LF NETWORKING

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Simplified CNF Resource Model

CNF Orchestration Enhancemnets

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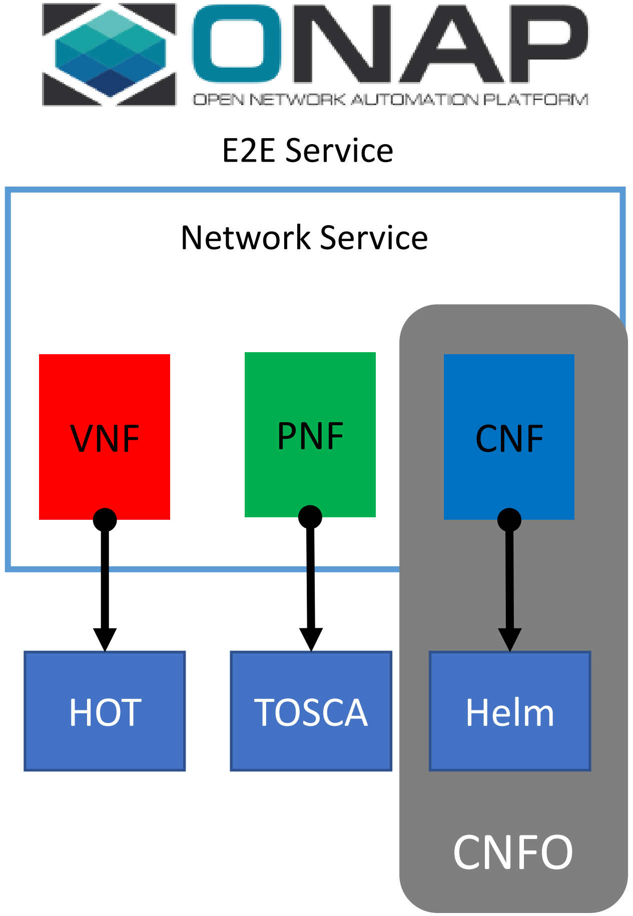
CNF Orchestration (1)



