# Easement spatialization with two cases based on BIM

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# Introduction

- The essence of the easement stays in the perspective of law
  - rather abstract and sometimes confusing
- Specific analysis is always needed, when refers to a practical application, and there is no geographical significance
- The easement limited to the concept of law must be combined with spatial information to adapt to 3D development.

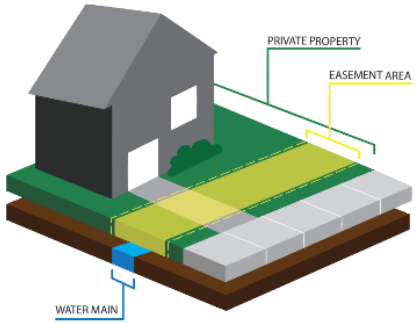
# Introduction

Aim

- to implement the abstract meaning of easement into physical city space, making it concrete and expressible
- to relate the servants and dominators of easement together
- to combine and promote the 3D technology and cadastral/property management.

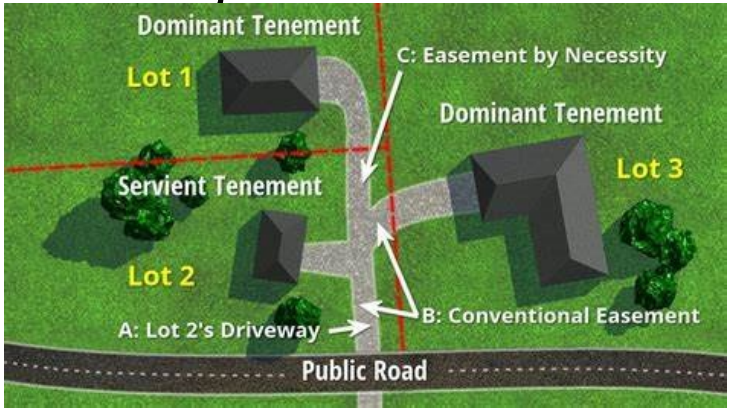
# Easement

- Easement is a kind of usufructuary right
- a right to cross or otherwise use someone else's land for a specif ied purpose, right of way
- Its main purpose is that one party wants to use the property of others to improve the benefits and interests of his own real estate.



# subjects of the easement

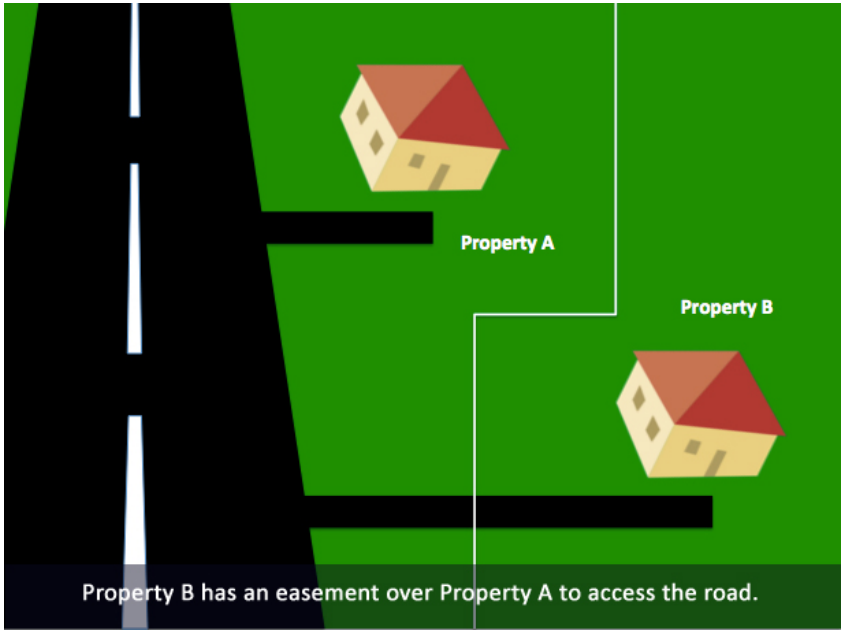
- The servant of easement refers to the real right holder who owns the land/building
- The dominator of easement refers to person who uses the real estate of others to improve his/her own benefits
- The owner is the right holder when the dominant tenement and the servient tenement have the same subject.

