

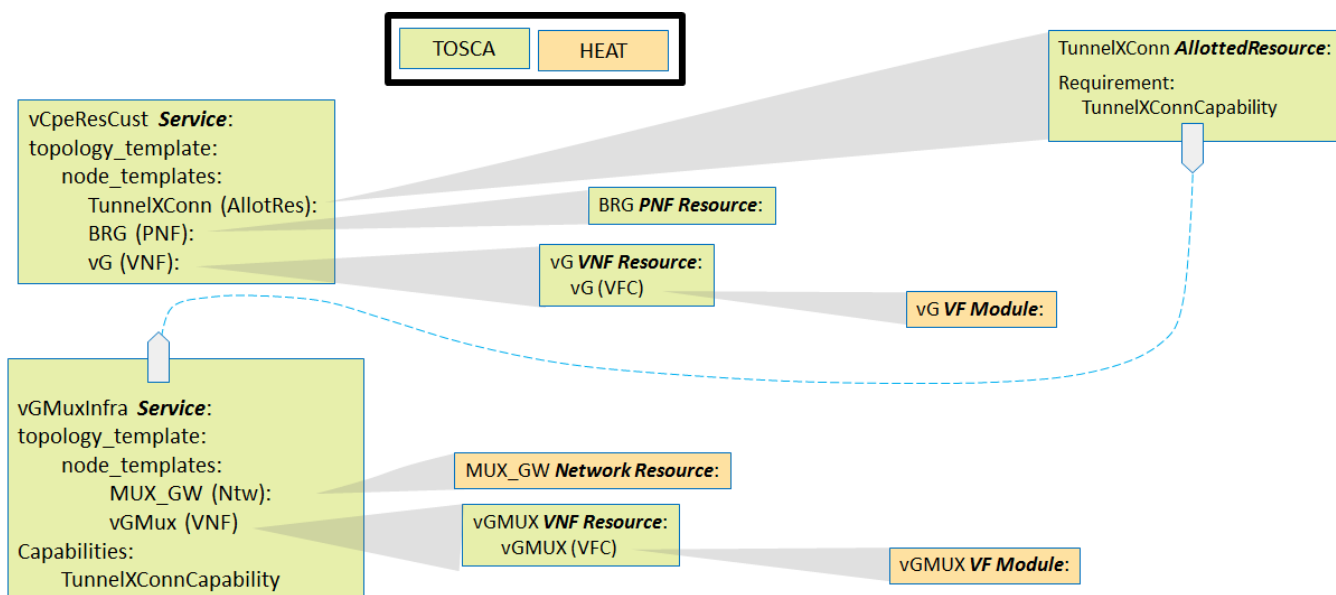
vCPE Homing Use Case

- vCPE Homing Use Case
 - vCPE Service Model
 - Homing Policies and information sources relevant to the policies
 - Homing Workflow
 - SO - HAS API (R) - before retrieving homing policies
 - HAS Homing Response
 - State - Done
 - State - Error
 - State - Template
 - State - Solving

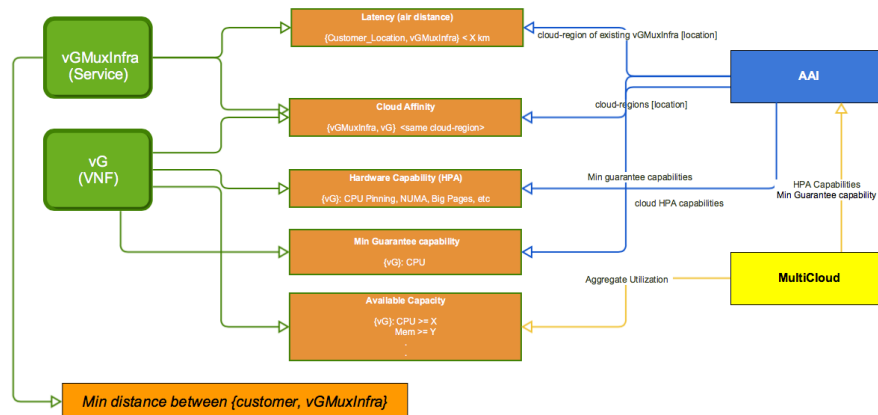
vCPE Homing Use Case

This document describes the Homing Template Specifications for residential vCPE. It is a work in progress and subject to frequent revision.

