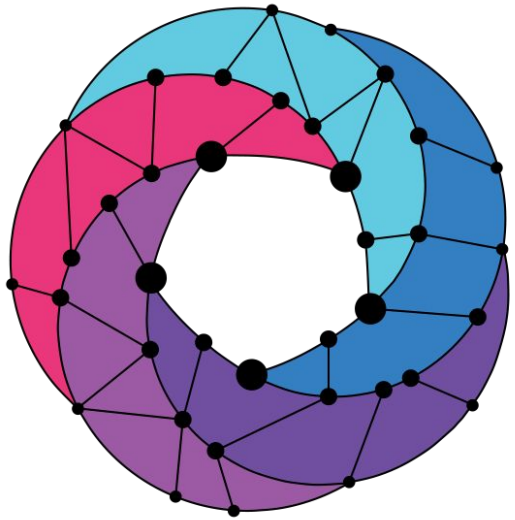

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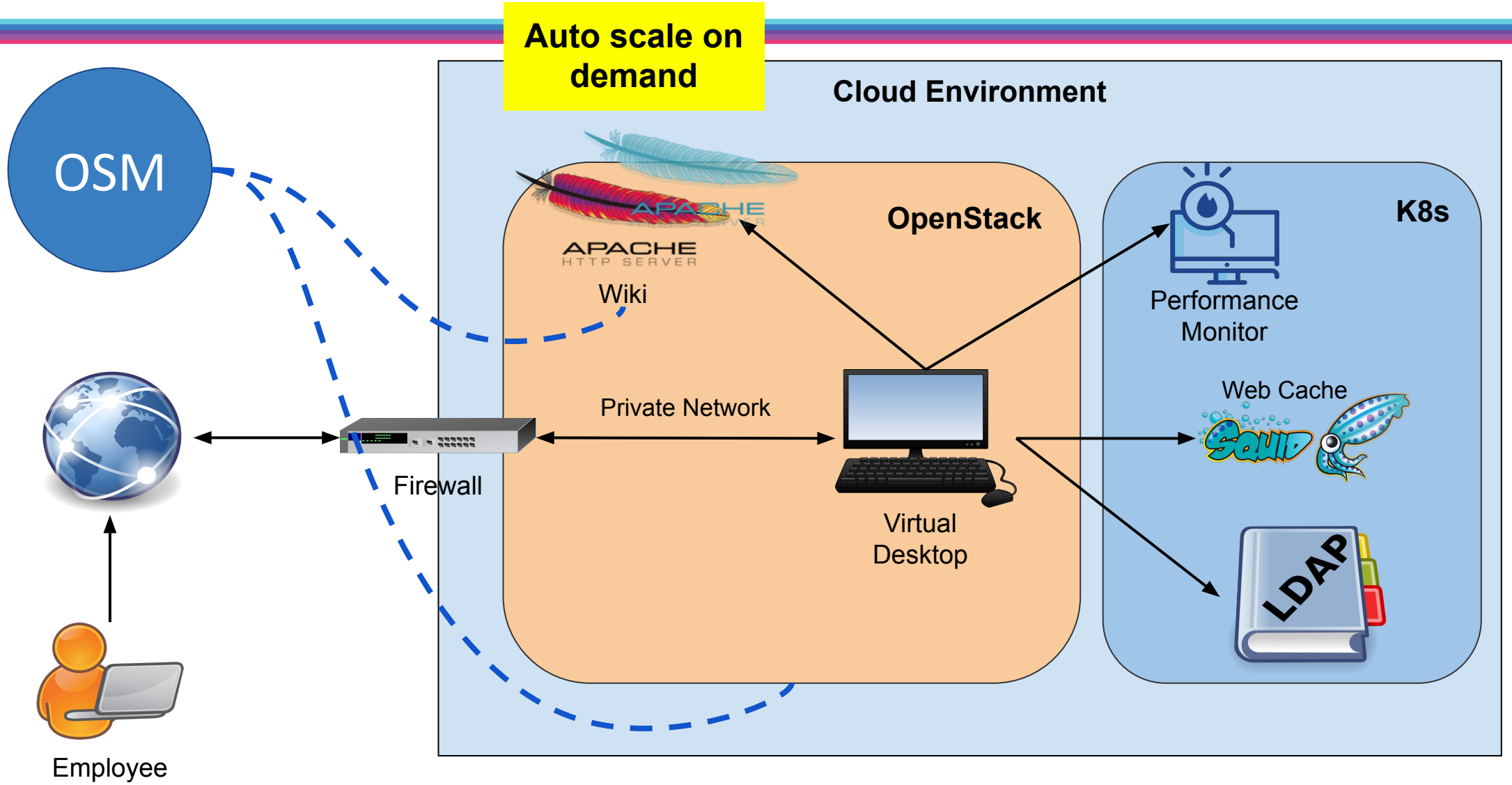
OSM-MR#10 Hackfest

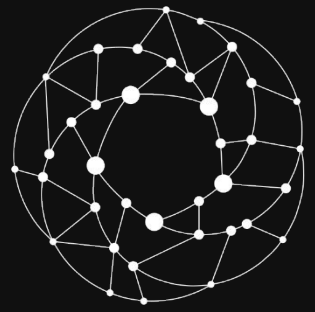
Network Automation (Scaling)

Subhankar Pal (Altran)

ETSI

The big picture !!