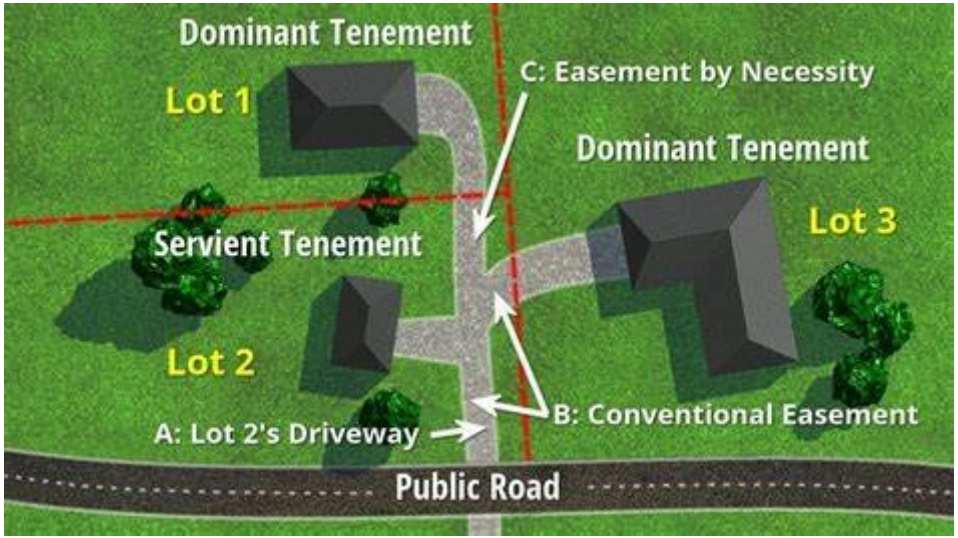


# Easement of access

- right-of-way

2D



# Easement

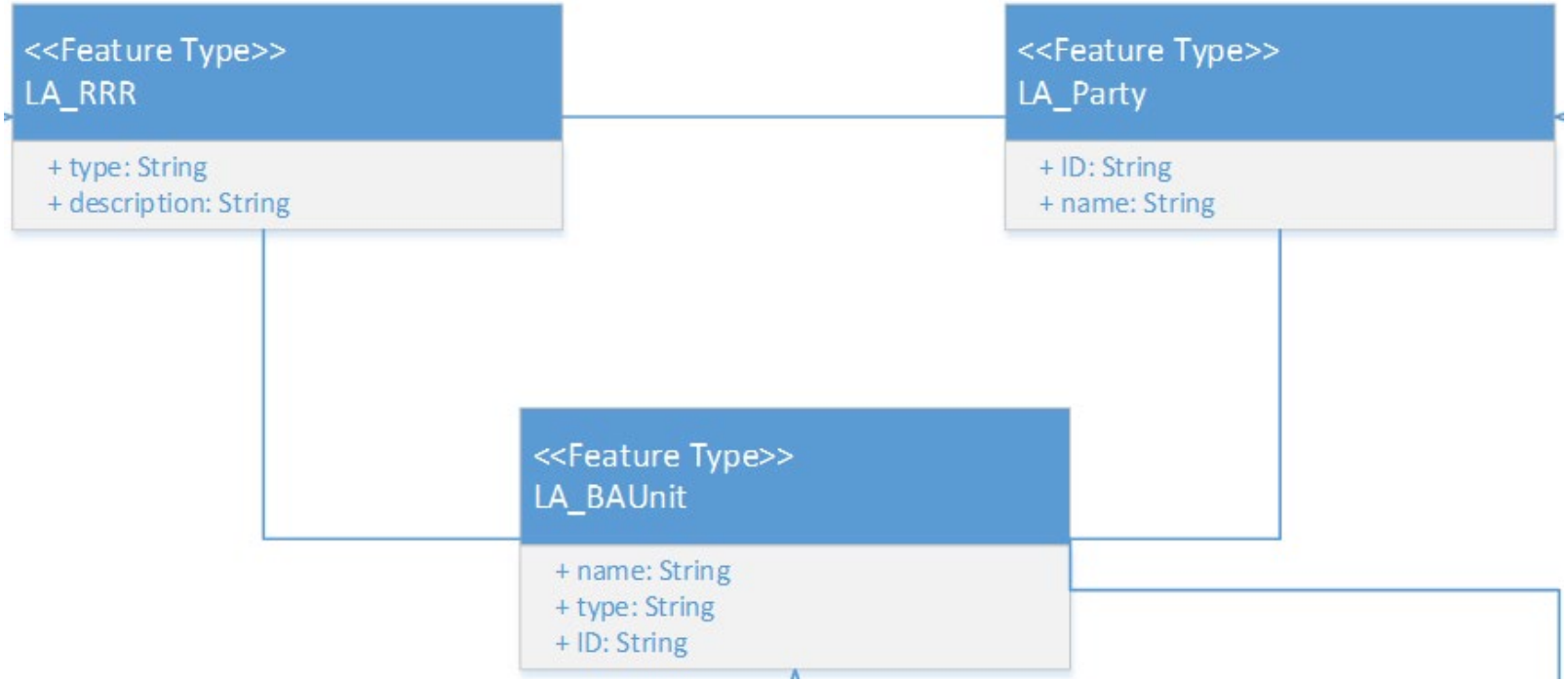
- 3D

