



TECHNISCHE
UNIVERSITÄT
DRESDEN

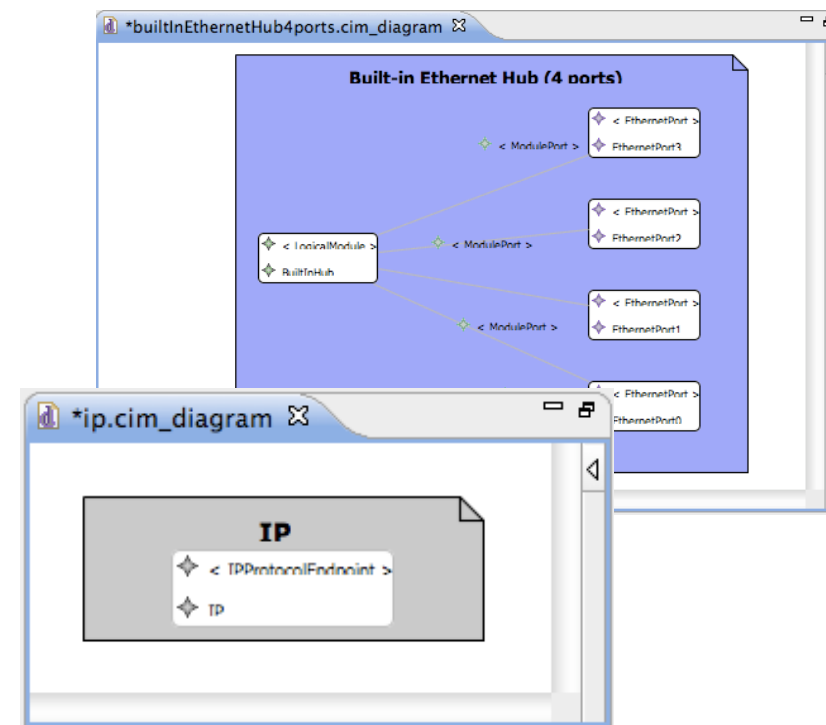


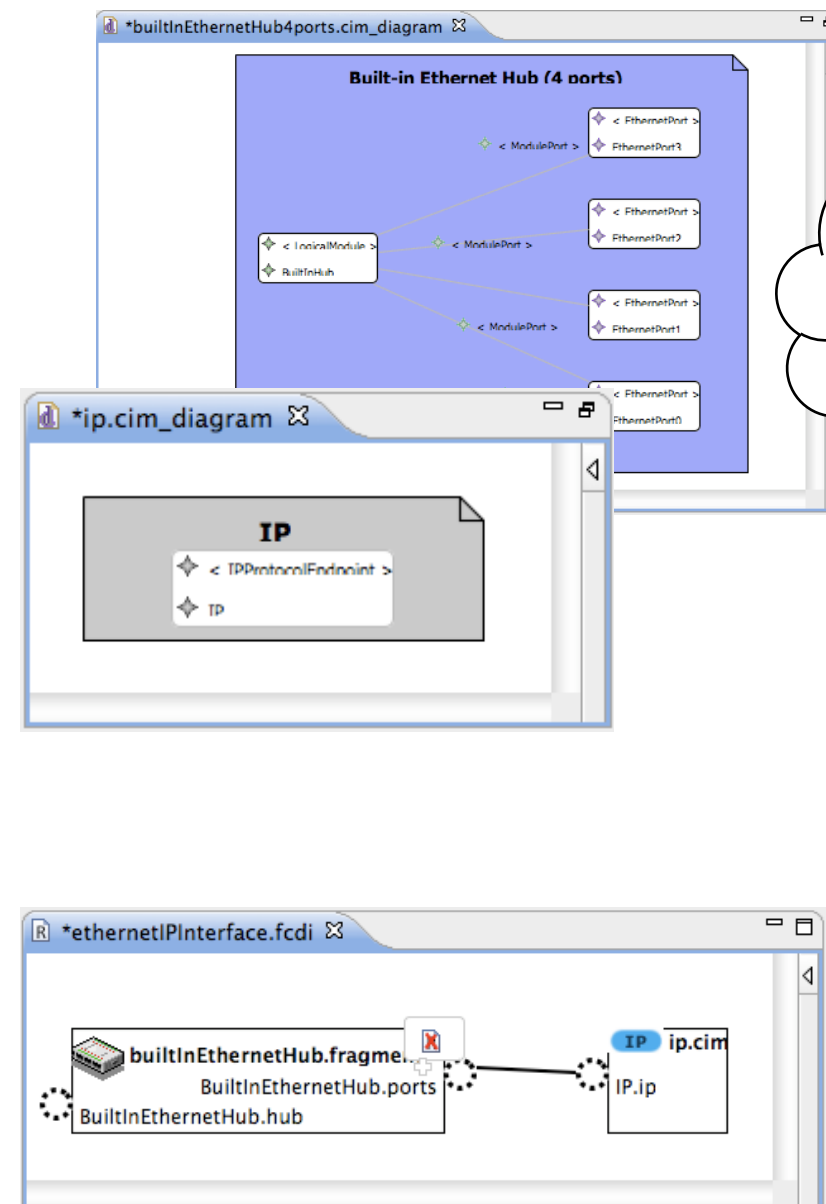
Fakultät Informatik, Institut für Software- und Multimediatechnologie, Lehrstuhl Softwaretechnologie

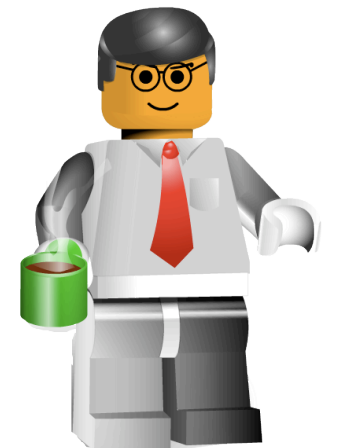
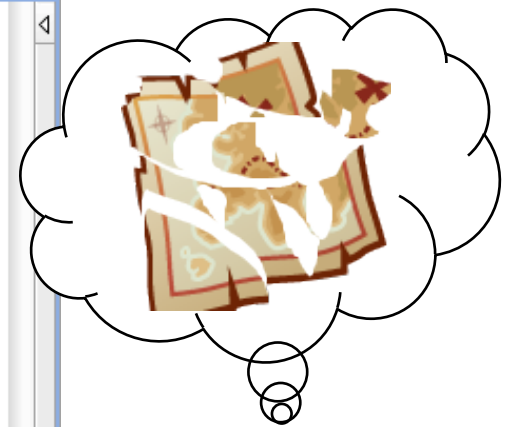
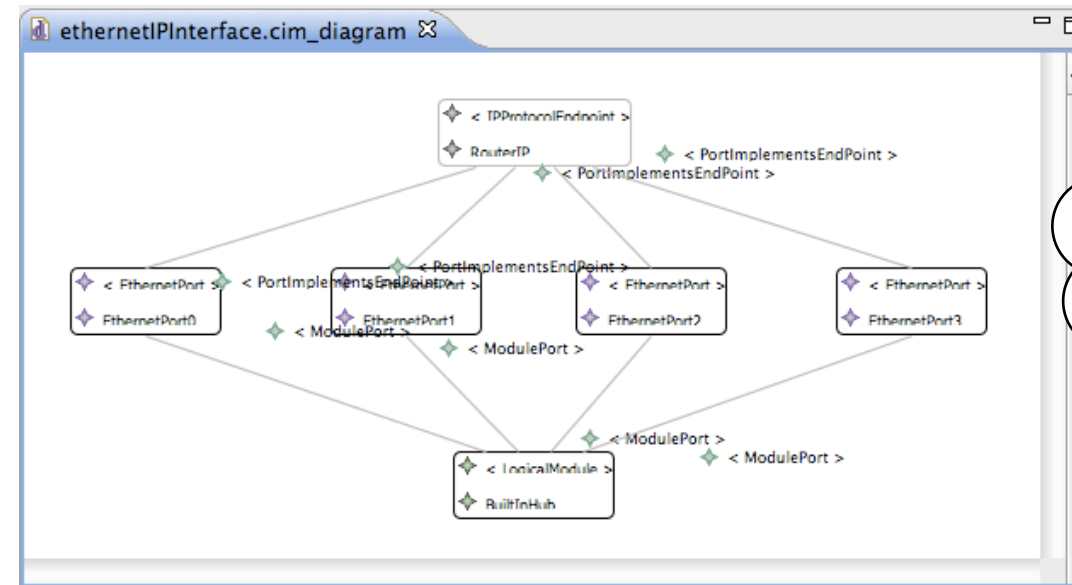
Towards a Generic Layout Composition Framework for Domain Specific Models

Jendrik Johannes
Karsten Gaul

26/10/2009, DSM'09, Orlando, Florida

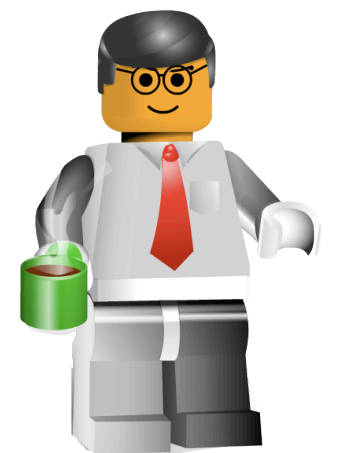
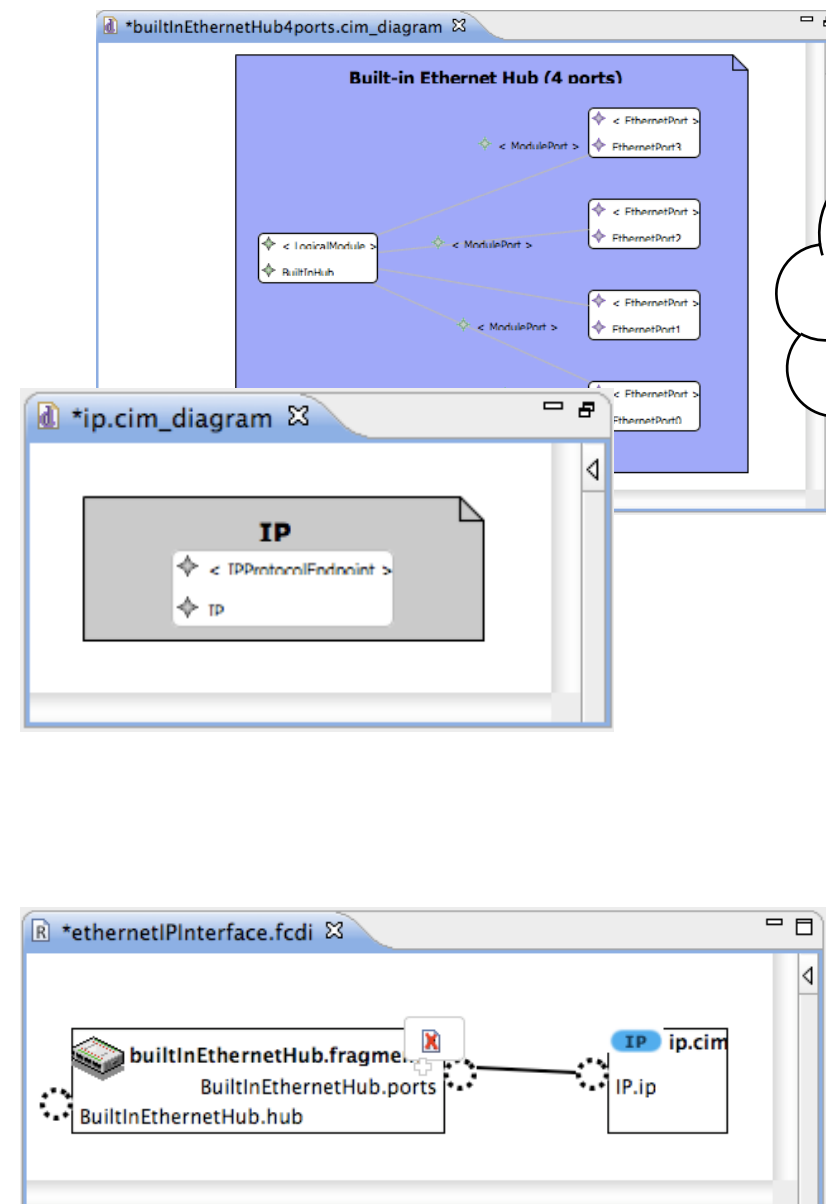