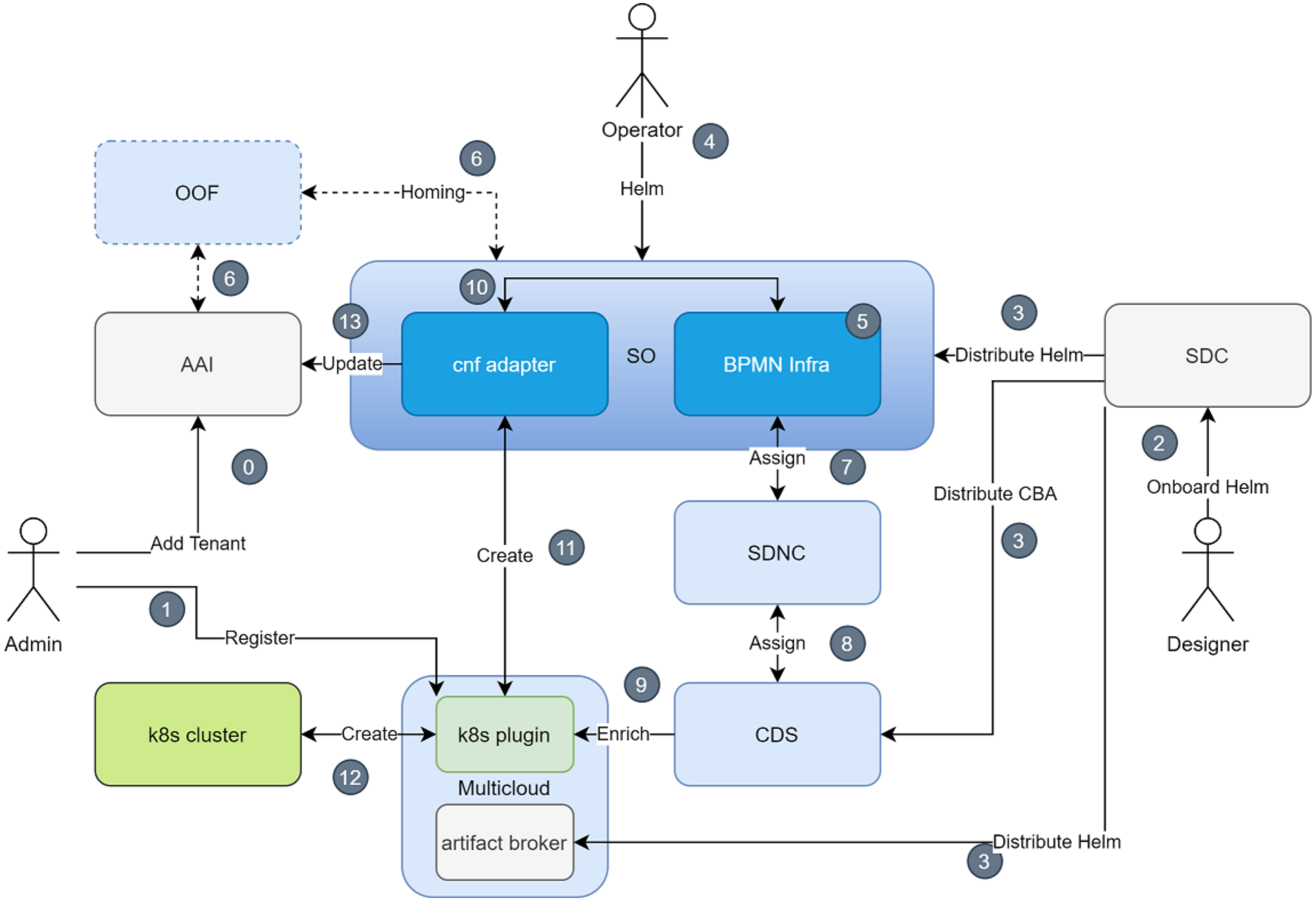
REQ-341 Guilin

REQ-458 Honolulu

REQ-627 Istanbul

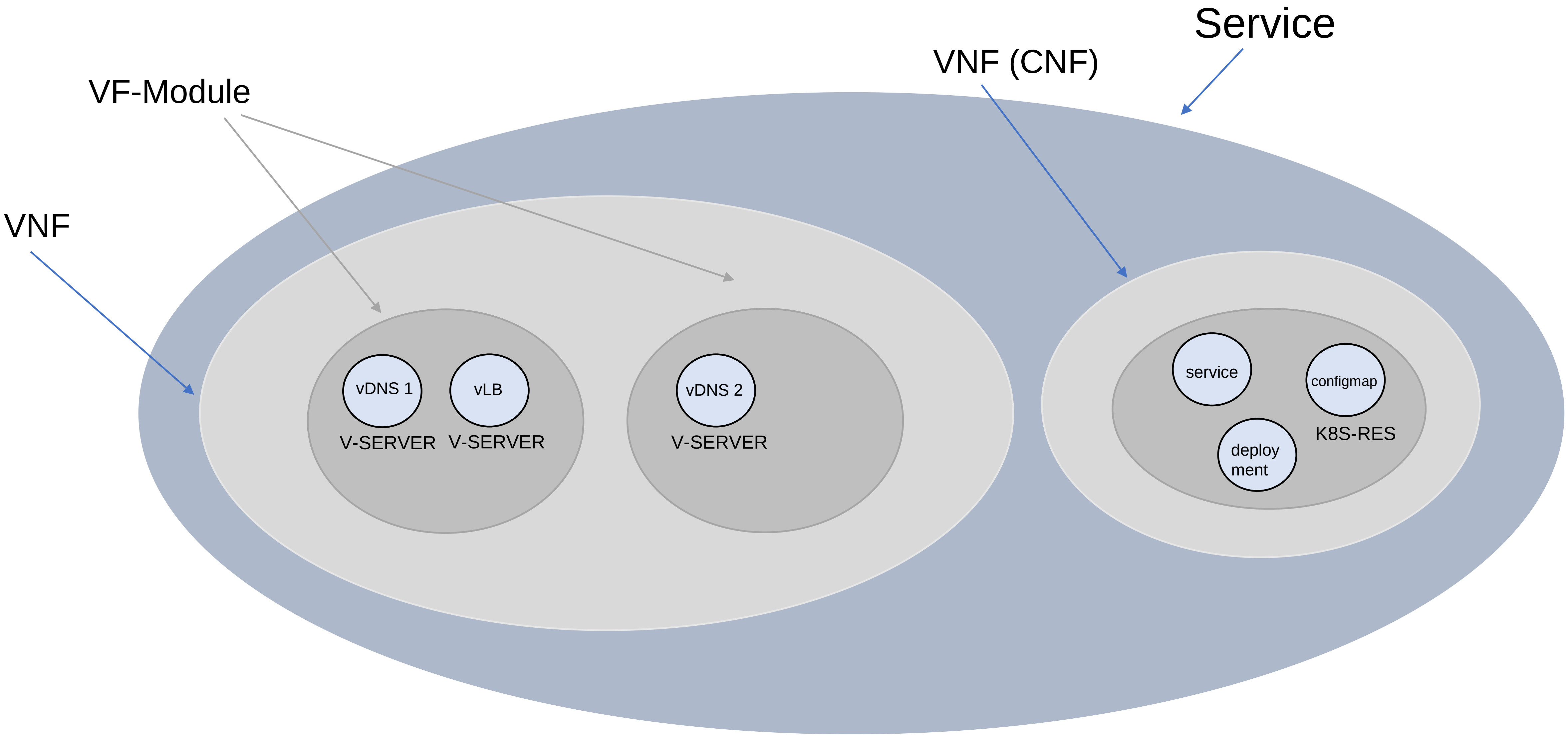
REQ-890 Jakarta

CNF Orchestration (2)



Helm Onboarding	**[SDC]**
Day 0/1 Customization	**[CDS/MC]**
Instantiation	**[SO/MC]**