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Hands-on!

Auto Scaling of Wiki Service

ETSI

Let’s play with wiki service !

Build Package

- Login to Mgmt. VM (172.21.1.3)

```
$ ssh osm_hackfest_xx@172.21.1.3
```

- Copy the scripts from location ~/Hackfest/HD2.2-Scaling/.

```
$ cp ~/Hackfest/HD2.2-Scaling/wiki-*.sh .
```

- Build and upload wiki VNF and NS package.

  Warning ‘osm-packages’ folder will be deleted. So if you need it later, backup this folder, before running this script,

```
$ ./wiki-build.sh
```

Let’s play with wiki service !

Verify package are uploaded in OSM

- Verify the packages are successfully deployed in OSM

```
$ osm nspkg-list
```

```
+-----------------------------------------------+--------------------------------------+
| nsd name                                      | id                                   |
+-----------------------------------------------+--------------------------------------+
| wiki_webserver_autoscale_ns_osm_instructor_9 | 1cdc9351-cfd7-42c2-9416-33ff85216a9e |
+-----------------------------------------------+--------------------------------------+
```

```
$ osm vnfpkg-list
```

```
+-----------------------------------------------+--------------------------------------+-----------+
| nfpkg name                                    | id                                   | desc type |
+-----------------------------------------------+--------------------------------------+-----------+
| wiki_webserver_autoscale_vnf_osm_instructor_9 | c70fe4c5-9401-4e19-b1af-d70978114280 | sol006    |
+-----------------------------------------------+--------------------------------------+-----------+
```

Let’s play with wiki service !

Instantiate Wiki Network Service

- Install wiki network service

```
$ ./wiki-launch.sh
```

- Verify the network service is deployed properly.

```
$ osm ns-list
```

```
+------------------+--------------------------------------+---------------------+---------+--------------------+---------------+
| ns instance name | id                                   | date                | ns state | current operation | error details |
+------------------+--------------------------------------+---------------------+---------+--------------------+---------------+
| wiki             | 706f5a5a-74c5-4cba-9145-5d1a7eb22d5c | 2021-03-08T16:07:08 | READY    | IDLE (None)       | N/A           |
+------------------+--------------------------------------+---------------------+---------+--------------------+---------------+
```

Let’s play with wiki service !

Verify wiki service is accessible

- List VMs deployed in the Openstack VIM. There should be

```
$ openstack server list
```

```
osm_instructor_9@osm-jumphost:~$ openstack server list
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
| ID                                   | Name                 | Status | Networks                                                        | Image                | Flavor    |
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
| e089084e-ba89-46c0-8c8a-6a692c4da932 | wiki-1-apache_vdu-0  | ACTIVE | wiki-internal_service=192.168.28.9                              | apache_ubuntu        | 1C-1R-10D |
| dcaac258-0db9-47de-95fe-2bced179a4e6 | wiki-1-haproxy_vdu-0 | ACTIVE | osm-ext=172.21.18.211; wiki-internal_service=192.168.28.2       | haproxy_ubuntu       | 4C-4R-10D |
| 94a6c8d9-e961-4252-a51d-905d1b79c2ba | vyos-pnf-router      | ACTIVE | osm-ext=172.21.19.99; private=192.168.239.250                   | vyos-1.1.7-cloudinit | m1.small  |
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
```

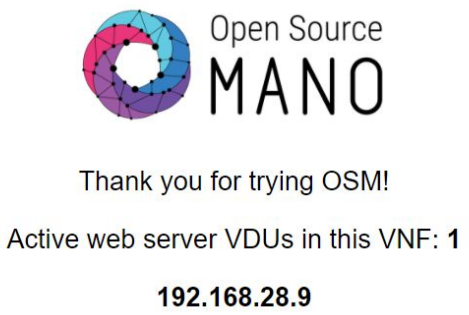
- Check if haproxy is working by trying to access the URL

```
http://<HA Proxy External IP>/
```

Let’s play with wiki service !

Troubleshoot if necessary

- You should see the following page.



- Tr**oubleshooting Tips** If HA proxy is not started start automatically play the following commands from haproxy VM

```
$ service haproxy status
$ sudo service haproxy restart
```

Let’s play with wiki service !
Service Monitoring

- Check monitoring is happening by logging into Grafana

```
http://<OSM IP Address>:3000/
Username / Password = osm_hackfest_xx / osm_hackfest_xx
```

Let’s play with wiki service !