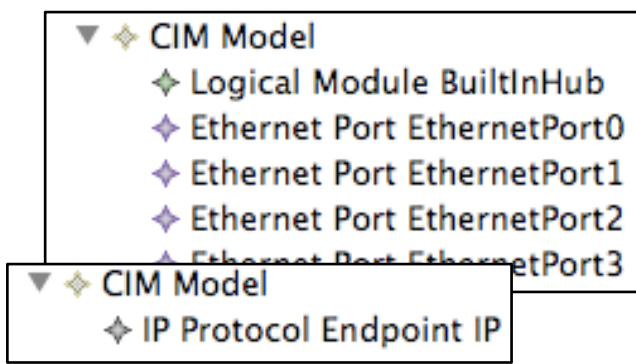
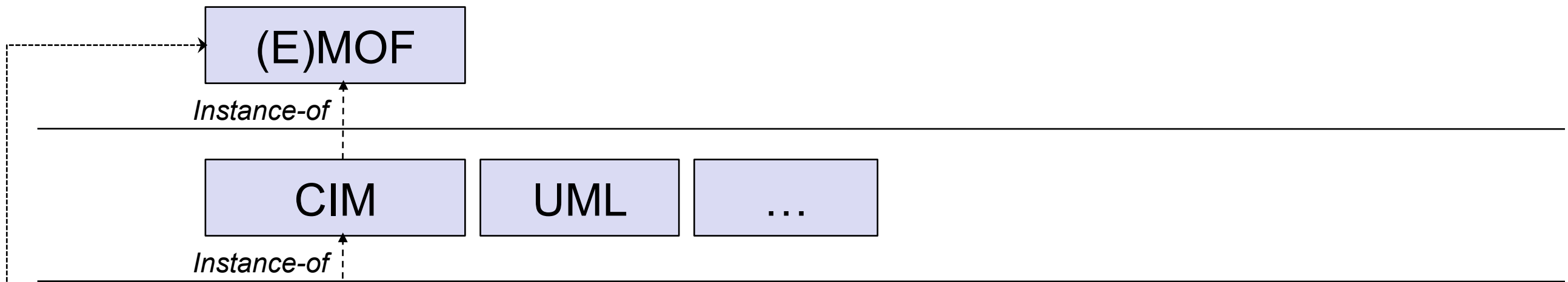




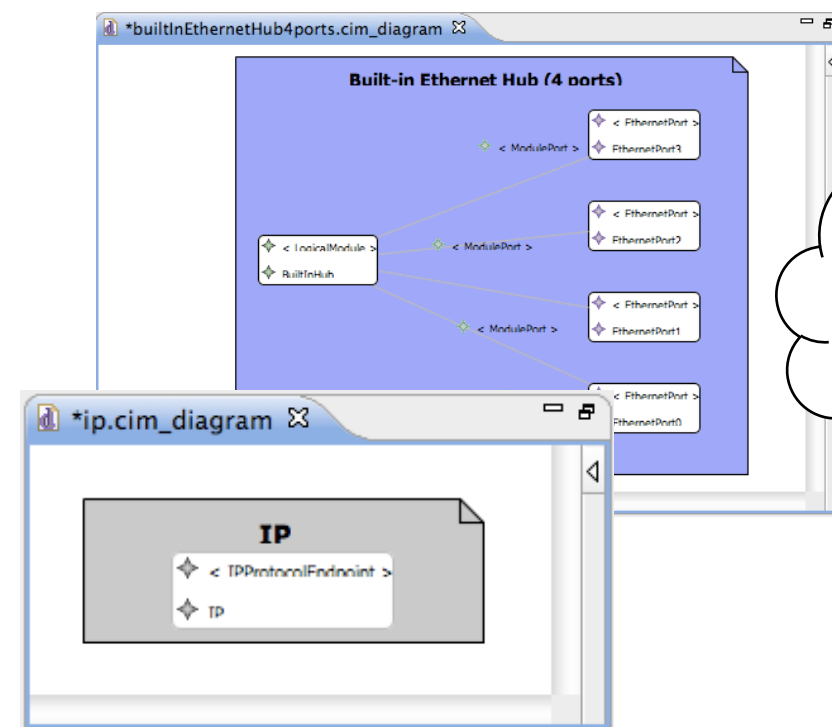
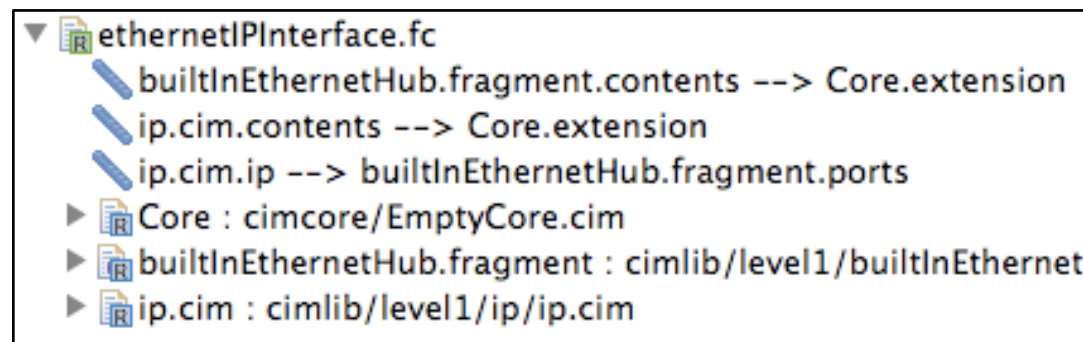
Tool View



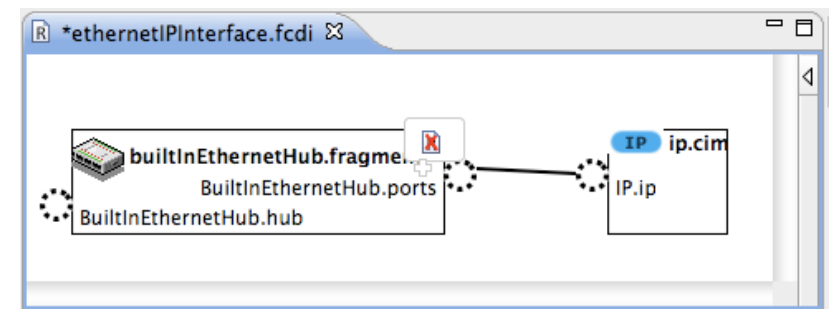
User View

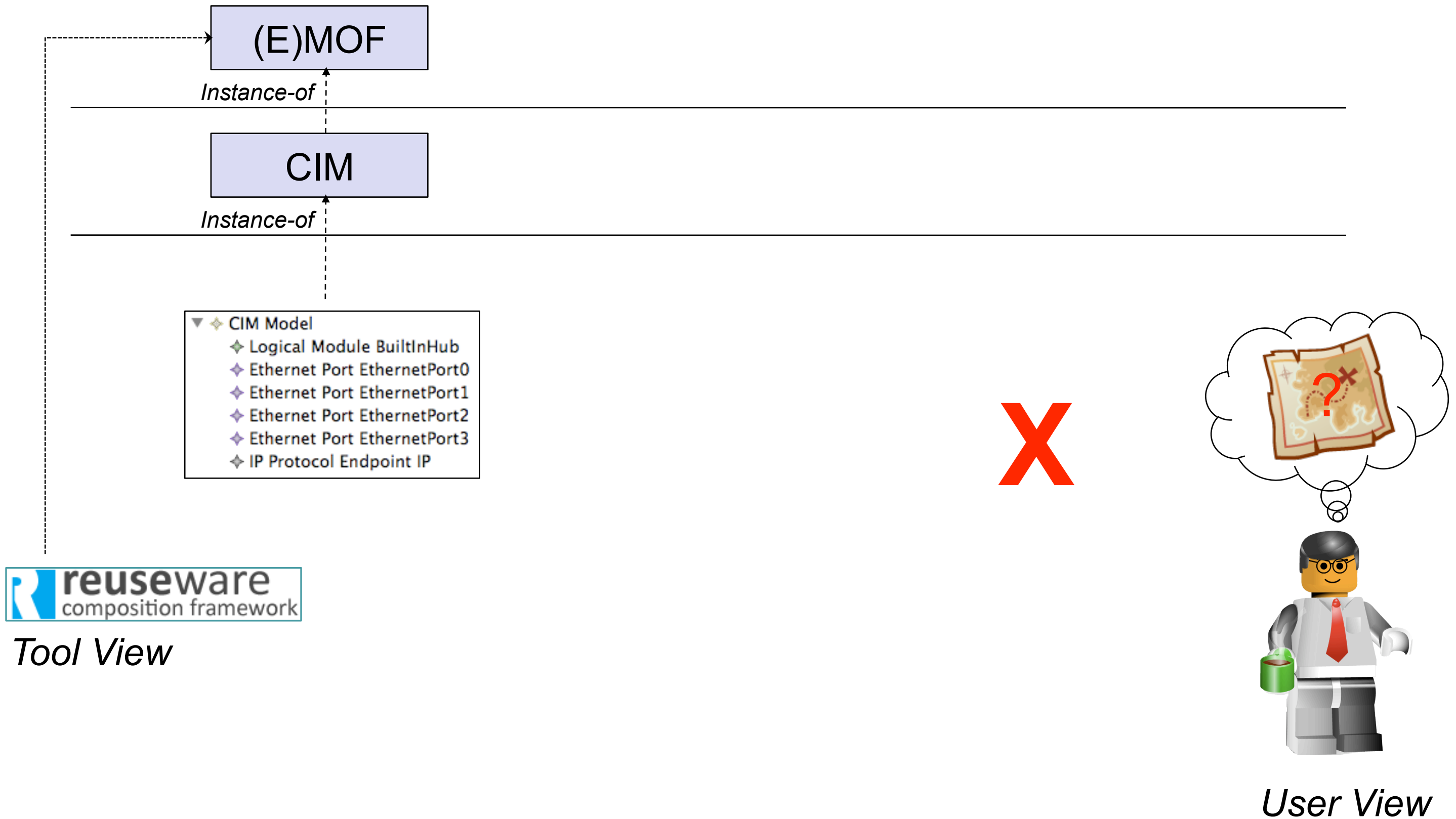


Tool View



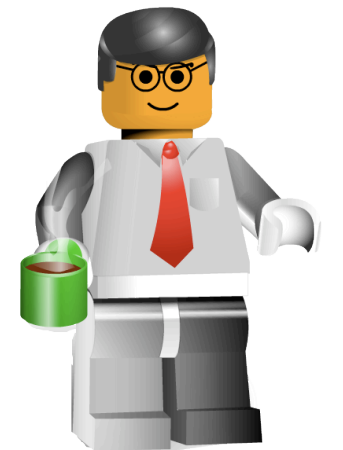
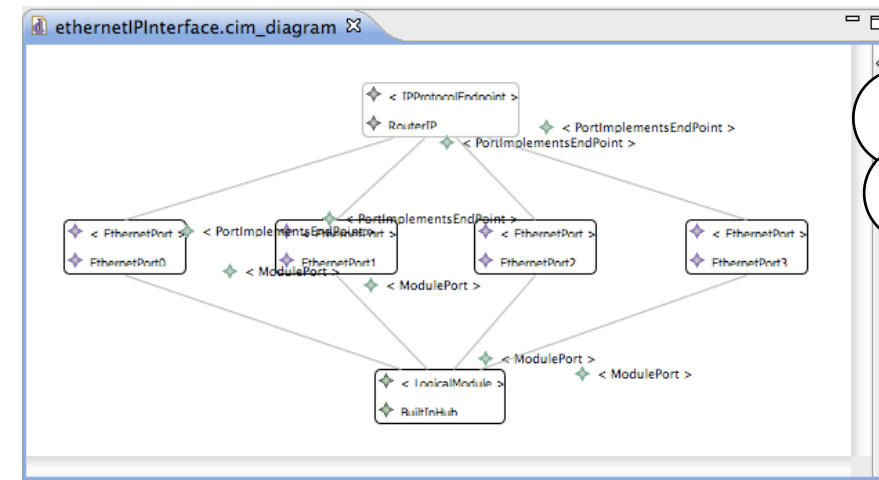
User View