Day 2 Configuration	**[CDS/MC]**
State Synchronization	**[SO/AAI/MC]**
Healthcheck	**[SO/CDS/MC]**
Multi-cluster deployment	**[SO/MC]**
VNF/PNF Integration	**[ALL]**
E2E Service Automation	**[SDK]**

ONAP modeling concept (AAI)



AAI model: k8s resource object

Attribute	Type	Mandatory
Id	UUID	Yes (PK)
Name	String	Yes
Group	String	Yes
Version	String	Yes
Kind	String	Yes
Labels	List of strings	Yes
Namespace	String	Yes
K8s-resource-selflink	URI	Yes

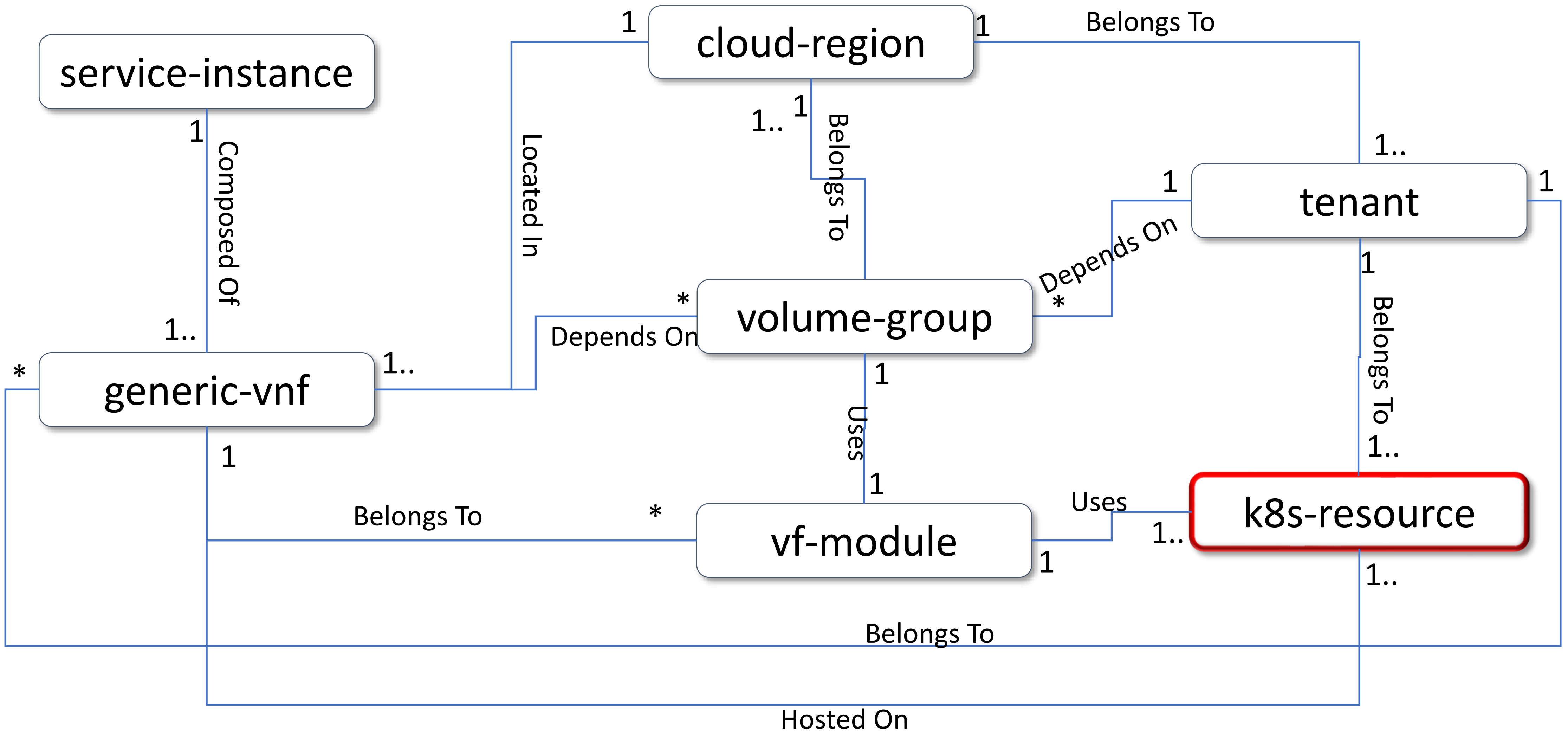
K8s resource is basic AAI entity to model resources created in K8s cluster.

