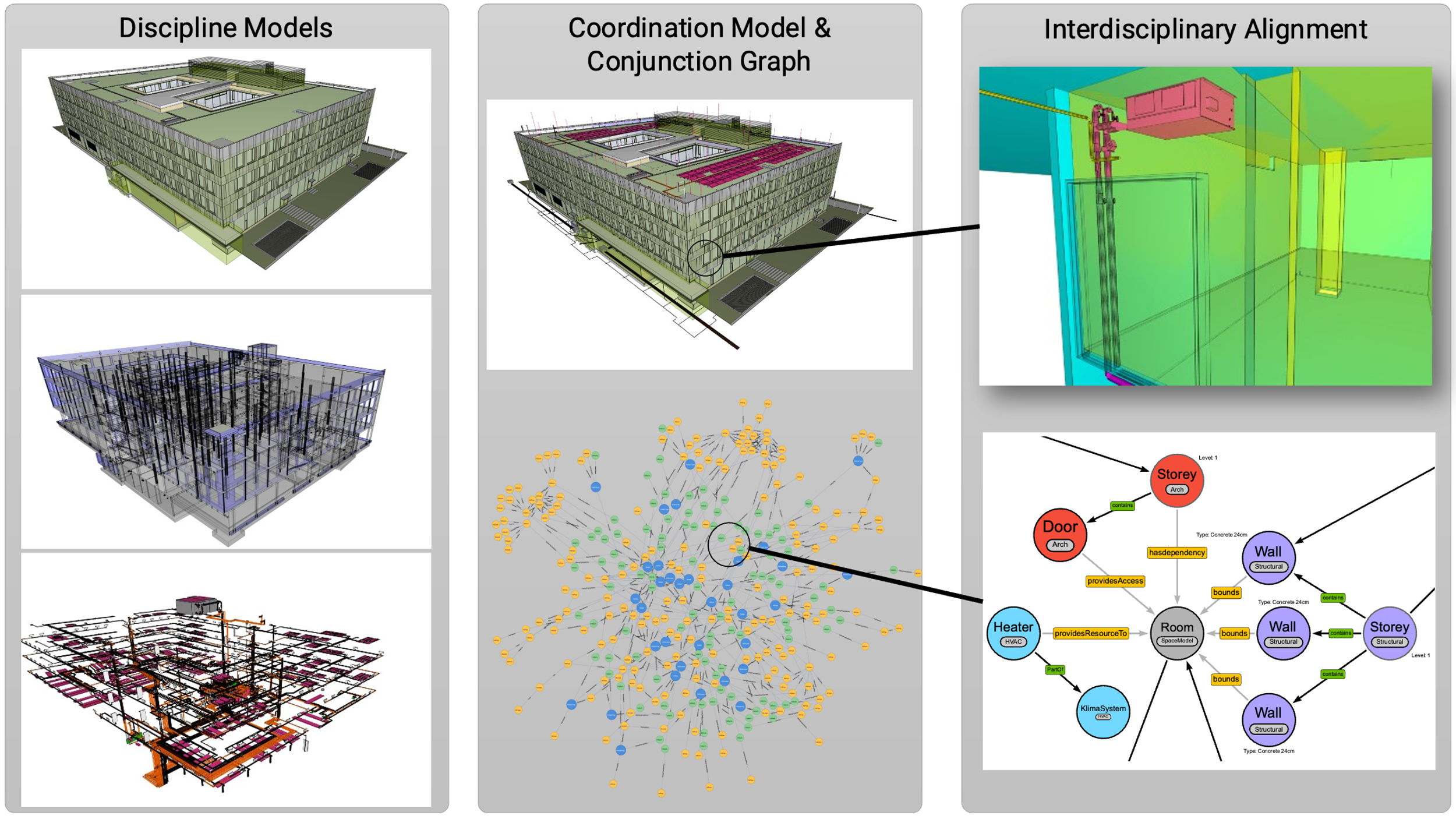
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# Software Lab:

Building Integration and Graph Analytics:

A Digital Twin Approach using Labeled Property Graphs

Description

*This software lab aims to integrate diverse Industry Foundation Classes (IFC) models from various disciplines of one building, focusing on creating a digital twin. The key objective is to merge geometry considering the IFC topology while also accounting for geometry adjacencies. Subsequently, students will prepare a graph-meta model that unites information and geometry to support the creation of a comprehensive Labeled Property Graph (LPG). The graph will represent an extensive dynamic virtual representation of the building. The final phase involves leveraging graph data science tools to query room-specific or floor-specific details, determine model discrepancies, and adeptly manage obsolete information within the context of the digital twin. This hands-on investigation aims to deepen students' comprehension of BIM integration, graph database analytics, and the powerful concept of a digital twin, highlighting the intricate connection between spatial data and advanced graph structures.*

Task

*This software lab utilizes Solibri, Ifcopenshell, and other tools to extract and interact with adjacencies from diverse IFC models. Participants will then use CYPHER to integrate this data into a comprehensive graph, utilizing Neo4j and the Graph Data Science library for construction and exploration.*

GENERAL INSTRUCTIONS:

* Understand IFC standards and essential BIM concepts.
* Employ suitable programming languages and libraries for geometry processing.
* Leverage Neo4j for effective graph database implementation.
* Experiment with Cypher queries and Neo4j Graph Data Science Tools for comprehensive graph data science.
* Highlight the importance of querying and managing data for informed decision-making in complex spatial structures.

Supervisor

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