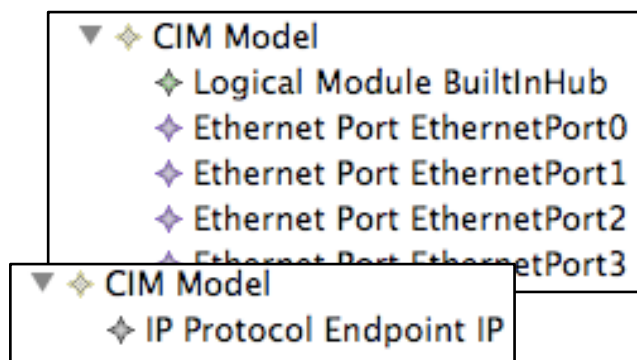
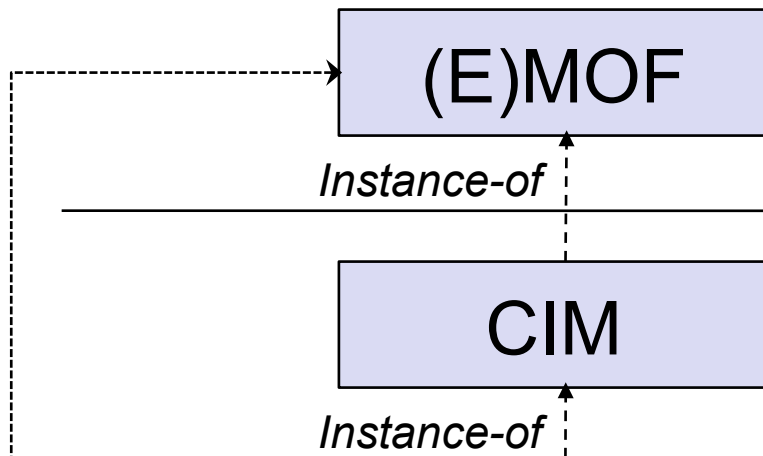
- ▼ ◆ CIM Model
- ◆ Logical Module BuiltInHub
- ◆ Ethernet Port EthernetPort0
- ◆ Ethernet Port EthernetPort1
- ◆ Ethernet Port EthernetPort2
- ◆ Ethernet Port EthernetPort3
- ◆ IP Protocol Endpoint IP



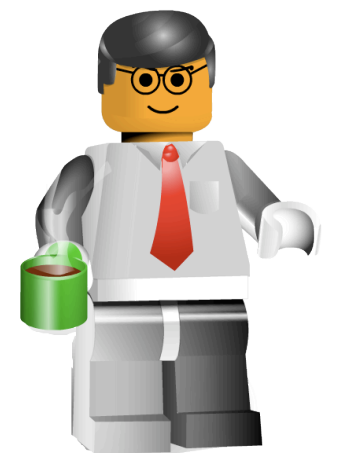
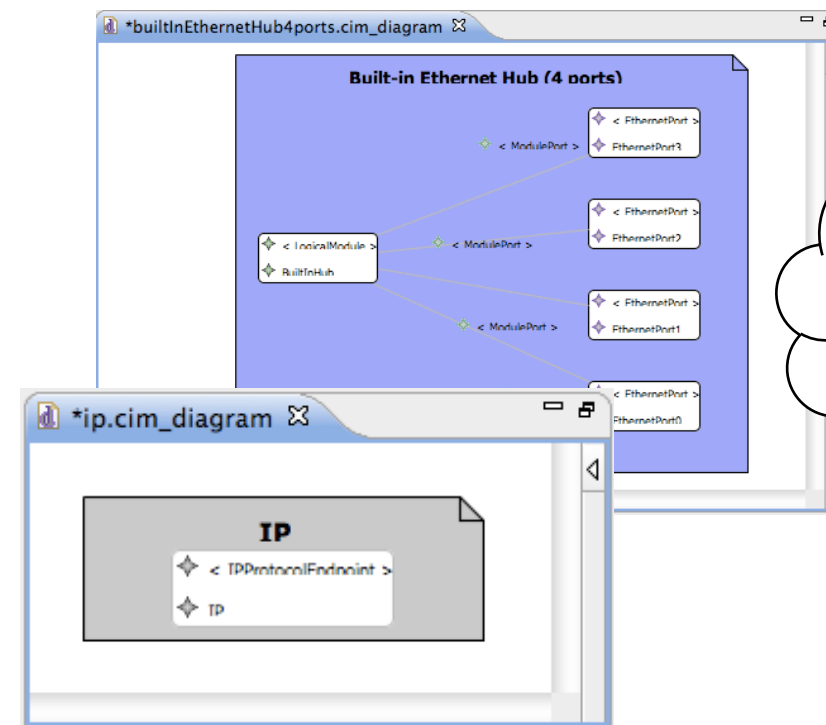
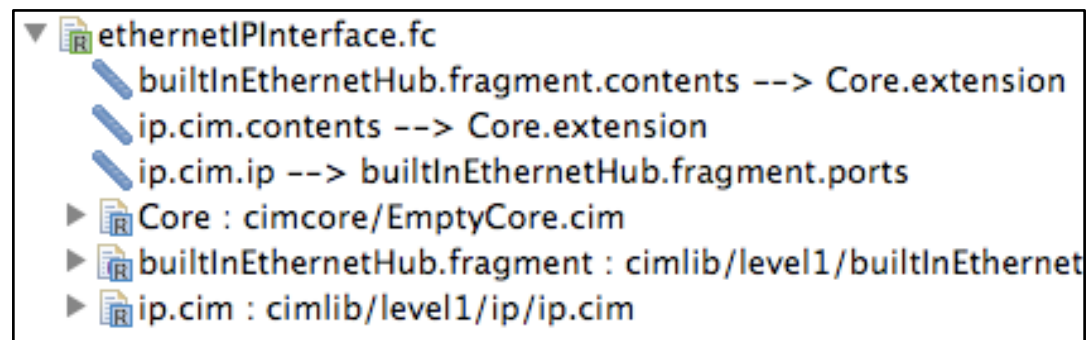
User View



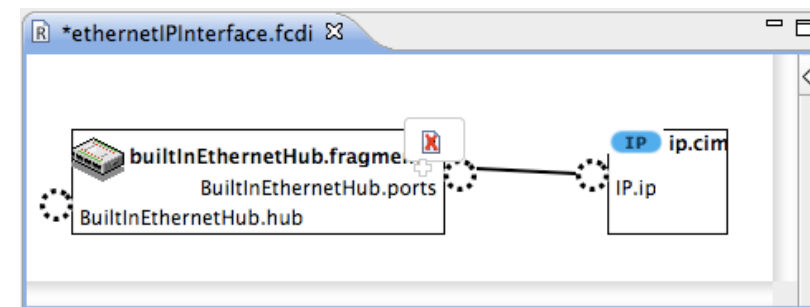
Tool View

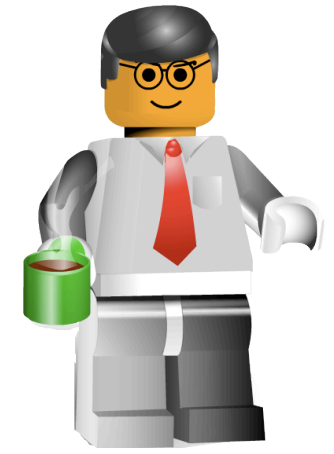
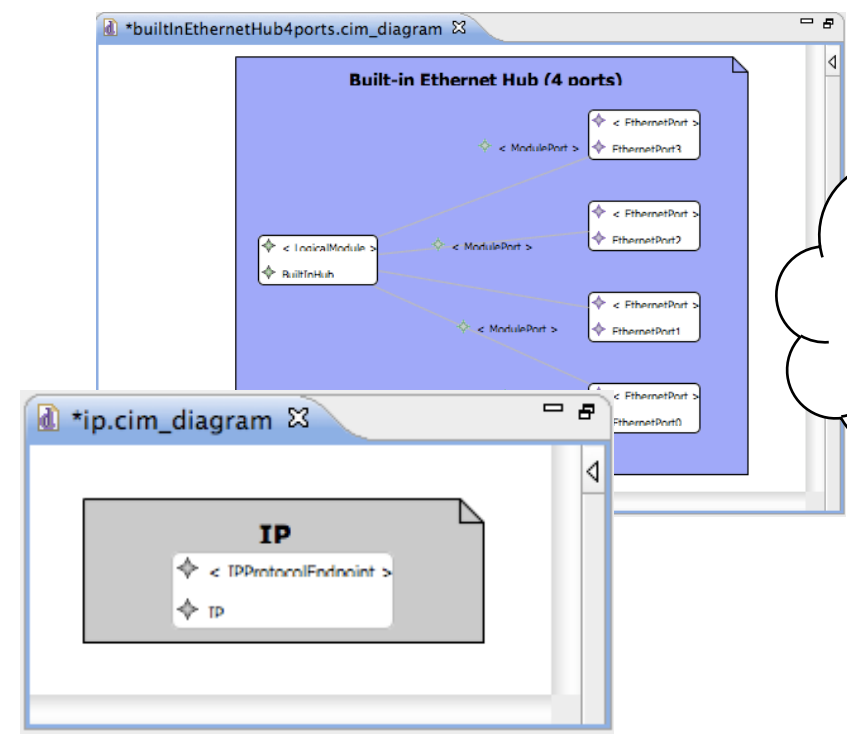
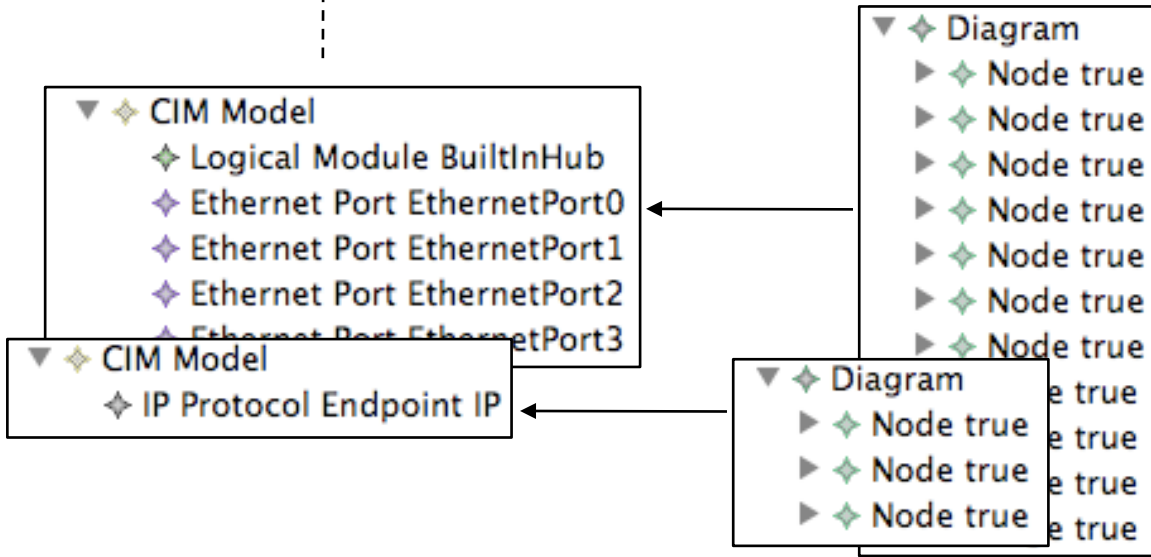
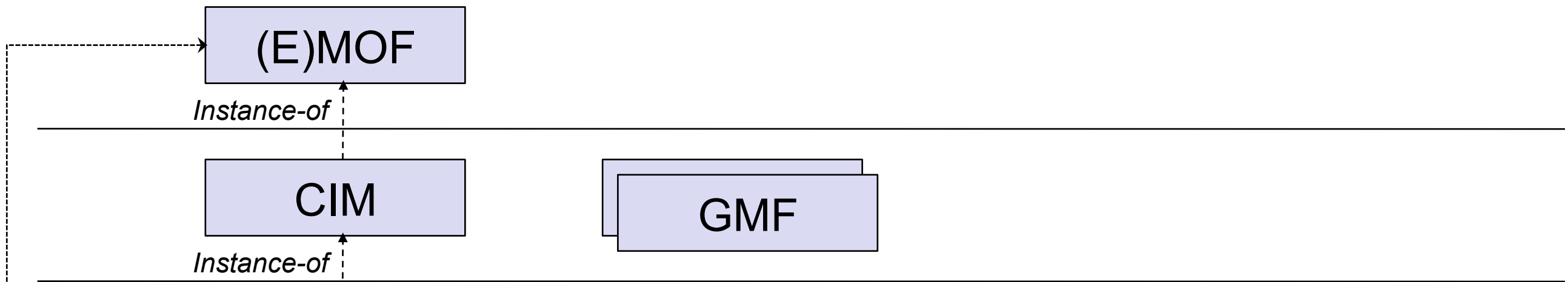


