## **Nội dung usecase:**

**Host NIC down làm ảnh hưởng đến VM**

Yêu cầu monitor:

* Trạng thái các interface của Host: up/down
* Kết nối của VM:
  + Ping/curl đến IP của VM. Lưu ý 1 Vm có thể có nhiều IP

Điều kiện alarm

* Alarm 1: Interface của Host down
* Alarm 2: VM bị mất kết nối

Yêu cầu Graph:

* 1 host có thể có nhiều br-ex.
* 1 br-ex có thể nối với 1 hoặc 2 NIC. 1 NIC chỉ nối với 1 br-ex
* 1 br-ex chỉ thuộc 1 provider network

Yêu cầu deduce:

* Deduce stace:
  + Trường hợp 1 br - 1 host NIC: Nếu có alarm 1 => deduce statce của host-NIC, br-ex tương ứng về error và các VM có interfaces nối với network của br-ex đó là ERROR
  + Trường hợp 1 br - 2 host NIC:
    - Nếu có alarm 1 trên 1 NIC => deduce statce của host-NIC, br-ex tương ứng về error và các VM có interfaces nối với network của br-ex đó là WARNING
    - Nếu có alarm 2 trên 1 NIC => deduce statce của host-NIC, br-ex tương ứng về error và các VM có interfaces nối với network của br-ex đó là ERROR
  + Deduce alarm (tương tự deduce stace):
    - Trường hợp 1 br - 1 host NIC: Nếu có alarm 1 => tạo alarm 3 cho VM là bị mất kết nối.
    - Trường hợp 1 br - 2 host NIC:
      * Nếu có alarm 1 trên 1 NIC => tạo alarm 4 cho VM là kết nối bị ảnh hưởng.
      * Nếu có alarm 1 trên 2 NIC => tạo alarm 3 cho VM là bị mất kết nối.

Yêu cầu RCA:

* Tạo RCA Alarm 1 => Alarm 2,|Alarm3|Alarm4

## **Thực hiện:**

### 1. Chuẩn bị monitor các thành phần:

Ở đây cần monitor interface up/down của host và kết nối (ping) đến VM

* Đầu tiên cần cài đặt zabbix agent cho mỗi instance, mỗi host. Các agent này cần gửi thông tin thu thập về cho một zabbix server cài trên 1 host ( hoặc VM), mà host (vm) đó vitrage có thể kết nối được
* Trên UI của zabbix server, ta cấu hình để monitor host và instance như sau:

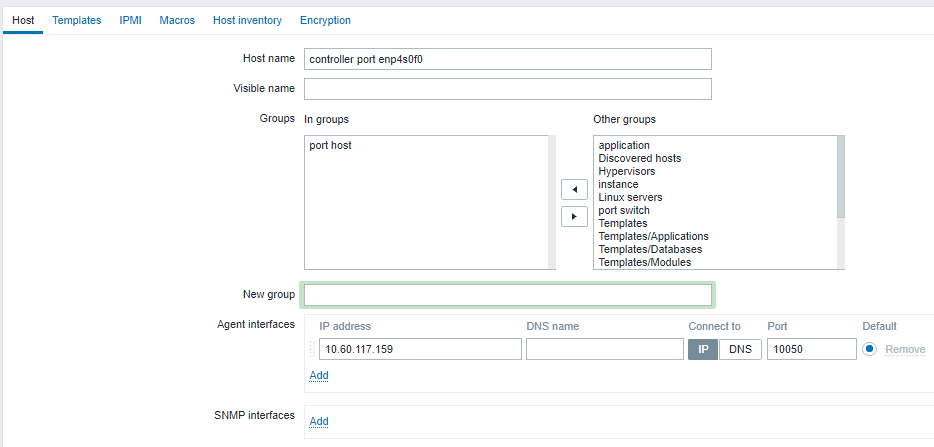
#### a) Monitor host: interface up/down

* Ứng với mỗi host cần monitor, tạo các zabbix host ứng với các interface host đó: vd host có 5 interface thì tạo 5 zabbix-host

Configuration > host > create host

Hostname: <tên host> port <tên\_port> vd “controller port enp4s0f0”

Agent interface: ip của host, mà ip đó dùng kết nối được zabbix server .



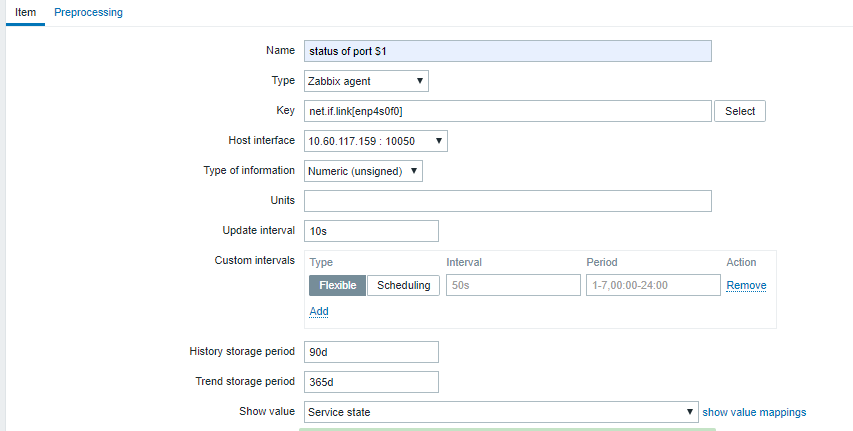
* Tạo item để thu thập thông tin của host:

Vào zabbix UI. tab: Configuration > host > [tên zabbix host] > item > create item

Name: tùy chọn

Key: net.if.link[\*] thay \* bằng interface muốn monitor

Show value: service state



Ở đây, net.if.link là một key ta tự định nghĩa để monitor interface. Tự định nghĩa như sau:

Trên mỗi zabbix agent ,tạo file /etc/zabbix/zabbix\_agentd.d/userparameter\_niclink.conf nội dung:

|  |
| --- |
| UserParameter=net.if.link[\*], if ip a | grep -Eq ": $1:.\*state UP" ; then echo "1" ; else echo "0" ; fi |

nếu interface up , item trả về 1(up), nếu không trả về 0(down)

rerstart zabbix-agent.service

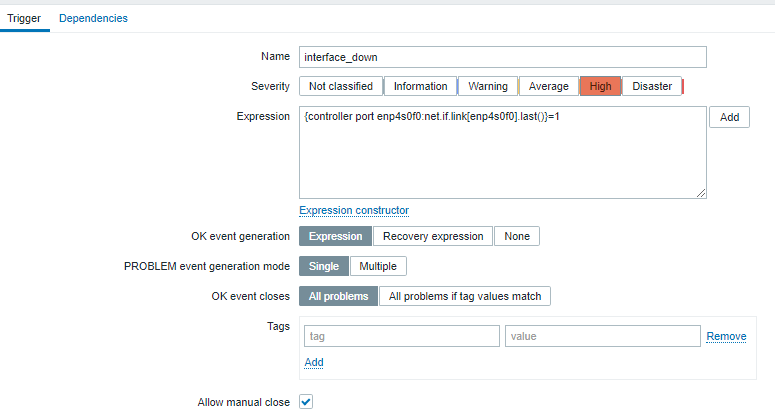
* Tạo trigger cảnh báo: khi interface down bắn alarm

Name: interface\_down

Key: {controller port enp4s0f0:net.if.link[enp4s0f0].last()}=1

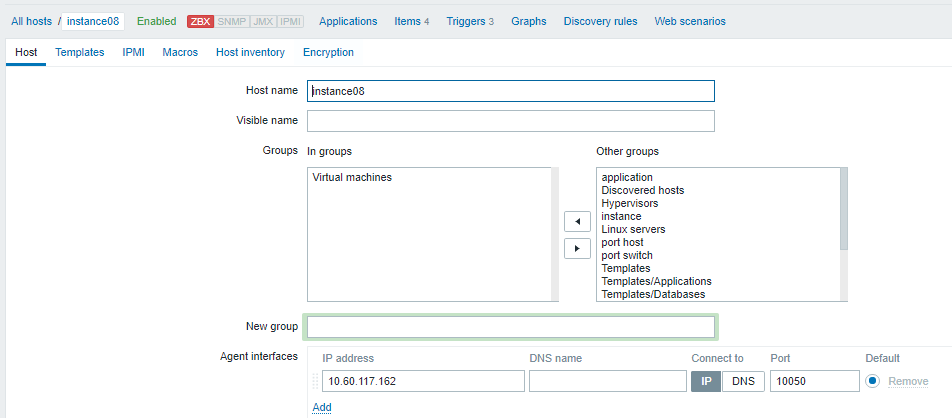
Serverity: high

Allow manual closes.



#### **b) Monitor instance** ping kiểm tra kết nối

* Tạo host: ứng với mỗi instance tạo 1 zabbix host:



* Tạo item để thu thập thông tin của instance:

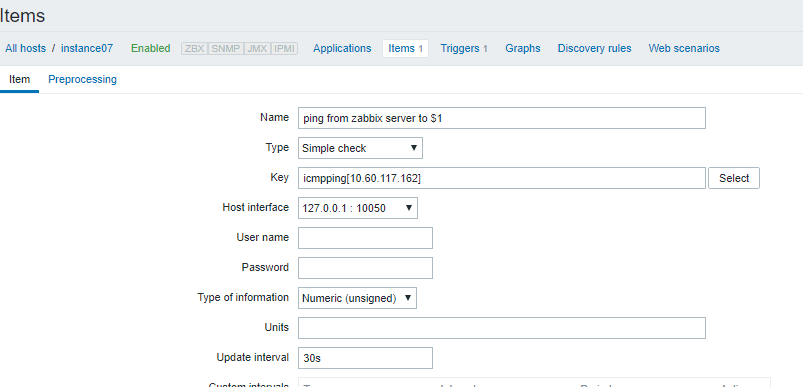
Ứng với mỗi ip của instance ta tạo 1 item:

Vào zabbix UI. tab: Configuration > host > [tên zabbix host] > item > create item