Increase web traffic

- Login to haproxy VM

```
$ ssh ubuntu@172.21.18.211
Password = osm2021
```

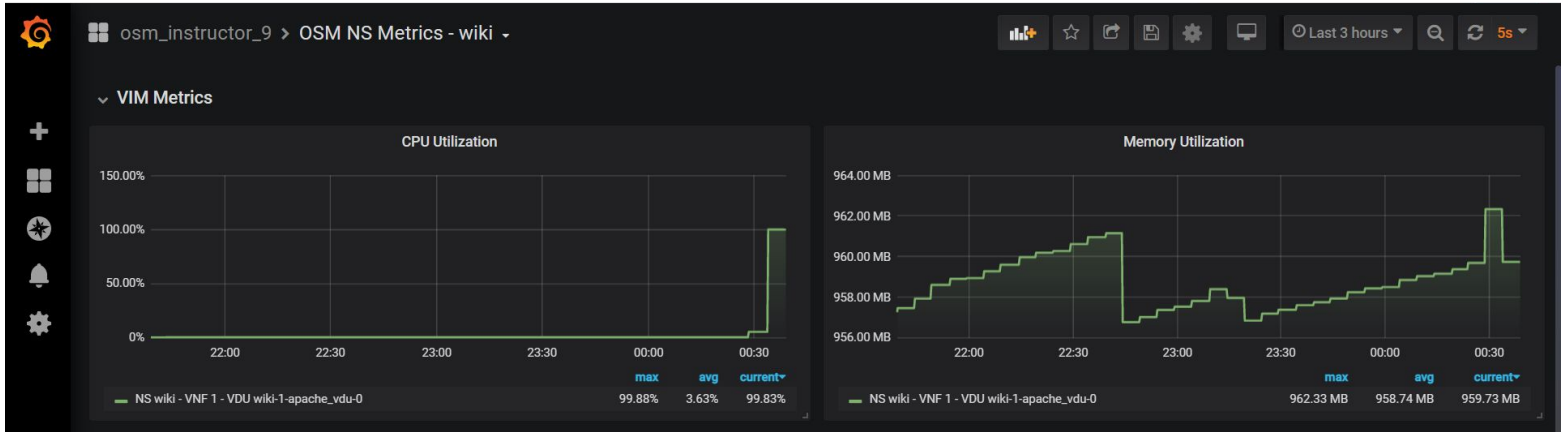
- Increase http traffic to the apache web server.

```
$ ab -n 10000000 -c 1000 http://<Private IP of Apache webserver>:8080/
```

Let’s play with wiki service !

Hurray!! Wiki scaled out.

- Verify CPU utilization increase in Grafana



- In Mgmt. VM (172.21.1.3) check additional webserver VMs are instantiated

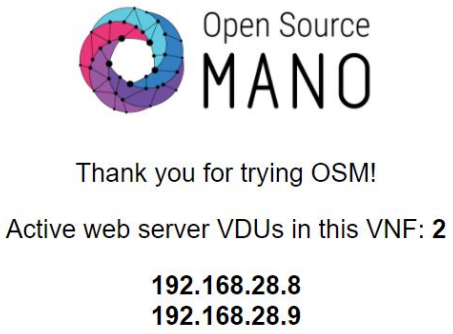
```
$ openstack server list
```

```
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
| ID                                   | Name                 | Status | Networks                                                        | Image                | Flavor    |
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
| 6cf3f9a8-7fd8-4323-ae08-714eb2654fb8 | wiki-1-apache_vdu-1  | ACTIVE | wiki-internal_service=192.168.28.8                              | apache_ubuntu        | 1C-1R-10D |
| e089084e-ba89-46c0-8c8a-6a692c4da932 | wiki-1-apache_vdu-0  | ACTIVE | wiki-internal_service=192.168.28.9                              | apache_ubuntu        | 1C-1R-10D |
| dcaac258-0db9-47de-95fe-2bced179a4e6 | wiki-1-haproxy_vdu-0 | ACTIVE | osm-ext=172.21.18.211; wiki-internal_service=192.168.28.2       | haproxy_ubuntu       | 4C-4R-10D |
| 94a6c8d9-e961-4252-a51d-905d1b79c2ba | vyos-pnf-router      | ACTIVE | osm-ext=172.21.19.99; private=192.168.239.250                   | vyos-1.1.7-cloudinit | m1.small  |
+--------------------------------------+----------------------+--------+-----------------------------------------------------------------+----------------------+-----------+
```

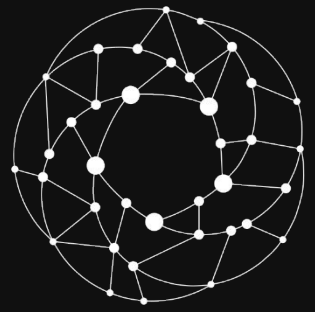
Let’s play with wiki service !

Stop additional traffic to trigger scale in.

- Also, HA Proxy is connecting to these additional webserver VMs



- Stop the traffic generator to see the scale in triggered.



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Auto Scaling & Alert Architecture

OSM Service Assurance

ETSI

Revisiting Service Assurance MDG

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Main components

MON

- Covers the basic uses cases, with a solid architecture to expand them easily.
- Opportunities to enhance usability.

POL

- Designed around the autoscaling use case.
- Starting to cover VNF alarms.

PLA

- Provides computation of optimal placement of NFs over VIMs
- Considers cost of compute/network

Prometheus

- OSM's TSDB for metrics since REL5
- Opportunities to enhance multi-tenancy to match new RBAC capabilities.

Grafana

- Integrates seamlessly with Prometheus.
- Great tool for enhancing usability of the system's Service Assurance

Auxiliary/ Optional

ELK

- Proved seamless integration with OSM.
- Main use case remains at log processing where stack is used.

