



# Structuring Information Framework for ADE Representation

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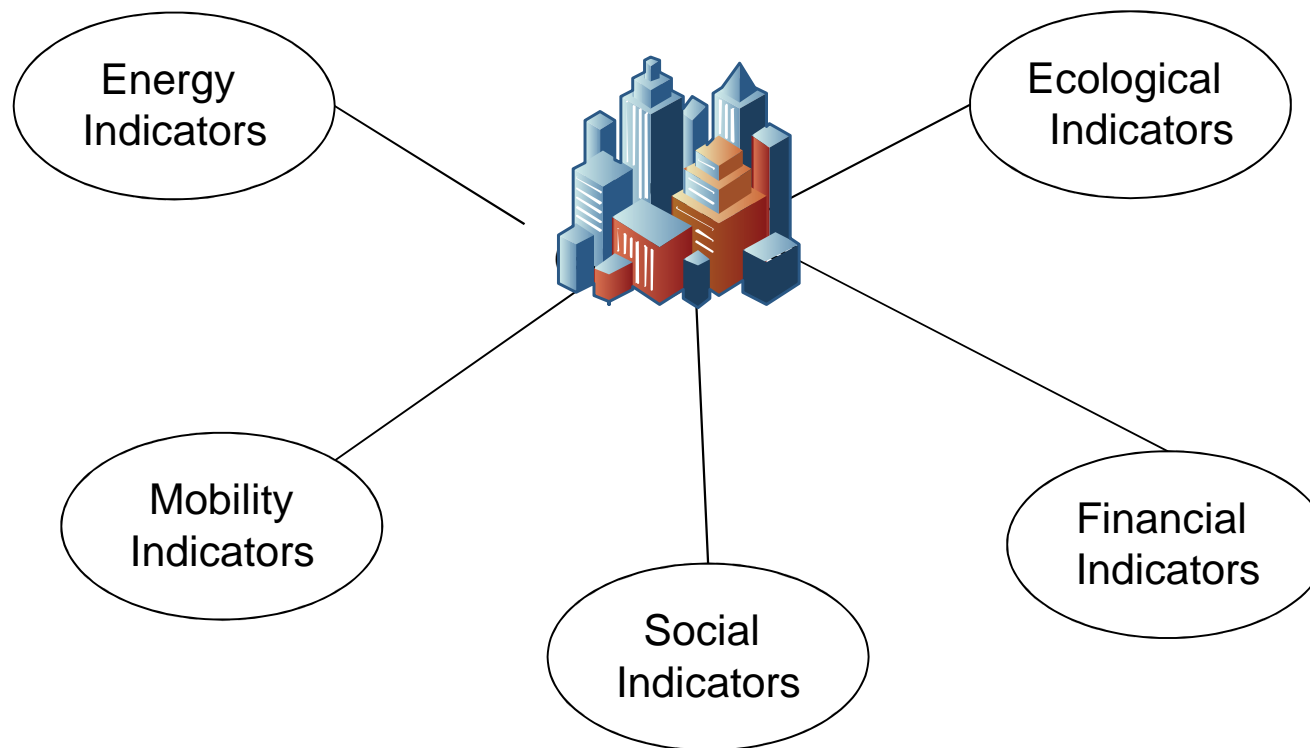
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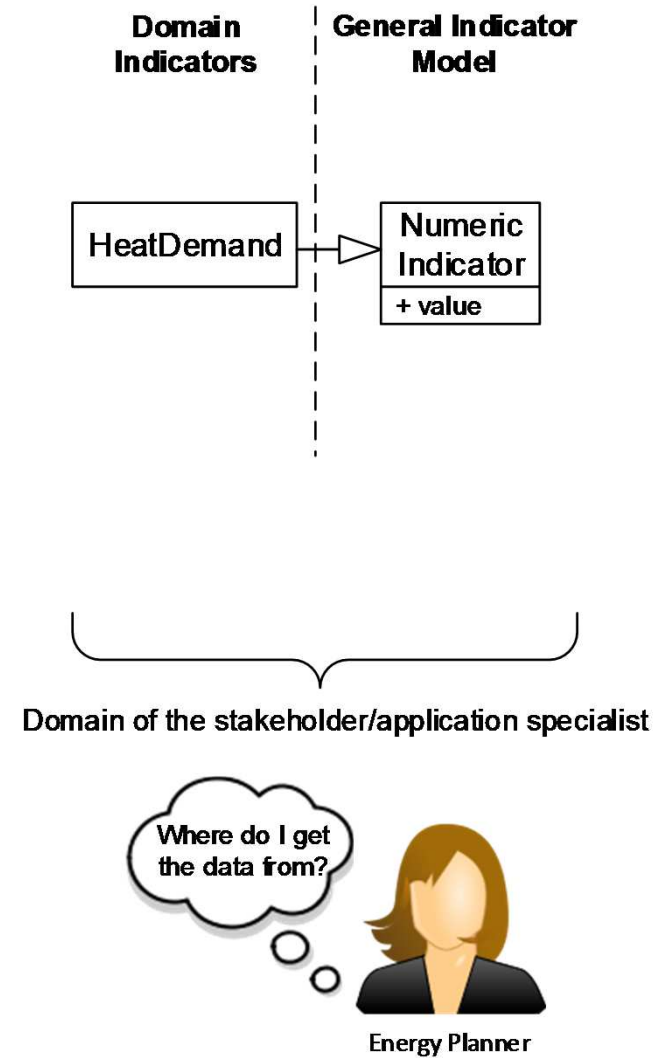
12. May 2015