Name: ping from zabbix server to $1

Type: simple check

Key: icmpping[\*] với \* là ip mà ta muốn zabbix server ping tới



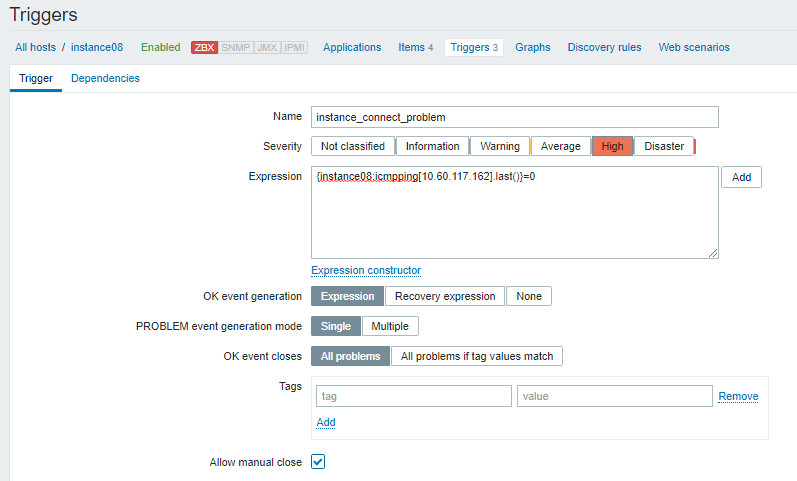
* Tạo trigger cảnh báo :

Expression: dạng:

{<zabbix\_host>:icmpping[<ip1>].last()}=0

OR {<zabbix\_host>:icmpping[<ip2>].last()}=0

…. với ip1, ip2 là danh sách các ip của instance đó



### 2. Chuẩn bị graph

#### a) add static datasoucre:

Mục đích là đưa vào cấu hình các port của host.

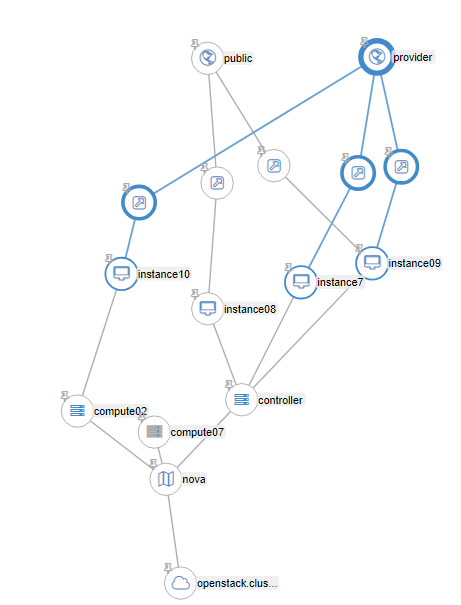
Với đề bài:

* 1 host có thể có nhiều br-ex ,
* 1 br-ex có thể nối với 1 hoặc 2 NIC. 1 NIC chỉ nối với 1 br-ex
* 1 br-ex chỉ thuộc 1 provider network

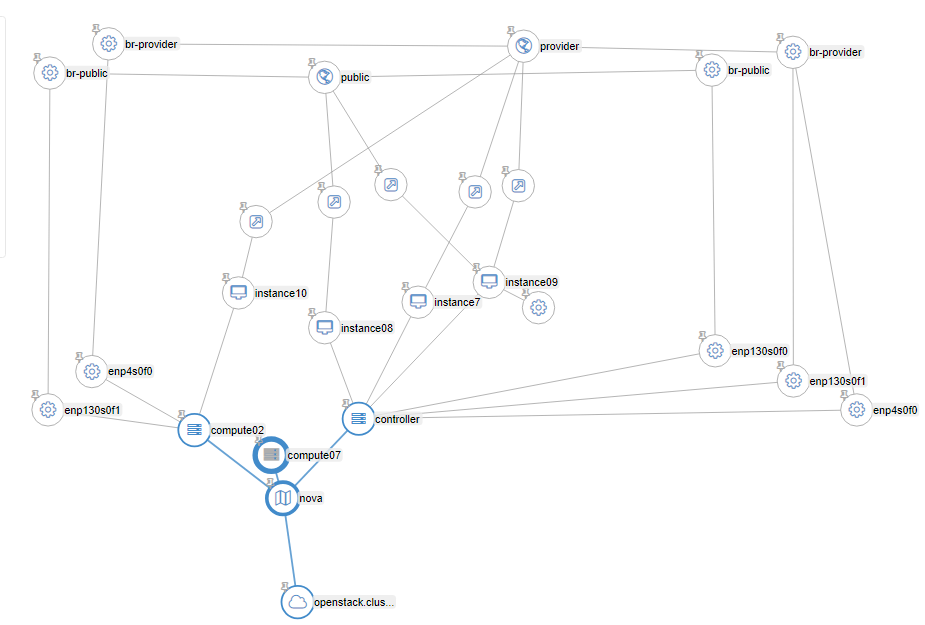
Ví dụ:

* host “controller” có 2 port loại ovs tên “br-provider” và “br-public” 2 port này nối vào 3 nic vật lý : br-provider nối với enp130s0f1, br-public nối với enp130s0f0 và enp130s0f1
* host “compute02” có 2 port ovs tên “br-provider” và “br-public” 2 port nối 2 nic : br-provider nối enp4s0f0 và br-public nối enp103s0f1.

