Open Horizon project Agent Working Group Meeting

August 24, 2020

OPEN HORIZON

THE LINUX FOUNDATION

LF EDGE

Meeting Details

August 24, 2020 (@ 11:30am ET/8:30am PT)
Meeting Info: https://zoom.us/j/94980775985

Meeting ID: 949 8077 5985
One tap mobile
+13462487799,,94980775985# US (Houston)
+16699006833,,94980775985# US (San Jose)

Dial by your location
+1 346 248 7799 US (Houston)
+1 669 900 6833 US (San Jose)
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888 788 0099 US Toll-free
877 853 5247 US Toll-free
Meeting ID: 949 8077 5985
Find your local number: https://zoom.us/u/av0XQgb3W

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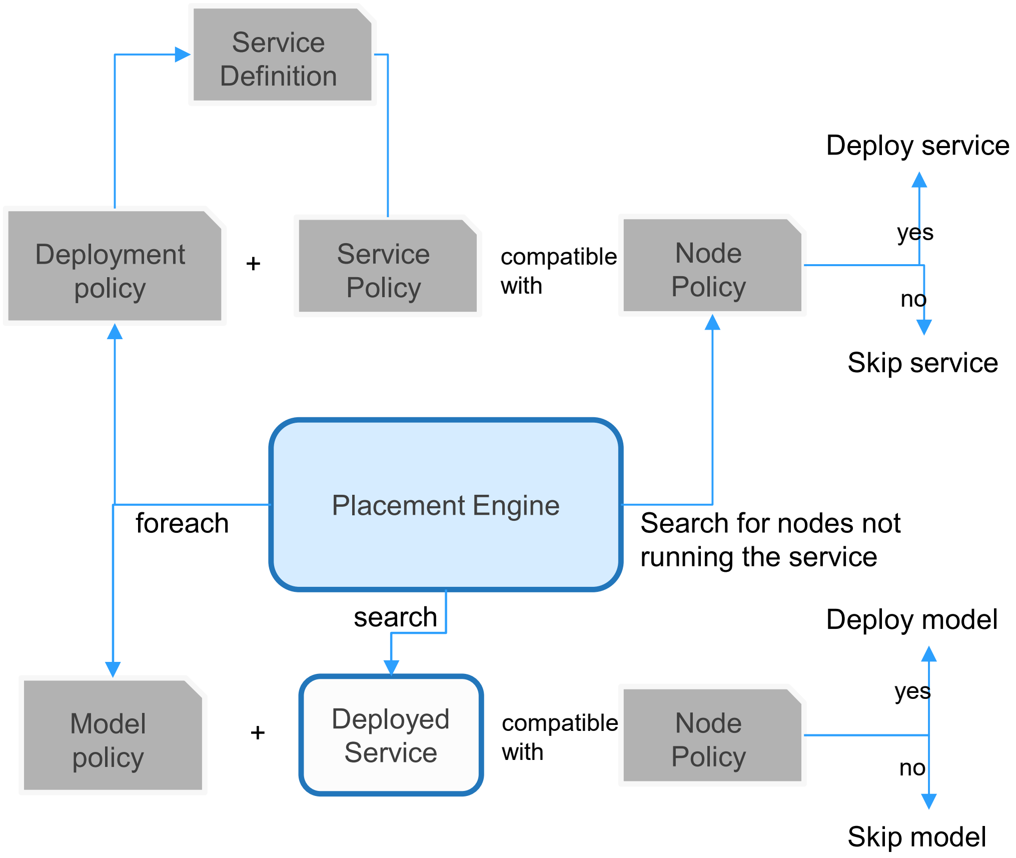
Topics

1. Welcome and Introductions for any new attendees
   A. Reminder of commit signoff
      1. https://wiki.lfedge.org/display/OH/Project+Contributions
   B. Any other administrative matters to address?