It plays similar role as vserver resource for standard VNFs.

Relations

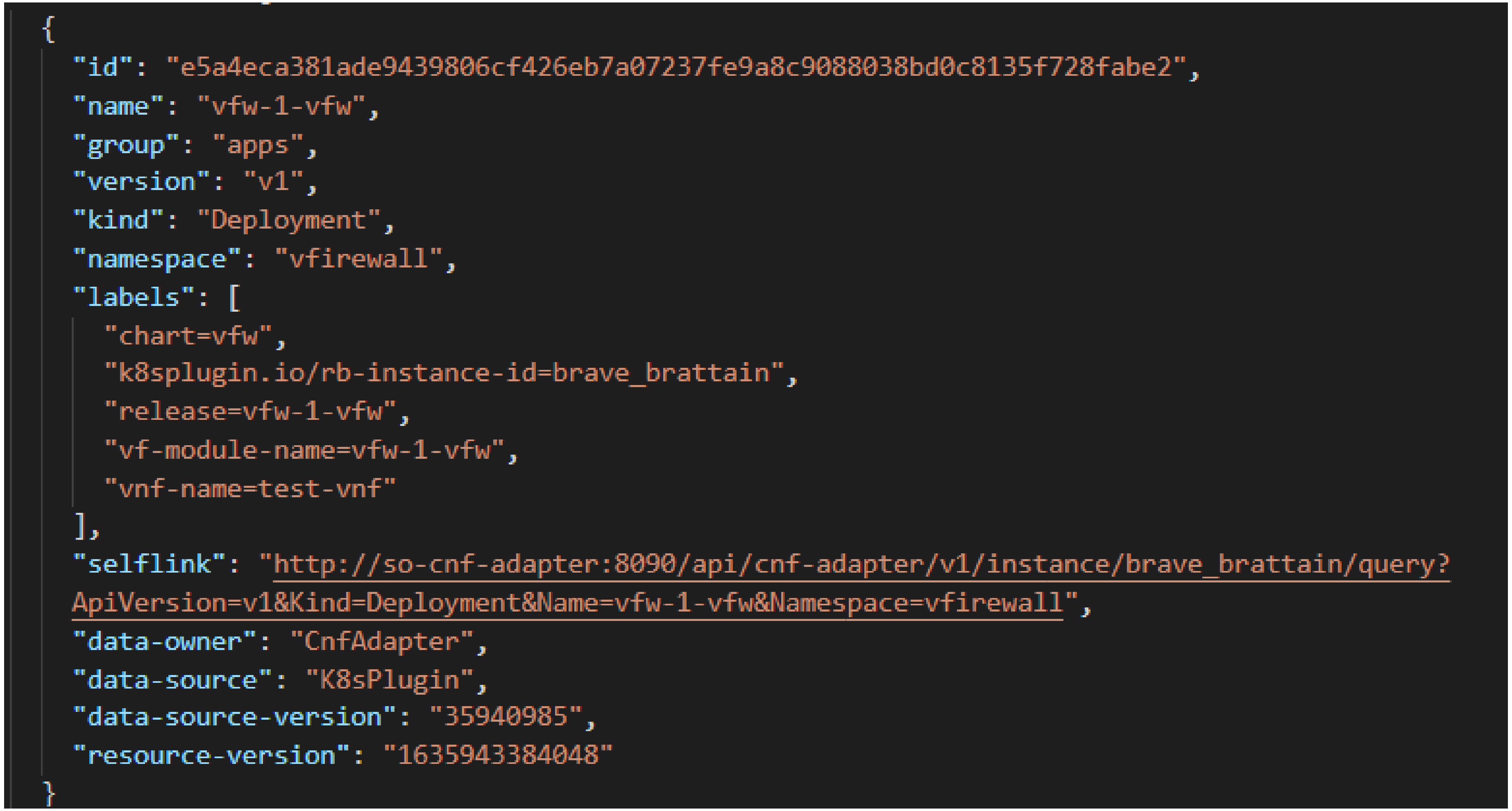
- Tenant
- Generic-Vnf
- Vf-Module

AAI model: relations



https://wiki.onap.org/display/DW/Simplified+K8S+Resource+Model+-+IM

K8s Resource Example (1)



```
{
  "id": "e5a4eca381ade9439806cf426eb7a07237fe9a8c9088038bd0c8135f728fabe2",
  "name": "vfw-1-vfw",
  "group": "apps",
  "version": "v1",
  "kind": "Deployment",
  "namespace": "vfirewall",
  "labels": [
    "chart=vfw",
    "k8splugin.io/rb-instance-id=brave_brattain",
    "release=vfw-1-vfw",
    "vf-module-name=vfw-1-vfw",
    "vnf-name=test-vnf"
  ],
  "selflink": "http://so-cnf-adapter:8090/api/cnf-adapter/v1/instance/brave_brattain/query?
  ApiVersion=v1&Kind=Deployment&Name=vfw-1-vfw&Namespace=vfirewall",
  "data-owner": "CnfAdapter",
  "data-source": "K8sPlugin",
  "data-source-version": "35940985",
  "resource-version": "1635943384048"
}
```

K8s Resource Example (2)