Mô hình ban đầu của vitrage :



mô hình mong muốn thể hiện:



Ta cần thêm các file :

*(để hiểu về nội dung các file cần đọc thêm* [*https://gitlab.visc.com/hoanq13/vitrage-doc/blob/master/entity\_graph.md*](https://gitlab.visc.com/hoanq13/vitrage-doc/blob/master/entity_graph.md) *, cách cấu static datasource )*

file thiết lập cho host controller : /etc/vitrage/static\_datasources/port\_host\_controller.yaml

|  |
| --- |
| 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: br-provider  state: available  - static\_id: br-public  type: port\_ovs  id: controller-port-br-public  name: br-public  state: available  - static\_id: enp4s0f0  type: port\_host  id: controller-port-enp4s0f0  name: enp4s0f0  state: available  - static\_id: enp130s0f0  type: port\_host  id: controller-port-enp130s0f0  name: enp130s0f0  state: available  - static\_id: enp130s0f1  type: port\_host  id: controller-port-enp130s0f1  name: enp130s0f1  state: available  - static\_id: h1  type: nova.host  id: controller  - static\_id: provider-network  type: neutron.network  id: 2b0756c1-b74a-4d1f-835c-cc2f66a0bdd3  - 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: enp130s0f0  target: h1  relationship\_type: attached  - source: enp4s0f0  target: br-provider  relationship\_type: connect  - source: enp130s0f0  target: br-public  relationship\_type: connect  - source: enp130s0f1  target: br-provider  relationship\_type: connect  - source: br-provider  target: provider-network  relationship\_type: attached  - source: br-public  target: public-network  relationship\_type: attached |

file thiết lập cho host compute02: /etc/vitrage/static\_datasources/port\_host\_compute02.yaml

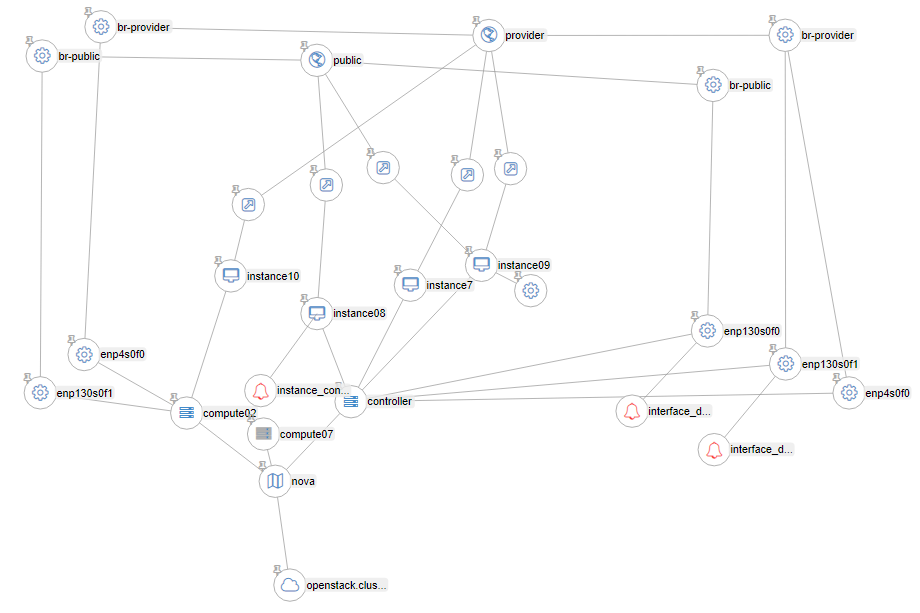
|  |
| --- |
| metadata:  name: port of compute02  description: port of compute02  definitions:  entities:  - static\_id: br-provider  type: port\_ovs  id: compute02-port-br-provider  name: br-provider  state: available  - static\_id: br-public  type: port\_ovs  id: compute02-port-br-public  name: br-public  state: available  - static\_id: enp4s0f0  type: port\_host  id: compute02-port-enp4s0f0  name: enp4s0f0  state: available  - static\_id: enp130s0f1  type: port\_host  id: compute02-port-enp130s0f1  name: 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 |

#### b) mapping cho alarm của zabbix vào đồ thị:

Thêm vào file /etc/vitrage/zabbix\_conf.yaml

|  |
| --- |
| zabbix:  - zabbix\_host: instance07  type: nova.instance  name: eff1daed-0d97-4975-abbd-3d3e907aeedf # (dùng id của instance, không dùng host name)  - zabbix\_host: instance08  …  - zabbix\_host: controller  type: nova.host  name: controller  - zabbix\_host: compute02  type: nova.host  name: compute02 |

Vậy ta đã chuẩn bị xong mô hình input, kết quả:



khi zabbix đã bắn 3 alarm : alarm on interface enp130s0f0 và enp13s0f1.

cần vitrage làm :

Warning state trên port br-provider (do port này vẫn còn kết nối được ra ngoài nhờ enp4s0f0) và raise alarm warning instance 07, 09

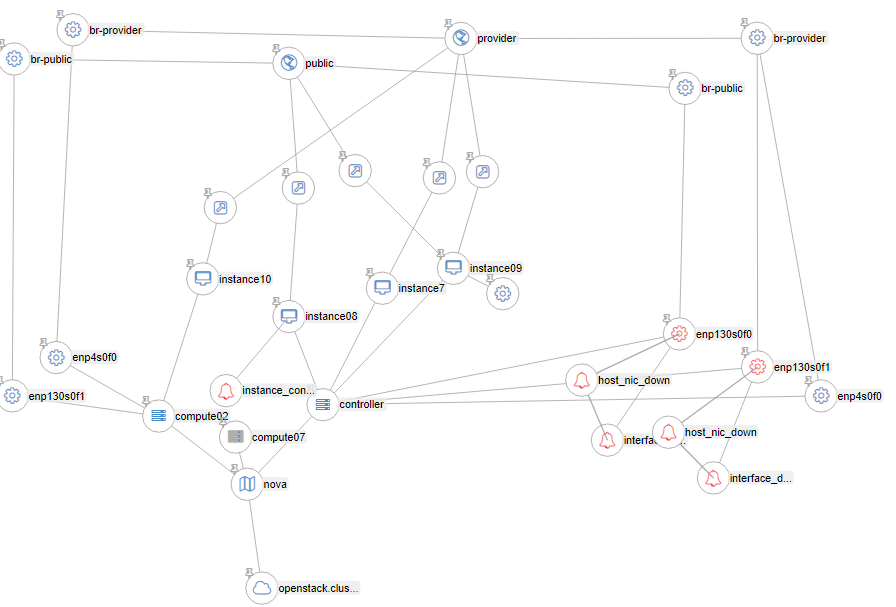
ERROR state trên port br-public instance08 và raise alarm vitrage trên instance08