Tool View



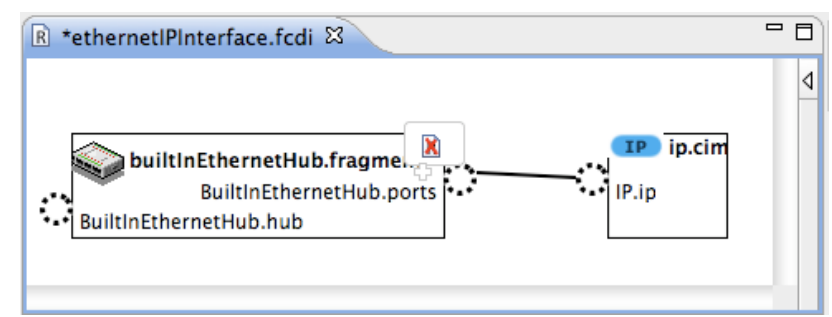
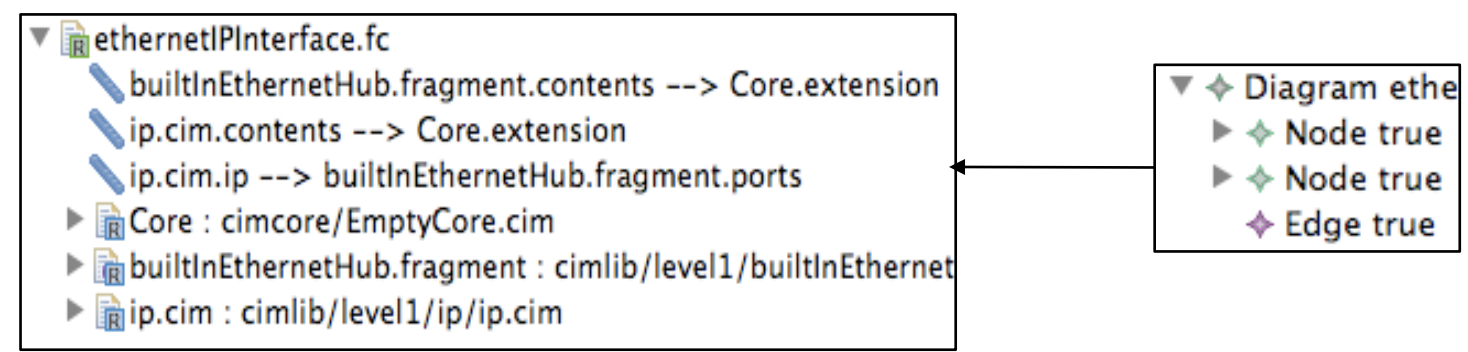
User View



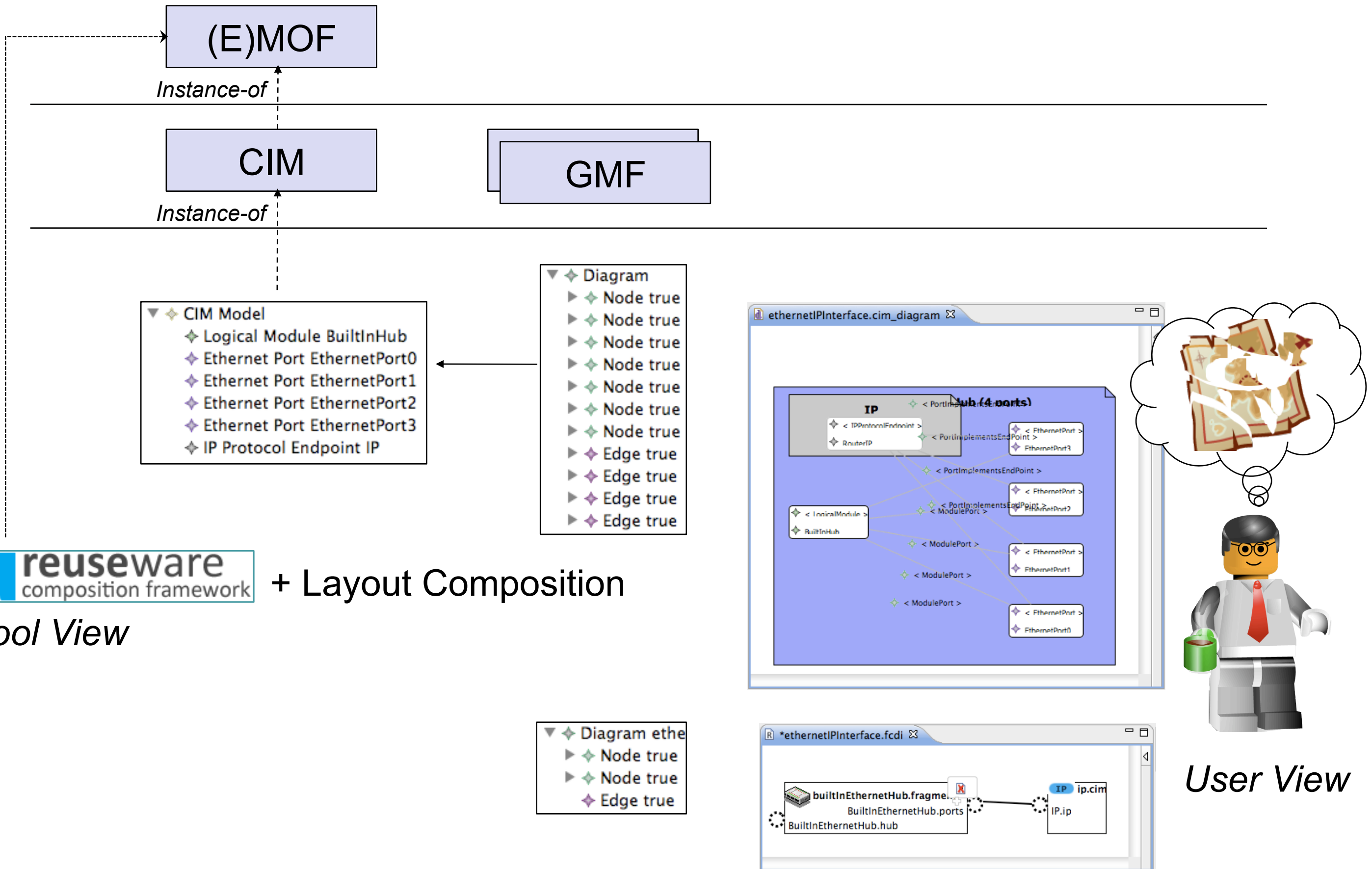


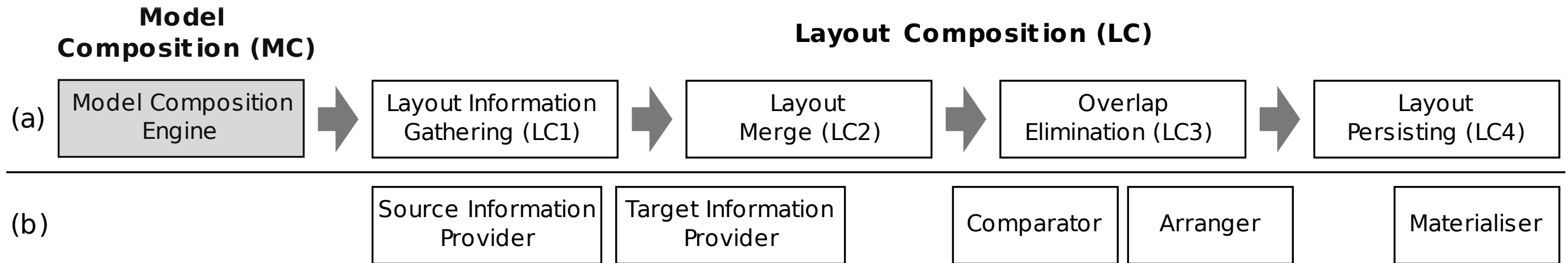
reuseware composition framework + Layout Composition

Tool View

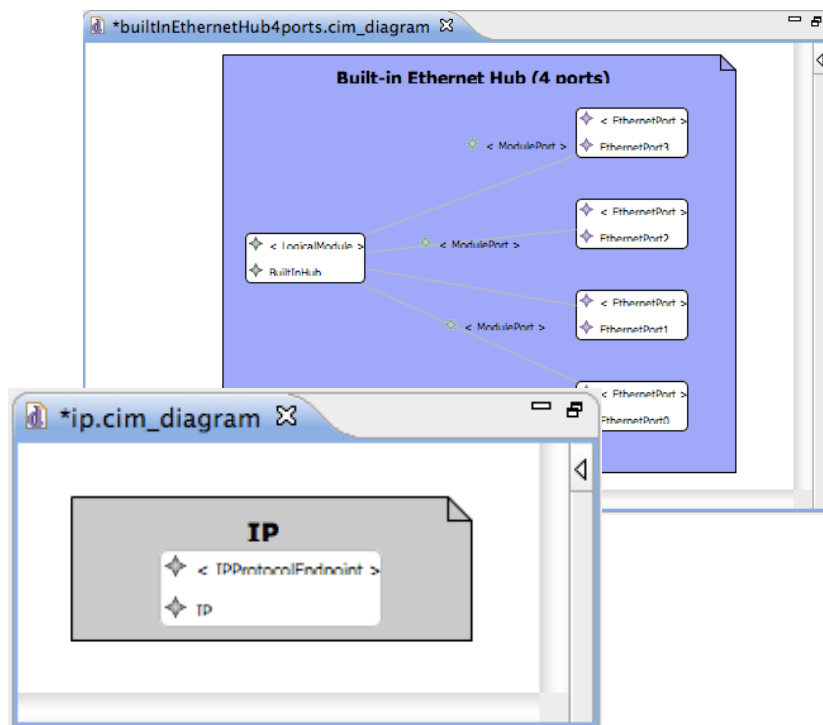
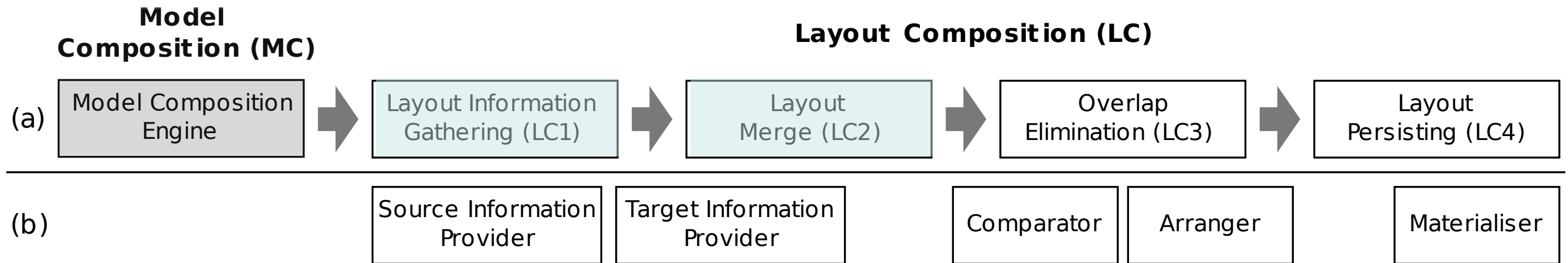