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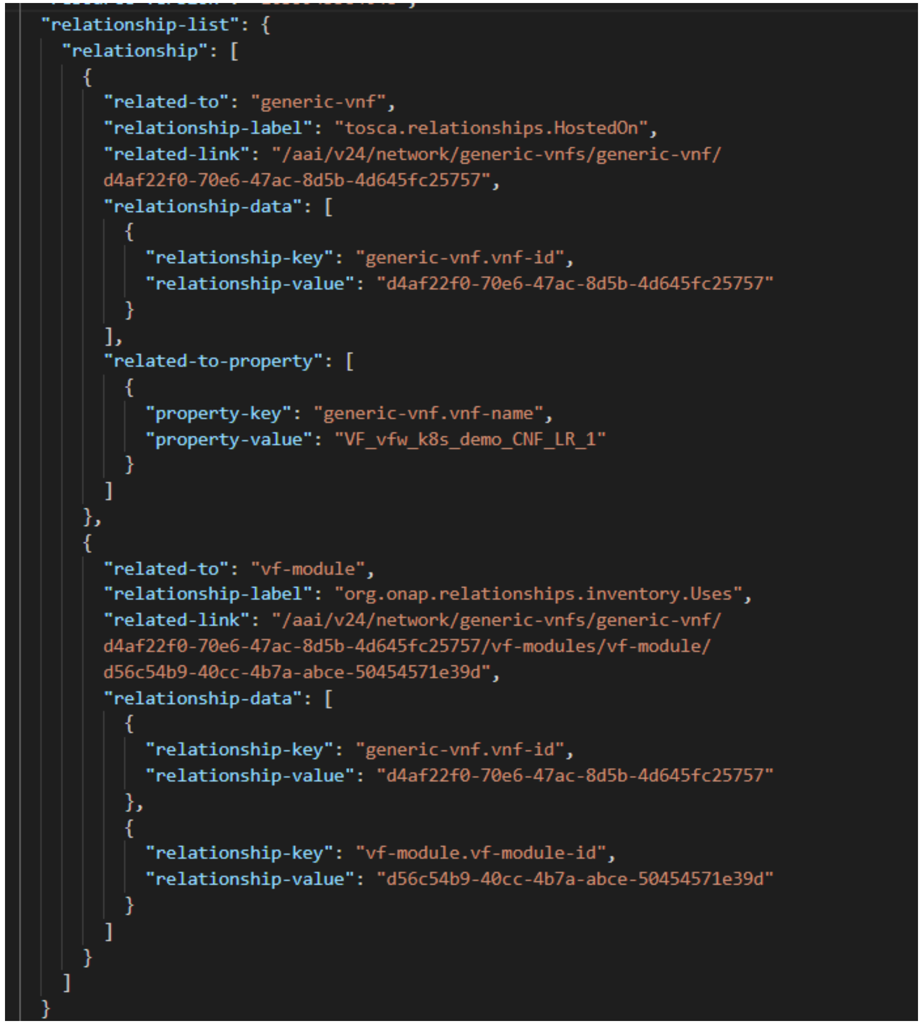
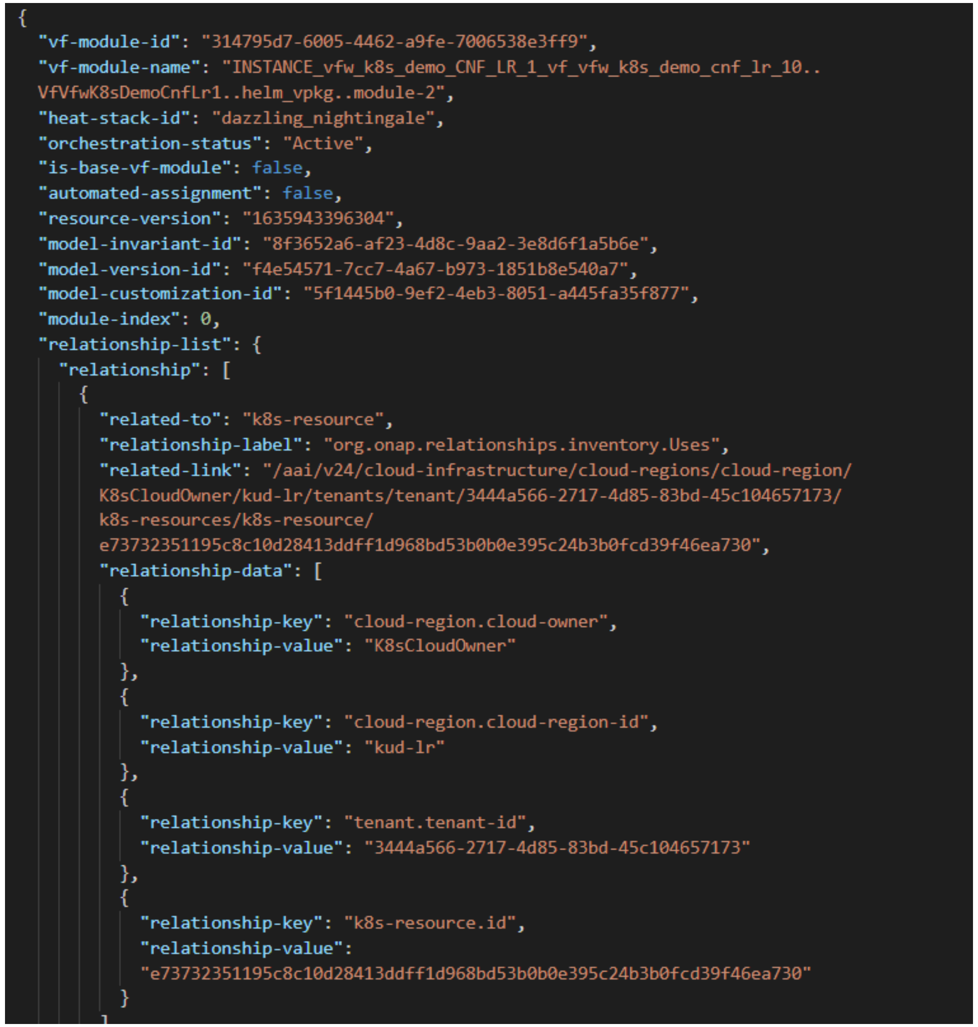


```
  "relationship-list": {
    "relationship": [
      {
        "related-to": "generic-vnf",
        "relationship-label": "tosca.relationships.HostedOn",
        "related-link": "/aai/v24/network/generic-vnfs/generic-vnf/
        d4af22f0-70e6-47ac-8d5b-4d645fc25757",
        "relationship-data": [
          {
            "relationship-key": "generic-vnf.vnf-id",
            "relationship-value": "d4af22f0-70e6-47ac-8d5b-4d645fc25757"
          }
        ],
        "related-to-property": [
          {
            "property-key": "generic-vnf.vnf-name",
            "property-value": "VF_vfw_k8s_demo_CNF_LR_1"
          }
        ]
      },
      {
        "related-to": "vf-module",
        "relationship-label": "org.onap.relationships.inventory.Uses",
        "related-link": "/aai/v24/network/generic-vnfs/generic-vnf/
        d4af22f0-70e6-47ac-8d5b-4d645fc25757/vf-modules/vf-module/
        d56c54b9-40cc-4b7a-abce-50454571e39d",
        "relationship-data": [
          {
            "relationship-key": "generic-vnf.vnf-id",
            "relationship-value": "d4af22f0-70e6-47ac-8d5b-4d645fc25757"
          },
          {
            "relationship-key": "vf-module.vf-module-id",
            "relationship-value": "d56c54b9-40cc-4b7a-abce-50454571e39d"
          }
        ]
      }
    ]
  }
```



```
{
  "vf-module-id": "314795d7-6005-4462-a9fe-7006538e3ff9",
  "vf-module-name": "INSTANCE_vfw_k8s_demo_CNF_LR_1_vf_vfw_k8s_demo_cnf_lr_10..
  VfVfwK8sDemoCnfLr1..helm_vpkg..module-2",
  "heat-stack-id": "dazzling_nightingale",
  "orchestration-status": "Active",
  "is-base-vf-module": false,
  "automated-assignment": false,
  "resource-version": "1635943396304",
  "model-invariant-id": "8f3652a6-af23-4d8c-9aa2-3e8d6f1a5b6e",
  "model-version-id": "f4e54571-7cc7-4a67-b973-1851b8e540a7",
  "model-customization-id": "5f1445b0-9ef2-4eb3-8051-a445fa35f877",
  "module-index": 0,
  "relationship-list": {
    "relationship": [
      {
        "related-to": "k8s-resource",
        "relationship-label": "org.onap.relationships.inventory.Uses",