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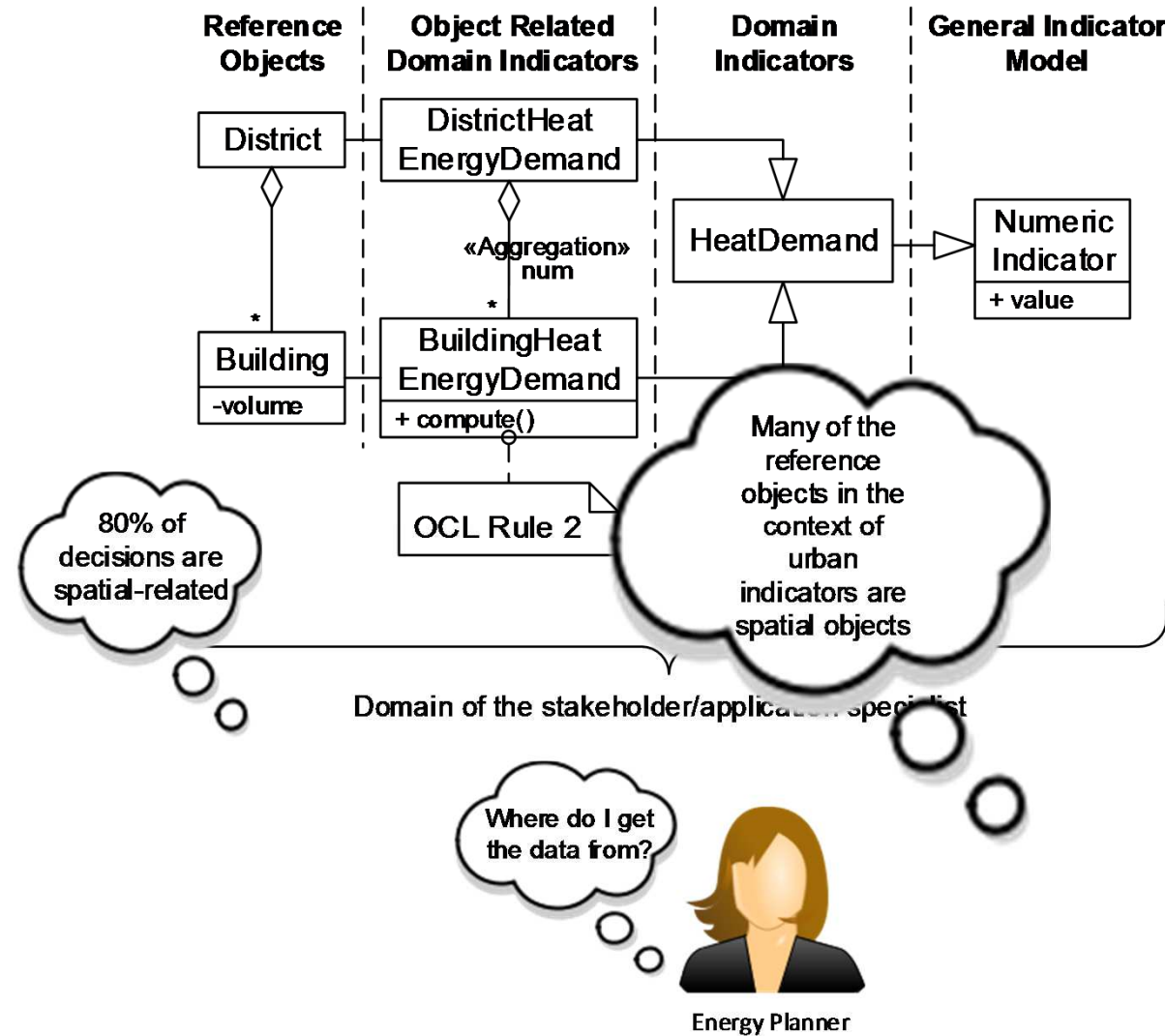
# Measuring City performance