User View

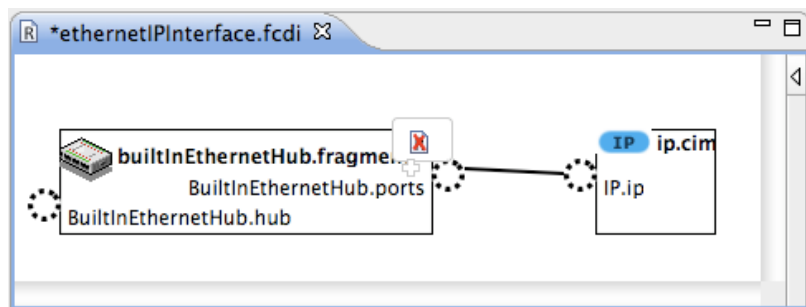




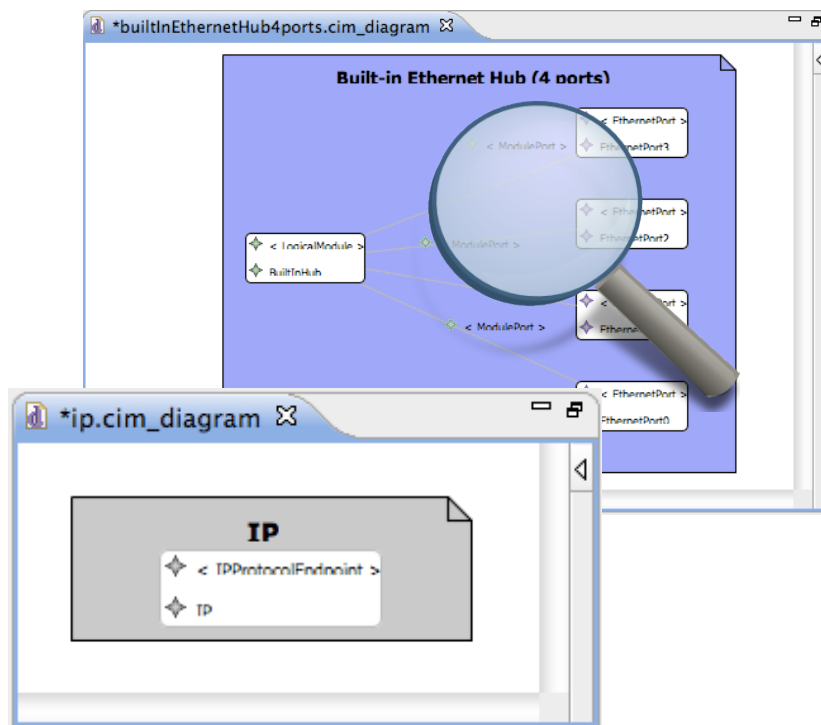
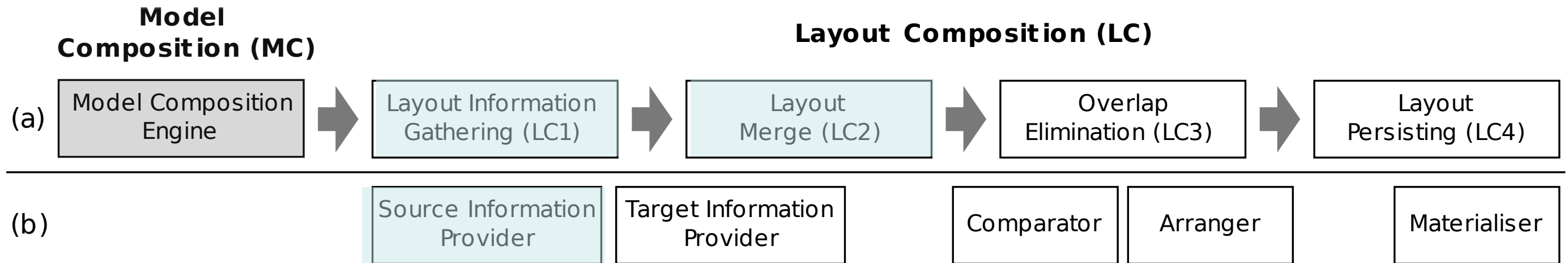
- Layout composition in addition to semantic composition
- Setting
 - DSMLs (defined in EMOF/Ecore) with graphical syntax
 - Graphical composition scripts
 - Composition tool needs to expose relations between composition scripts and input models



Source
width = ?
height = ?
Target
x = ?
y = ?

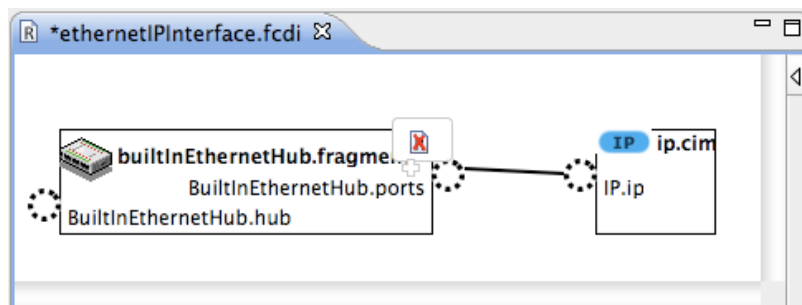


- Layout format dependent (e.g. GMF)
- Input Model (Source Layout)
 - Width and height of bounding box
- Composition Script (Target Layout)
 - Position of model in script

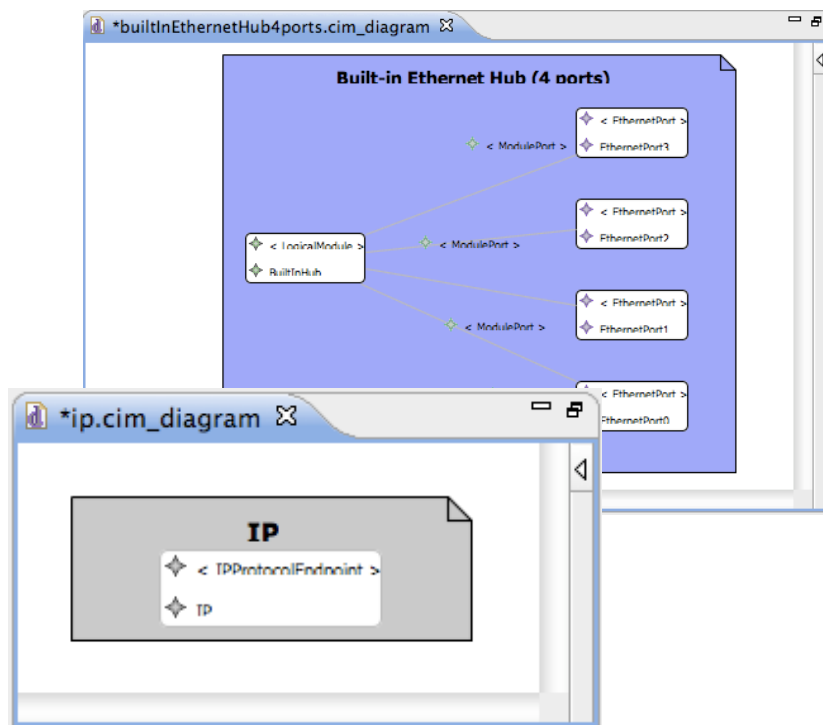
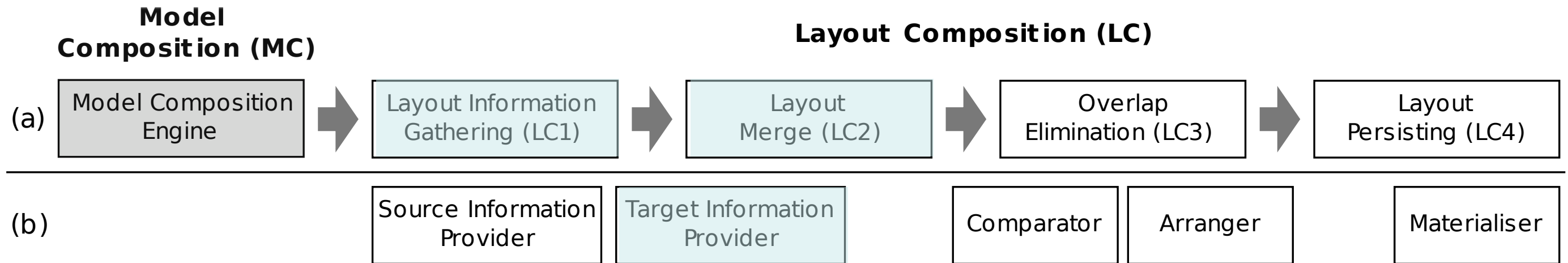


Source
width = 30
height = 20

Target
x = ?
y = ?

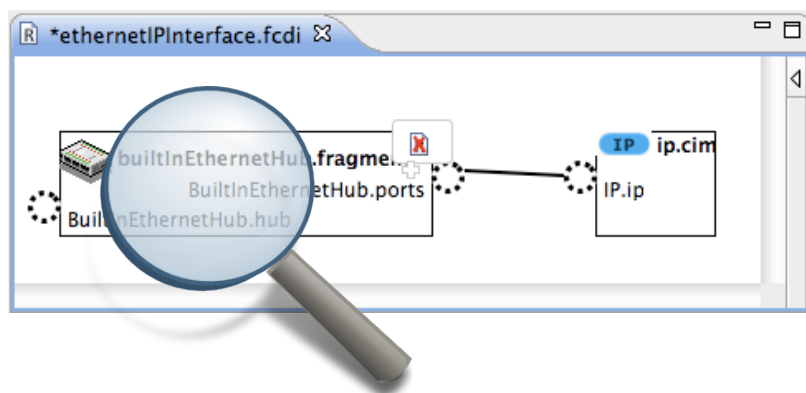


- Layout format dependent (e.g. GMF)
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 - Position of model in script

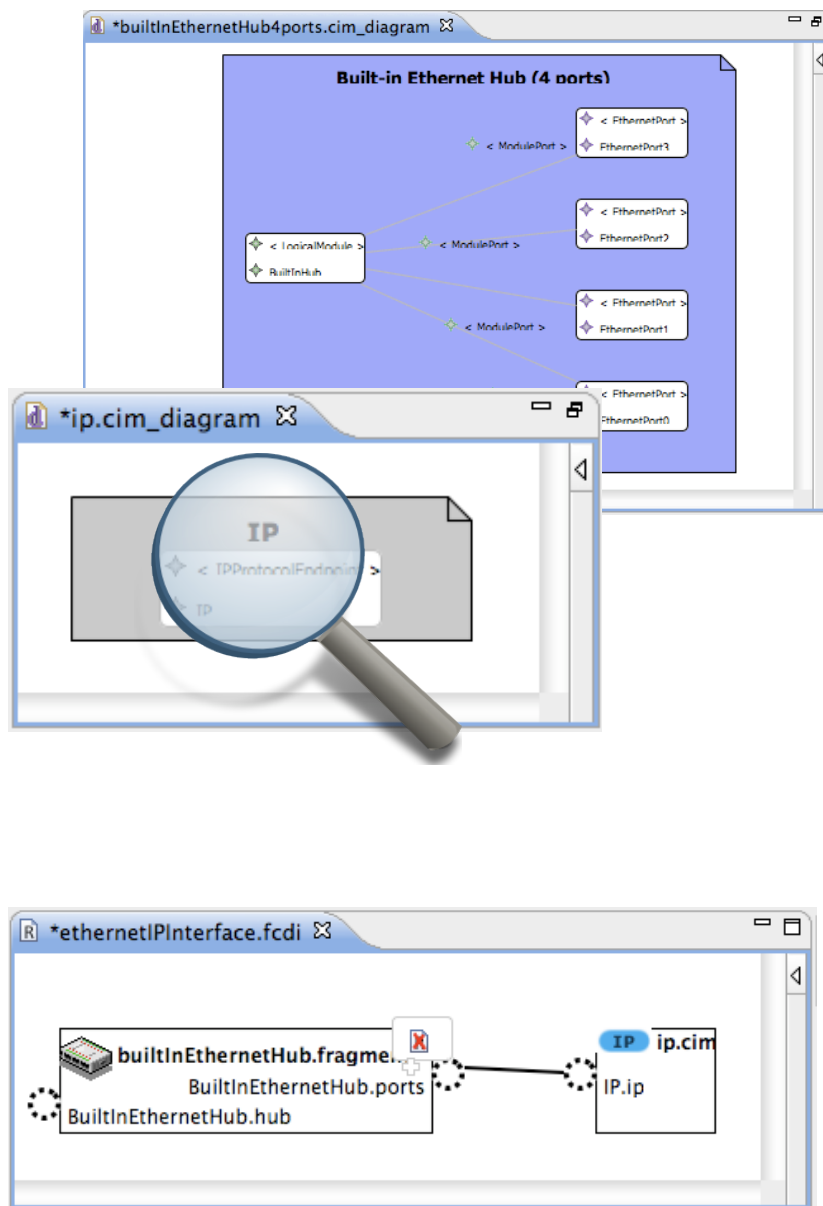
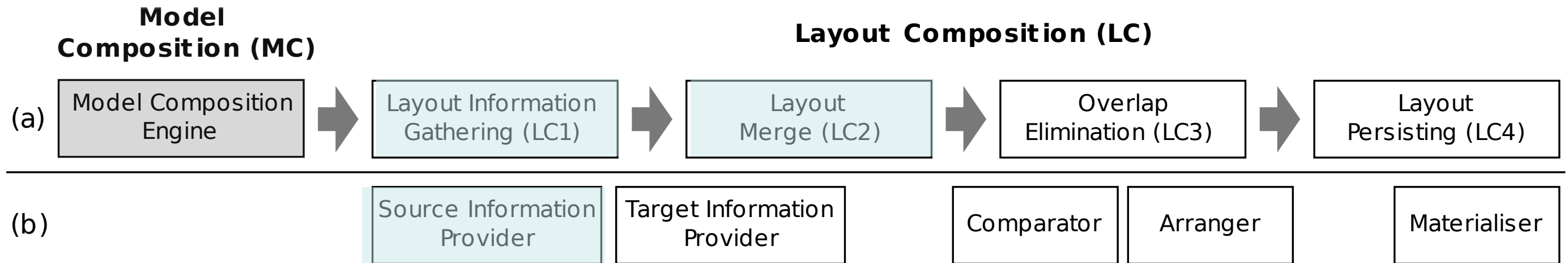


