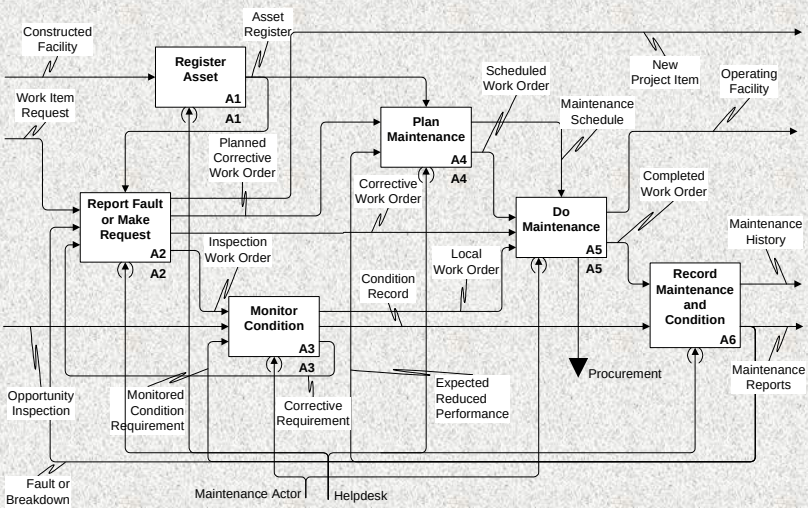
Process Model



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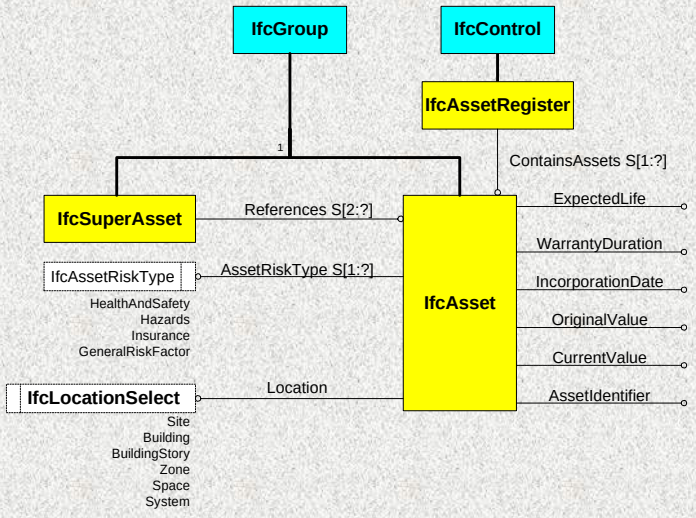
Object Model



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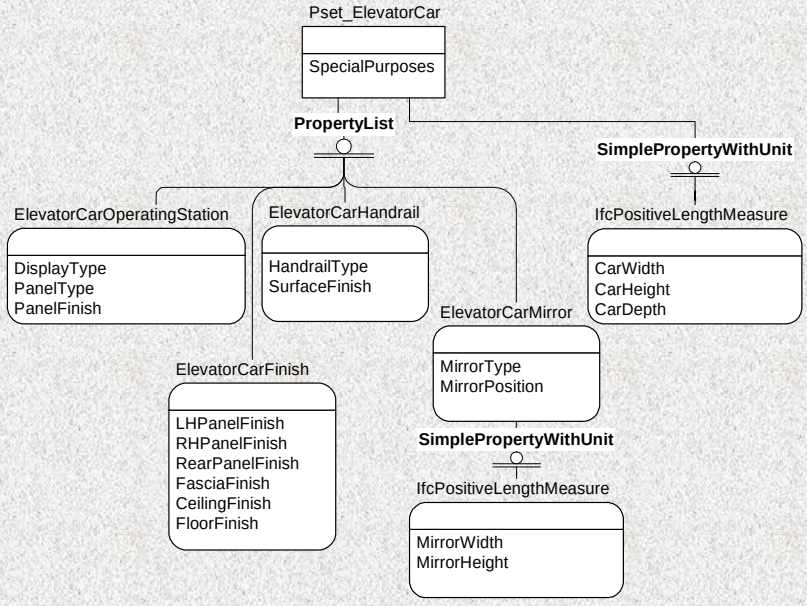
Property Set Model (Lifts)



