Haystack

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July 15, 2017

Haystack

- Official…
- …”to develop a standardized approach to representing and using [data and] metadata
- Common methodology for defining for defining metadata (tags) and common vocabulary (community defined tag libraries)
- Started in building automation community, general IoT potential
  - machine-understandable description for apps and services, e.g. analytics
- An open-source styled, community contribution of tag definitions

Haystack Model

- Haystack components
  - Entities: things to describe, like sites, points, equipment
  - Tags: name/value pairs, describe a fact or attribute of entity
  - Entities are modeled as collection of tags
- Can be used to define
  - Sites (location, address, geo coordinates, year built, function, tz)
  - Equipment (ahu, hvac, vav, zone, chiller, pipe, installed…)
  - Points (sensor, discharge, air temp, unit, tz, siteRef, equipRef)

Sensor data and meta-data use

- Sensor "zn3-wwf14"" "77.6" ??
- Apps and services, like analytics, would benefit from addl info
  - Is a zone temperature
  - Is an exterior zone
  - Is South facing
  - Is supplied by VAV box
  - Is served by AHU-1
  - Is operated on occupancy schedule #1 (7:30 am – 6:30 PM)
  - Has an occupied setpoint of 74 F
  - … geographic location, date (season), building type, constructed…
- All of these can be expressed in Haystack

Haystack example, “legacy” annotation

```
                                    //used to denote comments, not official syntax
   "id": "150a3c6e-bef0ee0e",       //RecId
   “dis”: “zn3-wwf14”               //str, for UI
    "sensor": "m:",                 // marker is Haystack notation for metadata
    "temp": "m:",                   // meta, measures temperature
     “air”: “m”,                    //   of air
    "curVal": "n:77.60",            // current value
     "unit": "F",                   // measurement unit, F
    “zone”: “m”,
    “floor”: “n:4”,
    “scheduleRef”: occSchedule1,
    “equipRef”: “@AHU-1”
```

… yearBuilt, primaryFunction,area, geoStreet, geoCity..

Haystack, simple end-points example (POC)

```
                          //used to denote comments, not official syntax
"id": "r:ghay.ahu1.cwt",  //identifier
“dis”: “Air-Handling Unit 1, Chilled Water Temperature”      //for UI
"sensor": "m:",           // marker is Haystack notation for metadata
"temp": "m:",             // meta, measures temperature
"water": "m:",            // meta, water (temperature) designation
"unit": "F",              // measurement unit, F
"curVal": "n:42.18",      // current value
"minVal": "n:34",         // minimum value
"maxVal": "n:45",         // max value
"DateTime": "t:2017-07-05T17:37:25 Paris”  //time stamp

---

"id": "r:ghay.lobby.co2s",
“dis”: “CO2 Sensor, Lobby”
"sensor": "m:",
"co2": "m:",              // meta, sensor measures CO2
"unit": "ppm",
"curVal": "n:460.21",
"DateTime": "t:2017-07-05T17:37:26 Paris”  //time stamp
```

Observations, interop

- Descriptive, not prescriptive
  - Does not mandate which tags to use with which entity BUT
  - defines how to name and structure tags when used
- Not a fixed object-model structure
  - ID and units
  - Meta-data added as desired, tags
  - Has linking mechanism, named ...Ref
- Common tag naming = pragmatic (almost) semantic substitute
  - Apps and services can use tags to infer meaning

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Qs

- ~~What do you work on?~~
  - ~~Domain, scope (foster interoperability)~~
- How do you work?
  - Open source (crowd sourcing…)
  - Working groups led by domain experts draft proposals, acceptance by consensus
- How far did you get?
  - Working on defining and extending tags for 5 years, current release 3.02
  - Fairly sophisticated models for commercial buildings, HVAC systems, power meters

Qs

- Opportunities for Reuse/Integration
  - Open for reuse/integration
  - Tagging model simple, flexible for use in other standards
  - Adopt naming and modeling conventions of other standards?
- Opportunities for collaboration
  - All IP licensed under open source, easy to reuse
  - Have many domain experts, straddle multiple domains to collaborate…
- Opportunities for research
  - WGs on data centers, fume hoods, access security, refrigeration systems, vertical transportation