Auto Scaling & Alert Features

Auto Scaling

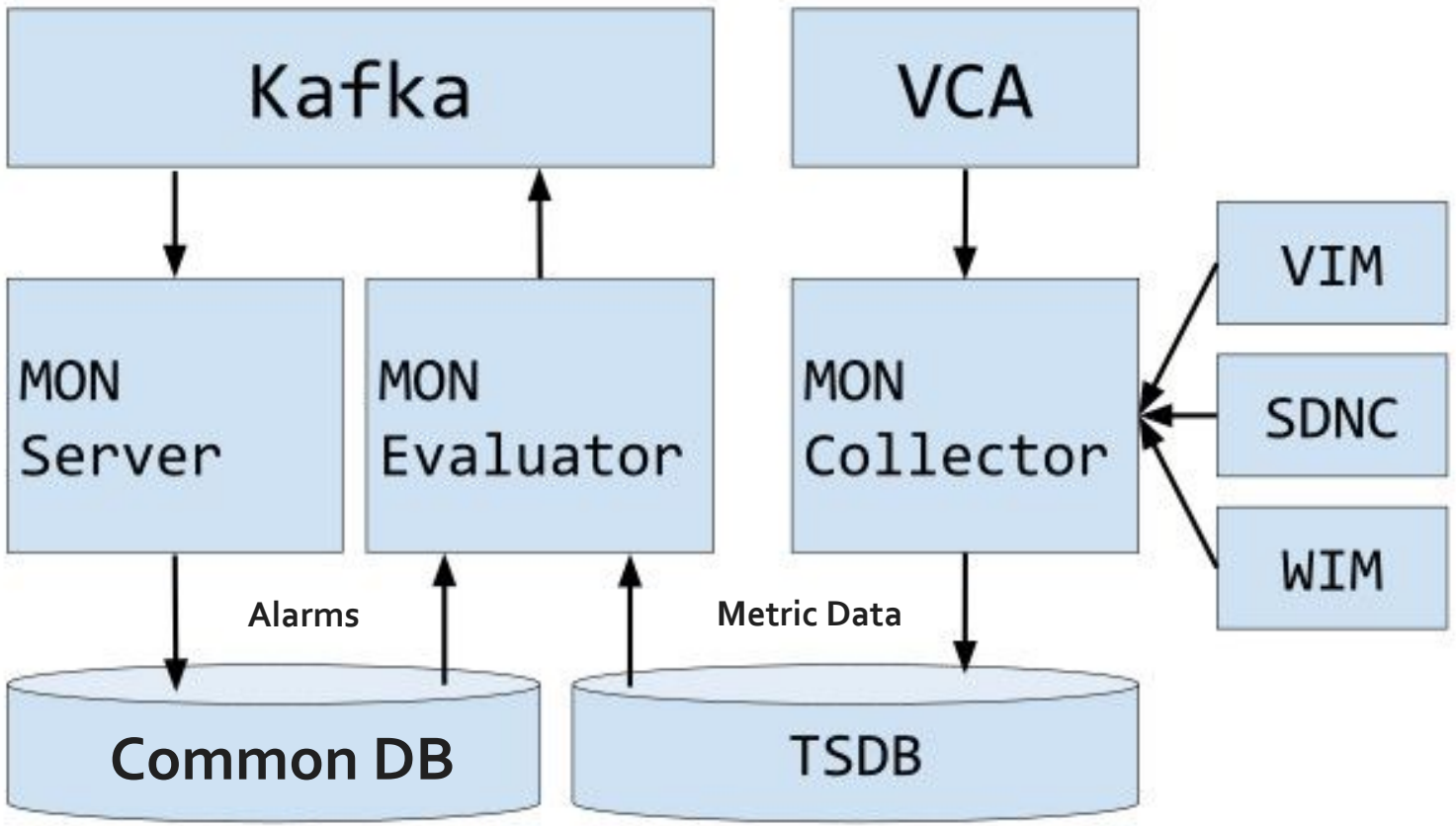
- Auto scaling allows to automatically scale VNFs with a VDU granularity and based on any available metric.
- Scaling descriptors can be included and be tied to automatic reaction to VIM/VNF metric thresholds.
- Supported metrics are both VIM and VNF metrics.

Alerts

- An internal alarm manager has been added to MON through the 'mon-evaluator' module, so that both VIM and VNF metrics can also trigger threshold-violation alarms and scaling actions

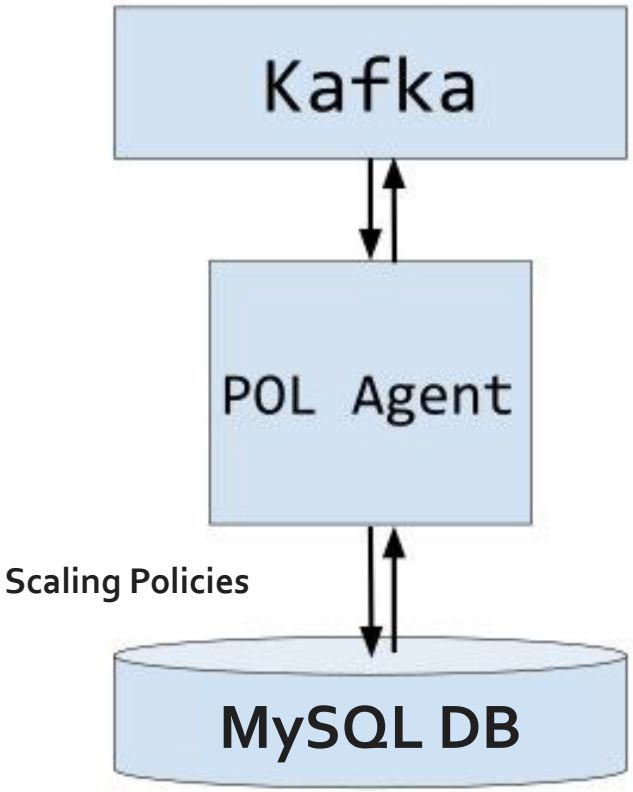
Revisiting MON Architecture

Formal documentation: https://osm.etsi.org/gitlab/osm-architecture/osm-arch-doc/blob/master/04-mon.md