From Where
Where to go
Where to pass
Relating to Whom

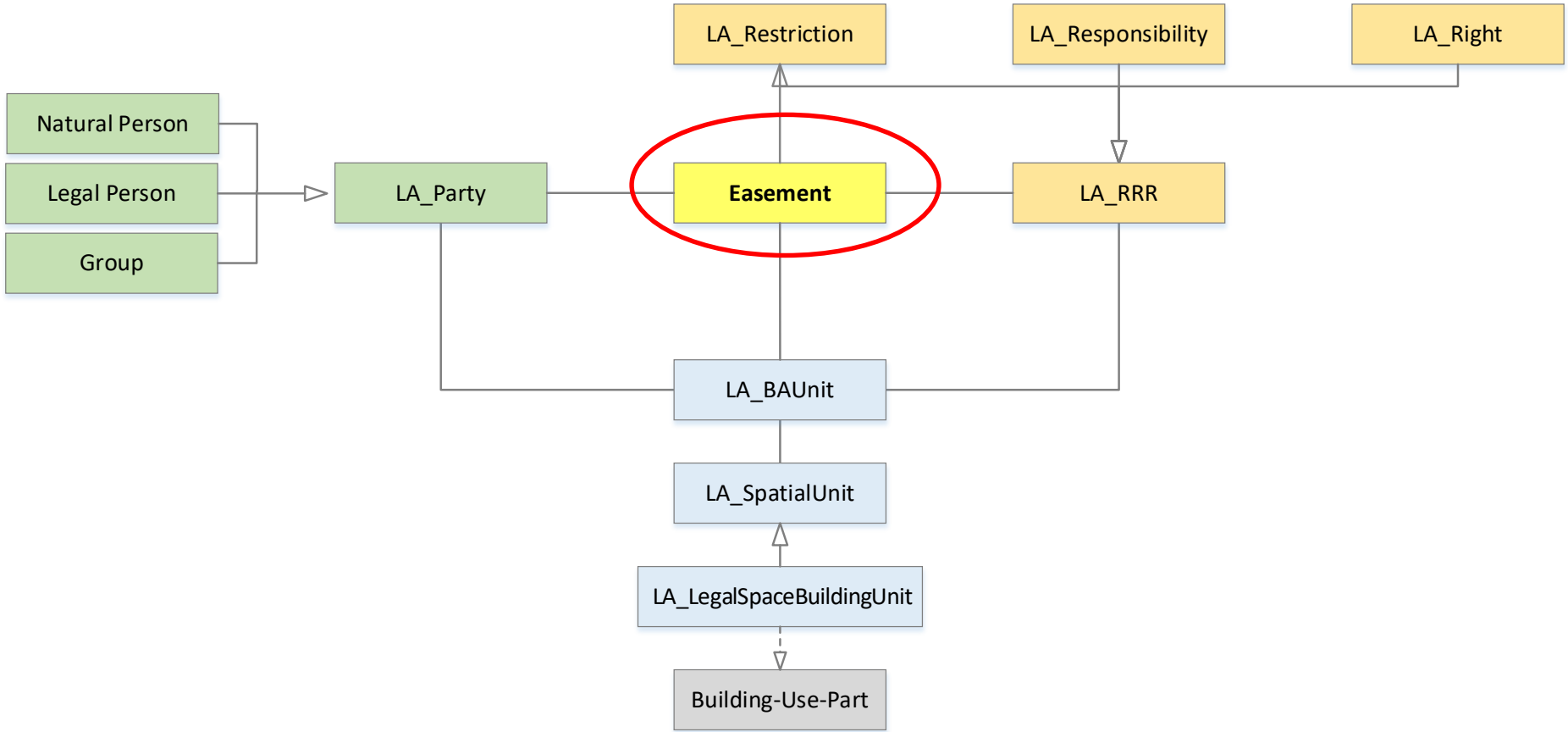
Shift from easement to space, object and party

