### I. Mô tả usecase:

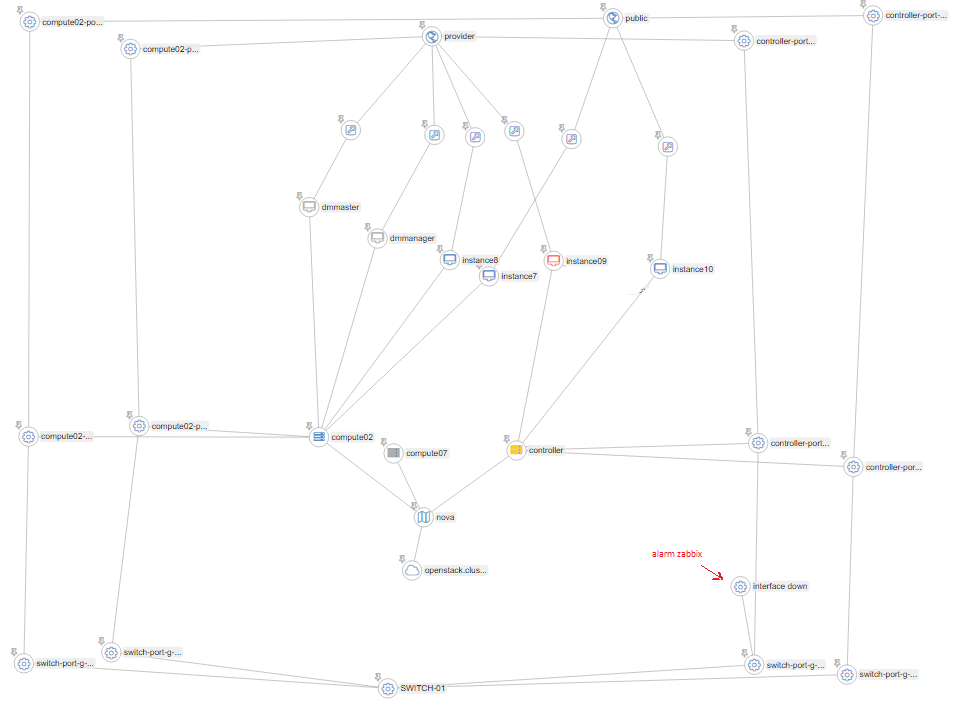
**Use case 2:**

- Deduce-alarm : nếu có alarm trên port switch nối với host bị DOWN => có alarm mất kết nối trên instrance ảnh hưởng => chuyển state của host và instance về WARNING, ERROR

- RCA: thêm mối quan hệ: alarm của port switch => alarm mất kết nối của instance

### II. Mô hình thử nghiệm:

Use case thử nghiệm trên cluster openstack, mô hình như sau:



* Cluster có 2 host , tên “controller” và “compute02” đều cài nova-compute
* Cluster có 2 provider network: “provider” và “public”, mỗi network nối với một port ovs, port ovs nối với 1 port vật lý trên host. Port vật lý này nối vào 1 port của switch vật lý
* Alarm xuất hiện trên port của switch nối với host “controller”, port này cung cấp đường ra ngoài cho mạng “provider”
* Kết quả cần có:
  + Raise alarm , set-state trên instance ảnh hưởng, ở đây là instance09
  + Root cause các alarm được raise ở trên, cùng với alarm trên instance nếu có

### III. Cấu hình chuẩn bị:

#### 1. Cấu hình graph

*mục đích bước này là để tạo ra được graph thể hiện được yêu cầu của use case*

Mô hình liên quan tới một số thành phần vật lý : port host, port switch, switch.