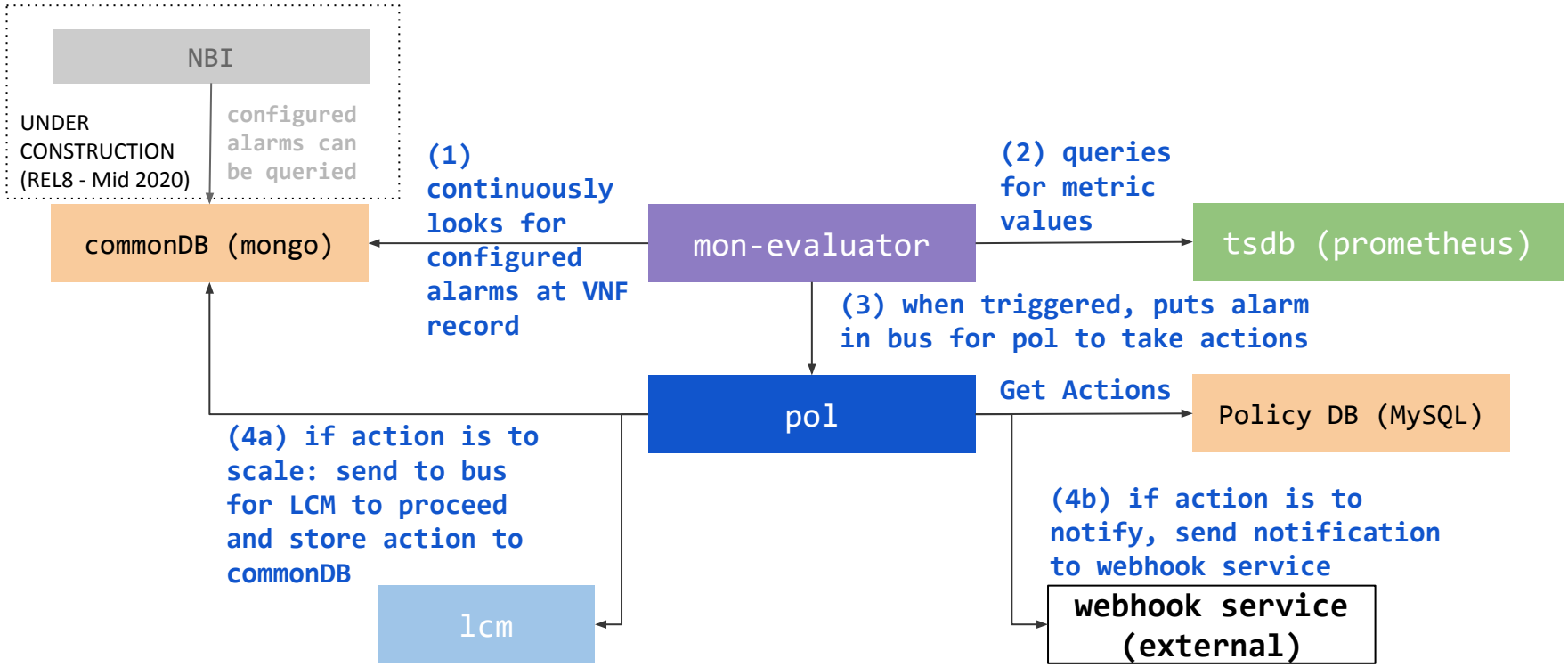
POL Architecture

Formal documentation: https://osm.etsi.org/gitlab/osm-architecture/osm-arch-doc/blob/master/05-pol.md



Auto Scaling & Alarms Architecture

When configuring alarms associated to scaling actions or just webhook notifications (through the VNFD), the following components interact.



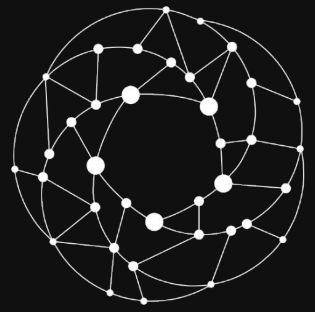
monitoring-parameter:

Scaling Group Descriptor

```
scaling-aspect:
-   aspect-delta-details:
        deltas:
        -   id: apache_vdu_autoscale-delta
            vdu-delta:
            -   id: apache_vdu
    number-of-instances: 1
    id: apache_vdu_autoscale
    max-scale-level: 10
    name: apache_vdu_autoscale
    scaling-policy:
    -   cooldown-time: 180
    name: apache_cpu_util_above_threshold
    scaling-criteria:
    -   name: apache_cpu_util_above_threshold
        scale-in-relational-operation: LT
        scale-in-threshold: 20
        scale-out-relational-operation: GT
        scale-out-threshold: 80
        vnf-monitoring-param-ref: apache_vnf_cpu_util
    scaling-type: automatic
    threshold-time: 10
```

The scaling descriptor is part of a VNFD. Like the example shows, it mainly specifies:

- An existing metric to be monitored, which should be pre-defined in the monitoring-param list (monitoring-parameter).
- The thresholds to monitor (scale-in/out-threshold)
- The minimum amount of scaled instances to produce.(max-scale-level).
- The minimum time it should pass between scaling operations (cooldown-time)
- The VDU to be scaled and the amount of instances to scale per event



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What's New in Release 9?