### 3. Thêm template:

**Tạo file template /etc/vitrage/templates/usecase4\_path1.yaml :**

khi có alarm interface down trên nic deduce alarm “host nic down”

|  |
| --- |
| metadata:  name: deduce-alarm, rca interface down to host nic down and set state error port  description: deduce-alarm rca interface down to host nic down and set state error port  definitions:  entities:  - entity:  category: ALARM  type: zabbix  rawtext: interface\_down  template\_id: alarm\_interface\_down  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port\_down  - entity:  category: RESOURCE  type: port\_host  template\_id: port\_host  relationships:  - relationship:  source: alarm\_interface\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_interface\_down\_on\_port  - relationship:  source: alarm\_port\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_port\_down\_on\_port  scenarios:  - scenario:  condition: alarm\_interface\_down\_on\_port  actions:  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: port\_host  - action:  action\_type: raise\_alarm  properties:  alarm\_name: host\_nic\_down  severity: CRITICAL  action\_target:  target: port\_host  - scenario:  condition: alarm\_interface\_down\_on\_port and alarm\_port\_down\_on\_port  actions:  - action:  action\_type: add\_causal\_relationship  action\_target:  source: alarm\_interface\_down  target: alarm\_port\_down |



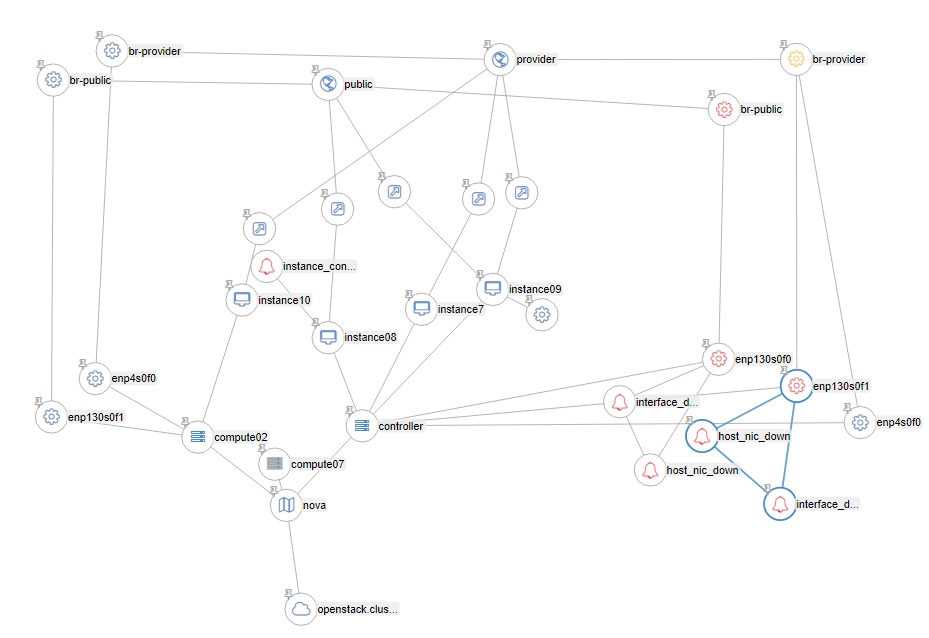
**Tạo file template /etc/vitrage/templates/usecase4\_deduce\_path2.yaml**

Nhiệm vụ:

Nếu port ovs nối 2 host nic : khi 1 nic down set state warning, 2 nic down set state error