vCPE Service Model

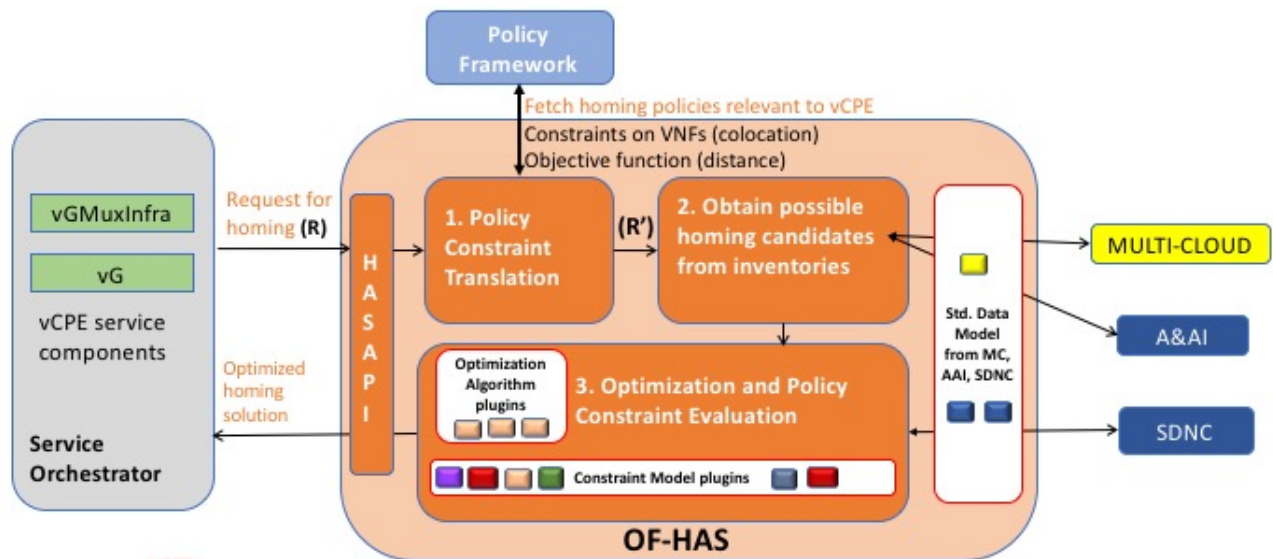


Homing Policies and information sources relevant to the policies



Homing Workflow

Homing workflow in residential vCPE use case



NOTE:

- HAS is service-agnostic by design.
- Service specific parameters/constraints are inputs/encoded in policy

SO - HAS API (R) - before retrieving homing policies

SO - HAS API (R)

```
requestInfo:
  callbackUrl: https://so:5000/callback
  numSolutions: 1
  optimizer:
    - placement
  requestId: yyy-yyy-yyyy
  sourceId: so
  timeout: 600
  transactionId: xxx-xxx-xxxx
  requestType: new
placementInfo:
  orderInfo:
    requestParameters:
      customerLatitude: 32.897480
      customerLongitude: -97.040443
      customerName: some_company
  demandInfo:
    placementDemands:
      - resourceName: vGMuxInfra
        resourceId: some_resource_id
        tenantId: some_tenant_id
        resourceModelInfo:
          modelId: vGMux_model_id
          modelName: ''
          modelType: allotted
          modelVersion: '2.0'
        existingPlacement:
          serviceInstanceId: 87257b49-9602-4ca1-9817-094e52bc873b
        excludedCandidates:
          - candidateType: service
            candidates:
              - serviceInstanceId: 1ac71fb8-ad43-4e16-9459-c3f372b8236d
        requiredCandidates:
          - candidateType: service
            candidates:
              - serviceInstanceId: 7e6c3e57-62cd-44f6-aa88-d0896998f7ec
      - resourceName: vG
        tenantId: some_tenant_id
        resourceId: 71d563e8-e714-4393-8f99-cc480144a05e
        resourceModelInfo:
          modelId: vG_model_id
          modelName: ''
          modelType: dedicated
          modelVersion: '2.0'
        existingPlacement:
          serviceInstanceId: 21d5f3e8-e714-4383-8f99-cc480144505a
        excludedCandidates:
          - candidateType: service
            candidates:
              - serviceInstanceId: 1ac71fb8-ad43-4e16-9459-c3f372b8236d
        requiredCandidates:
          - candidateType: cloud
            candidates:
              - cloud-region-id: TXAUS219

otherInfo:
  serviceInstanceId: d61b2543-5914-4b8f-8e81-81e38575b8ec
serviceModelInfo:
  serviceName: Residential vCPE
  service_id: vcpe_service_id
  serviceType: service
  serviceVersion: '1.0'
```