For OSM Service Assurance

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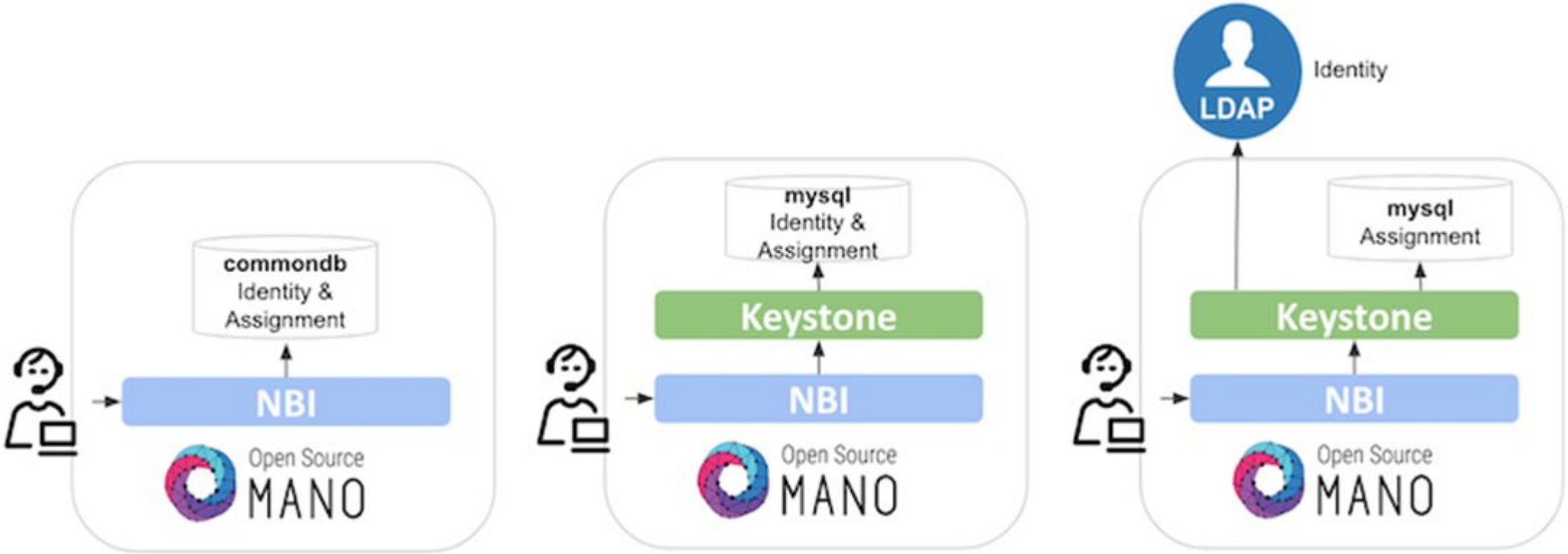
OSM Role Based Access Control (RBAC)

Role-Based Access Control (RBAC) in OSM provides different users and projects a controlled access to different resources. For achieving this, different backends are available.



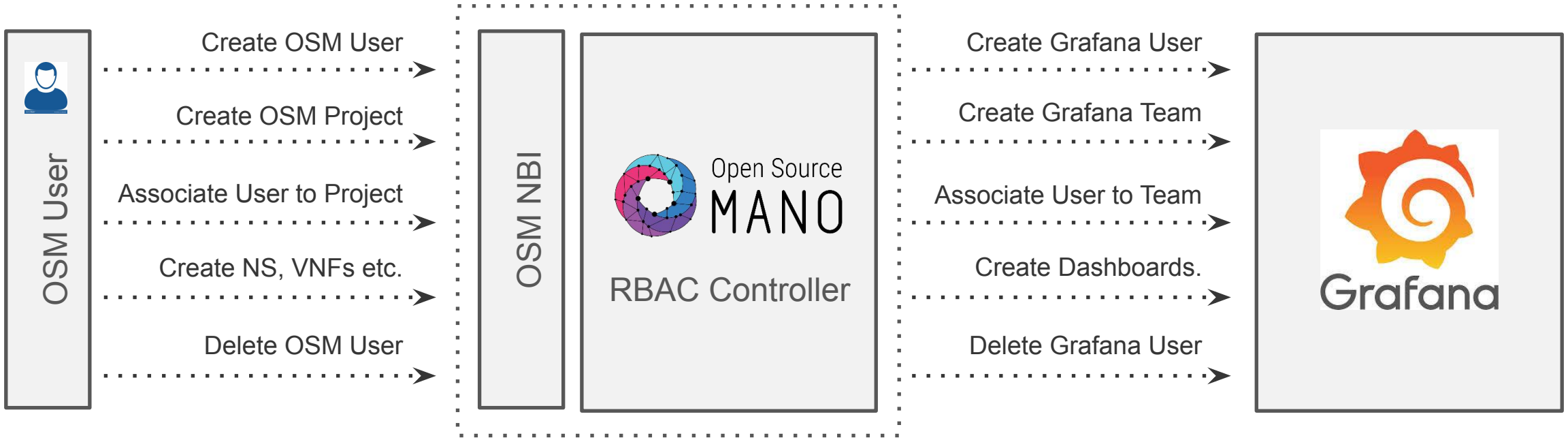
Option 1 (Internal)

