Portable Queries Using the **Brick Schema** for Building Applications

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**Brick Overview**
- A common metadata description
- It can express application requirements
- Query metadata without domain knowledge

**Goals**
- Completeness: capture all sensors/subsystems
- Expressiveness: capture all relationships needed to run applications
- Usability: easy to understand, easy to port buildings

**Example Building Diagram**

**Tagset Class Hierarchy**
- Equipment
  - Fire Safety System
    - HVAC
    - AHU
    - Terminal Unit
    - VAV
    - Fan Coil Unit
- Point
  - Command
  - Sensor
  - Temperature Sensor
  - Room Temperature Sensor
  - Water Temperature Sensor
- Location
  - Floor
  - Room
  - Server Room
  - Laboratory

**Example Building**
- Lighting Controller
  - AHU
  - Power Meter
  - HVAC Zone
  - VAV
  - Damper

**SPARQL Example**
```sparql
PREFIX ex: <http://example-building.com#>
PREFIX brick: <http://brickschema.org#>

SELECT ?ahu ?room
WHERE {
  ?zone rdf:type brick:HVAC_Zone .
  ?room rdf:type brick:Room .
  ?ahu rdf:type brick:AHU .
  ?zone brick:hasPart ?room .
}
```

**Brick vs Haystack**

<table>
<thead>
<tr>
<th>Brick</th>
<th>Haystack</th>
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</thead>
<tbody>
<tr>
<td>6 ported buildings, 8 ported applications</td>
<td>No reference implementation</td>
</tr>
<tr>
<td>Supports SPARQL queries that traverse Brick graph</td>
<td>Restrictive query mechanism cannot traverse relationships</td>
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<tr>
<td>Captures relationships within and across building subsystems</td>
<td>Can link entities, but does not classify these relationships</td>
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<tr>
<td>Functional blocks encapsulate complex subsystems, Tagset hierarchy permits partial descriptions</td>
<td>Flat, classless tag structure cannot capture uncertainty or complexity</td>
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