# LADM

- LA_RRR, LA_Party, LA_BAUnit

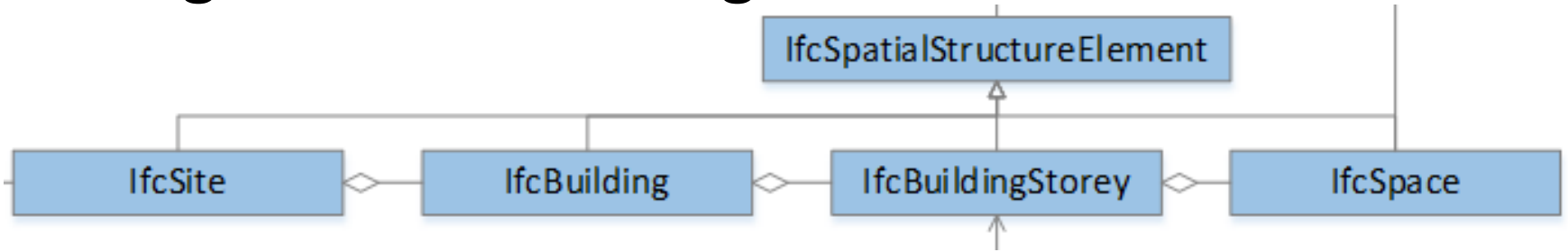


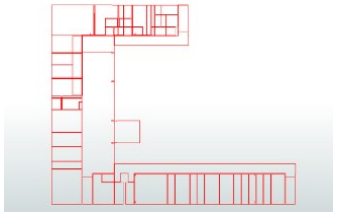
# Easement modeling

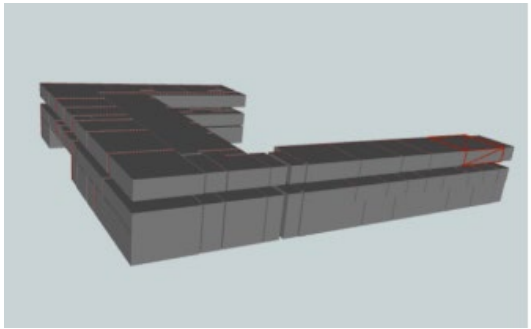


# IFC in BIM

- 3D space according to different functions / segments in buildings

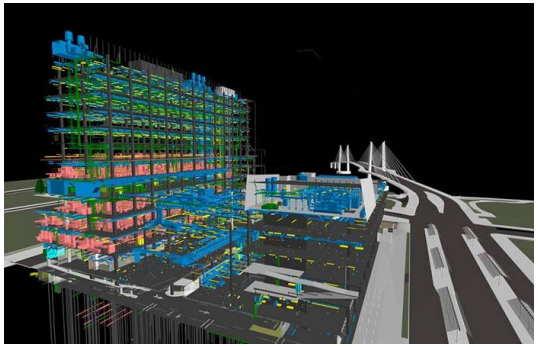




# LADM & IFC integration

- Legal information is presented by LADM.
- Physical information is represented by the IFC data model includes geometric information and semantic information.