Cần add static datasource như sau:

* Thêm file /etc/vitrage/static\_datasources/port\_host-controller.yaml mô tả port vật lý, port ovs của host controller:

|  |
| --- |
| metadata:  name: port of controller  description: network of controller host  definitions:  entities:  - static\_id: br-provider  type: port\_ovs  id: controller-port-br-provider  name: controller-port-br-provider  state: available  - static\_id: br-public  type: port\_ovs  id: controller-port-br-public  name: controller-port-br-public  state: available  - static\_id: enp4s0f0  type: port\_host  id: controller-port-enp4s0f0  name: controller-port-enp4s0f0  state: available  - static\_id: enp130s0f1  type: port\_host  id: controller-port-enp130s0f1  name: controller-port-enp130s0f1  state: available  - static\_id: h1  type: nova.host  id: controller  # state: available  - static\_id: provider-network  type: neutron.network  id: 2b0756c1-b74a-4d1f-835c-cc2f66a0bdd3  # state: active  - static\_id: public-network  type: neutron.network  id: 14435664-baec-43ec-93e8-ac30ab916ee7  relationships:  - source: enp4s0f0  target: h1  relationship\_type: attached  - source: enp130s0f1  target: h1  relationship\_type: attached  - source: enp4s0f0  target: br-provider  relationship\_type: connect  - source: enp130s0f1  target: br-public  relationship\_type: connect  - source: br-provider  target: provider-network  relationship\_type: attached  - source: br-public  target: public-network  relationship\_type: attached |

* Thêm file /etc/vitrage/static\_datasources/port\_host-compute02.yamlmô tả port vật lý, port ovs của host compute02:

|  |
| --- |
| metadata:  name: port of compute02  description: port of compute02  definitions:  entities:  - static\_id: br-provider  type: port\_ovs  id: compute02-port-br-provider  name: compute02-port-br-provider  state: available  - static\_id: br-public  type: port\_ovs  id: compute02-port-br-public  name: compute02-port-br-public  state: available  - static\_id: enp4s0f0  type: port\_host  id: compute02-port-enp4s0f0  name: compute02-port-enp4s0f0  state: available  - static\_id: enp130s0f1  type: port\_host  id: compute02-port-enp130s0f1  name: compute02-port-enp130s0f1  state: available  - static\_id: h1  type: nova.host  id: compute02  # state: AVAILABLE  - static\_id: provider-network  type: neutron.network  id: 2b0756c1-b74a-4d1f-835c-cc2f66a0bdd3  state: active  - static\_id: public-network  type: neutron.network  id: 14435664-baec-43ec-93e8-ac30ab916ee7  state: active  relationships:  - source: enp4s0f0  target: h1  relationship\_type: attached  - source: enp130s0f1  target: h1  relationship\_type: attached  - source: enp4s0f0  target: br-provider  relationship\_type: connect  - source: enp130s0f1  target: br-public  relationship\_type: connect  - source: br-public  target: public-network  relationship\_type: attached  - source: br-provider  target: provider-network  relationship\_type: attached |

* Thêm file /etc/vitrage/static\_datasources/port\_switch-01.yaml mô tả các port của switch

|  |
| --- |
| metadata:  name: port of switch  description: list port of switch  definitions:  entities:  - static\_id: switch  type: switch  id: SWITCH-01  name: SWITCH-01  state: available  - static\_id: g-1-0-22  type: port\_switch  id: switch-port-g-1-0-22  name: switch-port-g-1-0-22  state: available  - static\_id: g-1-0-20  type: port\_switch  id: switch-port-g-1-0-20  name: switch-port-g-1-0-20  state: available  - static\_id: g-1-0-21  type: port\_switch  id: switch-port-g-1-0-21  name: switch-port-g-1-0-21  state: available  - static\_id: g-1-0-23  type: port\_switch  id: switch-port-g-1-0-23  name: switch-port-g-1-0-23  state: available  relationships:  - source: g-1-0-23  target: switch  relationship\_type: attached  - source: g-1-0-22  target: switch  relationship\_type: attached  - source: g-1-0-20  target: switch  relationship\_type: attached  - source: g-1-0-21  target: switch  relationship\_type: attached |