HAS Homing Specification (R') - after retrieving and translating homing policies

vCPE Homing Template (JSON)

```
{
  "homing_template_version": "2017-10-10",
  "parameters": {
    "service_name": "Residential vCPE",
    "service_id": "vcpe_service_id",
    "customer_lat": 32.89748,
    "customer_long": -97.040443,
    "REQUIRED_MEM": 4,
    "REQUIRED_DISK": 100
  },
  "locations": {
    "customer_loc": {
      "latitude": {
        "get_param": "customer_lat"
      },
      "longitude": {
        "get_param": "customer_long"
      }
    }
  },
  "demands": {
    "vGMuxInfra": [
      {
        "inventory_provider": "aai",
        "inventory_type": "service",
        "attributes": {
          "equipment_type": "vG_Mux",
          "customer_id": "some_company"
        }
      },
      {
        "excluded_candidates": [
          {
            "candidate_id": "1ac71fb8-ad43-4e16-9459-c3f372b8236d"
          }
        ],
        "existing_placement": [
          {
            "candidate_id": "21d5f3e8-e714-4383-8f99-cc480144505a"
          }
        ]
      }
    ],
    "vG": [
      {
        "inventory_provider": "aai",
        "inventory_type": "cloud"
      }
    ]
  },
  "constraints": {
    "constraint_vgmux_customer": {
      "type": "distance_to_location",
      "demands": [
        "vGMuxInfra"
      ],
      "properties": {
        "distance": "< 100 km",
        "location": "customer_loc"
      }
    }
  },
  "colocation": {
    "type": "zone",
    "demands": [
      "vGMuxInfra",

```

```

    "vG"
  ],
  "properties": {
    "qualifier": "same",
    "category": "region"
  }
},
"hpa_constraint": {
  "type": "hpa",
  "demands": [
    "vG"
  ],
  "properties": {
    "evaluate": [
      {
        "flavorLabel": "flavor_label_1",
        "flavorProperties": [
          {
            "hpa-feature": "basicCapabilities",
            "hpa-version": "v1",
            "architecture": "generic",
            "hpa-feature-attributes": [
              {
                "hpa-attribute-key": "numVirtualCpu",
                "hpa-attribute-value": "4",
                "operator": "="
              },
              {
                "hpa-attribute-key": "virtualMemSize",
                "hpa-attribute-value": "4",
                "operator": "=",
                "unit": "GB"
              }
            ]
          }
        ],
      },
      {
        "hpa-feature": "numa",
        "hpa-version": "v1",
        "architecture": "generic",
        "hpa-feature-attributes": [
          {
            "hpa-attribute-key": "numaNodes",
            "hpa-attribute-value": "2",
            "operator": "="
          },
          {
            "hpa-attribute-key": "numaCpu-0",
            "hpa-attribute-value": "2",
            "operator": "="
          },
          {
            "hpa-attribute-key": "numaCpu-1",
            "hpa-attribute-value": "4",
            "operator": "="
          },
          {
            "hpa-attribute-key": "numaMem-0",
            "hpa-attribute-value": "2",
            "operator": "=",
            "unit": "GB"
          },
          {
            "hpa-attribute-key": "numaMem-1",
            "hpa-attribute-value": "4",
            "operator": "=",
            "unit": "GB"
          }
        ]
      },
      {
        "hpa-feature": "cpuPinning",

```

```

    "hpa-version": "v1",
    "architecture": "generic",
    "hpa-feature-attributes": [
      {
        "hpa-attribute-key": "logicalCpuThreadPinningPolicy",
        "hpa-attribute-value": "prefer",
        "operator": "="
      },
      {
        "hpa-attribute-key": "logicalCpuPinningPolicy",
        "hpa-attribute-value": "dedicated",
        "operator": "="
      }
    ]
  }
},
{
  "flavorLabel": "flavor_label_2",
  "flavorProperties": [
    {
      "hpa-feature": "basicCapabilities",
      "hpa-version": "v1",
      "architecture": "generic",
      "hpa-feature-attributes": [
        {
          "hpa-attribute-key": "numVirtualCpu",
          "hpa-attribute-value": "8",
          "operator": "="
        },
        {
          "hpa-attribute-key": "virtualMemSize",
          "hpa-attribute-value": "16",
          "operator": "=",
          "unit": "GB"
        }
      ]
    },
    {
      "hpa-feature": "numa",
      "hpa-version": "v1",
      "architecture": "generic",
      "hpa-feature-attributes": [
        {
          "hpa-attribute-key": "numaNodes",
          "hpa-attribute-value": "2",
          "operator": "="
        },
        {
          "hpa-attribute-key": "numaCpu-0",
          "hpa-attribute-value": "2",
          "operator": "="
        },
        {
          "hpa-attribute-key": "numaCpu-1",
          "hpa-attribute-value": "4",
          "operator": "="
        },
        {
          "hpa-attribute-key": "numaMem-0",
          "hpa-attribute-value": "2",
          "operator": "=",
          "unit": "GB"
        },
        {
          "hpa-attribute-key": "numaMem-1",
          "hpa-attribute-value": "4",
          "operator": "=",
          "unit": "GB"
        }
      ]
    }
  ]
}