Nếu port ovs chỉ nối 1 host nic: khi 1 nic down set state error

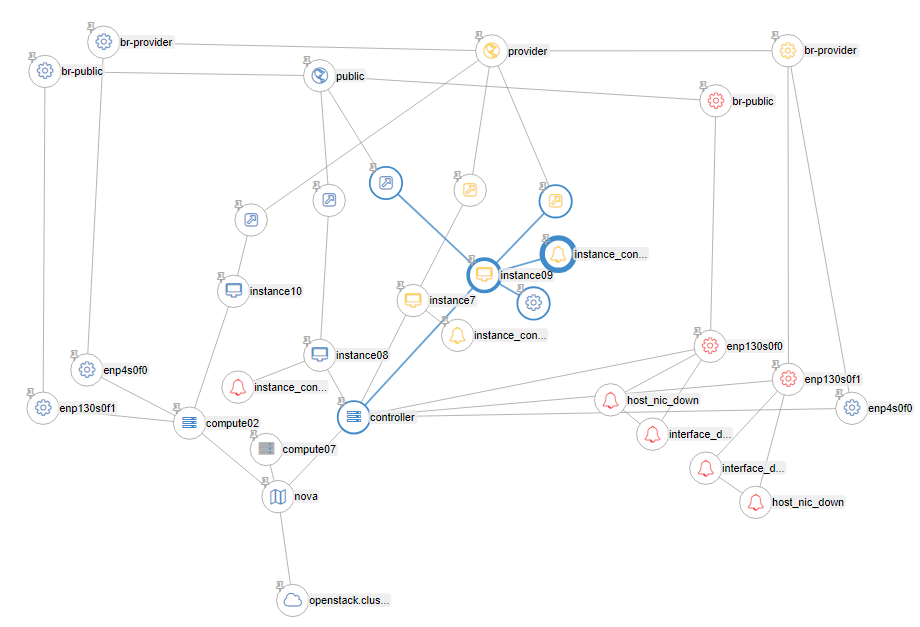
|  |
| --- |
| metadata:  name: deduce-alarm port host down raise alarm and set state on port ovs  description: deduce-alarm port host down raise alarm and set state on port ovs  definitions:  entities:  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port1\_down  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port2\_down  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: port\_host  template\_id: port1\_host  - entity:  category: RESOURCE  type: port\_host  template\_id: port2\_host  - entity:  category: RESOURCE  type: port\_ovs  template\_id: port\_ovs  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  relationships:  - relationship:  source: alarm\_port1\_down  target: port1\_host  relationship\_type: on  template\_id : alarm\_on\_port1\_host  - relationship:  source: alarm\_port2\_down  target: port2\_host  relationship\_type: on  template\_id : alarm\_on\_port2\_host  - relationship:  source: port1\_host  target: host  relationship\_type: attached  template\_id : port1\_host\_attached\_host  - relationship:  source: port2\_host  target: host  relationship\_type: attached  template\_id : port2\_host\_attached\_host  - relationship:  source: port1\_host  target: port\_ovs  relationship\_type: connect  template\_id : port1\_host\_connect\_port\_ovs  - relationship:  source: port2\_host  target: port\_ovs  relationship\_type: connect  template\_id : port2\_host\_connect\_port\_ovs  scenarios:  - scenario:  condition: (alarm\_on\_port1\_host and port1\_host\_connect\_port\_ovs and not port2\_host\_connect\_port\_ovs) or (alarm\_on\_port1\_host and alarm\_on\_port2\_host and port1\_host\_connect\_port\_ovs and port2\_host\_connect\_port\_ovs)  actions:  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: port\_ovs  - scenario:  condition: alarm\_on\_port1\_host and not alarm\_on\_port2\_host and port1\_host\_connect\_port\_ovs and port2\_host\_connect\_port\_ovs  actions:  - action:  action\_type: set\_state  properties:  state: SUBOPTIMAL  action\_target:  target: port\_ovs |



**Tạo file template /etc/vitrage/templates/usecase4\_deduce\_path3-1.yaml**

Nhiệm vụ: nếu port ovs bị warning thì set state, bật alarm warning trên instance ảnh hưởng

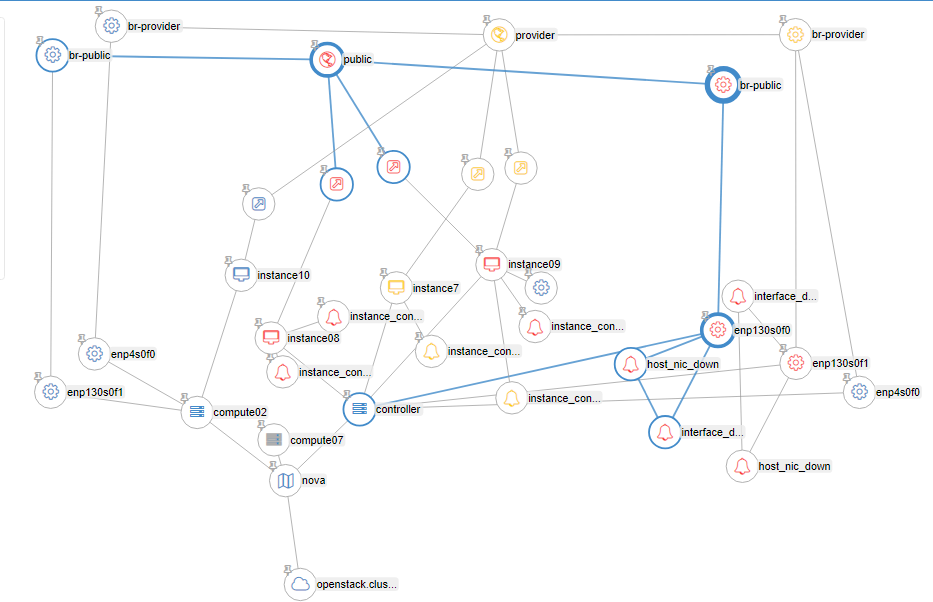
|  |
| --- |
| metadata:  name: deduce-alarm port host down and port ovs suboptimal raise alarm and set state on instance, host, neutron port  description: deduce-alarm port host down and port ovs suboptimal raise alarm and set state on instance, host, neutron port  definitions:  entities:  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port\_down  - entity:  category: RESOURCE  type: port\_host  template\_id: port\_host  - entity:  category: RESOURCE  type: port\_ovs  vitrage\_operational\_state: SUBOPTIMAL  template\_id: port\_ovs\_warning  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: neutron.network  template\_id: neutron\_network  - entity:  category: RESOURCE  type: neutron.port  template\_id: port\_neutron  relationships:  - relationship:  source: alarm\_port\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_on\_port\_host  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_host\_attached\_host  - relationship:  source: port\_host  target: port\_ovs\_warning  relationship\_type: connect  template\_id : port\_host\_connect\_port\_ovs  - relationship:  source: port\_ovs\_warning  target: neutron\_network  relationship\_type: attached  template\_id : port\_ovs\_attached\_network  - relationship:  source: neutron\_network  target: port\_neutron  relationship\_type: contains  template\_id : network\_contains\_neutron\_port  - relationship:  source: port\_neutron  target: instance  relationship\_type: attached  template\_id : port\_neutron\_attached\_instance  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  scenarios:  - scenario:  condition: (port\_ovs\_warning and port\_ovs\_attached\_network and network\_contains\_neutron\_port and port\_neutron\_attached\_instance) and (alarm\_on\_port\_host and port\_host\_attached\_host and host\_contains\_instance ) and port\_host\_connect\_port\_ovs  actions:  - action:  action\_type: set\_state  properties:  state: SUBOPTIMAL  action\_target:  target: neutron\_network  - action:  action\_type: set\_state  properties:  state: SUBOPTIMAL  action\_target:  target: port\_neutron  - action:  action\_type: set\_state  properties:  state: SUBOPTIMAL  action\_target:  target: instance  - action:  action\_type: raise\_alarm  properties:  alarm\_name: instance\_connect\_at\_risk  severity: WARNING  action\_target:  target: instance |