Source
width = 30
height = 20

Target
x = 5
y = 5



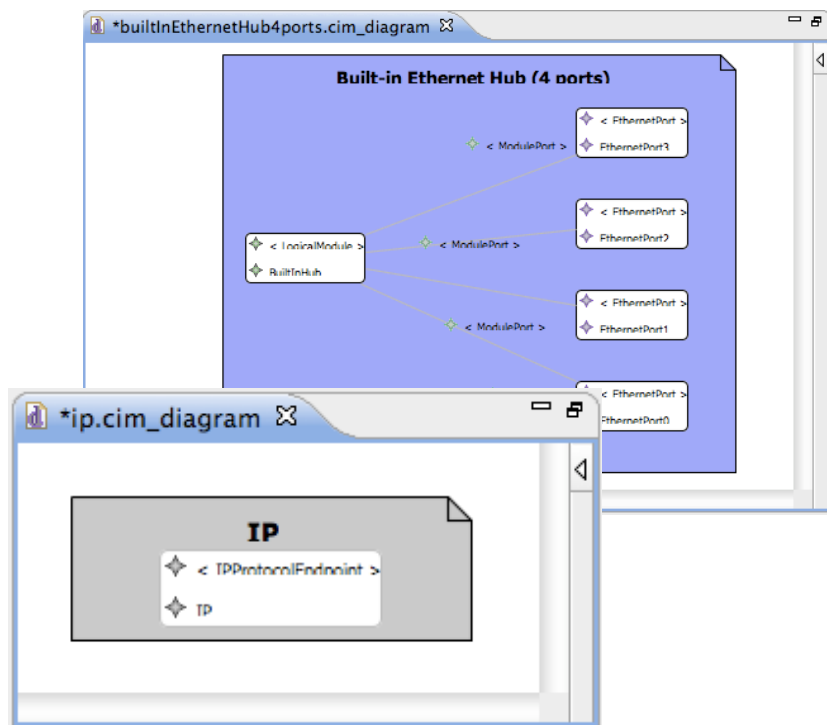
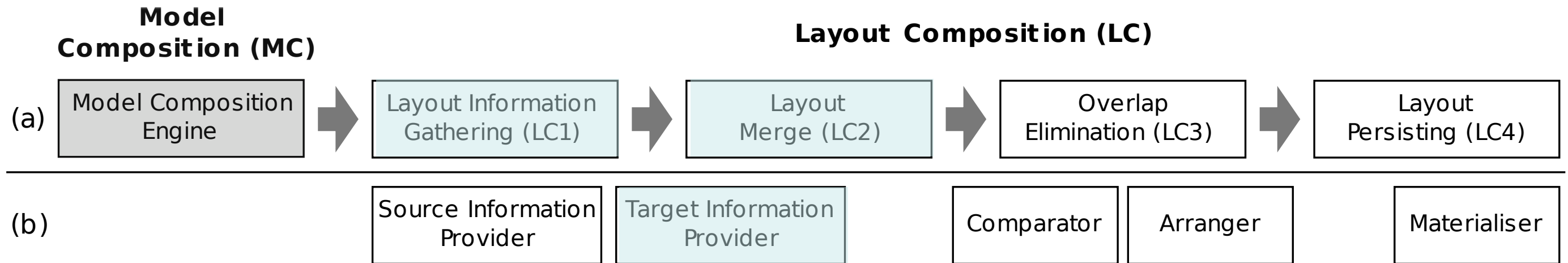
- Layout format dependent (e.g. GMF)
- Input Model (Source Layout)
 - Width and height of bounding box
- Composition Script (Target Layout)
 - Position of model in script



Source
width = 20
height = 10

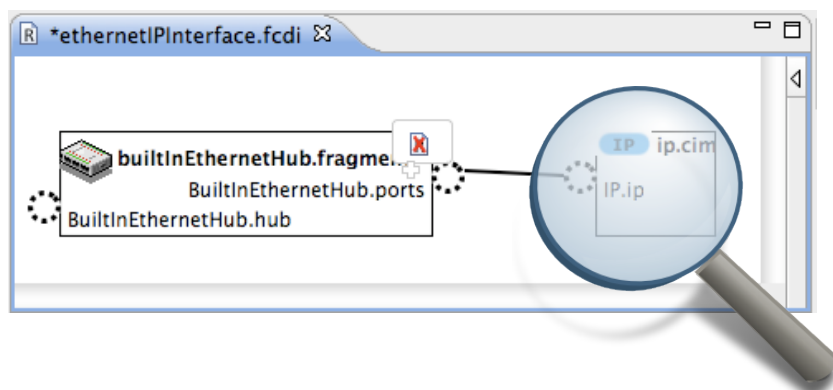
Target
x = ?
y = ?

- Layout format dependent (e.g. GMF)
- Input Model (Source Layout)
 - Width and height of bounding box
- Composition Script (Target Layout)
 - Position of model in script

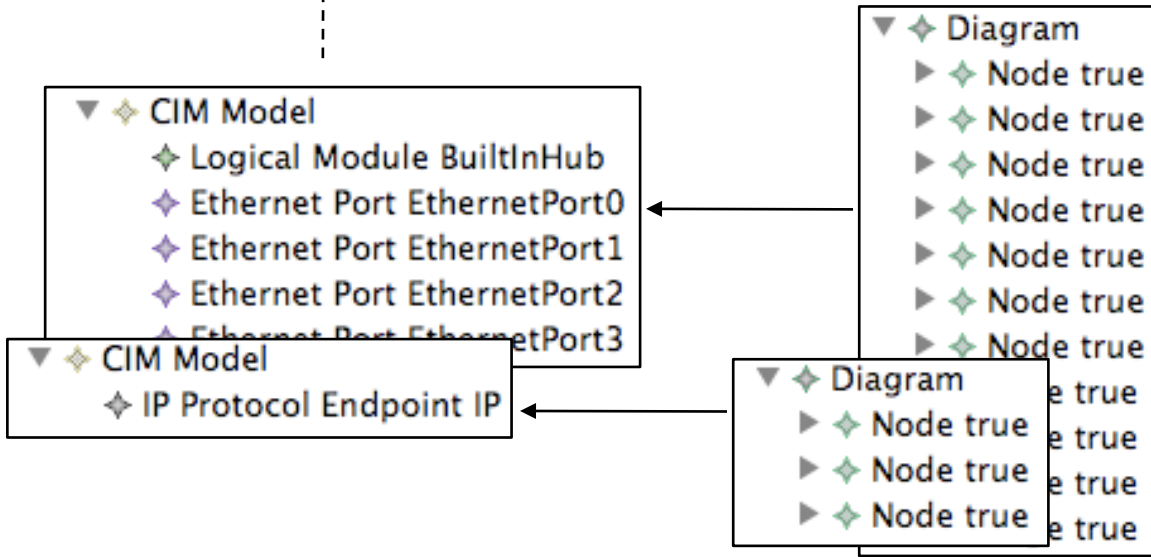
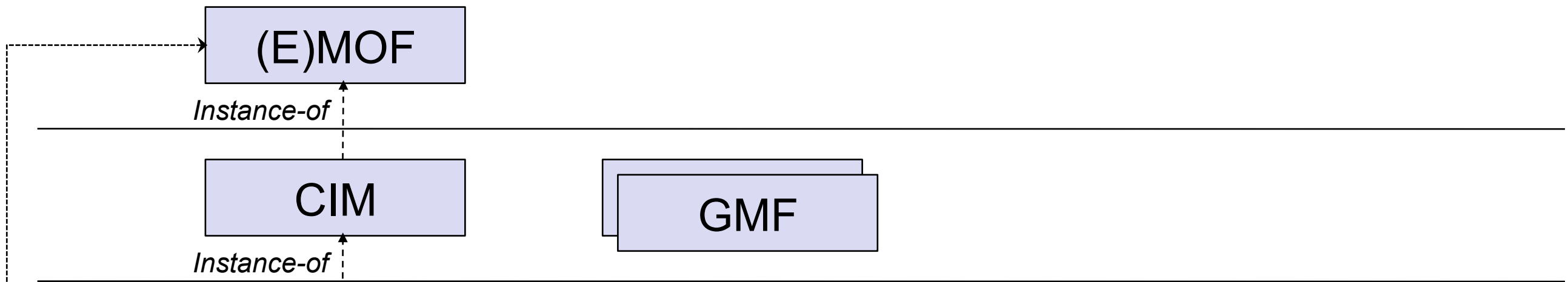


Source
width = 20
height = 10

Target
x = 40
y = 5

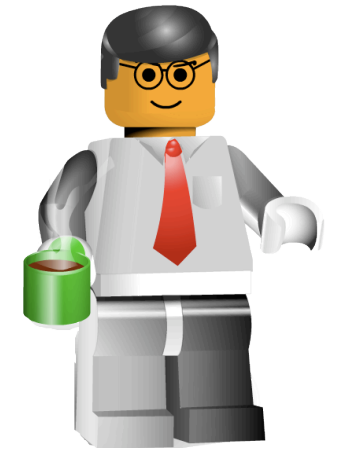
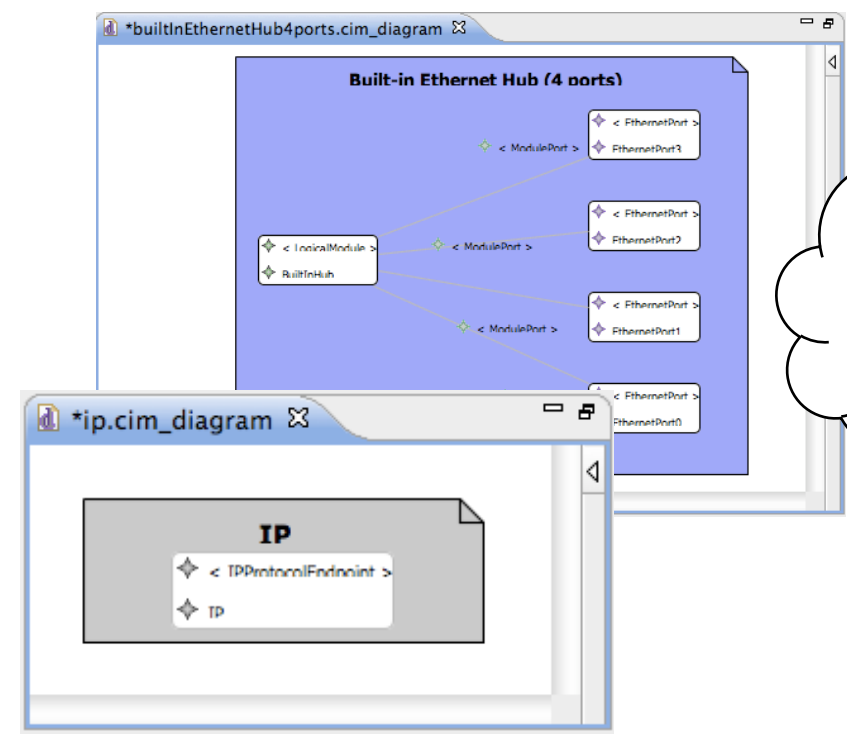
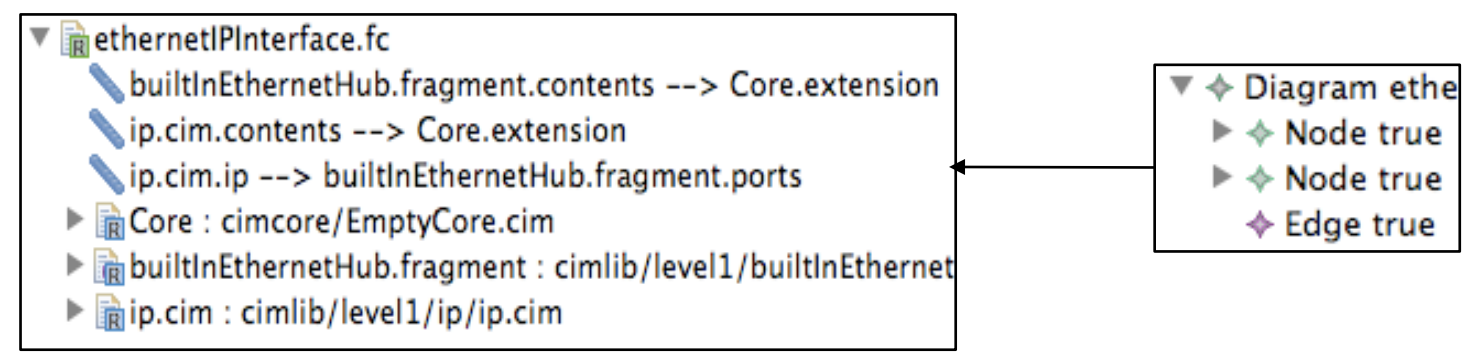


