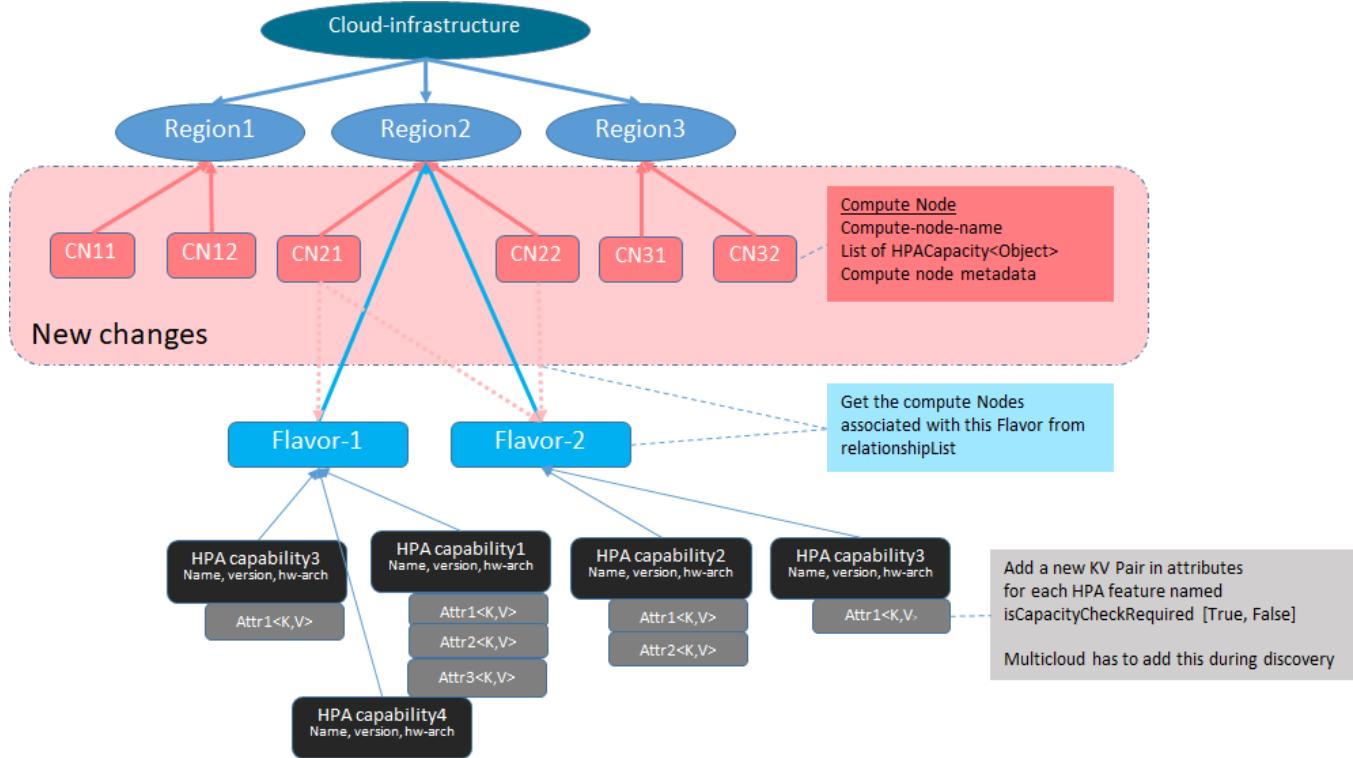


HPA - Telemetry OOF and A&AI

A&AI Schema



ComputeNode, HPACapacity schema

Compute Node

- Compute-node-name
- List of HPACapacity<Object>
- Metadata (optional for now)

HPACapacity

- HPACapacityAttributes<K,V>

Key is composed using attributes required for capacity check. This is generated during HPA discovery in Multicloud and will be used to match the capacity check. The service which ingests the telemetry data will use same key composition.

Value is JSON string

{

Total Capacity : Float

Free Capacity :Float

Unit: Unit in which the capacity is represented.

Health – {enum: “GOOD”, “BAD”}

}

Note: Availability is calculated with reference to a Threshold. For eg: if the resource availability is greater than 50% then return true for capacity check.

Example

Compute Node

- “compute-node-name” : “node-01”

HPACapacityKey	HPACapacityValue
Pcie+pciedeviceid+pcievendorid	{"total": "64", "free": "32", "health": "GOOD"}
BasicCapability+vCPU	{"total": "64", "free": "32", "health": "GOOD"}
BasicCapability+Memory	{"total": "1024", "free": "512", "unit": "GB", "health": "GOOD"}