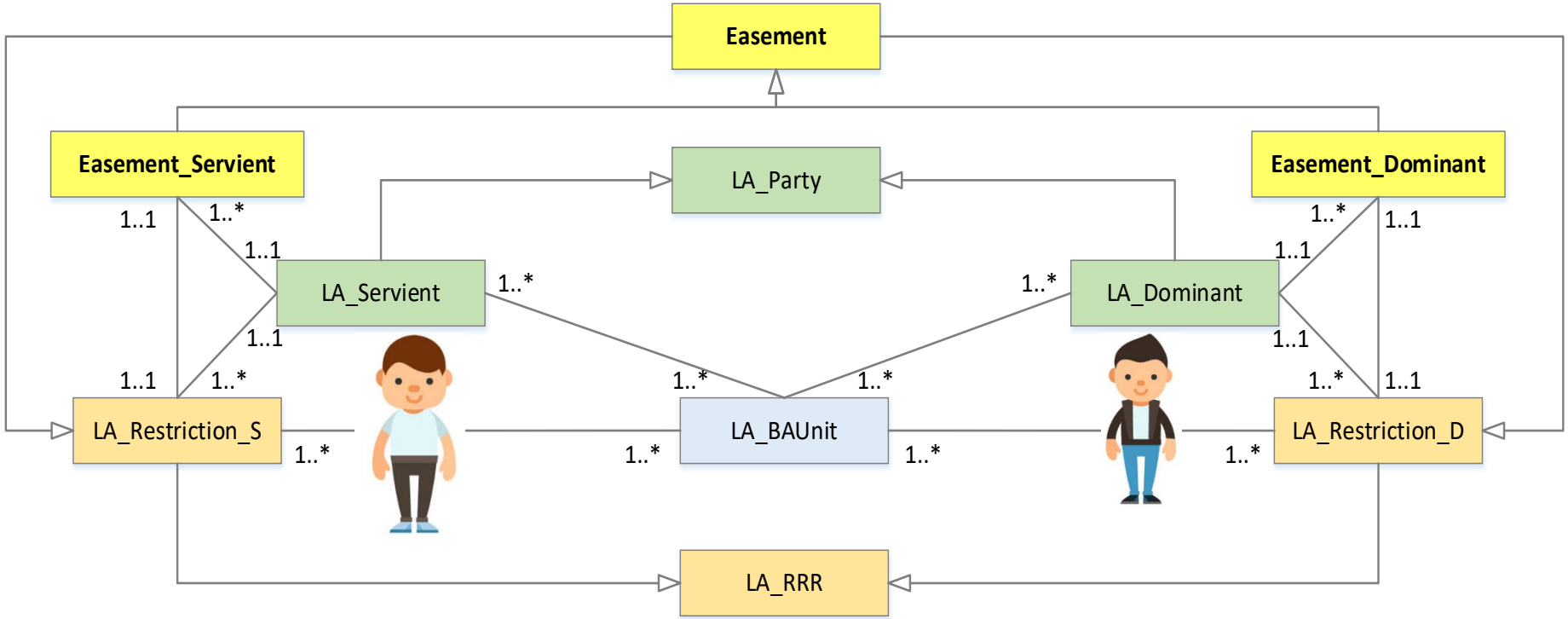


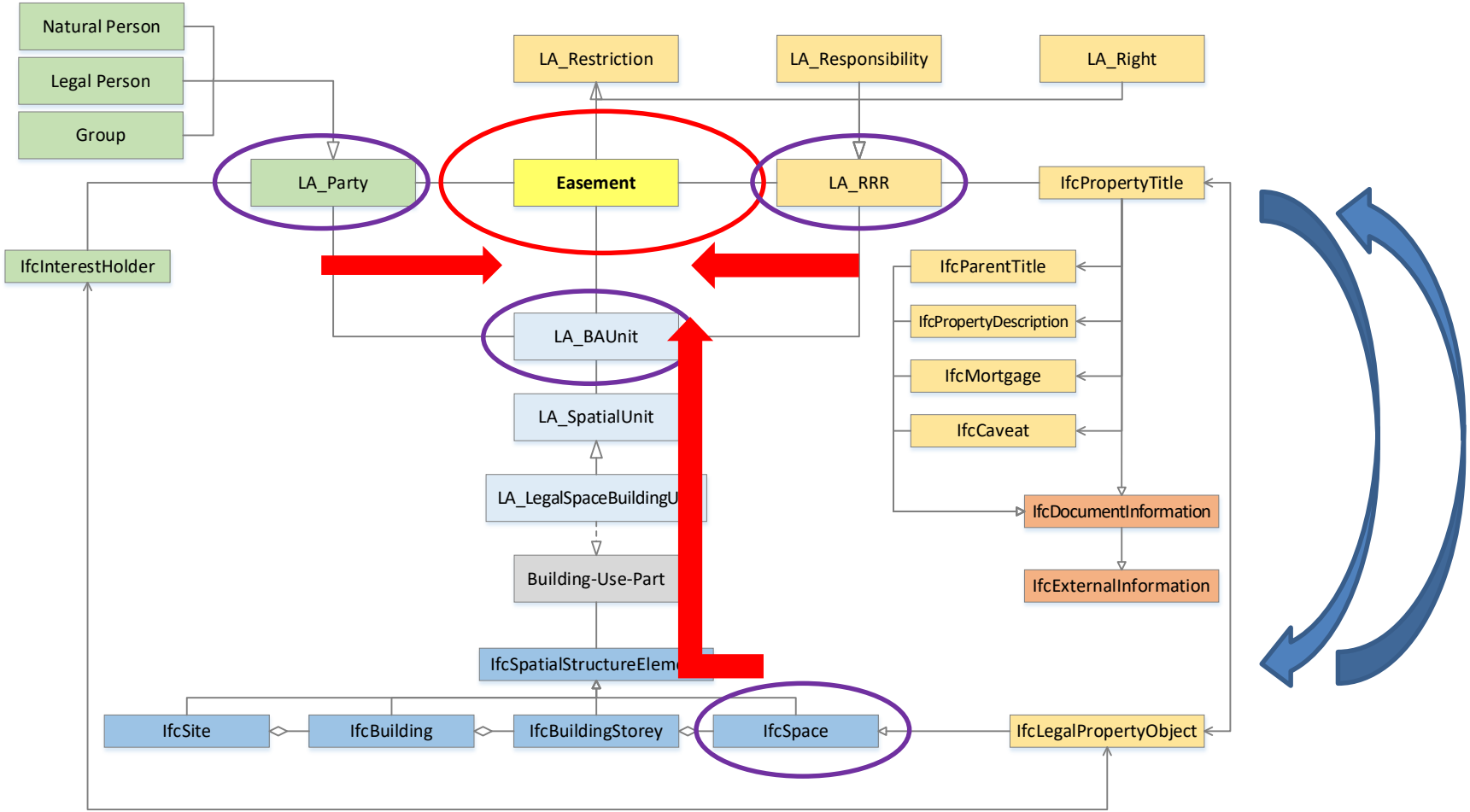
GeoReference: from IFC to Geospace

# Modeling of easement spatialization

- We first need to use IFC data to divide the architectural space, then spatialize various legal concepts, matching and fitting of legal meanings with property space.
- It is necessary to judge the easement attribute of the space occupied by the passage path, that is, whether space is the dominant tenement or the servient tenement, and to whom space belongs.

# Relationship between Dominant and Servient Tenement




Natural Person
Legal Person
Group
LA_Party
LA_Restriction
LA_Responsibility
LA_Right
Easement
LA_RRR
IfcPropertyTitle
IfcInterestHolder
IfcParentTitle
IfcPropertyDescription
IfcMortgage
IfcCaveat
LA_BAUnit
LA_SpatialUnit
LA_LegalSpaceBuildingU
IfcDocumentInformation
IfcExternalInformation
Building-Use-Part
IfcSpatialStructureEleme
IfcSite
IfcBuilding
IfcBuildingStorey
IfcSpace
IfcLegalPropertyObject