- Layout format dependent (e.g. GMF)
- Input Model (Source Layout)
 - Width and height of bounding box
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 - Position of model in script

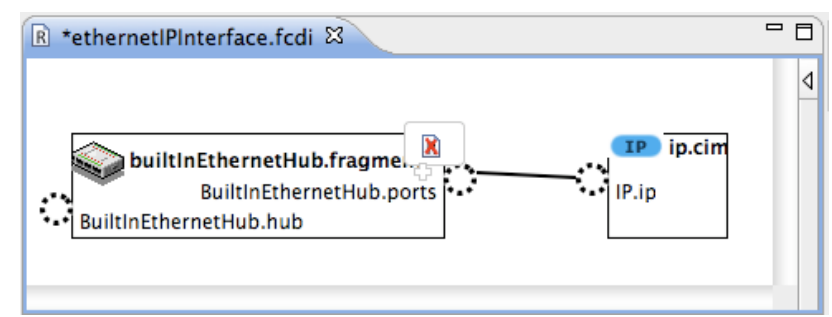


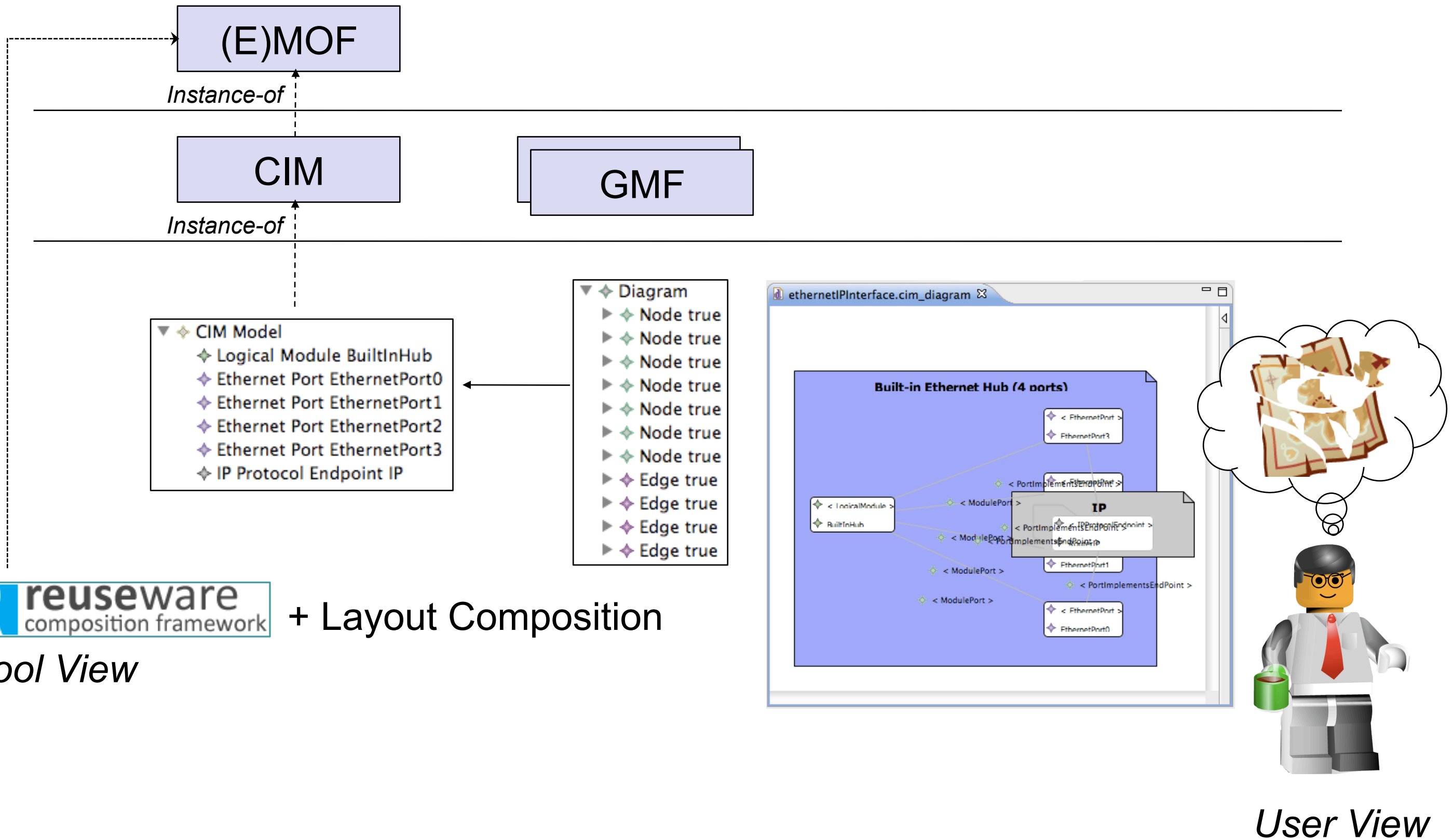
+ Layout Composition

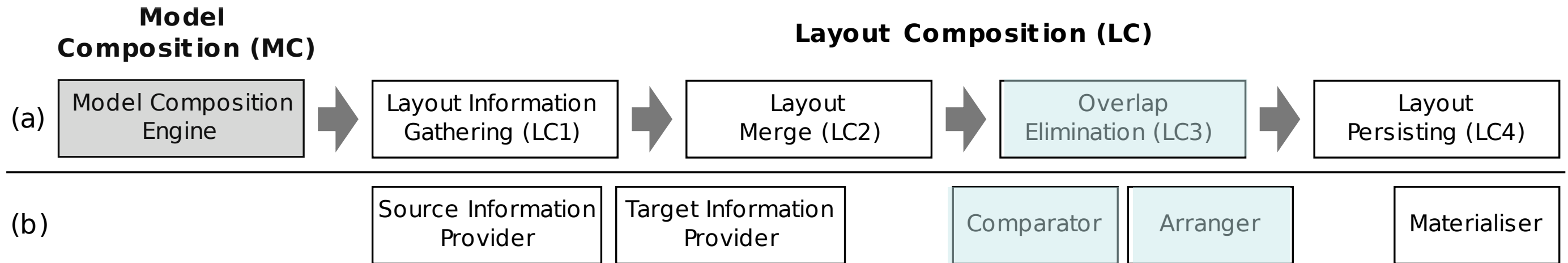
Tool View



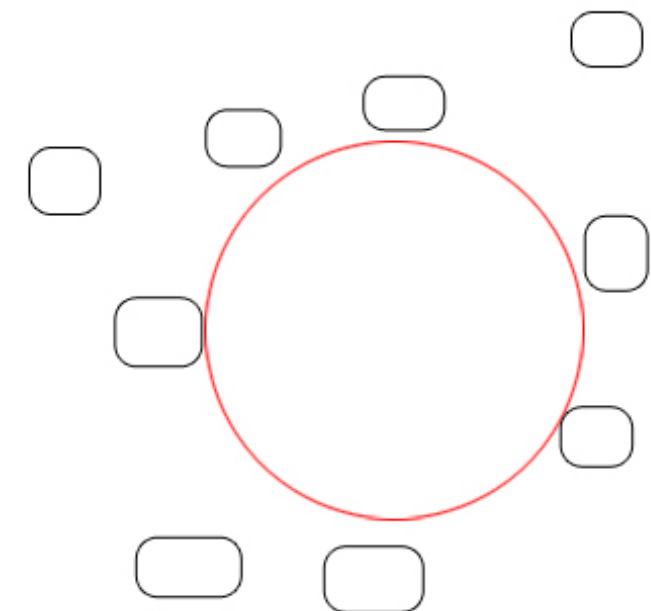
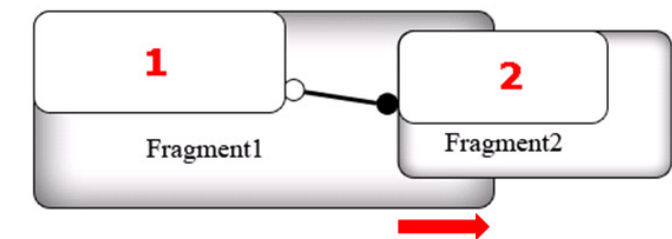
User View