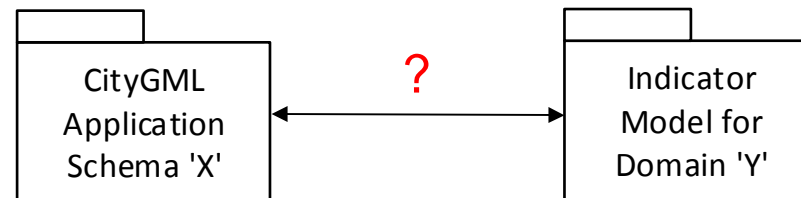


# Structured Indicator Modelling



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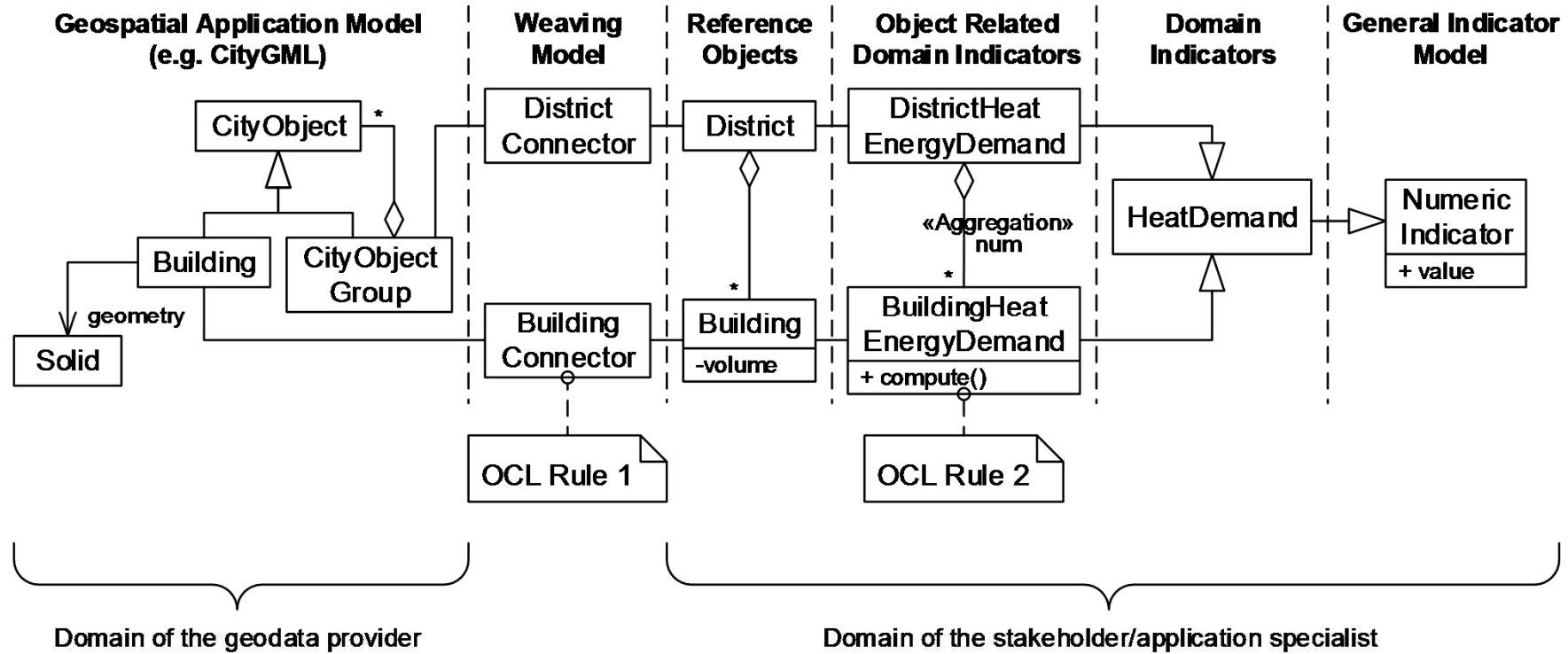
► Questions:

1. To which degree can Indicators be related to objects from X?
2. To which degree can Indicators be expressed in terms of objects from X?
3. To which degree can Indicators be computed from objects from X?
4. Can all the required data from Y be taken from or derived from X?
5. Do the indicators refer to the same or similar concepts that are represented in X?  
(e.g. X:Building ↔ Y:BuildingHeatEnergyDemand)

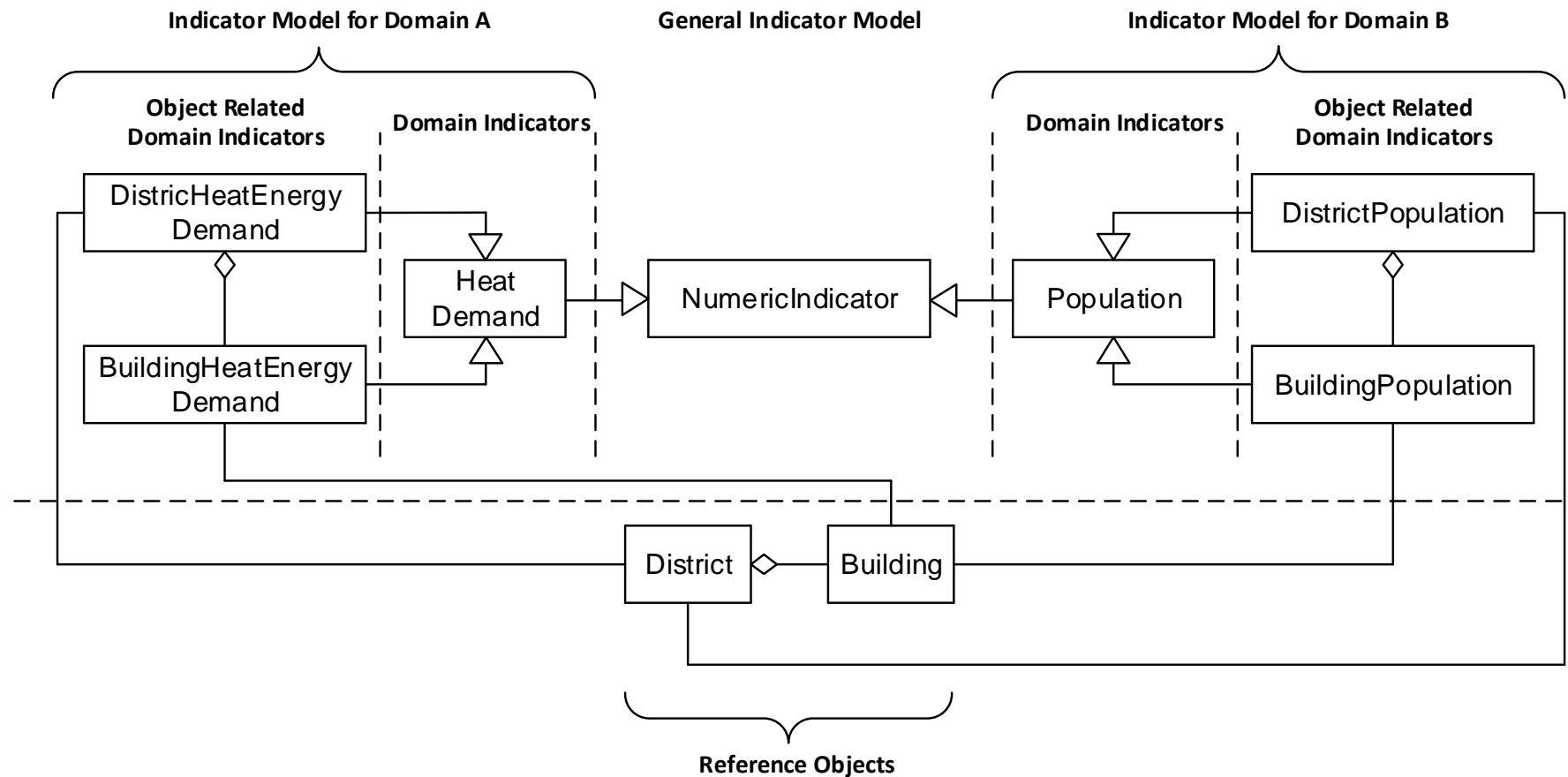
6. Are the indicators and their relations of Y similarly structured than the represented concepts in X?  
(e.g. X:District  $\diamond$  X:Buildings  $\leftrightarrow$  Y:DistrictHeatEnergyDemand = Sum(  
buildingHeatEnergyDemand))
7. What is missing in X with respect to the required information in Y?
8. Can X be augmented by the missing information and if yes; how?  
(e.g. ADEs, but also: Weaving Classes)
9. Which of the available geospatial application schemas is the most suitable regarding 1-8?

