

Proposal for better support of space boundaries

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Overview

Space boundaries are a feature that can be used to aid both thermal analysis and quantity takeoff. However, the ability of CAD programs to support space boundaries for either one of these use cases is limited.

Keeping in mind that CAD programs will never do all the work for the analysis programs there are a few rules that would help these analysis programs a lot, while not demanding too much from the CAD programs

Space boundary rules

In the past energy analysis programs have not really used the spaces boundaries from the IFC files; instead they have created their own. If we clarify the implementation of space boundaries we will be able to support the analysis programs better with only a little extra effort in the implementation and from the users.

Even with these rules there will be need to for analyzing the geometry in the analysis applications, but the complexity of the analysis can be greatly reduced.

Required relationships

- Space to wall
- Space to slab / roof (floor and ceiling of the space)

Geometry

- IFC R2.0 spec says
 - Virtual space boundaries have geometry
 - Physical space boundaries don't have geometry
- Proposed rules
 - Provide geometry for both physical and virtual space boundaries
 - Always provide space boundary for all sides of the space
 - If space boundary is aligned with a wall or slab
 - Type is physical
 - Provide geometry for the boundary
 - If space boundary is not aligned with a wall or slab
 - Type is virtual
 - Provide geometry for the boundary
- Simplified geometry for curved boundaries
 - Straight boundary from the start point of the segment to the endpoint of the segment

When implementations are done in this way the programs contain the possibility to create files with valid space boundaries. However, also the user has to follow some modeling rules or this won't always work

- Spaces must be drawn to the inside surface of the bounding walls
- Spaces can't span multiple stories
 - Allowing multi storey spaces would set additional requirements to CAD programs.
- Spaces have to be drawn accurately.
 - Allowed tolerance depends on application