```

```

    },
    {
      "hpa-feature": "memoryPageSize",
      "hpa-version": "v1",
      "architecture": "generic",
      "hpa-feature-attributes": [
        {
          "hpa-attribute-key": "memoryPageSize",
          "hpa-attribute-value": "2",
          "operator": "=",
          "unit": "GB"
        }
      ]
    }
  ]
}
],
},
"check_cloud_capacity": {
  "type": "vim_fit",
  "demands": [
    "vG"
  ],
  "properties": {
    "controller": "multicloud",
    "request": {
      "vCPU": 10,
      "Memory": {
        "quantity": {
          "get_param": "REQUIRED_MEM"
        },
        "unit": "GB"
      },
      "Storage": {
        "quantity": {
          "get_param": "REQUIRED_DISK"
        },
        "unit": "GB"
      }
    }
  }
},
},
"optimization": {
  "minimize": {
    "sum": [
      {
        "distance_between": [
          "customer_loc",
          "vGMuxInfra"
        ]
      },
      {
        "distance_between": [
          "customer_loc",
          "vG"
        ]
      }
    ]
  }
}
}
}

```

```
---
homing_template_version: '2017-10-10'
parameters:
  service_name: Residential vCPE
  service_id: vcpe_service_id
  customer_lat: 32.89748
  customer_long: -97.040443
  REQUIRED_MEM: 4
  REQUIRED_DISK: 100
locations:
  customer_loc:
    latitude:
      get_param: customer_lat
    longitude:
      get_param: customer_long
demands:
  vGMuxInfra:
    - inventory_provider: aai
      inventory_type: service
      attributes:
        equipment_type: vG_Mux
        customer_id: some_company
      excluded_candidates:
        - candidate_id: 1ac71fb8-ad43-4e16-9459-c3f372b8236d
      existing_placement:
        - candidate_id: 21d5f3e8-e714-4383-8f99-cc480144505a
  vG:
    - inventory_provider: aai
      inventory_type: cloud
constraints:
  constraint_vgmux_customer:
    type: distance_to_location
    demands:
      - vGMuxInfra
    properties:
      distance: "< 100 km"
      location: customer_loc
colocation:
  type: zone
  demands:
    - vGMuxInfra
    - vG
  properties:
    qualifier: same
    category: region
hpa_constraint:
  type: hpa
  demands:
    - vG
  properties:
    evaluate:
      - flavorLabel: flavor_label_1
        flavorProperties:
          - hpa-feature: basicCapabilities
            hpa-version: v1
            architecture: generic
            hpa-feature-attributes:
              - hpa-attribute-key: numVirtualCpu
                hpa-attribute-value: '4'
                operator: "="
              - hpa-attribute-key: virtualMemSize
                hpa-attribute-value: '4'
                operator: "="
                unit: GB
          - hpa-feature: numa
            hpa-version: v1
            architecture: generic
            hpa-feature-attributes:
              - hpa-attribute-key: numaNodes
                hpa-attribute-value: '2'
                operator: "="
```