2. Deploying services by Policy

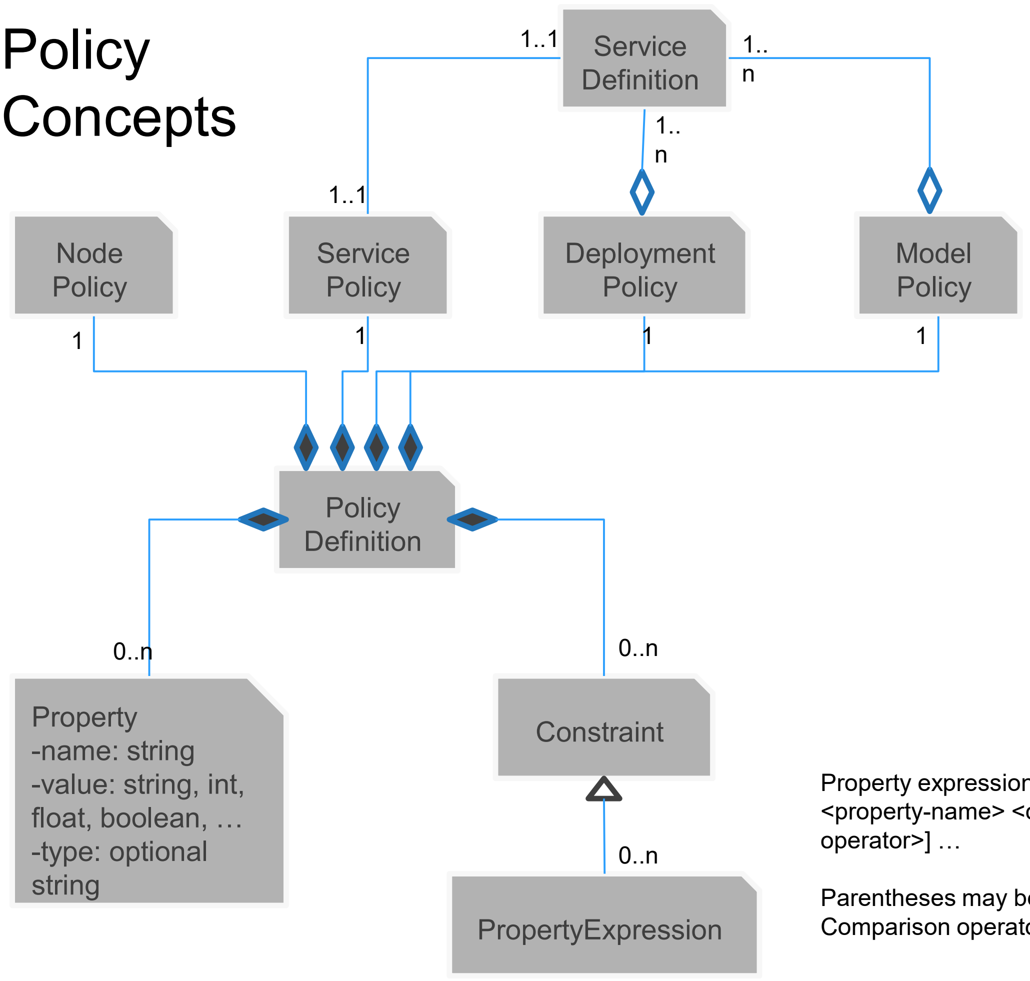
3. Next Meeting

Service Placement



- The placement engine runs in the Agbot.
- Continually searches for nodes that are compatible with existing deployment policies.
- Continually searches for deployed services that have model policy which is compatible with the node where the service is running.
- Deployment policy is logically ‘AND’ed with service policy to form the full set of policy definitions.
- Service policy is optional, specified by the service author.
- Compatibility is bidirectional:
  - the node policy satisfies the combined deployment policy
  - The combined deployment policy satisfies the node policy

Policy Concepts



In English:

- A policy definition is composed of 0 or more properties, and 0 or more constraints.
- A Property has name, type (optional), and value.
- A Constraint has zero or more property expressions.
- A node, service, deployment and model policy each have 1 policy definition.
- A service definition and a service policy are independent entities with a 1..1 relationship.
- A deployment policy and a model policy are independent entities that each refer to a service definition.
- A deployment policy may refer to more than 1 version of a service to denote service rollback instructions.
- A model policy may refer to more than 1 service definition, for each service the model is going to be deployed with.

Property expression form:
<property-name> <comparison-operator> <property-value> [<boolean-operator>] …

Parentheses may be used to provide precedence order.
Comparison operator depends on property type.