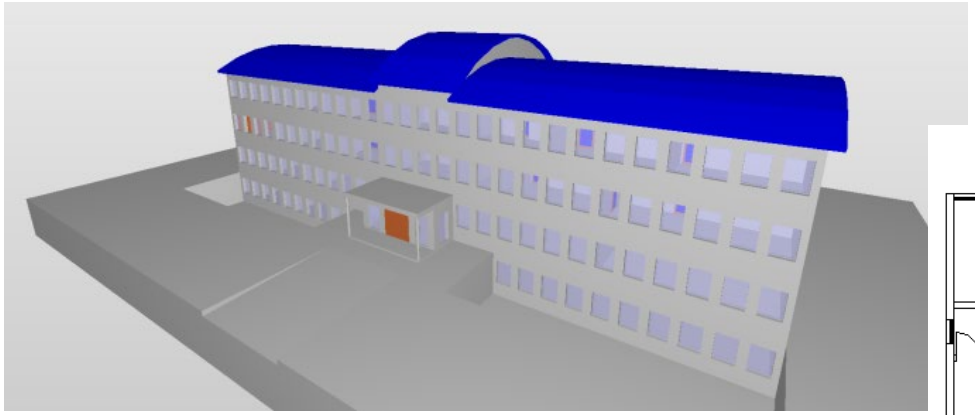
# Easement route

Similar with indoor navigation

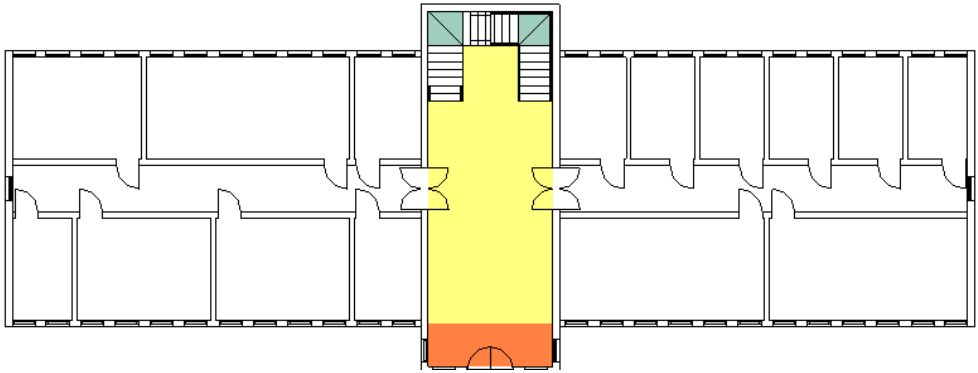
Different with indoor route computation

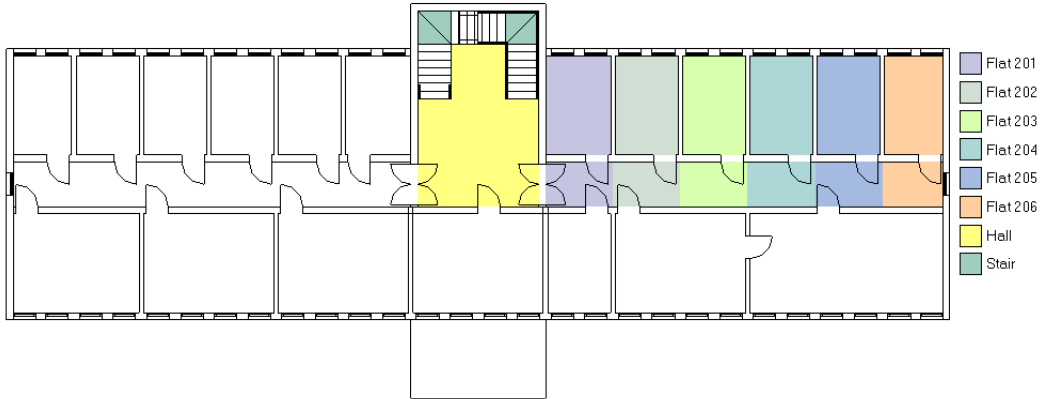
- The way to exit/entrance/road
- through common space or certain space of others (Whose property space)
- How to divide the space and who own the space