**Tạo file template /etc/vitrage/templates/usecase4\_deduce\_path3-2.yaml**

Nhiệm vụ: nếu port ovs bị error thì set state, bật alarm critical trên instance ảnh hưởng

|  |
| --- |
| metadata:  name: deduce-alarm port host down and port ovs error raise alarm and set state on instance, host, neutron port  description: deduce-alarm port host down and port ovs error raise alarm and set state on instance, host, neutron port  definitions:  entities:  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port\_down  - entity:  category: RESOURCE  type: port\_host  template\_id: port\_host  - entity:  category: RESOURCE  type: port\_ovs  vitrage\_operational\_state: ERROR  template\_id: port\_ovs\_error  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  - entity:  category: RESOURCE  type: nova.host  template\_id: host  - entity:  category: RESOURCE  type: neutron.network  template\_id: neutron\_network  - entity:  category: RESOURCE  type: neutron.port  template\_id: port\_neutron  relationships:  - relationship:  source: alarm\_port\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_on\_port\_host  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_host\_attached\_host  - relationship:  source: port\_host  target: port\_ovs\_error  relationship\_type: connect  template\_id : port\_host\_connect\_port\_ovs  - relationship:  source: port\_ovs\_error  target: neutron\_network  relationship\_type: attached  template\_id : port\_ovs\_attached\_network  - relationship:  source: neutron\_network  target: port\_neutron  relationship\_type: contains  template\_id : network\_contains\_neutron\_port  - relationship:  source: port\_neutron  target: instance  relationship\_type: attached  template\_id : port\_neutron\_attached\_instance  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  scenarios:  - scenario:  condition: (port\_ovs\_error and port\_ovs\_attached\_network and network\_contains\_neutron\_port and port\_neutron\_attached\_instance) and (alarm\_on\_port\_host and port\_host\_attached\_host and host\_contains\_instance ) and port\_host\_connect\_port\_ovs  actions:  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: neutron\_network  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: port\_neutron  - action:  action\_type: set\_state  properties:  state: ERROR  action\_target:  target: instance  - action:  action\_type: raise\_alarm  properties:  alarm\_name: instance\_connect\_problem  severity: CRITICAL  action\_target:  target: instance |



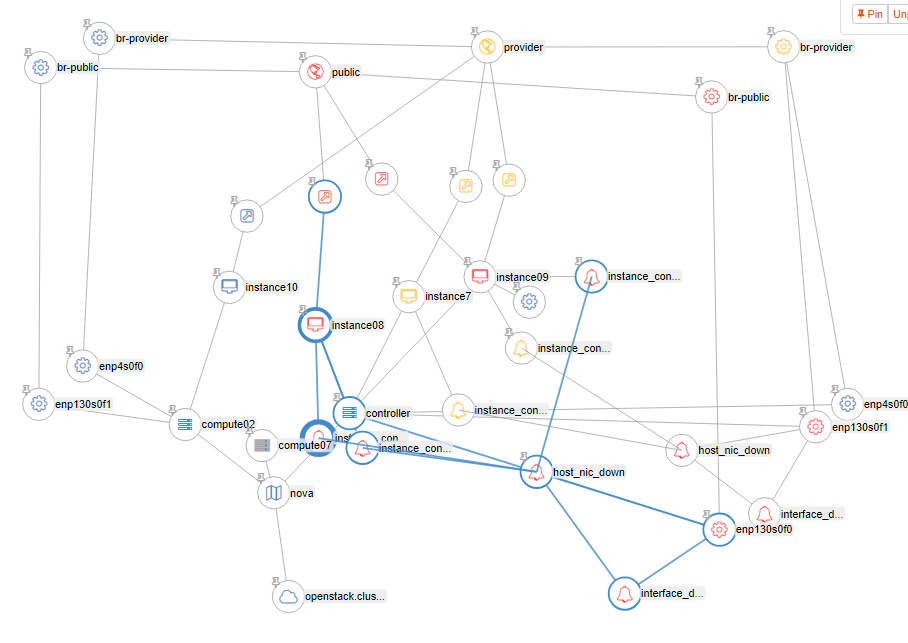
Thêm các file để rca các alarm deduce , alaem zabbix