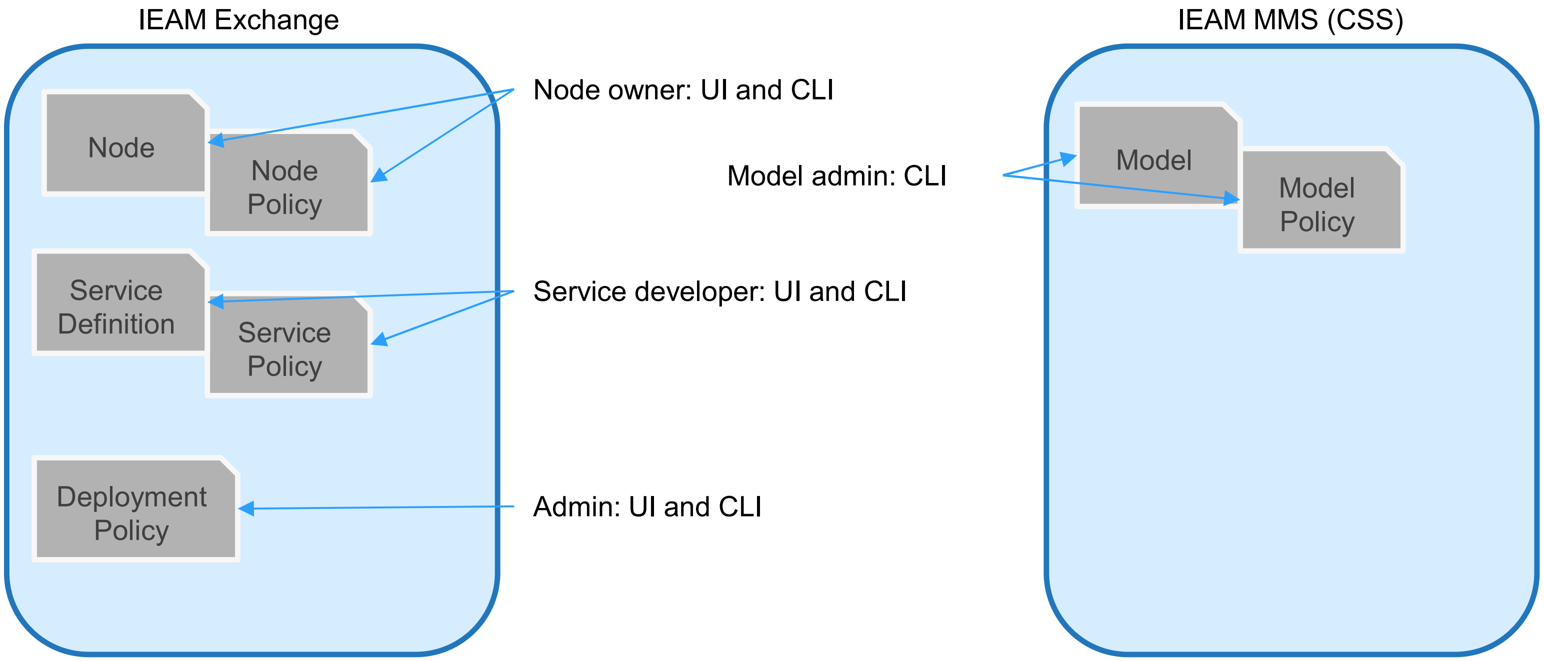
Policy Definition

```
{
  "properties": [   /* A list of name value pairs that describe what they are
attached to. */
    {"name": "robot","value": true}
  ],
  "constraints": [  /* A list of constraint expressions of the form <property
name> <operator> <property value>, separated by boolean operators AND
(&&) or OR (||). */
    "purpose=asset-utilization-monitor OR purpose=assess-paint-quality"
  ]
}
```

Policy Definition notes

- Properties are defined by the user at the time of use.
- Names are arbitrary to allow the user to define any naming scheme they desire.
- Node, deployment, and model policy can be changed at any time and the placement engine will react.
- Service policy can be changed at any time, but it is not a best practice to do so. If a service policy needs to change then it should be changed with a corresponding change to service version.
- Node policy has built-in properties, prefixed with openhorizon:
  - allowPrivileged, arch, cpu, hardwareId, memory
  - allowPrivileged is how a node opts into running privileged containers, it is the only built-in property that is read/write. All others are readonly.
- Service policy has builtin properties, prefixed with openhorizon:
  - allowPrivileged, arch, name, org, url, version
  - allowPrivileged in introspected from the associated service definition.
- All policy definitions are stored in the exchange (DB).

