

Space Connection Rule Specification

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Description

This should be a rather simple rule that checks direct connections between spaces or from space to outside of the building.

Rule ID	241
Rule Name (en)	Space Connection Rule
Rule Description (en)	This rule checks the direct connections between spaces and connections from space to outside the building. In direct connections, the spaces are to be directly accessed from one another without going through other spaces.

Use Cases

Centralized Air Condition Checking:

- No direct access to outside from the building when a space has centralized AC
- No direct access to a non-centralized AC space from the building when a space has centralized AC (Independent AC) – (Figure 1)

Scope Restrictions

- This rule checks only the direct connection of the spaces.
- No routing algorithms are used.

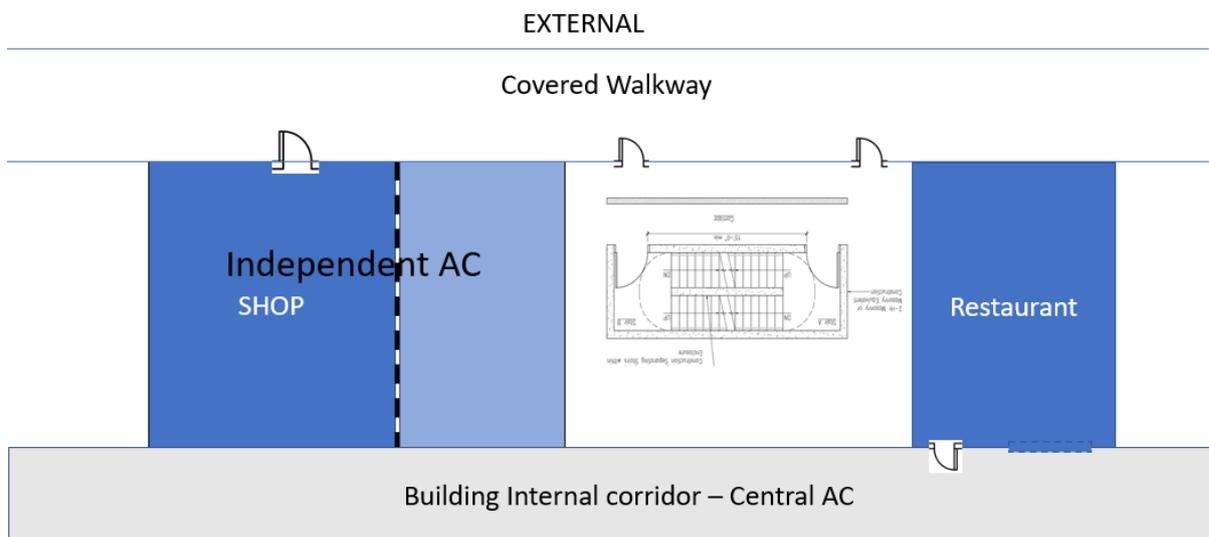


Figure 1. Centralized air-conditioning

Parameters

The default values are selected in the pictures below. Filters should be empty by default, (Figure 2) and (Figure 3).

- Spaces to check are filtered each by 'space to check' filter table.
- Space Connection Requirements are presented in 3 groups each dedicated for value options of one parameter:
 - Space Connection Requirements:
 - Allowed
 - Required
 - Forbidden
 - Type of Direct Access To Consider
 - Any Door or Opening
 - Consider Doors
 - Consider openings

- The description states the overall purpose of the 3 parameters.
- Radio buttons are used instead of combo boxes.
- For clarity's sake, each option is presented through 2 parts: 1. Label, 2. Description. Label style is emphasis.

PS. Preliminary stage of rule’s template development can be seen in (Figure 5).

The screenshot shows a software window titled "PARAMETERS" with a close button (X) in the top right corner. Below the title bar, there is a "Severity Parameters" section with a warning icon and a list icon. The main content area is divided into two sections:

Spaces to Check

Spaces to Check (A)

Below this section is a table with the following headers: State, Component, Property, Operator, and Value. The table is currently empty.