# Case 1 Path Particularity – with Necessary Point (entrance)



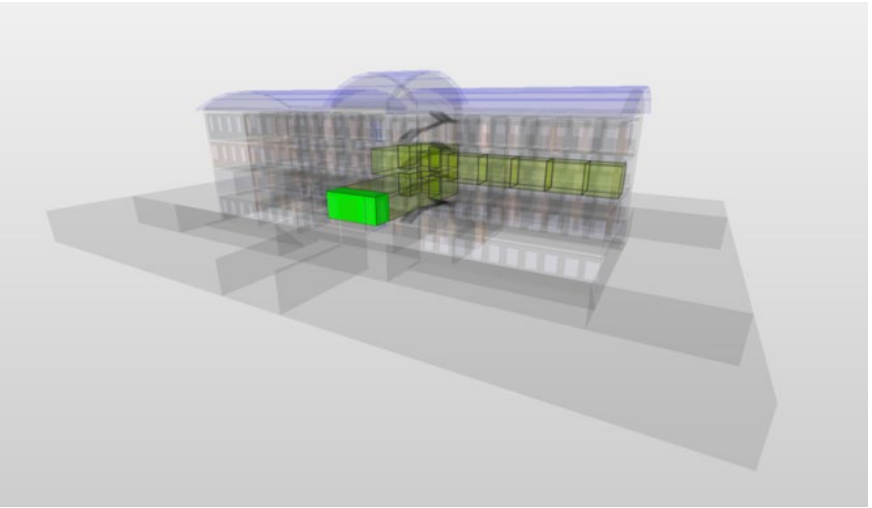
Overall Appearance of the Condominium

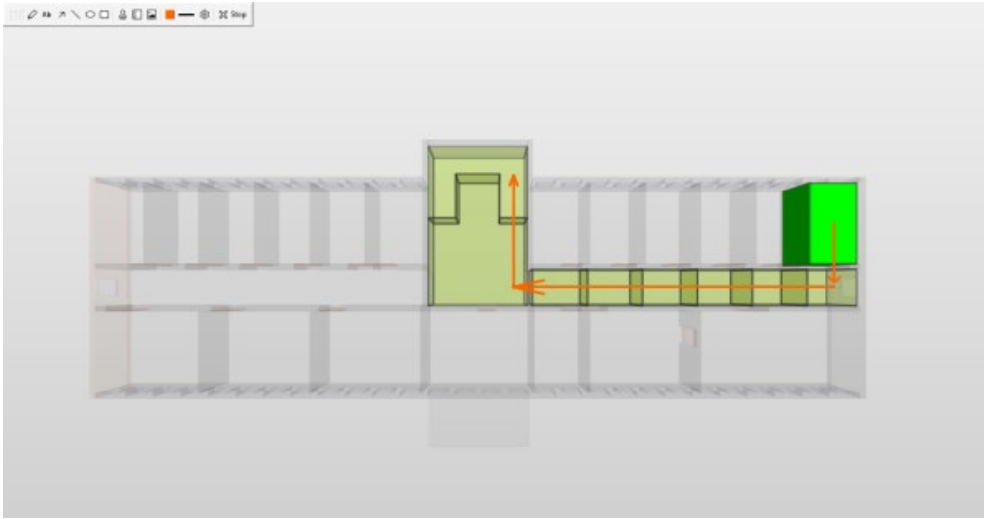





2D Floor Plan in Revit

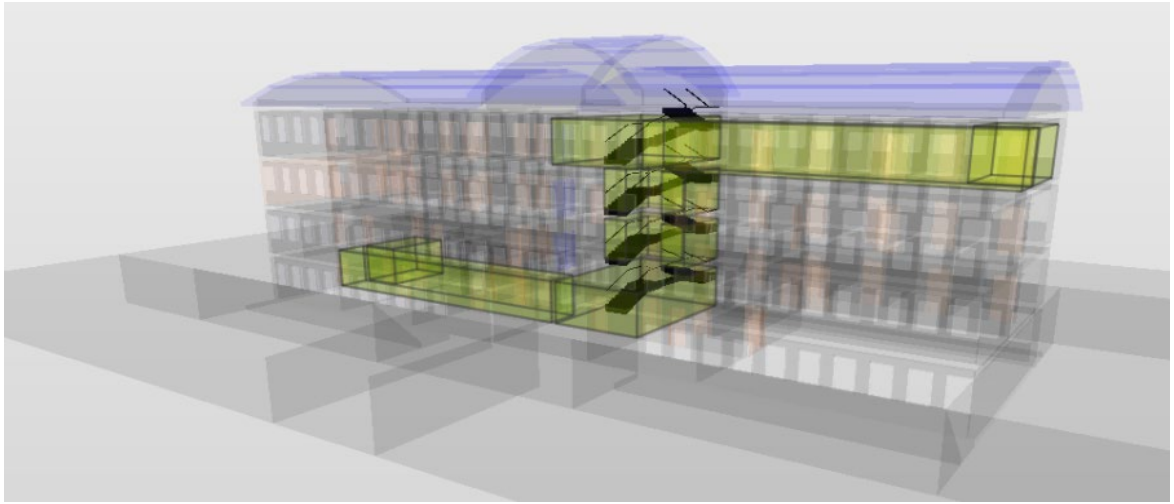
# Case 1 Path Particularity – with Necessary Point (entrance)





In the 3D environment, easement spatialization can be calculated and visualized, which can help non-technical people to accurately understand the boundary of three-dimensional ownership, route and avoid unnecessary disputes.

## Case 2 Space Particularity
## – with Aboveground, Surface and Underground Space Parts



The route of easement not only refers to reaching the surface from a selected location, but also includes a location from the aboveground to the underground.