Policy Authoring



IEAM Exchange

Node

Node Policy

Service Definition

Service Policy

Deployment Policy

Node owner: UI and CLI

Service developer: UI and CLI

Admin: UI and CLI

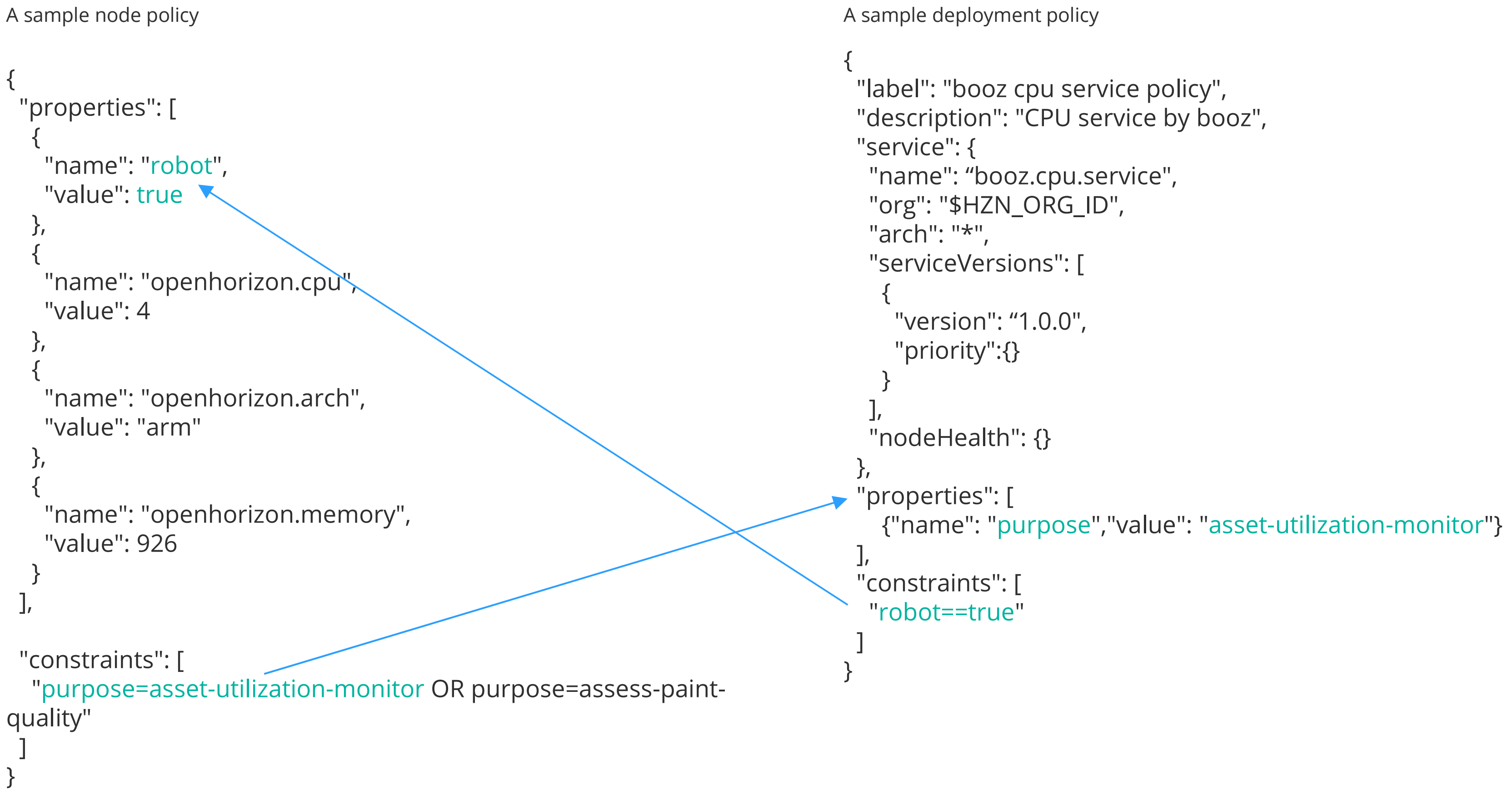
Model admin: CLI

IEAM MMS (CSS)

Model

Model Policy

Policy compatibility example - bidirectional



A sample node policy

```
{
  "properties": [
    {
      "name": "robot",
      "value": true
    },
    {
      "name": "openhorizon.cpu",
      "value": 4
    },
    {
      "name": "openhorizon.arch",
      "value": "arm"
    },
    {
      "name": "openhorizon.memory",
      "value": 926
    }
  ],

  "constraints": [
    "purpose=asset-utilization-monitor OR purpose=assess-paint-quality"
  ]
}
```

A sample deployment policy

```
{
  "label": "booz cpu service policy",
  "description": "CPU service by booz",
  "service": {
    "name": “booz.cpu.service",
    "org": "$HZN_ORG_ID",
    "arch": "*",
    "serviceVersions": [
      {
        "version": “1.0.0",
        "priority":{}
      }
    ],
    "nodeHealth": {}
  },
  "properties": [
      {"name": "purpose","value": "asset-utilization-monitor"}
  ],
  "constraints": [
    "robot==true"
  ]
}
```

Deployment Checker – Verify policy compatibility

- Suppose you have a node policy in a file that you want to apply to a set of devices when you register them. You also have a deployment/business policy that is already in the exchange. You want to use that deployment policy to deploy a service to those nodes. The question; is the node policy compatible with the deployment policy? Or stated another way, will IEAM deploy the service to these nodes or not?

```
# hzn deploycheck policy --node-pol node.policy.json -b booz.top-service.policy
{
  "compatible": false,
  "reason": {
    "mycluster/booz.top-service_1.0.1_amd64": "Policy Incompatible: Compatibility Error: Node properties do not satisfy constraint requirements. The required properties (robot==true, openhorizon.allowPrivileged==true) AND service-tree-test=true were not found in the available properties robot=true, model=100, single-service-test=true, service-tree-test=false"
  }
}
```

Next Meeting

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Next Meeting

- Monday Sept 7 is a US Holiday, Labor Day.
- Next Meeting: Monday, Sept 21 @ 8:30am PT/11:30am ET

Thank You

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