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Elevator Car Property Set

Property Name	Definition	Property Type	Data or Rel. Type
SpecialPurposes	Additional purposes for which the elevator car may be used including firefighting, evacuation etc.	IfcSimpleProperty	IfcString
CarWidth	The horizontal dimensions between the inner surfaces of the car walls measured parallel to the front entrance and at 1m above the car floor.	IfcSimplePropertyWithUnit	IfcPositiveLength Measure
CarHeight	The inside vertical distance between the entrance threshold and the constructional roof of the car. Light fittings and false ceilings are accommodated within this dimension.	IfcSimplePropertyWithUnit	IfcPositiveLength Measure
CarDepth	The horizontal dimensions between the inner surfaces of the car walls measured at right angles to the car width and at 1m above the car floor.	IfcSimplePropertyWithUnit	IfcPositiveLength Measure
ElevatorCarOperating Station	See ElevatorCarOperatingStation property list definition	IfcPropertyList	
ElevatorCarFinish	See ElevatorCarFinish property list definition	IfcPropertyList	
ElevatorCarHandrail	See ElevatorCarHandrail property list definition	IfcPropertyList	
ElevatorCarMirror	See ElevatorCarMirror property list definition	IfcPropertyList	

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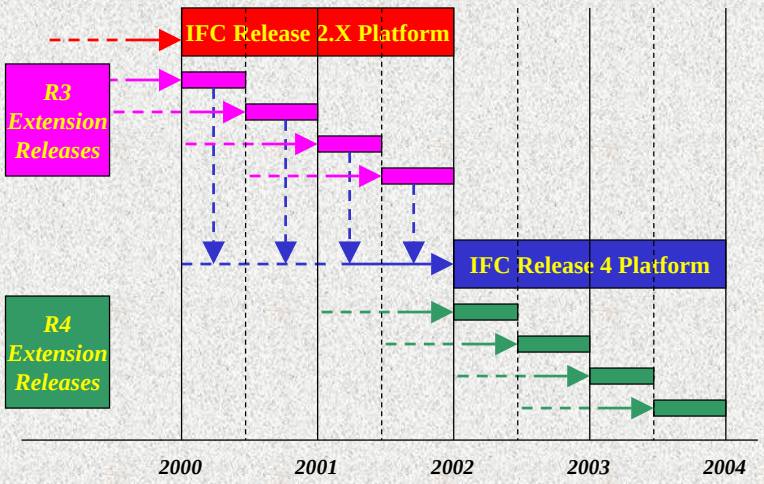
Release Strategy



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Relationship with STEP

- IFC uses a lot of STEP technology
- **BUT** it must be used carefully
- We have to find ways of working more closely with ISO
  - We have A-liaison status
  - We have good contact with ISO TC59 and we must build on this
- Conversations have been held between IAI and STEP people of the STEP Technical Architecture
- **We must participate**
  - Model from the Process Industry (EPISTLE/PIEBASE)
  - Model from the Petrochemical Industry (POSC)
- **We need resources to do this**

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Needs

- Tools and approaches that enable people in projects to work together more effectively
- Development of abilities to reference static information stores
- Extend and refine property set capability to handle differences in 'flavor' of a common concept.
- **Use and reference current work**
- Deliver capability to industry
- Market what we do to industry
- Extend collaboration
- Extend technology

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IFC As State of the Art Technology

- IFC is State of the Art for the Building Construction Industry
- It is a Leading Edge, not 'Bleeding Edge'
- Technology is only one part of the problem
- It may be the easiest part of the problem to solve
- There are also
  - People Issues
  - Business Issues
  - Cultural Issues
  - Legal Issues
  - …. and others

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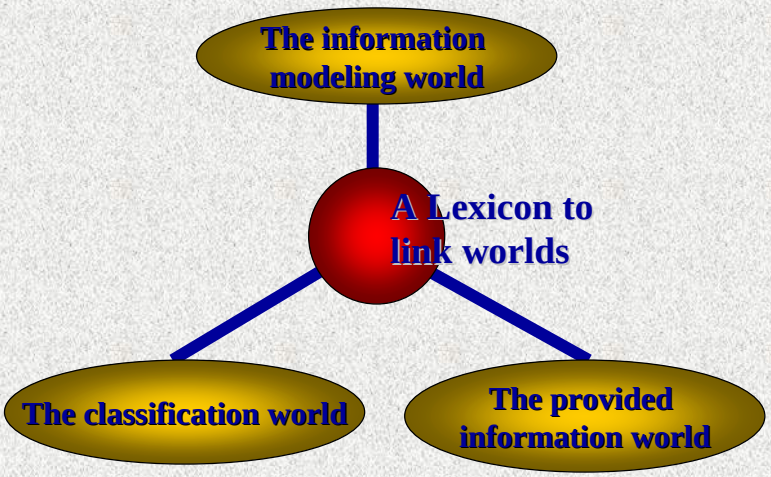
Lexicon of Terminology



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Future Services