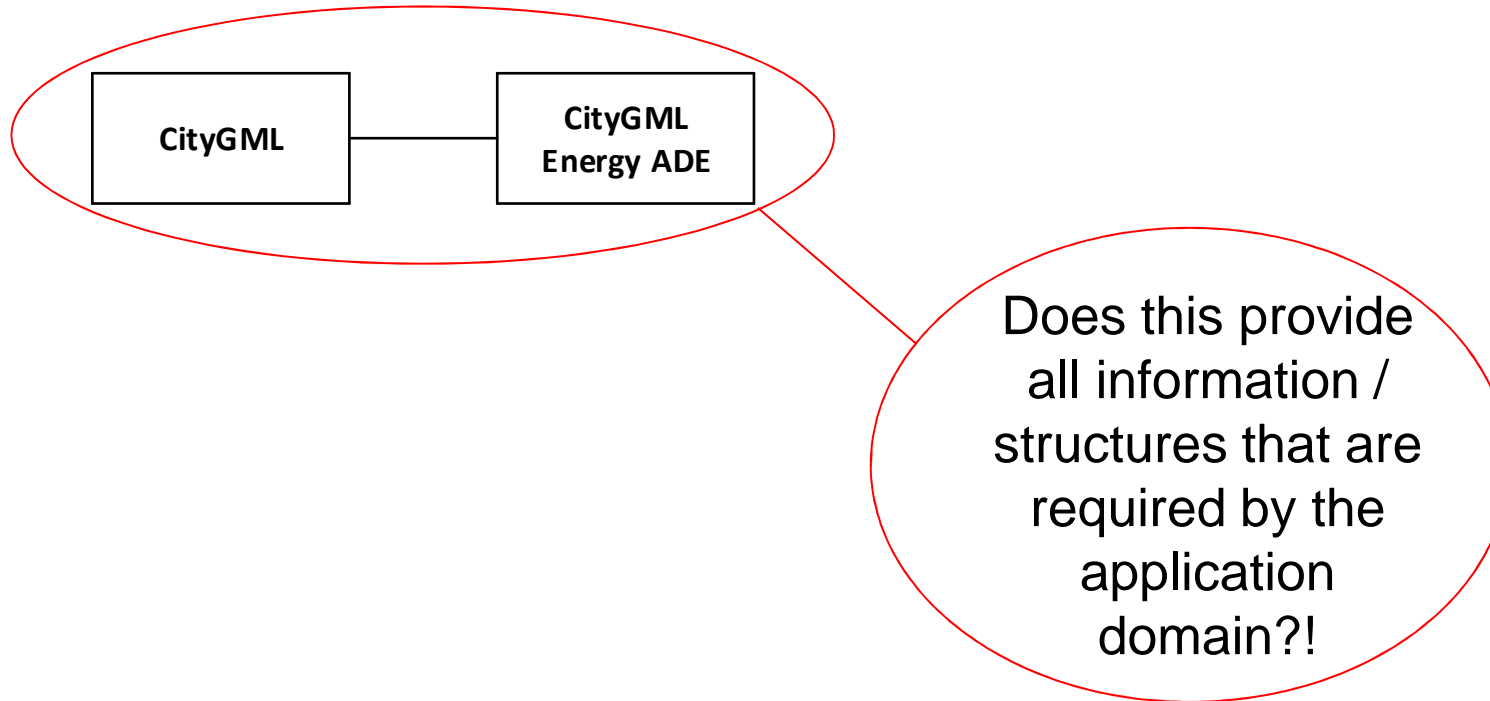
How to measure this?!