        "related-link": "/aai/v24/cloud-infrastructure/cloud-regions/cloud-region/
        K8sCloudOwner/kud-lr/tenants/tenant/3444a566-2717-4d85-83bd-45c104657173/
        k8s-resources/k8s-resource/
        e73732351195c8c10d28413ddff1d968bd53b0b0e395c24b3b0fcd39f46ea730",
        "relationship-data": [
          {
            "relationship-key": "cloud-region.cloud-owner",
            "relationship-value": "K8sCloudOwner"
          },
          {
            "relationship-key": "cloud-region.cloud-region-id",
            "relationship-value": "kud-lr"
          },
          {
            "relationship-key": "tenant.tenant-id",
            "relationship-value": "3444a566-2717-4d85-83bd-45c104657173"
          },
          {
            "relationship-key": "k8s-resource.id",
            "relationship-value":
            "e73732351195c8c10d28413ddff1d968bd53b0b0e395c24b3b0fcd39f46ea730"
          }
        ]
```

K8s Resource ID Calculation

- K8s resource id is calculated from values available to client; it is SHA 256 of a concatenation of the following values:
  1. K8s RB Instance ID (Heat Stack ID param if AAI vf-module or label in resource in K8s)
  2. K8s resource name
  3. K8s namespace
  4. K8s resource kind
  5. K8s resource group
  6. K8s resource version
  7. CloudOwnerName (From AAI, for tenant in which CNF is deployed)
  8. CloudRegionName (From AAI, for tenant in which CNF is deployed)
  9. TenantId (From AAI, for tenant in which CNF is deployed)
- The above may be used to calculate K8s resource ID i.e. base on the data gathered from Prometheus to access AAI k8S Resource relationships (vnf-id, service-instance-id)

Integration with Prometheus

- Metrics gathered by Prometheus can be labeled with properties of k8s resources
  - Name
  - Kind
  - Labels
  - Namespace
- Prometheus is typically deployed on each k8s cluster separately
- In consequence we can combine particular Prometheus metric with concrete k8s-resource in AAI
- From k8s-resource we can find generic-vnf and its service
- It opens possibility to build closed-loop for CNFs in ONAP base on the monitoring information from Prometheus

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