Space Connection Requirements

Direct Exit to Outside of Building from Space A

- Allowed**
If access exists it may be checked for correct type.
- Required**
Must have door or opening to outside.
- Forbidden**
No access allowed out of building.

Type of Direct Access To Consider

- Any Door or Opening**
Both doors and openings are considered.
- Consider Doors**
Only doors are considered.
- Consider Openings**
Only openings are considered.

Figure 2. Space A - connection requirements

Spaces to Check

Spaces to Check (B)

State	Component	Property	Operator	Value

Space Connection Requirements

Direct Access (Door or Opening) to Space B

Allowed
 If access exists it may be checked for correct type.

Required
 Each Space A must have at least one direct connection to a Space B.

Forbidden
 None of Space A shall have connection to a Space B.

Type of Direct Access To Consider

Any Door or Opening
 Both doors and openings are considered.

Consider Doors
 Only doors are considered.

Consider Openings
 Only openings are considered.

Figure 3. Space B – connection requirements

Checking Algorithm

Check space by space.

1. Check direct connection requirement if required
 - a. Find connected spaces B for space A.
 - b. Check direct access and create results (Note: check also missing connection)
2. Check connection type if required
 - a. Find connected spaces B for space A.
 - b. Check access type and create result
3. Check connection to outside if required
 - a. Find connections to outside
 - b. Check and create results (Note: check also missing connection)

Results

This rule creates following results for spaces A and B (Figure 4):

Case	Name	Description
NO_DIRECT_ACCESS	No direct access from A to B	There is no required direct access from A to B.
NOT_ALLOWED_DIRECT_ACCESS	Not allowed direct access from A to B	There is a direct access from A to B, which is not allowed in the requirements.
DIRECT_ACCESS_WITHOUT_A_DOOR	Direct access without a door from A to B	There is a direct access without a door from A to B. A door is required in the requirements.
NO_OPENING_BETWEEN	No opening between A and B	There is no required opening without a door between A and B.
NO_DIRECT_ACCESS_TO_OUTSIDE	No direct access to outside from A	There is no required direct access to outside the building from A.
DIRECT_ACCESS_TO_OUTSIDE	Direct Access to outside from A	There is a direct access to outside the building, which is not allowed in the requirements.

Both spaces A and B are included to the result entities.

Use space display names in the result name and description.

Use following enum as part of the result key: <ResultType>-<space A UUID>-<space B UUID>

```
enum ResultType {
    NO_DIRECT_ACCESS,
    NOT_ALLOWED_DIRECT_ACCESS,
    DIRECT_ACCESS_WITHOUT_A_DOOR,
    NO_OPENING_BETWEEN,
    NO_DIRECT_ACCESS_TO_OUTSIDE,
    DIRECT_ACCESS_TO_OUTSIDE,
}
```

Visualization

Use original entity colors in the visualization.

Visualize both spaces: A and B or just A in the cases: NO_DIRECT_ACCESS_TO_OUTSIDE,
DIRECT_ACCESS_TO_OUTSIDE

Visualize the possible door and wall between them.

PARAMETERS
Severity Parameters

Spaces to Check

Spaces to Check (A)

State	Component	Property	Operator	Value

Space Connection Requirements

Direct Exit to Outside of Building from Space A

- Allowed**
If access exists it may be checked for correct type.
- Required**
Must have door or opening to outside.
- Forbidden**
No access allowed out of building.

Type of Direct Access To Consider

- Any Door or Opening**
Both doors and openings are considered.
- Consider Doors**
Only doors are considered.
- Consider Openings**
Only openings are considered.

Spaces to Check

Spaces to Check (B)

State	Component	Property	Operator	Value

Space Connection Requirements

Direct Access (Door or Opening) to Space B

- Allowed**
If access exists it may be checked for correct type.
- Required**
Each Space A must have at least one direct connection to a Space B.
- Forbidden**
None of Space A shall have connection to a Space B.

Type of Direct Access To Consider

- Any Door or Opening**
Both doors and openings are considered.
- Consider Doors**
Only doors are considered.
- Consider Openings**
Only openings are considered.

Figure 4. Rule's parameters template

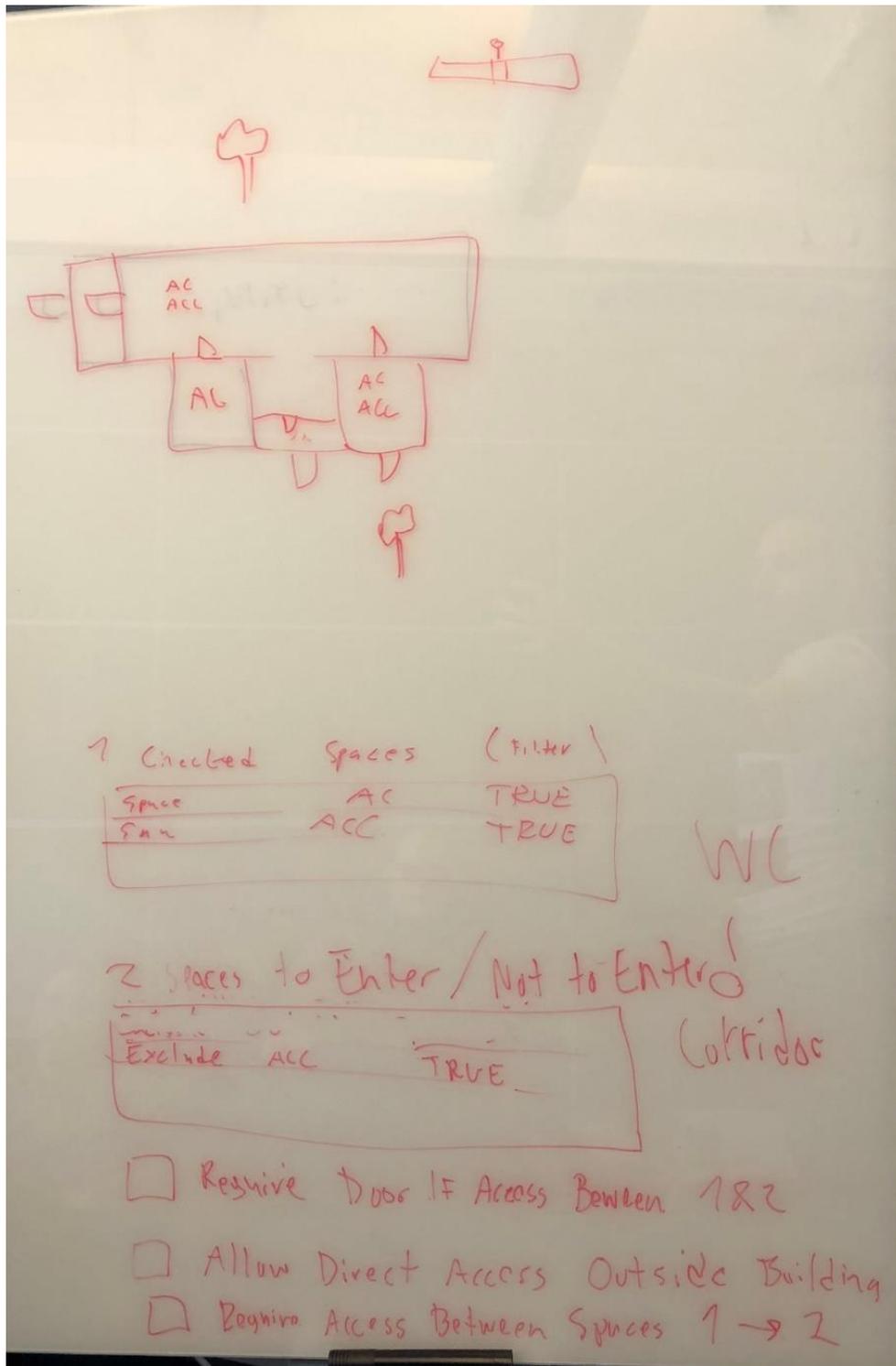


Figure 5. Preliminary stage of rule's template development