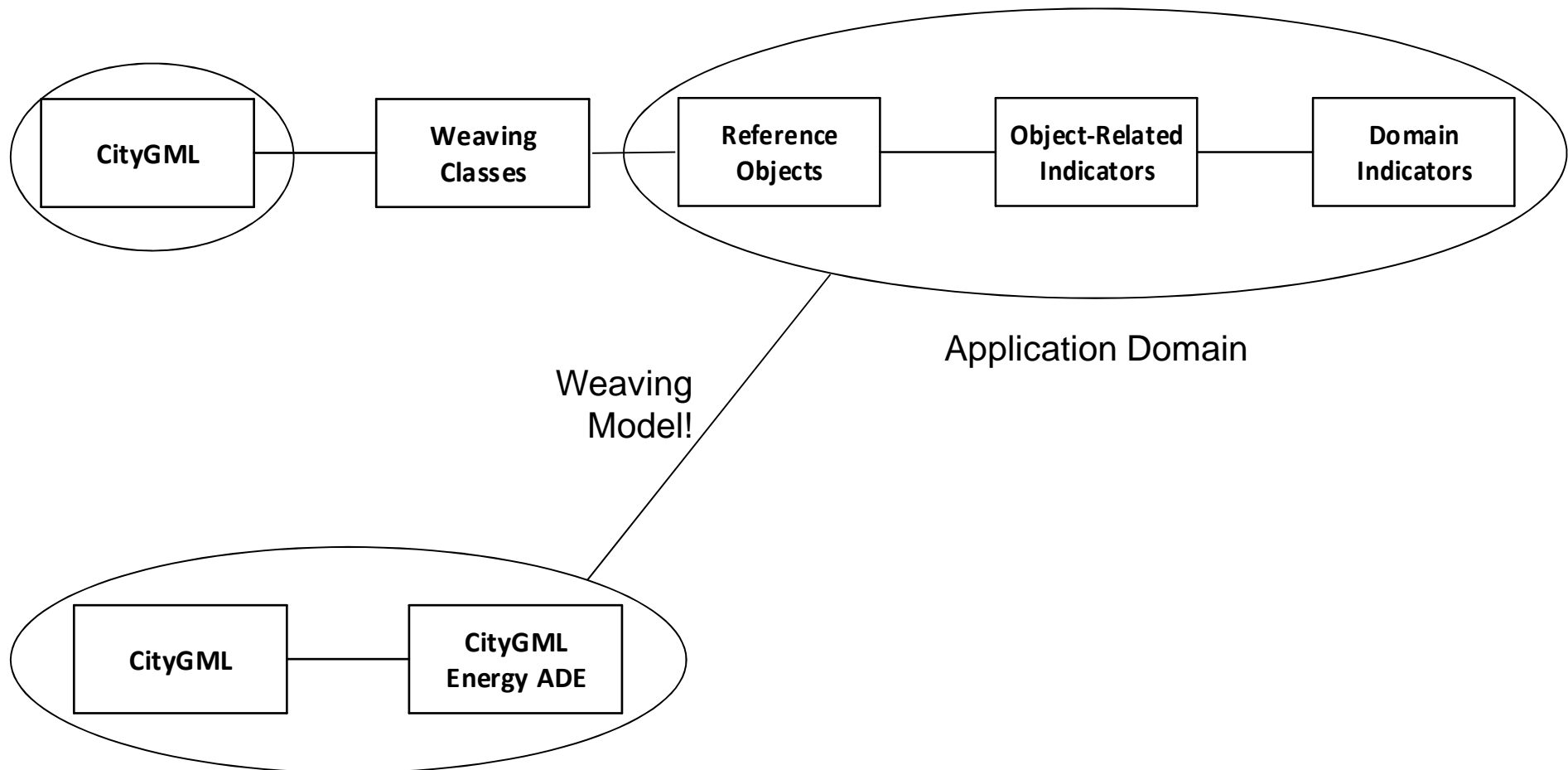
# The Big Picture

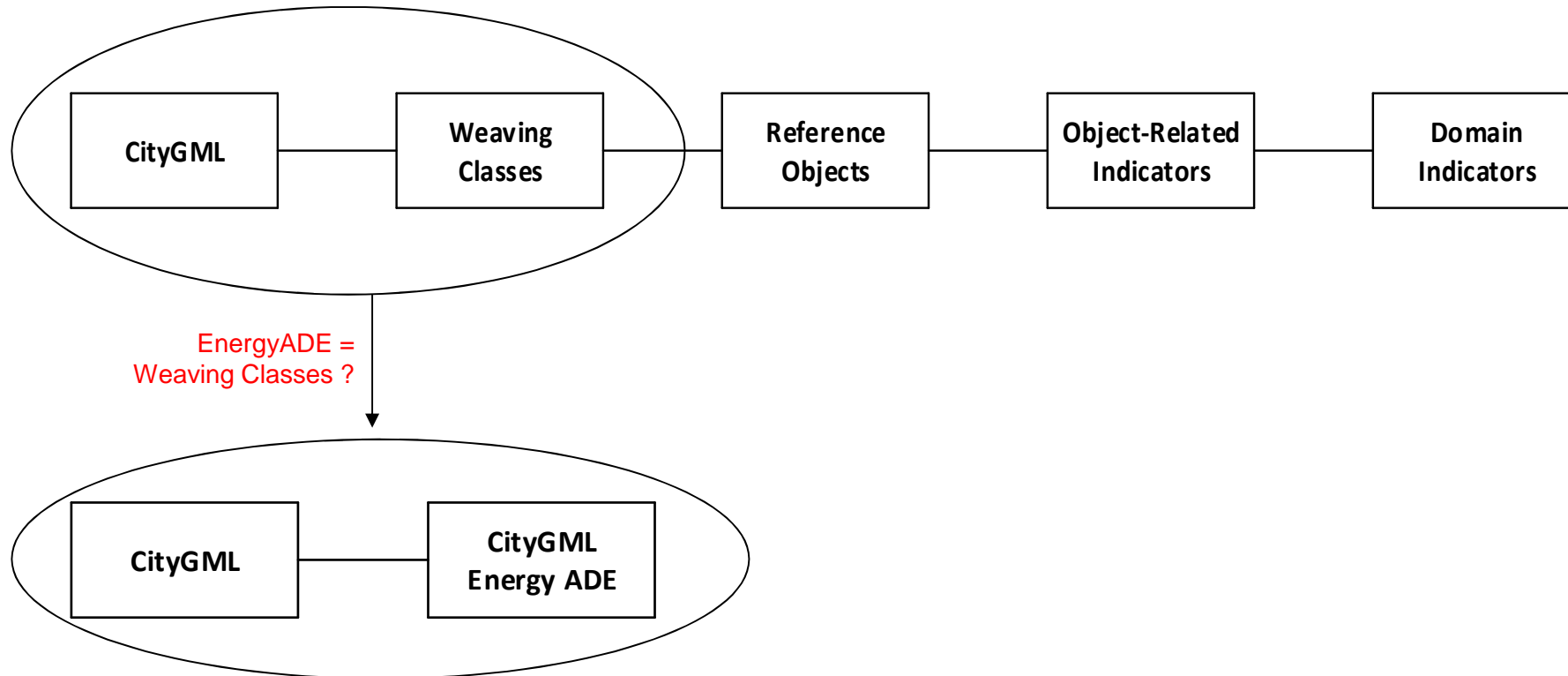


# Indicator Data Model linkage for different application domains





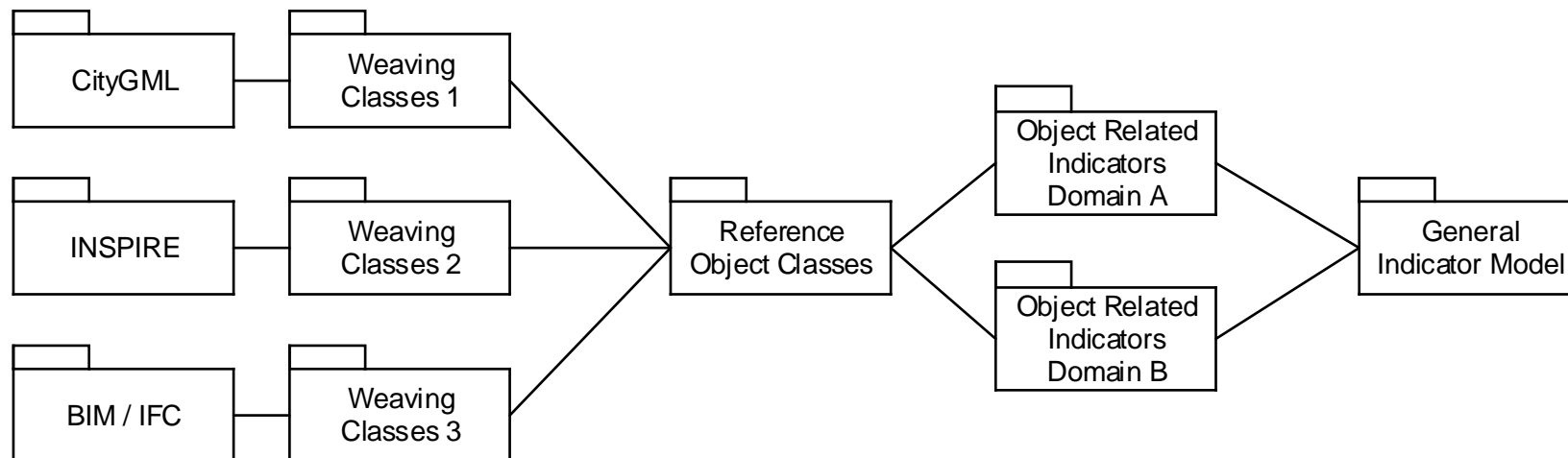




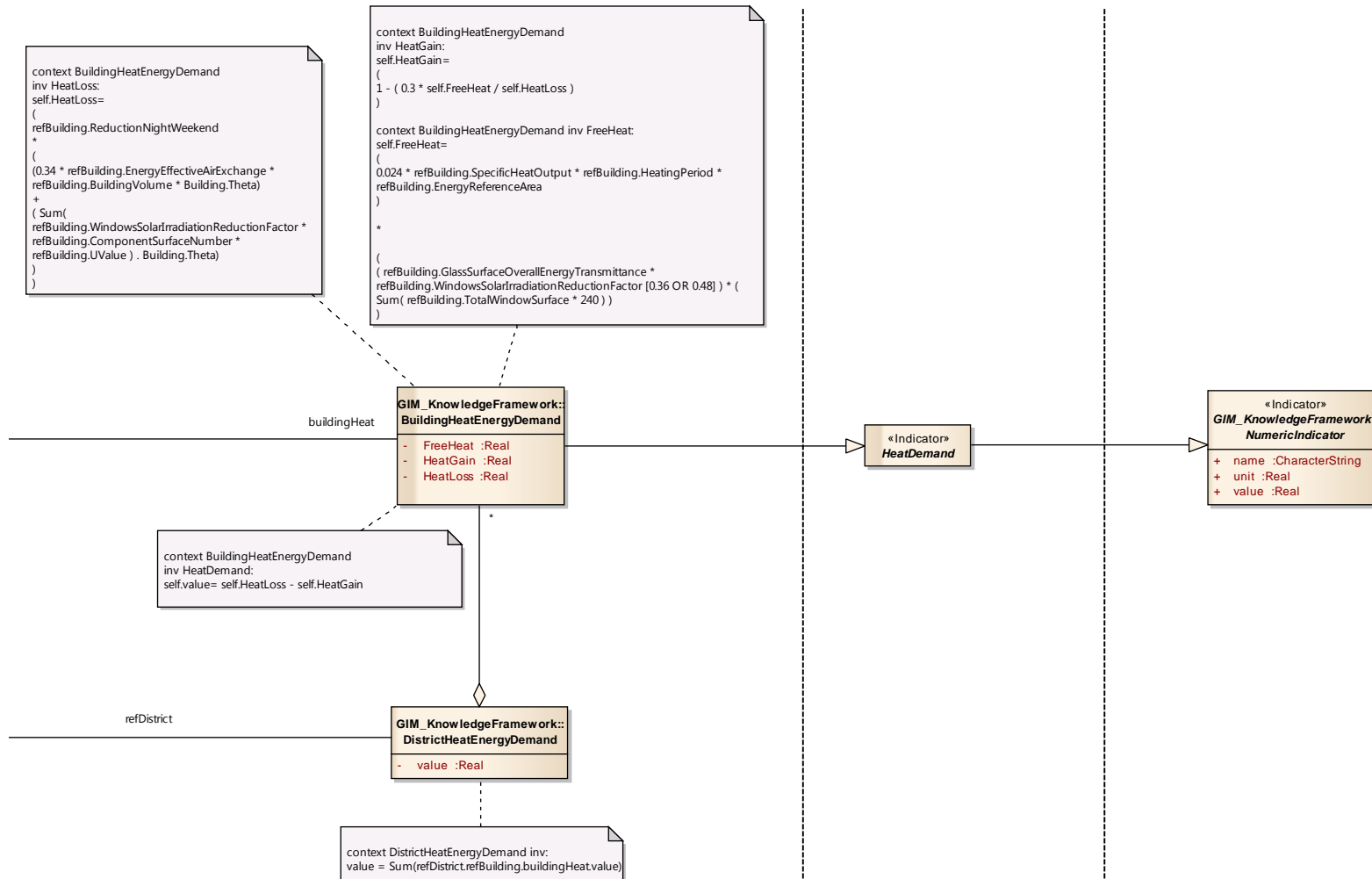
# Model Weaving Concept

- ▶ Reference Objects in different domains (Energy-Related Indicator, Climate-Related Indicator, etc...) can be connected to the different geospatial application models (e.g. CityGML, INSPIRE, etc...) using the model weaving concept.