* Thêm file /etc/vitrage/static\_datasources/connect\_port.yaml mô tả kết nối port vật lý của host và switch:

|  |
| --- |
| metadata:  name: port of switch connect port of host  description: list port of switch  definitions:  entities:  - static\_id: g-1-0-22  type: port\_switch  id: switch-port-g-1-0-22  state: available  - static\_id: g-1-0-20  type: port\_switch  id: switch-port-g-1-0-20  state: available  - static\_id: g-1-0-21  type: port\_switch  id: switch-port-g-1-0-21  state: available  - static\_id: g-1-0-23  type: port\_switch  id: switch-port-g-1-0-23  state: available  - static\_id: compute02-port-enp4s0f0  type: port\_host  id: compute02-port-enp4s0f0  state: available  - static\_id: compute02-port-enp130s0f1  type: port\_host  id: compute02-port-enp130s0f1  state: available  - static\_id: controller-port-enp4s0f0  type: port\_host  id: controller-port-enp4s0f0  state: available  - static\_id: controller-port-enp130s0f1  type: port\_host  id: controller-port-enp130s0f1  state: available  relationships:  - source: g-1-0-22  target: compute02-port-enp4s0f0  relationship\_type: connect  - source: g-1-0-23  target: compute02-port-enp130s0f1  relationship\_type: connect  - source: g-1-0-20  target: controller-port-enp4s0f0  relationship\_type: connect  - source: g-1-0-21  target: controller-port-enp130s0f1  relationship\_type: connect |

#### 2. Cấu hình monitor

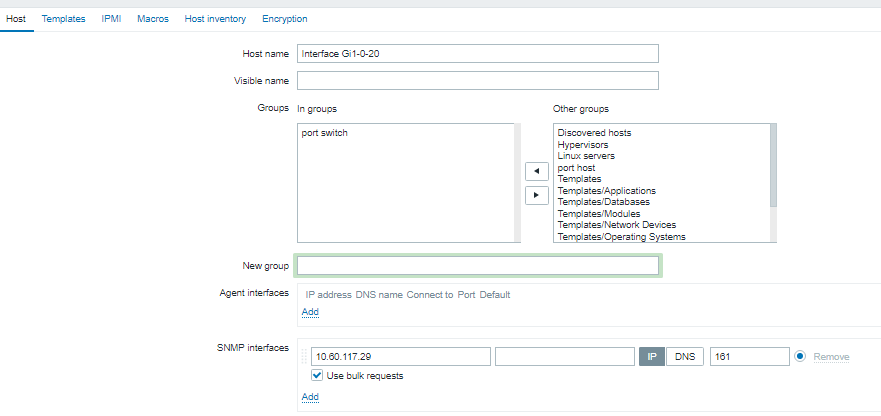
*mục đích bước này là lấy được alarm đầu vào cho vitarge*

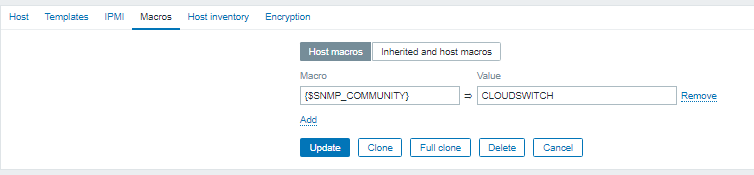
1. chuẩn bị zabbix monitor port\_switch:

* Cài đặt zabbix server trên host “controller”

<https://www.digitalocean.com/community/tutorials/how-to-install-and-configure-zabbix-to-securely-monitor-remote-servers-on-ubuntu-16-04>