Option 2 (Keystone)

Option 3 (LDAP)

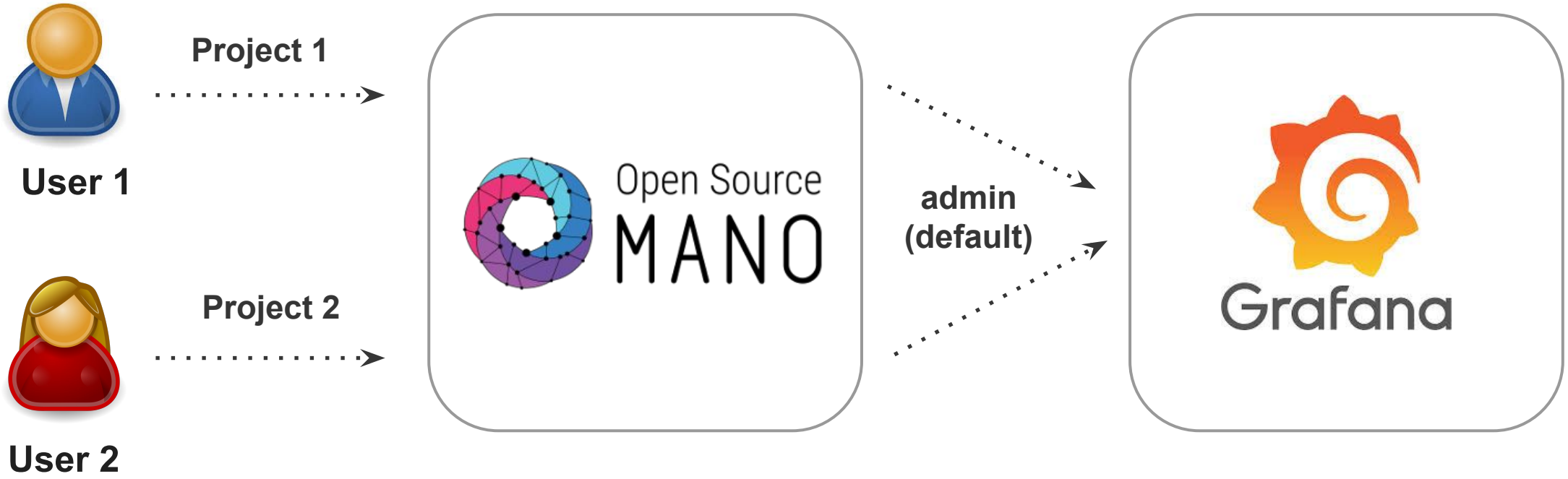
Multi Tenant Grafana

Grafana multi-tenancy extends the RBAC feature to OSM's Grafana and provides OSM users with controlled access to OSM dashboards. With multi-tenancy, users can now login to Grafana with their OSM credentials instead of a common username as was the case in previous releases.