# Weaving Classes between different geospatial application models



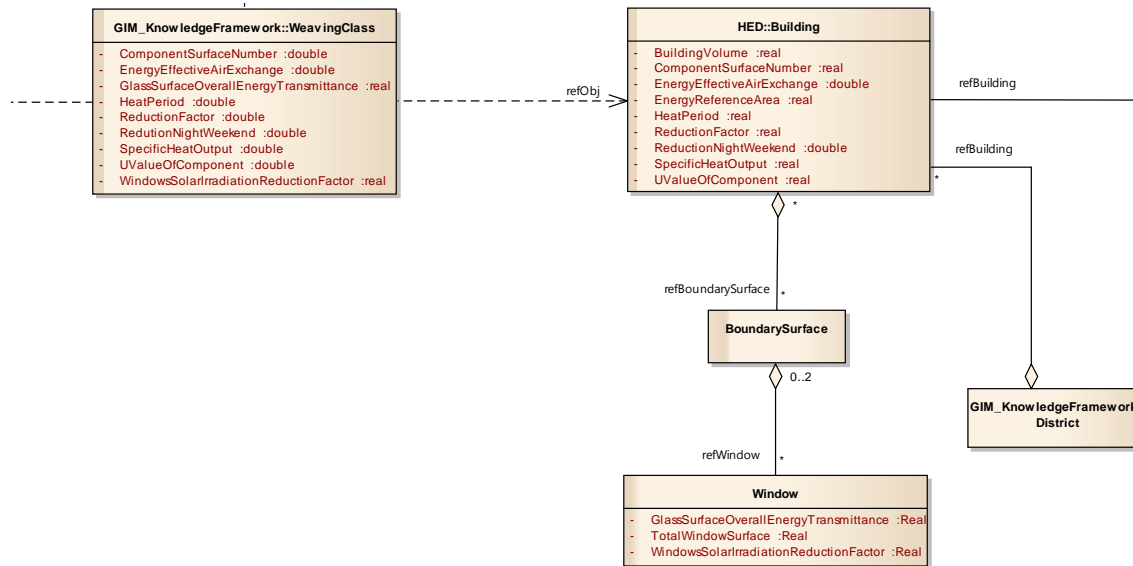




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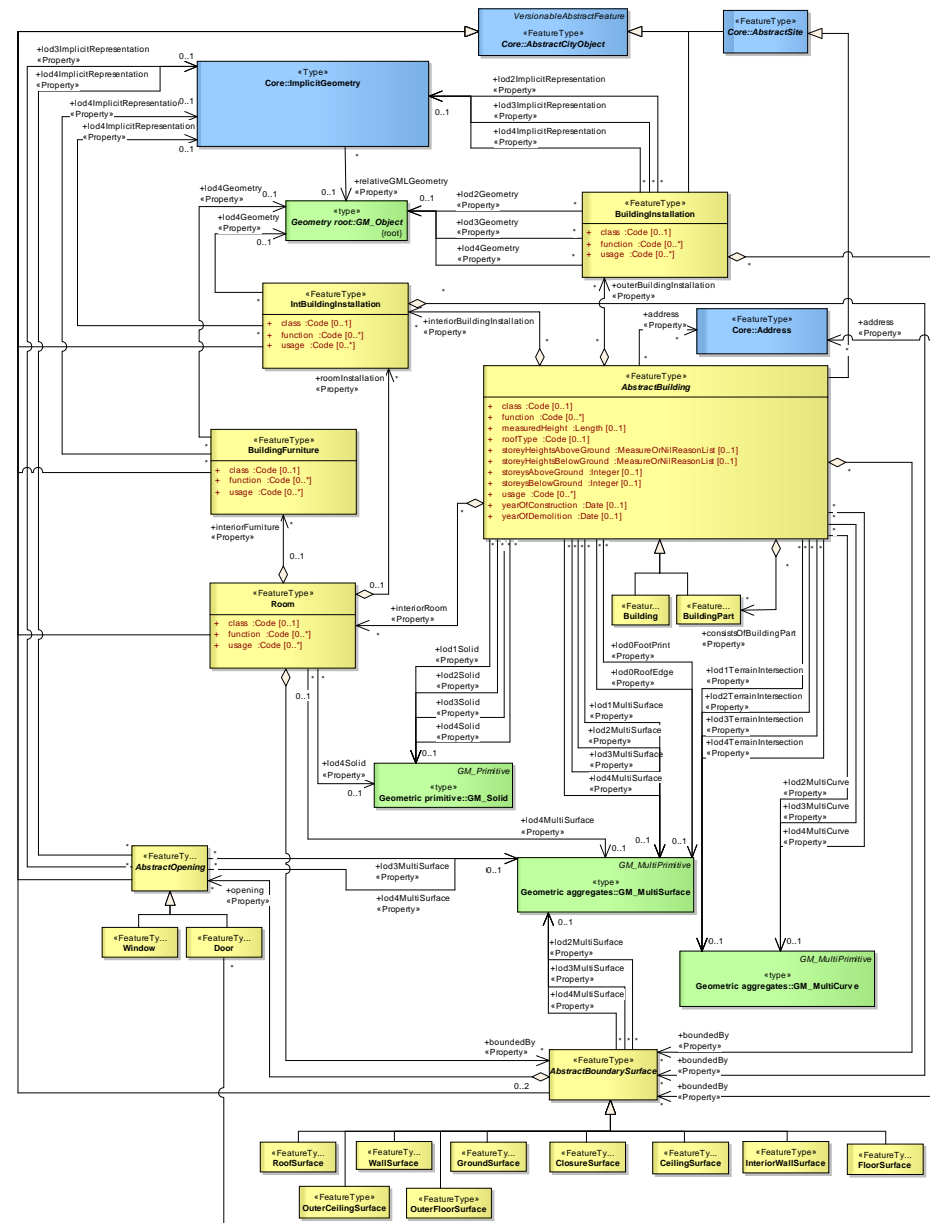
context WeavingClass
inv HED_Mapping:

refObj.ReductionNightWeekend = self.ReductionNightWeekend
refObj.EnergyEffectiveAirExchange = self.EnergyEffectiveAirExchange
refObj.HeatPeriod = self.HeatPeriod
refObj.ReductionFactor = self.ReductionFactor
refObj.SpecificHeatOutput = self.SpecificHeatOutput
refObj.UValueOfComponent = self.UValueOfComponent
refObj.refBoundarySurface.refWindow.GlassSurfaceOverallEnergyTransmittance
= self.GlassSurfaceOverallEnergyTransmittance
refObj.refBoundarySurface.refWindow.WindowsSolarIrradiationReductionFactor
= self.WindowsSolarIrradiationReductionFactor
refObj.BuildingVolume = refCityGML.measuredHeight *
refCityGML.boundedBy.GroundSurface.Area
refObj.refBoundarySurface.refWindow.TotalWindowSurface =
refCityGML.boundedBy.WallSurface.opening.Window.Area
refObj.EnergyReferenceArea = 0.75 * refCityGML.storeysAboveGround *
refCityGML.boundedBy.GroundSurface.Area
    
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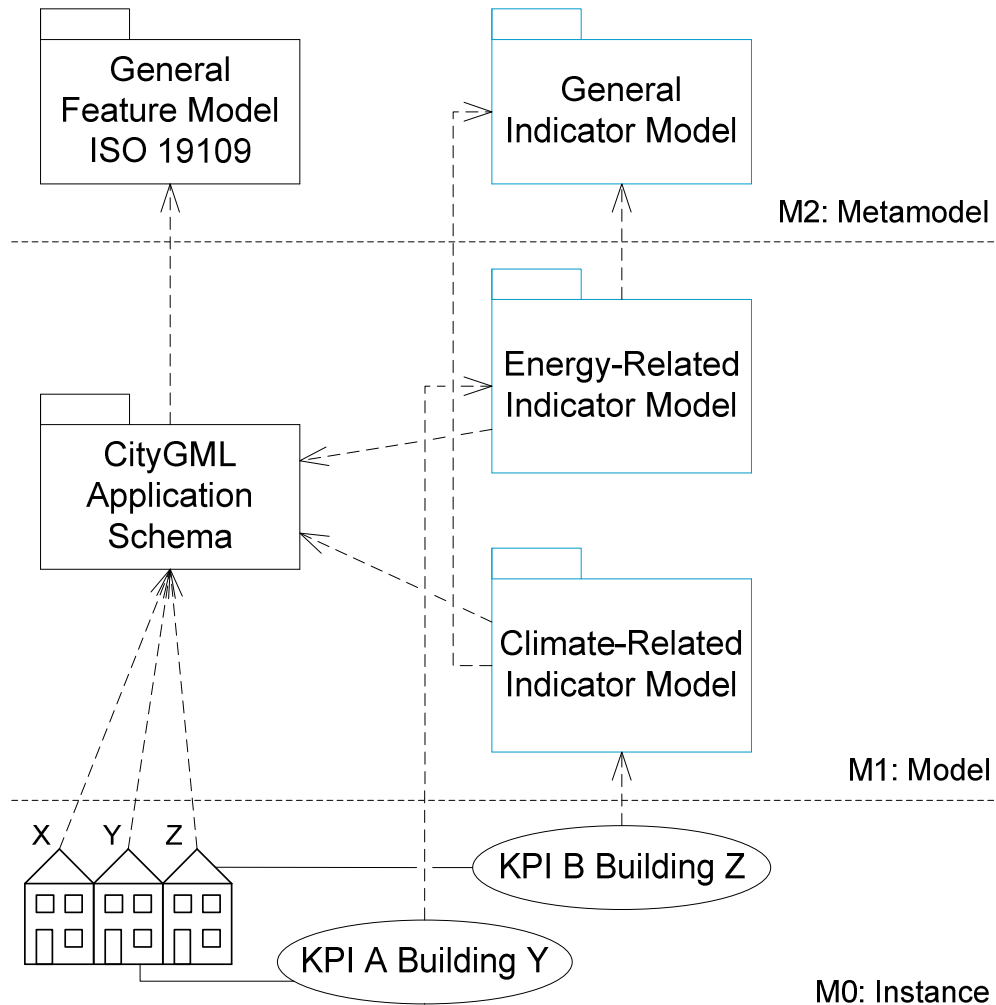


Weaving Model

Reference Objects



# Key Indicators Modelling (KPIs)



General Indicator Model and domain-specific indicator models in the MDE perspective. The dashed arrows indicate an “is-represented-by” relationship.



## Conclusion

- ▶ Automatically derive computational rules
- ▶ Evaluating alternative scenarios
- ▶ Automatic decision-making process
- ▶ Credibility, reliability, tractability, and accuracy of indicators
- ▶ Diverse utilization in the geospatial context
- ▶ Model relations between geospatial objects and individual indicators