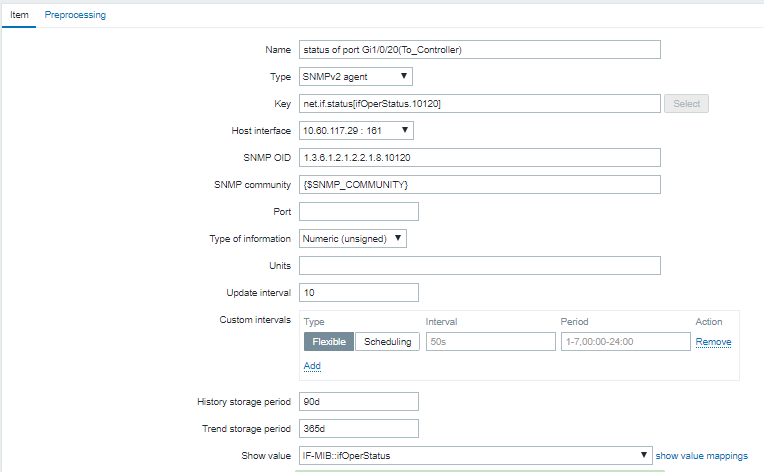
* Ứng với mỗi port của switch, thêm 1 zabbix-host: Configuration > host > create host:



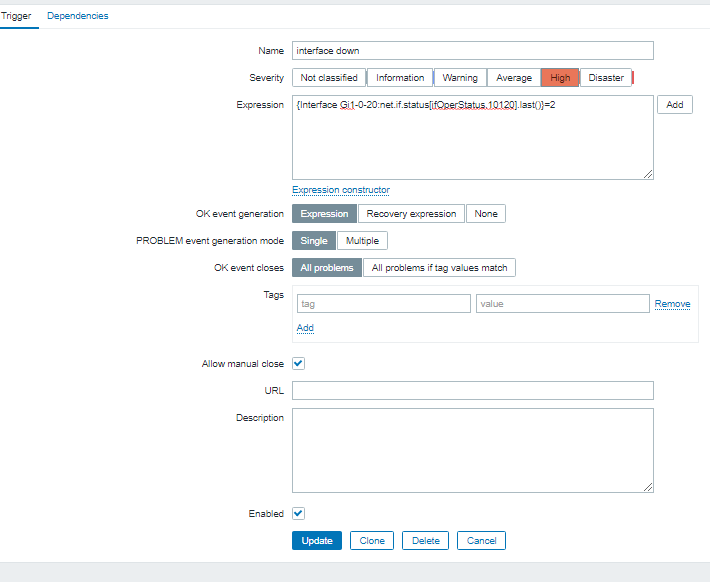


* Với mỗi host, tạo item và trigger để kiểm tra port switch có bị down:

tạo item: configuration > host > {tên zabbix-host} > item > create>item



tạo trigger alarm nếu port down:



* Mapping alarm của zabbix lấy về vào entity node của graph:

Trên controller host, thêm file cấu hình /etc/vitrage/zabbix\_conf.yaml nội dung:

|  |
| --- |
| zabbix:  - zabbix\_host: controller port enp4s0f0  type: port\_host  name: controller-port-enp4s0f0  - zabbix\_host: controller port enp130s0f1  type: port\_host  name: controller-port-enp130s0f1  - zabbix\_host: compute02 port enp4s0f0  type: port\_host  name: compute02-port-enp4s0f0  - zabbix\_host: compute02 port enp130s0f1  type: port\_host  name: compute02-port-enp130s0f1  - zabbix\_host: Interface Gi1-0-21  type: port\_switch  name: switch-port-g-1-0-21  - zabbix\_host: Interface Gi1-0-20  type: port\_switch  name: switch-port-g-1-0-20  - zabbix\_host: Interface Gi1-0-22  type: port\_switch  name: switch-port-g-1-0-22 |