# Conclusion

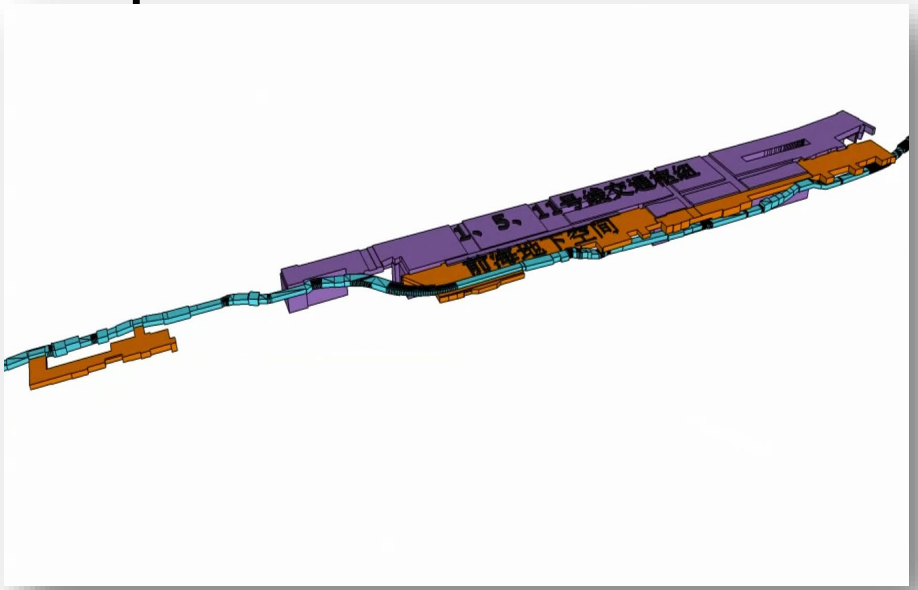
- Realize and operate the easement spatialization: connecting the RRR, parties and spatial units
  - From abstract right to specific routes
  - From qualitative description to quantitative calculation with locations

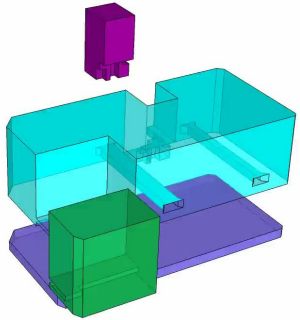
# Conclusion

- BIM can optimize the presentation of 3D property with owner and is an effective carrier of easement spatialization.
- The combination of legal information and spatial information of 3D property could improves space management, accelerate the development of 3D cities

# Conclusion

- Urban space planning should take easement spatialization into consideration.





# THANKS

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