usecase4\_rca\_error\_alarm.yaml:

|  |
| --- |
| metadata:  name: rca alarm error on instance caused by alarm error on port\_host  description: rca alarm error on instance caused by alarm error on port\_host  definitions:  entities:  - entity:  category: ALARM  name: instance\_connect\_problem  template\_id: alarm\_instance\_connect\_problem  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  - entity:  category: RESOURCE  type: neutron.port  vitrage\_operational\_state: ERROR  template\_id: port\_neutron  - entity:  category: RESOURCE  type: neutron.network  vitrage\_operational\_state: ERROR  template\_id: neutron\_network  - entity:  category: RESOURCE  type: port\_ovs  vitrage\_operational\_state: ERROR  template\_id: port\_ovs  - entity:  category: RESOURCE  type: port\_host  vitrage\_operational\_state: ERROR  template\_id: port\_host  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port\_host\_down  - entity:  category: RESOURCE  type: nova.host  template\_id: host  relationships:  - relationship:  source: alarm\_instance\_connect\_problem  target: instance  relationship\_type: on  template\_id : alarm\_on\_instance  - relationship:  source: port\_neutron  target: instance  relationship\_type: attached  template\_id : port\_neutron\_attached\_instance  - relationship:  source: neutron\_network  target: port\_neutron  relationship\_type: contains  template\_id : network\_contains\_neutron\_port  - relationship:  source: port\_ovs  target: neutron\_network  relationship\_type: attached  template\_id : port\_ovs\_attached\_network  - relationship:  source: port\_host  target: port\_ovs  relationship\_type: connect  template\_id : port\_host\_connect\_port\_ovs  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_host\_attached\_host  - relationship:  source: alarm\_port\_host\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_on\_port\_host  scenarios:  - scenario:  condition: alarm\_on\_instance and (port\_neutron\_attached\_instance and network\_contains\_neutron\_port and port\_ovs\_attached\_network and port\_host\_connect\_port\_ovs and port\_host\_connect\_port\_ovs ) and (host\_contains\_instance and port\_host\_attached\_host) and alarm\_on\_port\_host  actions:  - action:  action\_type: add\_causal\_relationship  action\_target:  source: alarm\_port\_host\_down  target: alarm\_instance\_connect\_problem |

usecase4\_rca\_warning\_alarm.yaml

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| metadata:  name: rca alarm warning on instance caused by alarm error on port\_host  description: rca alarm warning on instance caused by alarm error on port\_host  definitions:  entities:  - entity:  category: ALARM  name: instance\_connect\_at\_risk  template\_id: alarm\_instance\_connect\_at\_risk  - entity:  category: RESOURCE  type: nova.instance  template\_id: instance  - entity:  category: RESOURCE  type: neutron.port  vitrage\_operational\_state: SUBOPTIMAL  template\_id: port\_neutron  - entity:  category: RESOURCE  type: neutron.network  vitrage\_operational\_state: SUBOPTIMAL  template\_id: neutron\_network  - entity:  category: RESOURCE  type: port\_ovs  vitrage\_operational\_state: SUBOPTIMAL  template\_id: port\_ovs  - entity:  category: RESOURCE  type: port\_host  vitrage\_operational\_state: ERROR  template\_id: port\_host  - entity:  category: ALARM  name: host\_nic\_down  template\_id: alarm\_port\_host\_down  - entity:  category: RESOURCE  type: nova.host  template\_id: host  relationships:  - relationship:  source: alarm\_instance\_connect\_at\_risk  target: instance  relationship\_type: on  template\_id : alarm\_on\_instance  - relationship:  source: port\_neutron  target: instance  relationship\_type: attached  template\_id : port\_neutron\_attached\_instance  - relationship:  source: neutron\_network  target: port\_neutron  relationship\_type: contains  template\_id : network\_contains\_neutron\_port  - relationship:  source: port\_ovs  target: neutron\_network  relationship\_type: attached  template\_id : port\_ovs\_attached\_network  - relationship:  source: port\_host  target: port\_ovs  relationship\_type: connect  template\_id : port\_host\_connect\_port\_ovs  - relationship:  source: host  target: instance  relationship\_type: contains  template\_id : host\_contains\_instance  - relationship:  source: port\_host  target: host  relationship\_type: attached  template\_id : port\_host\_attached\_host  - relationship:  source: alarm\_port\_host\_down  target: port\_host  relationship\_type: on  template\_id : alarm\_on\_port\_host  scenarios:  - scenario:  condition: alarm\_on\_instance and (port\_neutron\_attached\_instance and network\_contains\_neutron\_port and port\_ovs\_attached\_network and port\_host\_connect\_port\_ovs and port\_host\_connect\_port\_ovs ) and (host\_contains\_instance and port\_host\_attached\_host) and alarm\_on\_port\_host  actions:  - action:  action\_type: add\_causal\_relationship  action\_target:  source: alarm\_port\_host\_down  target: alarm\_instance\_connect\_at\_risk |



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