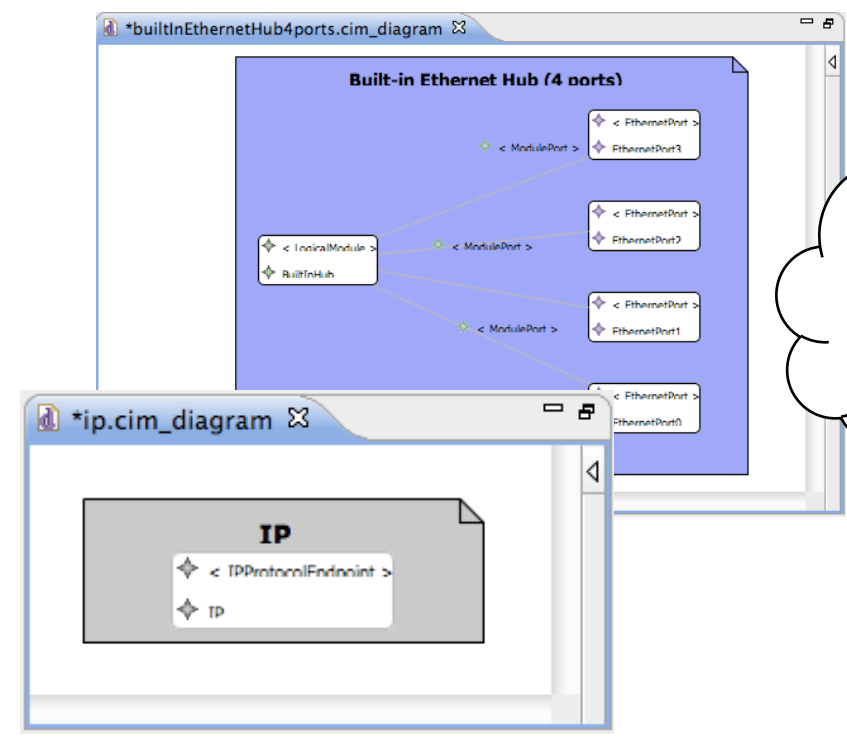
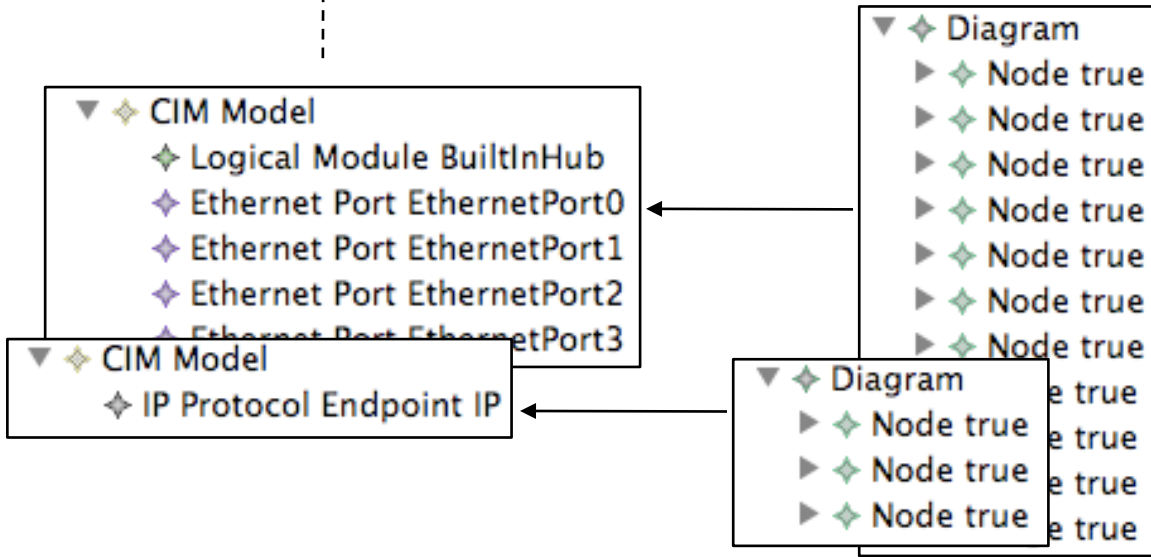
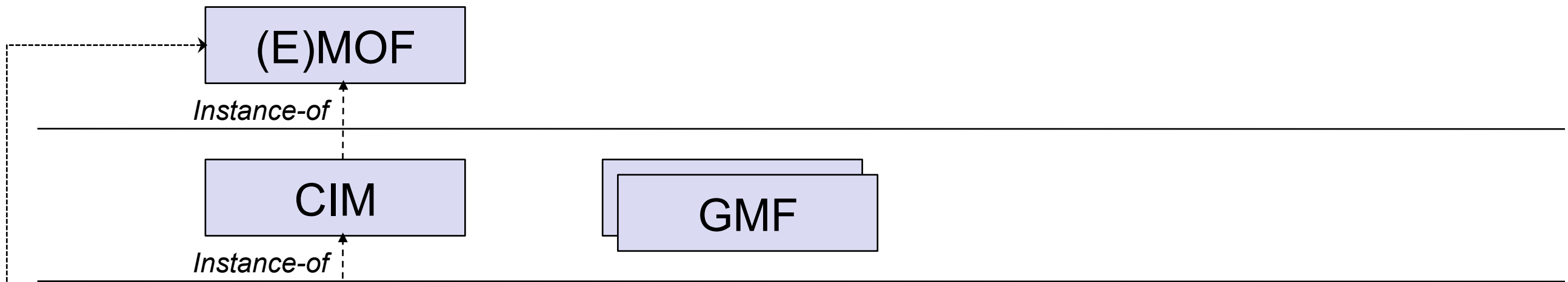






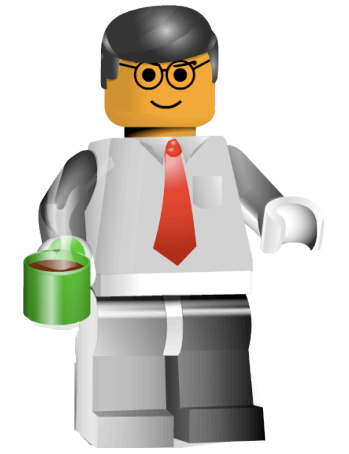
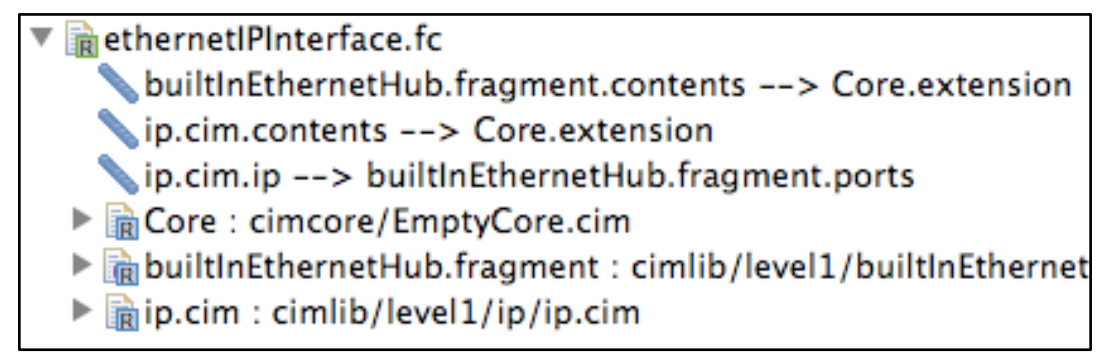
- **Layout adjustment algorithms**
 - Always apply on input model element sets
 - Horizontal sorting
 - May destroy layout by moving elements too far
 - Uniform Scaling
 - May move elements too far out
 - Danger of loosing compactness



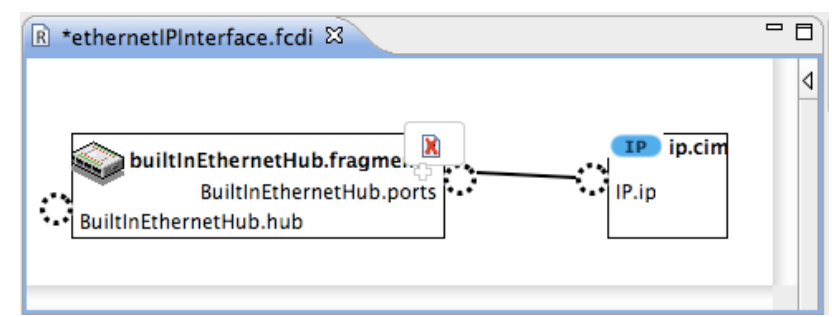


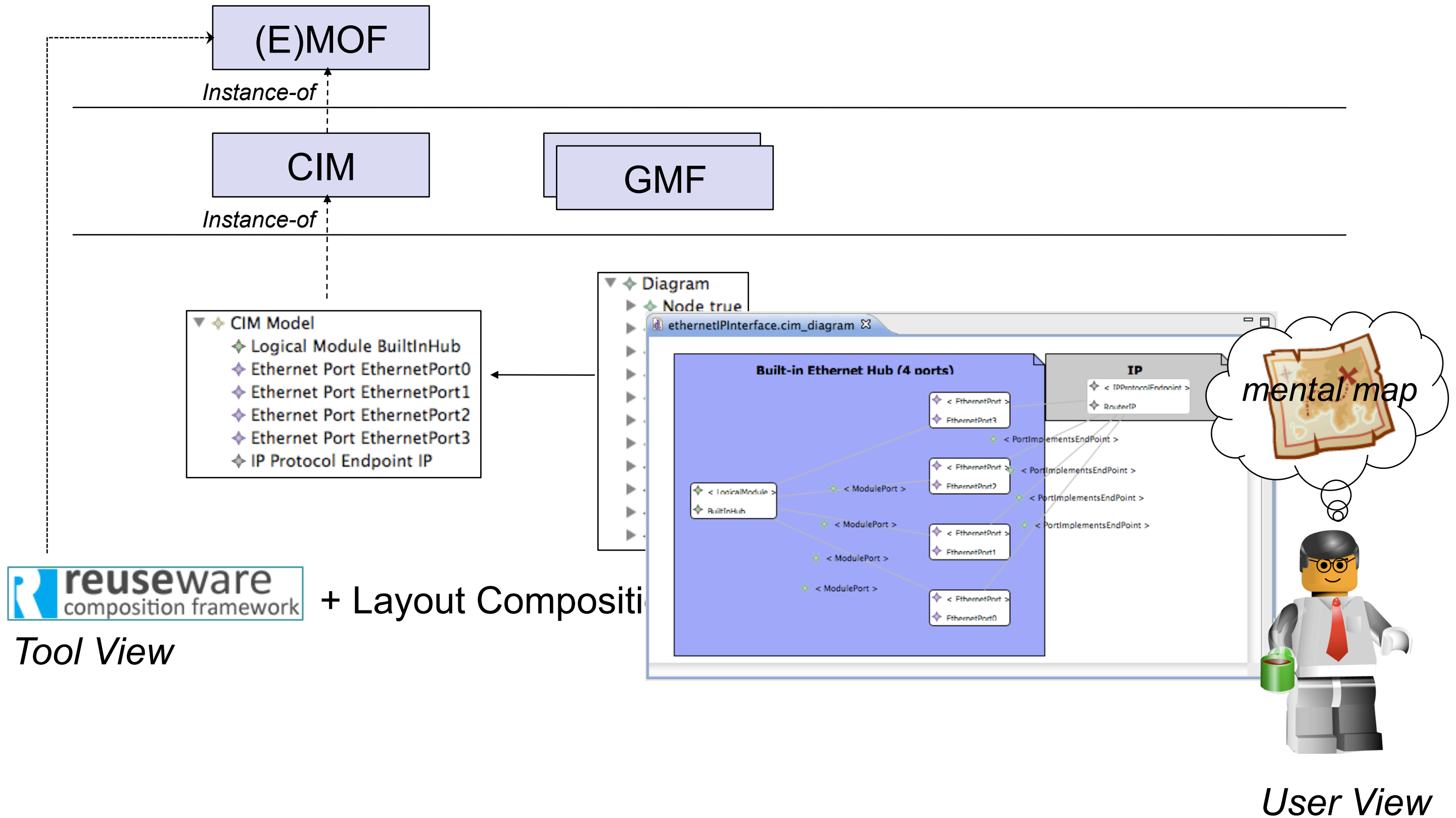
+ Layout Composition

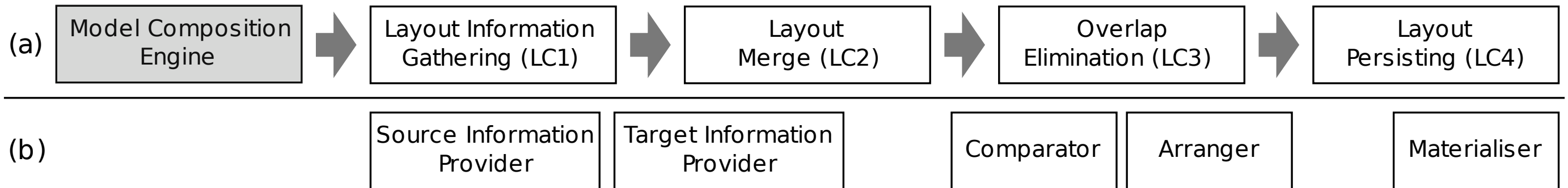
Tool View



User View







- Source Information Provider
 - GMF: all GMF-based DSMLs
 - TOPCASED: all TOPCASED-based DSMLs
- Target Information Provider
 - GMF: Reuseware Composition Programs
- Comparator
 - XYComparator
- Arranger
 - Horizontal Sorting
 - Uniform Scaling
- Materialiser
 - GMF: all GMF-based DSMLs
 - TOPCASED: all TOPCASED-based DSMLs

- Experimented with different modelling languages
 - Common Interface Model (CIM) DSML
 - UML Activity Diagrams
- Tried out different layout adjustment algorithms
- Combined different strategies in staged composition

- We showed
 - Systematic approach to preserve as much layout information as possible in model composition
 - Adjustment algorithms to improve layout without destroying mental map
 - Applicable to different modelling languages
- Future work
 - Did not look at less free layouts (e.g. Sequence Diagrams)
 - Did not consider compositions where elements are replaced (layout of replaced or replacing element(s)?)
 - Did not test with other composition (or transformation) tools/frameworks
 - Do require graphical composition script language
- We are looking for interesting case studies

Thank You!

Questions?



<http://reuseware.org>