Modified AAI Schema

```
<java-type name="ComputeNodes">
    <xml-properties>
        <xml-property name="description" value="List of ComputeNodes in a CloudRegion"/>
    </xml-properties>
    <xml-root-element name="compute-nodes" />
    <java-attributes>
        <xml-element container-type="java.util.ArrayList" java-attribute="computeNode" name="compute-node" type="inventory.aai.onap.org.v14.ComputeNode"/>
    </java-attributes>
</java-type>
```

```

<java-type name="ComputeNode">
    <xml-root-element name="compute-node" />
    <java-attributes>
        <xml-element java-attribute="nodeName" name="node-name" required="true" type="java.lang.String" xml-key="true">
            <xml-properties>
                <xml-property name="description" value="UUID to uniquely identify a HPA capability"/>
            </xml-properties>
        </xml-element>
        <xml-element java-attribute="resourceVersion" name="resource-version" type="java.lang.String">
            <xml-properties>
                <xml-property name="description" value="Used for optimistic concurrency. Must be empty on create, valid on update and delete."/>
            </xml-properties>
        </xml-element>
        <xml-element java-attribute="relationshipList" name="relationship-list" type="inventory.aai.onap.org.v14.RelationshipList"/>
            <xml-element container-type="java.util.ArrayList" java-attribute="hpaCapacity" name="hpa-capacity" type="inventory.aai.onap.org.v14.HpaCapacity"/>
                </java-attributes>
                <xml-properties>
                    <xml-property name="description" value="Represents a Compute Node with HPA capacity information"/>
                    <xml-property name="indexedProps" value="node-name"/>
                    <xml-property name="dependentOn" value="cloud-region"/>
                    <xml-property name="container" value="compute-nodes"/>
                </xml-properties>
            </java-type>

            <java-type name="HpaCapacity">
                <xml-root-element name="hpa-capacity" />
                <java-attributes>
                    <xml-element java-attribute="hpaCapacityKey" name="hpa-capacity-key" required="true" type="java.lang.String" xml-key="true">
                        <xml-properties>
                            <xml-property name="description" value="Composite key formed with hpaFeature and append list of hpaFeatureAttributes needed for capacity check"/>
                        </xml-properties>
                    </xml-element>
                    <xml-element java-attribute="hpaCapacityValue" name="hpa-capacity-value" type="java.lang.String">
                        <xml-properties>
                            <xml-property name="description" value="JSON string specifying the capacity (total,free), unit and metadata of the specific HPA attribute"/>
                        </xml-properties>
                    </xml-element>
                    <xml-element java-attribute="resourceVersion" name="resource-version" type="java.lang.String">
                        <xml-properties>
                            <xml-property name="description" value="Used for optimistic concurrency. Must be empty on create, valid on update and delete."/>
                        </xml-properties>
                    </xml-element>
                    <xml-element java-attribute="relationshipList" name="relationship-list" type="inventory.aai.onap.org.v14.RelationshipList"/>
                </java-attributes>
                <xml-properties>
                    <xml-property name="description" value="HPA Capability Feature attributes"/>
                    <xml-property name="indexedProps" value="hpa-attribute-key"/>
                    <xml-property name="dependentOn" value="hpa-capability"/>
                </xml-properties>
            </java-type>

```

Edge Relations

```
{  
    "from": "compute-node",  
    "to": "cloud-region",  
    "label": "org.onap.relationships.inventory.BelongsTo",  
    "direction": "OUT",  
    "multiplicity": "MANY2ONE",  
    "contains-other-v": "${direction}",  
    "delete-other-v": "NONE",  
    "SVC-INFRA": "NONE",  
    "prevent-delete": "${direction}",  
    "default": "true",  
    "description": ""  
},  
{  
    "from": "compute-node",  
    "to": "flavor",  
    "label": "org.onap.relationships.inventory.AssociatedWith",  

```

Changes Required in OOF HPA constraint

Match Flavor Function (per vnfc)

For each flavor in cloud-region-flavor-list

 For each hpaCapability in HPACapabilities requirement

 Match hpaCapability in flavor

 If matching hpaCapability found,

 Check-Capacity(hpaCapacityKey, flavor, threshold).

Check-Capacity Function(input: hpaCapacityKey, flavor, threshold)

Get the compute Nodes associated with the input flavor.

```
getHPACapacityValue(hpaCapacityKey)  
if( (free/total) < threshold): //Not enough capacity  
    return False and add to discard set  
else:  
    return True and add to candidate list
```

getHPACapacityValue(hpaCapacityKey)

return from List of HPACapacity.get(hpaCapacityKey)

Maintain HPA JSON Metadata file in Multicloud and OOF (Most of it is static information)

```

"HPA_feature_qualifications" : {
    "HPA_features" [
        {
            "HPA feature name": <"HPA feature name AKA HPA capability Name">
            "HPA capacity matching attributes" [
                "<Attribute Name>"
            ]
        ],
        "HPA capacity check attribute": <"Attribute Name">
    ]
}

```

Example configuration file:

```

"HPA feature qualifications": {
    "HPA features": [
        {"PCIePassthrough", ["pciVendorid", "pciDeviceID"], "pciCount"},
        {"basicCapabilites", ["numVirtualCPU"], "numVirtualCPU"},
        {"basicCapabilities", ["virtualMemSize"], "virtualMemSize:"}
    ]
}

```

OOF - Generate the composite hpaCapacityKey

Examples of forming the composite key from the metadata file during capacity check.

HPAFeature	HPACapabilityAttribute	Composite hpaCapacityKey
basicCapabilities	numVirtualCpu	basicCapabilities_numVirtualCpu
basicCapabilities	virtualMemSize	basicCapabilities_virtualMemSize
pciePassthrough	pciVendorId	pciePassthrough_\${pciVendorId}_\${pciDeviceId}
	pciDeviceId	\${VAR} - replace with the hpa-capability-attribute-value
hugePages	memoryPageSize	hugePages_memoryPageSize_4KB hugePages_memoryPageSize_2MB hugePages_memoryPageSize_1GB