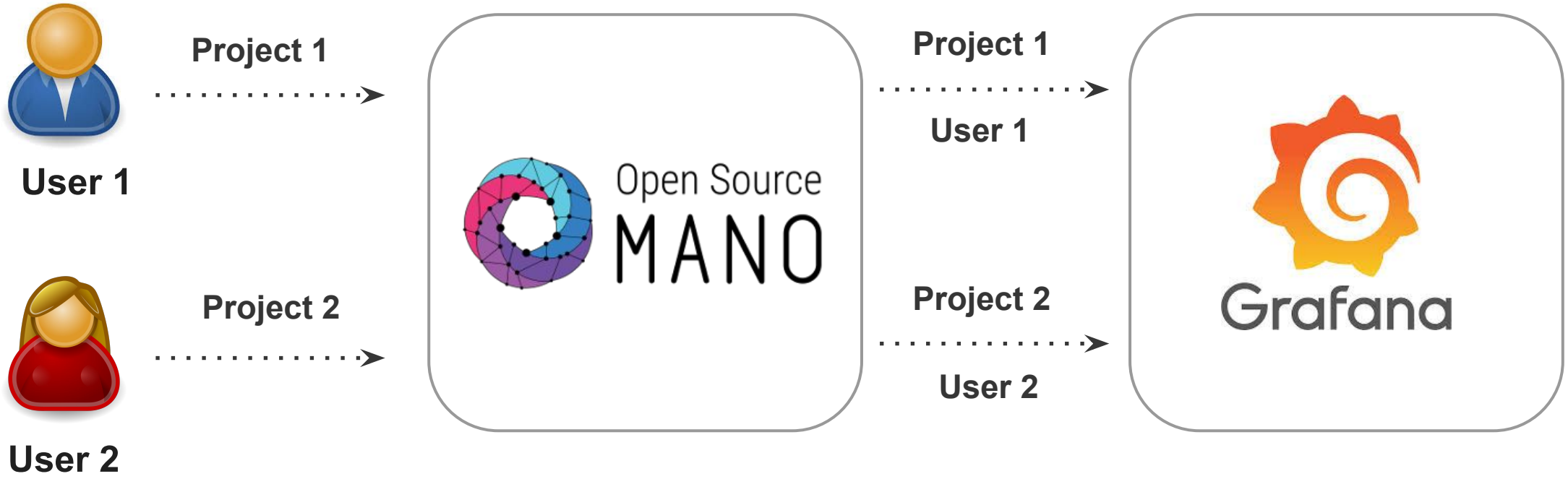


Feature Description: https://osm.etsi.org/gerrit/#/c/osm/Features/+/9177/

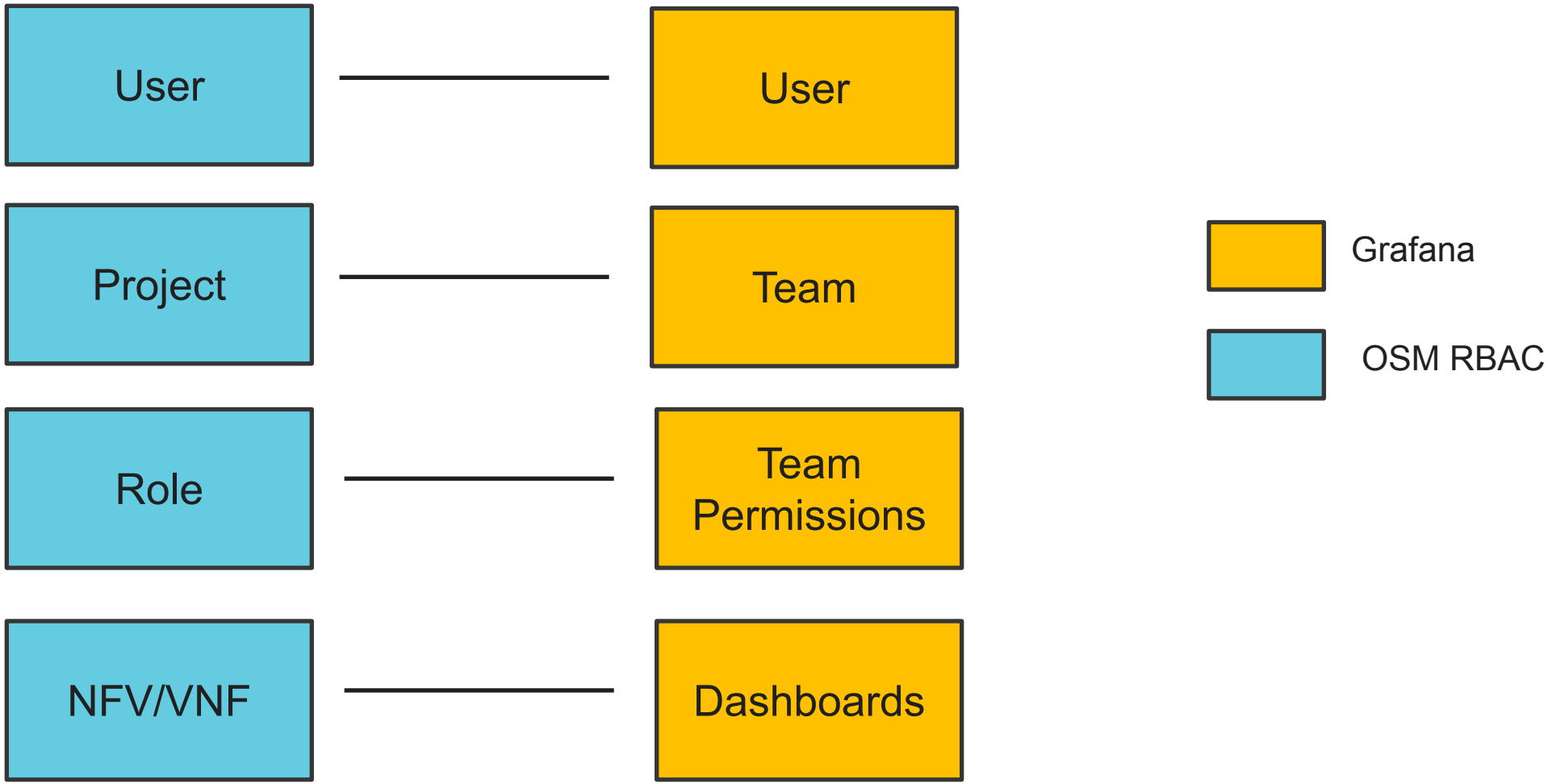
How it was before Release 9?

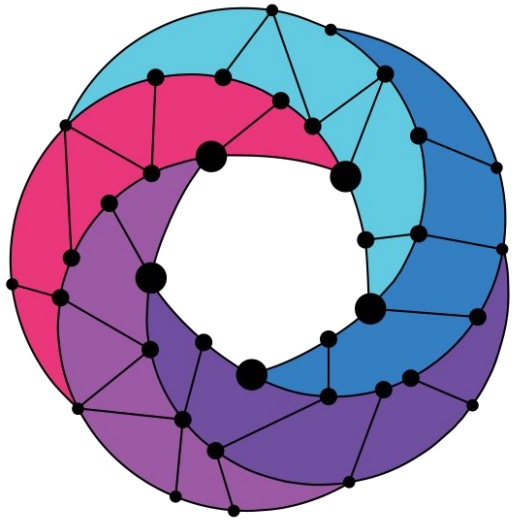


How it is in Release 9?



OSM RBAC & Grafana Mapping





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Thank You !!

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osm.etsi.org/wikipub