- hpa-attribute-key: numaCpu-0
hpa-attribute-value: '2'
operator: "="
- hpa-attribute-key: numaCpu-1
hpa-attribute-value: '4'
operator: "="
- hpa-attribute-key: numaMem-0
hpa-attribute-value: '2'
operator: "="
unit: GB
- hpa-attribute-key: numaMem-1
hpa-attribute-value: '4'
operator: "="
unit: GB
- hpa-feature: cpuPinning
hpa-version: v1
architecture: generic
hpa-feature-attributes:
 - hpa-attribute-key: logicalCpuThreadPinningPolicy
hpa-attribute-value: prefer
operator: "="
 - hpa-attribute-key: logicalCpuPinningPolicy
hpa-attribute-value: dedicated
operator: "="
- flavorLabel: flavor_label_2
flavorProperties:
 - hpa-feature: basicCapabilities
hpa-version: v1
architecture: generic
hpa-feature-attributes:
 - hpa-attribute-key: numVirtualCpu
hpa-attribute-value: '8'
operator: "="
 - hpa-attribute-key: virtualMemSize
hpa-attribute-value: '16'
operator: "="
unit: GB
 - hpa-feature: numa
hpa-version: v1
architecture: generic
hpa-feature-attributes:
 - hpa-attribute-key: numaNodes
hpa-attribute-value: '2'
operator: "="
 - hpa-attribute-key: numaCpu-0
hpa-attribute-value: '2'
operator: "="
 - hpa-attribute-key: numaCpu-1
hpa-attribute-value: '4'
operator: "="
 - hpa-attribute-key: numaMem-0
hpa-attribute-value: '2'
operator: "="
unit: GB
 - hpa-attribute-key: numaMem-1
hpa-attribute-value: '4'
operator: "="
unit: GB
 - hpa-feature: memoryPageSize
hpa-version: v1
architecture: generic
hpa-feature-attributes:
 - hpa-attribute-key: memoryPageSize
hpa-attribute-value: '2'
operator: "="
unit: GB

check_cloud_capacity:

type: vim_fit

demands:

- vG

properties:

```
controller: multicloud
request:
  vCPU: 10
  Memory:
    quantity:
      get_param: REQUIRED_MEM
    unit: GB
  Storage:
    quantity:
      get_param: REQUIRED_DISK
    unit: GB
optimization:
  minimize:
    sum:
      - distance_between:
          - customer_loc
          - vGMuxInfra
      - distance_between:
          - customer_loc
          - vG
```

HAS Homing Response

State - Done

vCPE homing response (JSON)

```
{
  "plans": [
    {
      "status": "done",
      "id": "plan_id",
      "name": "Plan Name 1",
      "links": [
        [
          {
            "href": "http://conductor:8091/v1/plans/plan_id",
            "rel": "self"
          }
        ]
      ],
      "recommendations": [
        {
          "vG": {
            "inventory_provider": "aai",
            "candidate": {
              "candidate_id": "DLLSTX1A",
              "cloud_owner": "CloudOwner1",
              "inventory_type": "cloud",
              "location_id": "DLLSTX1A",
              "location_type": "openstack-cloud"
            },
            "attributes": {
              "flavors": {
                "flavor_label_1": "vim_flavor_X",
                "flavor_label_2": "vim_flavor_Y"
              },
              "cloud_owner": "CloudOwner1",
              "physical-location-id": "DLLSTX1A",
              "cloud_version": "3.0",
              "vim-id": "CloudOwner1_DLLSTX1A"
            }
          },
          {
            "vGMuxInfra": {
              "attributes": {
                "host_id": "vgmux_host_name",
                "cloud_owner": "CloudOwner1",
                "physical-location-id": "DLLSTX1A",
                "service_instance_id": "21d5f3e8-e714-4383-8f99-cc480144505a",
                "cloud_version": "3.0",
                "vim-id": "CloudOwner1_DLLSTX1A"
              },
              "inventory_provider": "aai",
              "service_resource_id": "12345",
              "candidate": {
                "is_rehome": "false",
                "location_id": "DLLSTX1A",
                "inventory_type": "service",
                "candidate_id": "21d5f3e8-e714-4383-8f99-cc480144505a",
                "host_id": "vgmux_host_name",
                "cloud_owner": "CloudOwner1",
                "location_type": "openstack-cloud"
              }
            }
          }
        ]
      ]
    }
  ]
}
```

State - Error

HAS Error Response

```
{
  "plans": [
    {
      "status": "error",
      "message": "Some error message",
      "name": "Plan Name 1",
      "links": [
        [
          {
            "href": "http://conductor:8091/v1/plans/plan_id",
            "rel": "self"
          }
        ]
      ],
      "id": "plan_id"
    }
  ]
}
```

State - Template

HAS Plan in Template State

```
{
  "status": "template",
  "name": "Plan Name 1",
  "links": [
    [
      {
        "href": "http://conductor:8091/v1/plans/plan_id",
        "rel": "self"
      }
    ]
  ],
  "id": "plan_id"
}
```

State - Solving

HAS Plan in Solving state

```
{
  "plans": [
    {
      "status": "solving",
      "name": "Plan Name 1",
      "links": [
        [
          {
            "href": "http://conductor:8091/v1/plans/plan_id",
            "rel": "self"
          }
        ]
      ],
      "id": "plan_id"
    }
  ]
}
```