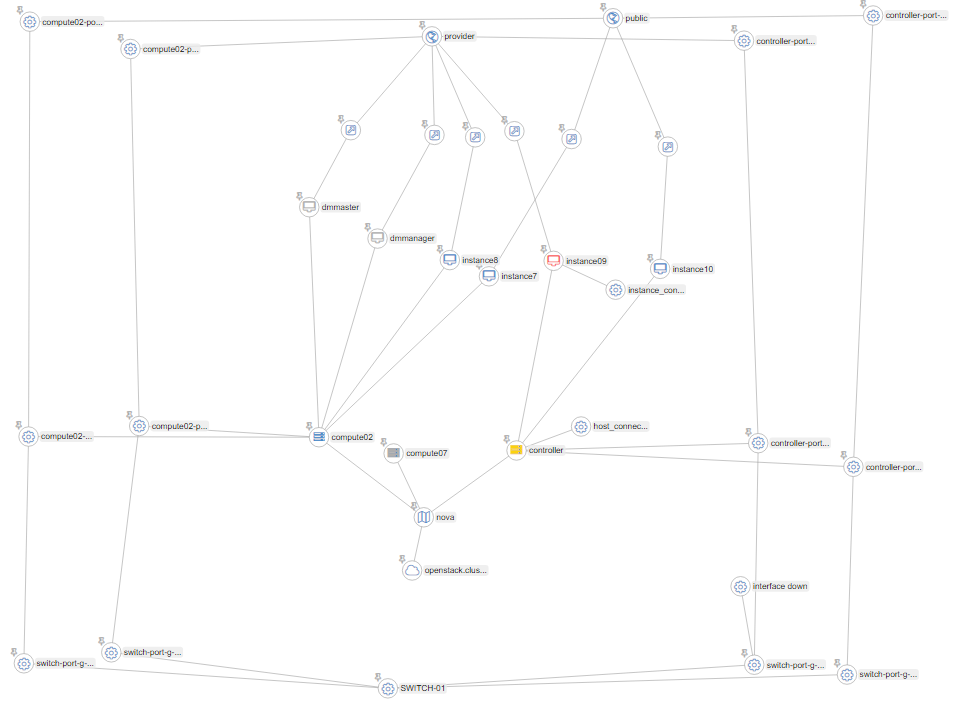
### IV. Thêm template cho use-case.

#### Template để cho deduce alarm+ set-state của use-case này:

|  |
| --- |
| metadata:  name: port switch down template  description: for port switch down set state of switch warning and raise alarm of host connect port and instance of that host  definitions:  entities:  - entity:  category: ALARM  type: zabbix  rawtext: interface down  template\_id: alarm  - entity:  category: RESOURCE  type: port\_switch  template\_id: port\_switch  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: port\_host  template\_id: port\_host  - entity:  category: RESOURCE  type: port\_ovs  template\_id: port\_ovs  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  - entity:  category: RESOURCE  type: neutron.network  template\_id: network  - entity:  category: RESOURCE  type: neutron.port  template\_id: port\_neutron  relationships:  - relationship:  source: alarm  target: port\_switch  relationship\_type: on  template\_id : alarm\_on\_port\_switch  - relationship:  source: port\_switch  target: port\_host  relationship\_type: connect  template\_id : port\_switch\_connect\_port\_host  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_host\_attached\_host  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  - relationship:  source: port\_host  target: port\_ovs  relationship\_type: connect  template\_id : port\_host\_connect\_port\_ovs  - relationship:  source: port\_ovs  target: network  relationship\_type: attached  template\_id : port\_ovs\_attached\_network  - relationship:  source: network  target: port\_neutron  relationship\_type: contains  template\_id : network\_contains\_port\_neutron  - relationship:  source: port\_neutron  target: instance  relationship\_type: attached  template\_id : port\_neutron\_attached\_instance  scenarios:  - scenario:  condition: alarm\_on\_port\_switch and port\_switch\_connect\_port\_host and port\_host\_attached\_host  actions:  - action:  action\_type: raise\_alarm  properties:  alarm\_name: host\_connect\_problem  severity: WARNING  action\_target:  target: host  - action:  action\_type: set\_state  properties:  state: SUBOPTIMAL  action\_target:  target: host  - scenario:  condition: alarm\_on\_port\_switch and port\_switch\_connect\_port\_host and port\_host\_connect\_port\_ovs and port\_ovs\_attached\_network and network\_contains\_port\_neutron and port\_neutron\_attached\_instance and port\_host\_attached\_host and host\_contains\_instance  actions:  - action:  action\_type: raise\_alarm  properties:  alarm\_name: instance\_connect\_problem  severity: CRITICAL  action\_target:  target: instance  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: instance |

**Kết quả**

sau khi thêm deduce template:



**Phân tích:**

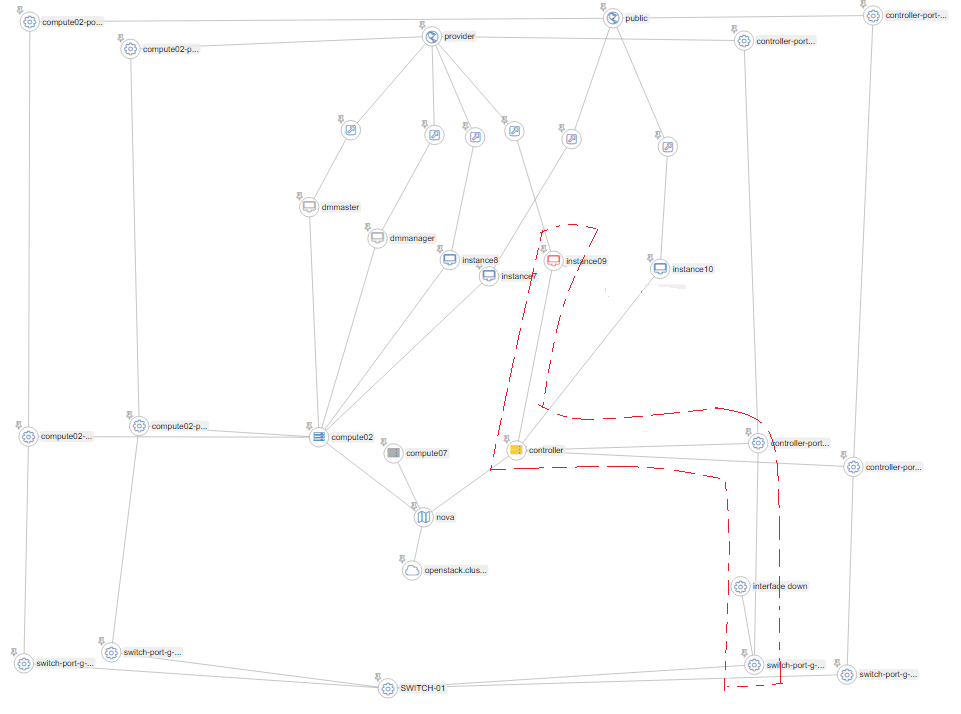
Ta có instance bị ảnh hưởng bởi một port switch down với 2 điều kiện:

* (1) instance thuộc vào host có port bị ảnh hưởng bởi port switch down
* (2) instance nối với neutron network bị ảnh hưởng bởi port switch down.

( port switch down => port host ens4s0p0 disconnect => port ovs br-provider disconnect => network provider error)

Vậy có instance trên đồ thị sẽ là node giao của 2 subgraph như sau:

* điều kiện (1):



Trong template, condition để mô tả subgraph này:

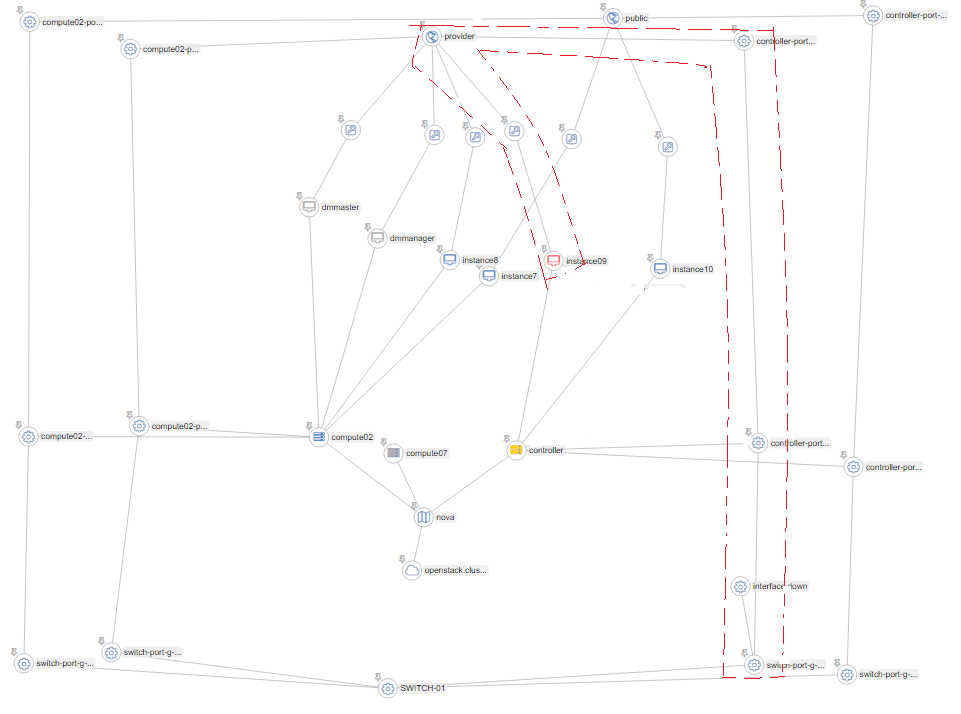
alarm\_on\_port\_switch **and**

port\_switch\_connect\_port\_host **and**

port\_host\_attached\_host **and**

host\_contains\_instance

* điều kiện 2:



Trong template, condition để mô tả subgraph này:

alarm\_on\_port\_switch **and**

port\_switch\_connect\_port\_host **and**

port\_host\_connect\_port\_ovs **and**

port\_ovs\_attached\_network **and**

network\_contains\_port\_neutron **and**

port\_neutron\_attached\_instance

Kết hợp and 2 condition mô tả 2 subgraph trên, ta mới có thể lấy được đúng instance bị ảnh hưởng.

#### Template cho thực hiện Root-cause:

Cần thêm vào 2 template:

rca1.yaml : thêm quan hệ caused với alarm trên instance và alarm trên host

|  |
| --- |
| metadata:  name: rca of connect\_problem on instance causeby connect\_problem on host  description: rca of connect\_problem  definitions:  entities:  - entity:  category: ALARM  name: host\_connect\_problem  template\_id: host\_alarm  - entity:  category: ALARM  name: instance\_connect\_problem  template\_id: instance\_alarm  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  relationships:  - relationship:  source: host\_alarm  target: host  relationship\_type: on  template\_id : alarm\_on\_host  - relationship:  source: instance\_alarm  target: instance  relationship\_type: on  template\_id : alarm\_on\_instance  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  scenarios:  - scenario:  condition: alarm\_on\_host and alarm\_on\_instance and host\_contains\_instance  actions:  - action:  action\_type: add\_causal\_relationship  action\_target:  source: host\_alarm  target: instance\_alarm |

rca2.yaml: thêm quan hệ caused với alarm trên host và alarm trên switch

|  |
| --- |
| metadata:  name: rca of connect\_problem on host  description: rca of connect\_problem on host  definitions:  entities:  - entity:  category: ALARM  name: host\_connect\_problem  template\_id: alarm\_host  - entity:  category: ALARM  type: zabbix  name: interface down  template\_id: alarm\_port\_switch  - entity:  category: RESOURCE  type: port\_switch  template\_id: port\_switch  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: port\_host  template\_id: port\_host  relationships:  - relationship:  source: alarm\_host  target: host  relationship\_type: on  template\_id : alarm\_on\_host  - relationship:  source: alarm\_port\_switch  target: port\_switch  relationship\_type: on  template\_id : alarm\_on\_port\_switch  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_attached\_host  - relationship:  source: port\_switch  target: port\_host  relationship\_type: connect  template\_id : port\_switch\_connect\_port\_host  scenarios:  - scenario:  condition: alarm\_on\_host and alarm\_on\_port\_switch and port\_switch\_connect\_port\_host and port\_attached\_host  actions:  - action:  action\_type: add\_causal\_relationship  action\_target:  source: alarm\_port\_switch  target: alarm\_host |

Kết quả sau khi thên rca template:

