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DARE
DIGITAL LIFELONG PREVENTION

An Overview of the Monitoring and Accounting Architecture for Computing within INFN Projects

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- Examples

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Context



General concepts



Accounting

- Tracks resource usage and user activities.
- Essential for cost management, auditing, and compliance.
- Often used in cloud computing and enterprise environments.



Monitoring

- Continuous observation of systems, networks, and applications.
- Helps detect anomalies, performance issues, and security threats.
- Uses tools like logs, metrics, and alerts.



Difference

- Monitoring focuses on real-time system health and performance.
- Accounting focuses on tracking and reporting resource usage over time.



INFN Cloud project

For almost 5 years INFN made available to its users **INFN Cloud**: an easy to use, distributed, user-centric cloud infrastructure and services portfolio targeted to scientific communities.

INFN offers to its users a comprehensive and integrated set of Cloud services through its dedicated INFN Cloud infrastructure. The INFN Cloud **portfolio**, available via an easy-to-use web interface, is defined upon clear users' requirements. It is based on composable, open-source solutions and can be easily extended either by the INFN Cloud support team or directly by end users.

The INFN Cloud infrastructure is based on a **core backbone** connecting the large data centers of CNAF and Bari, and on **several federated sites** connecting to the backbone



DARE project and connection with INFN

DARE (DigitAl lifelong pRevEntion) is a project part of the Italian National Recovery and Resilience Plan (NRRP). The initiative, taking advantage of new digital technologies, is aimed at creating and developing a community of knowledge, connected and distributed, which encourages the establishment of models and solutions for surveillance, prevention, health promotion and health safety.

The collaboration with INFN includes both the supply of **computational resources** (hardware) and **technical support** for their use and the **technologies** that can be deployed on them.

Considering the special nature of the data, i.e. **personal data** belonging to the medical field, we need a **secure infrastructure**, capable of dealing with any malicious attacks coming from the outside. Our platform was designed to meet these security needs.

Accounting



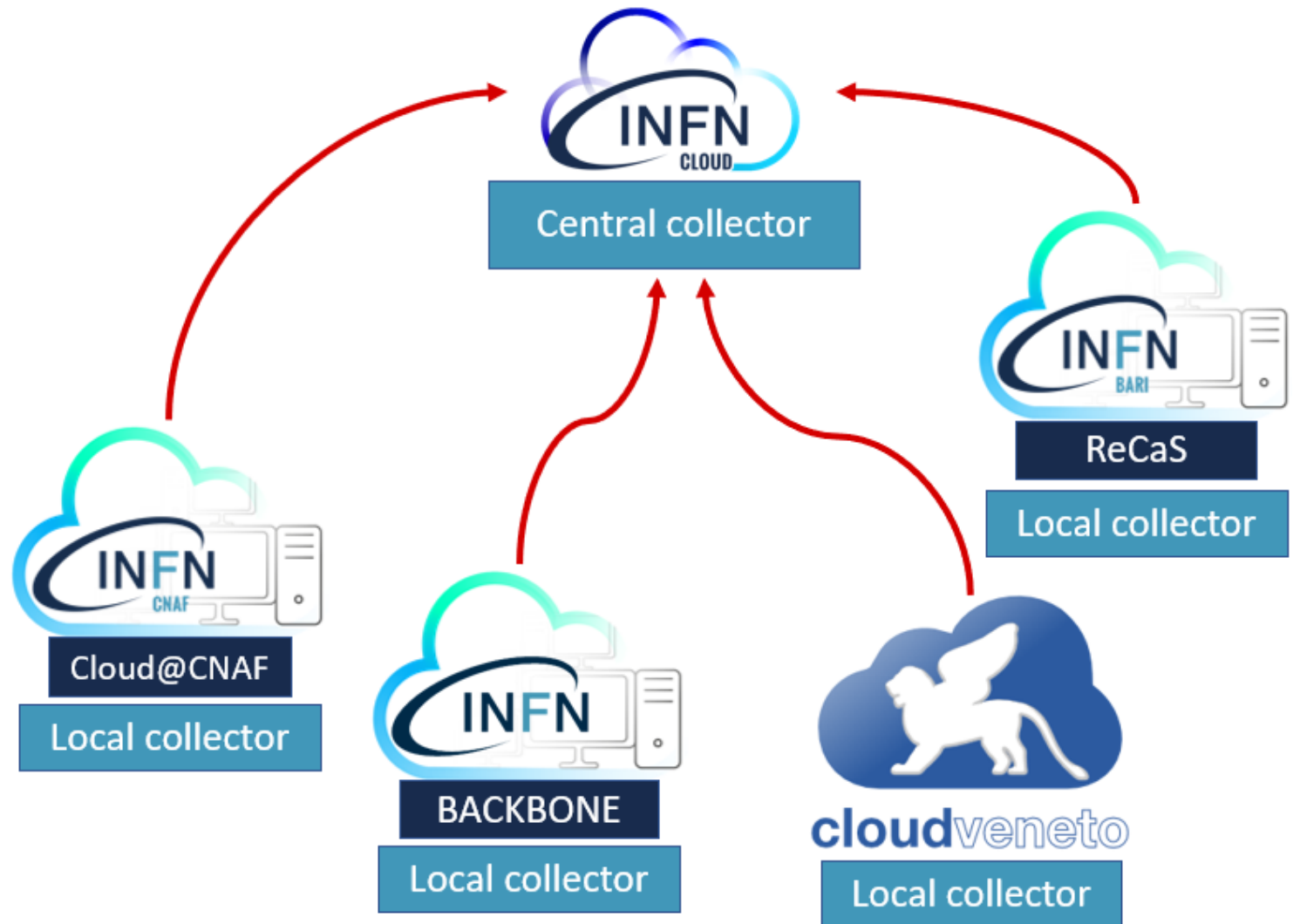
Infrastructure

Local collector

- Same on every cloud
- Collect metrics

Central collector

- Collect metrics from all clouds
- Store and display data



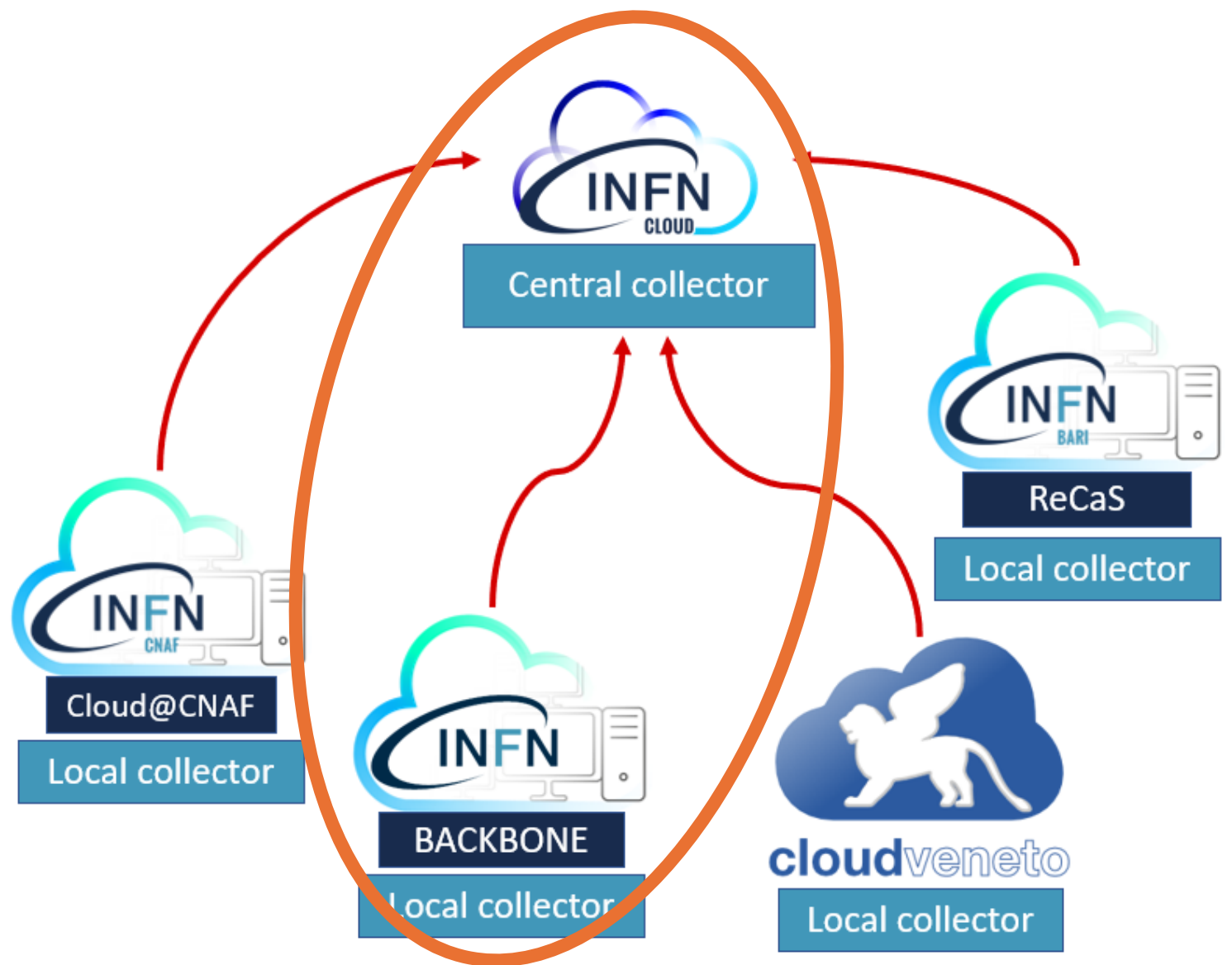
Infrastructure

Local collector

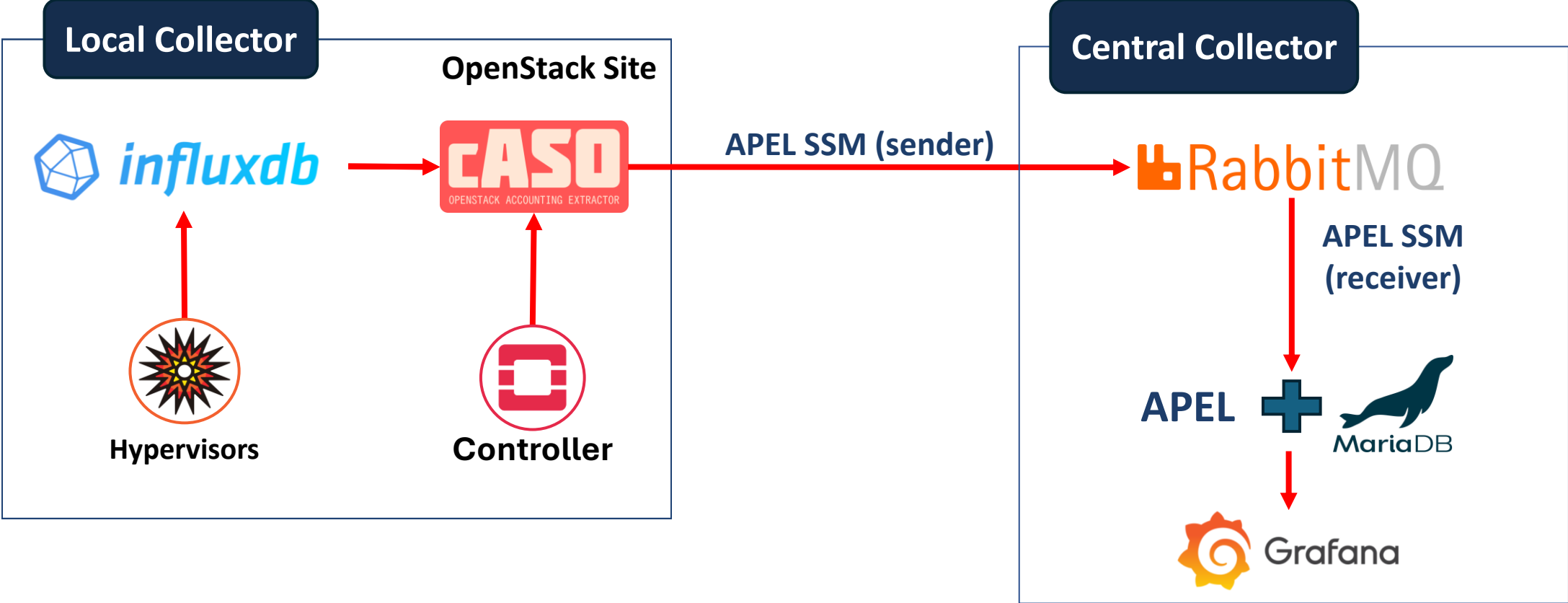
- Same on every cloud
- Collect metrics

Central collector

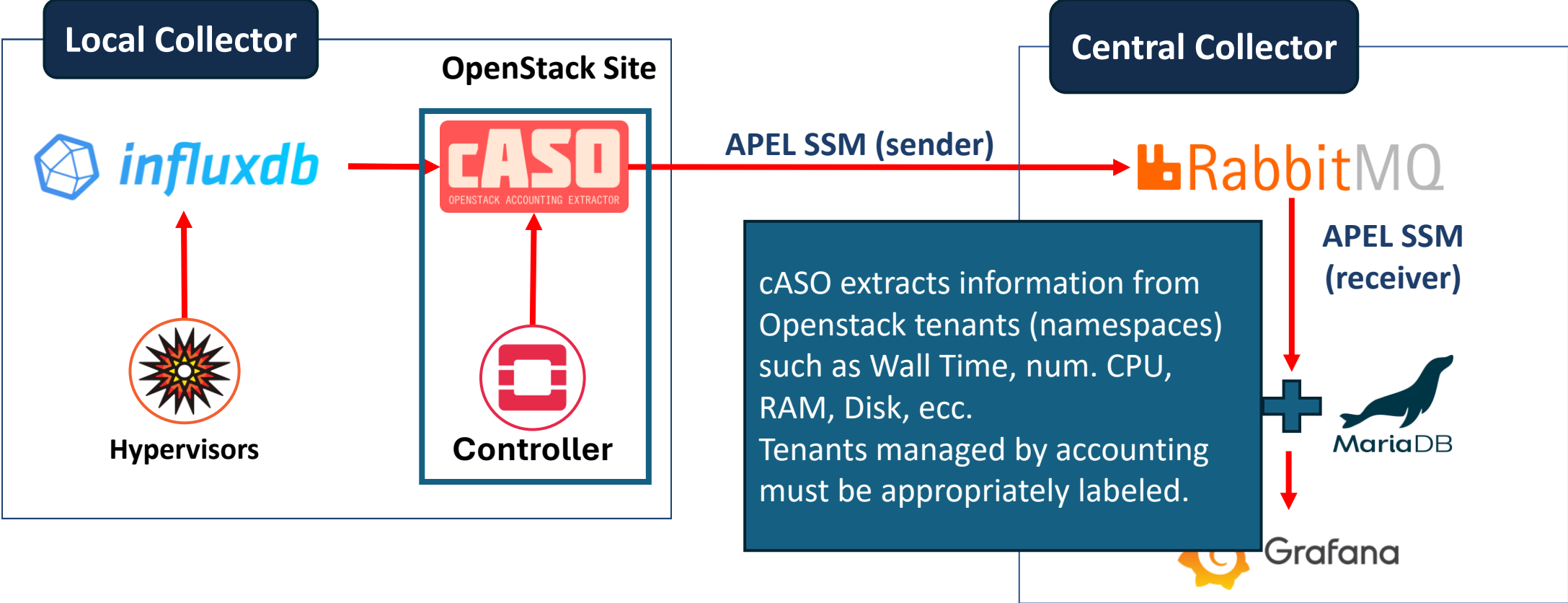
- Collect metrics from all clouds
- Store and display data



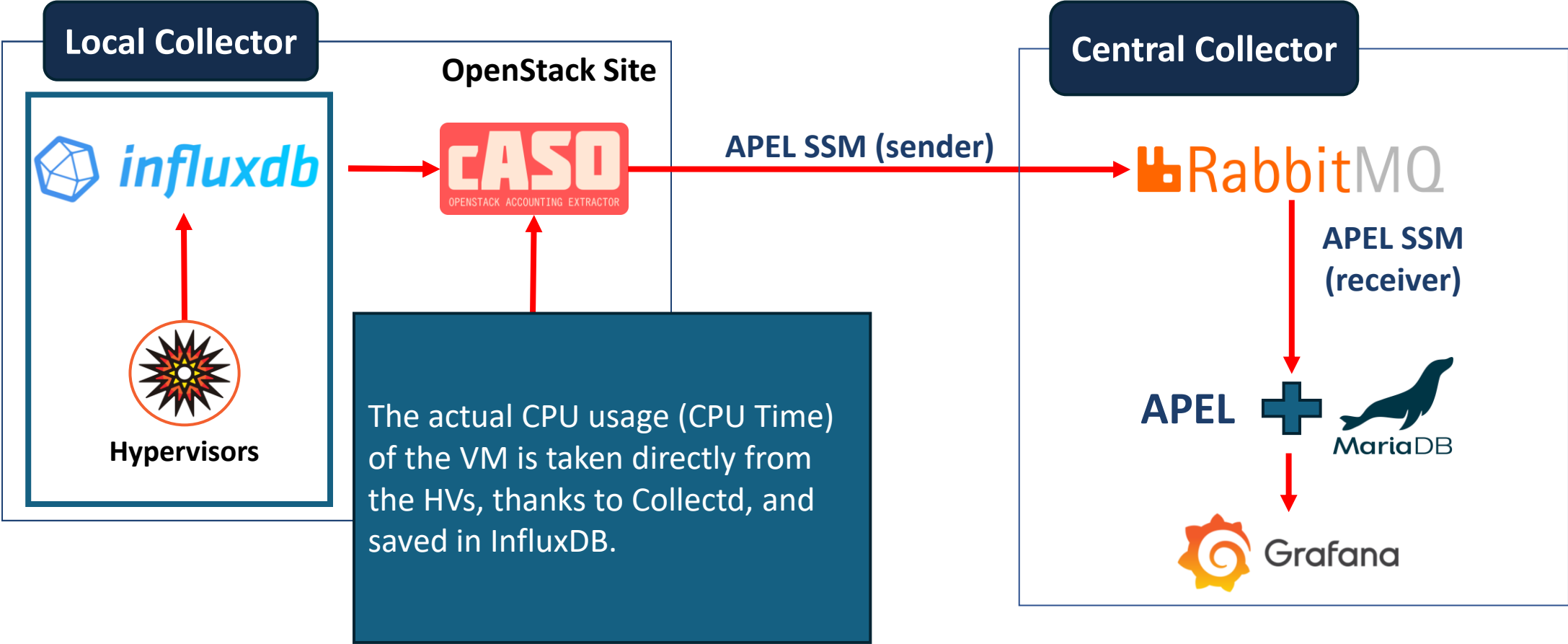
Schema



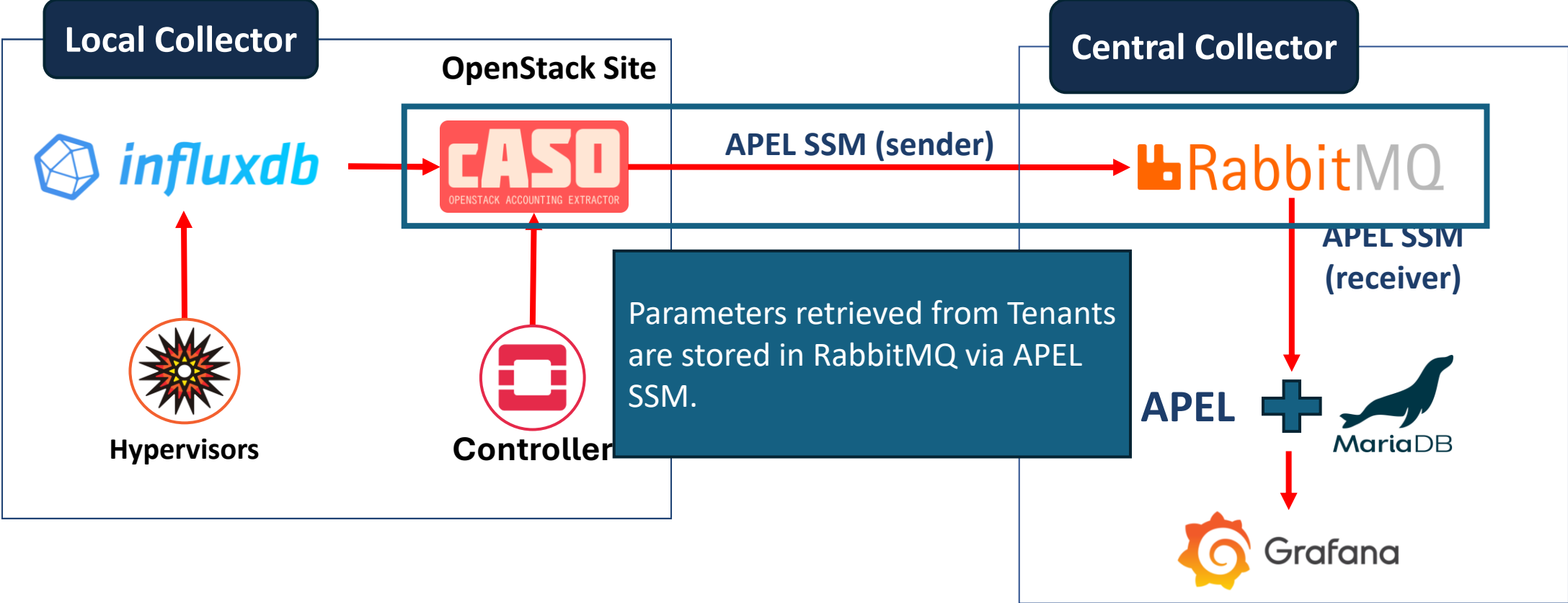
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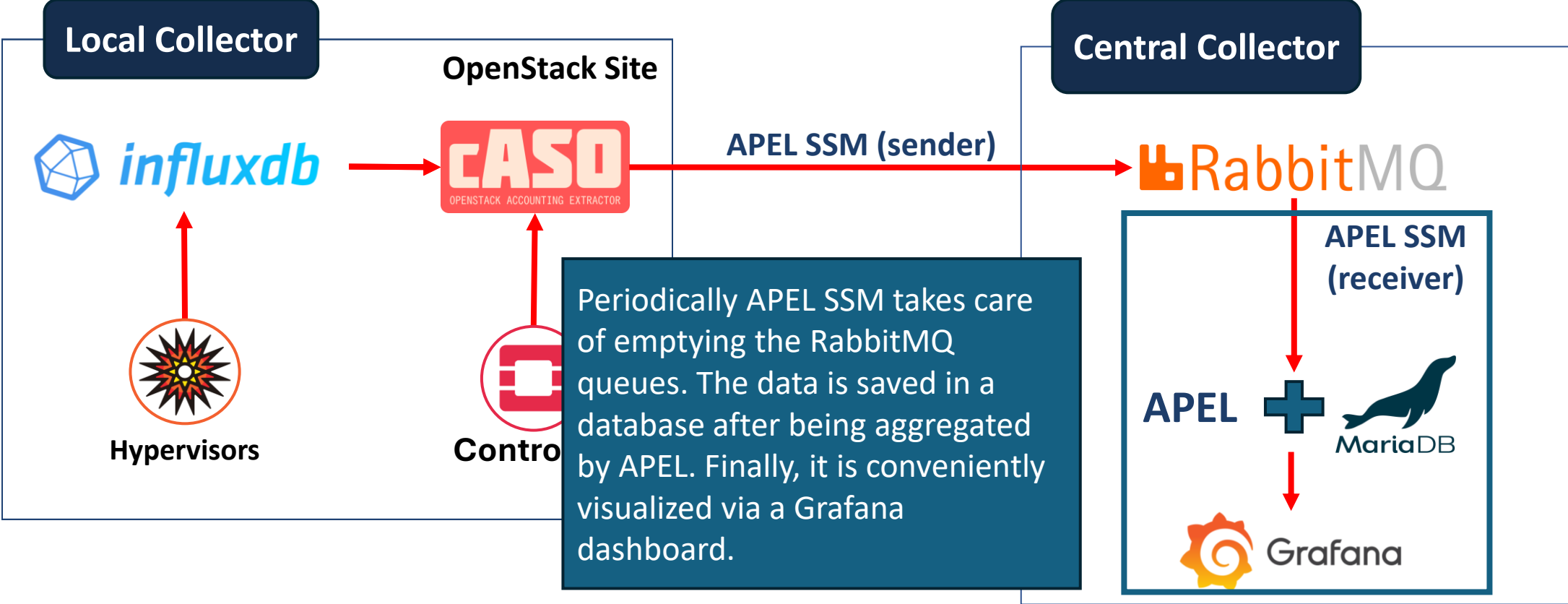
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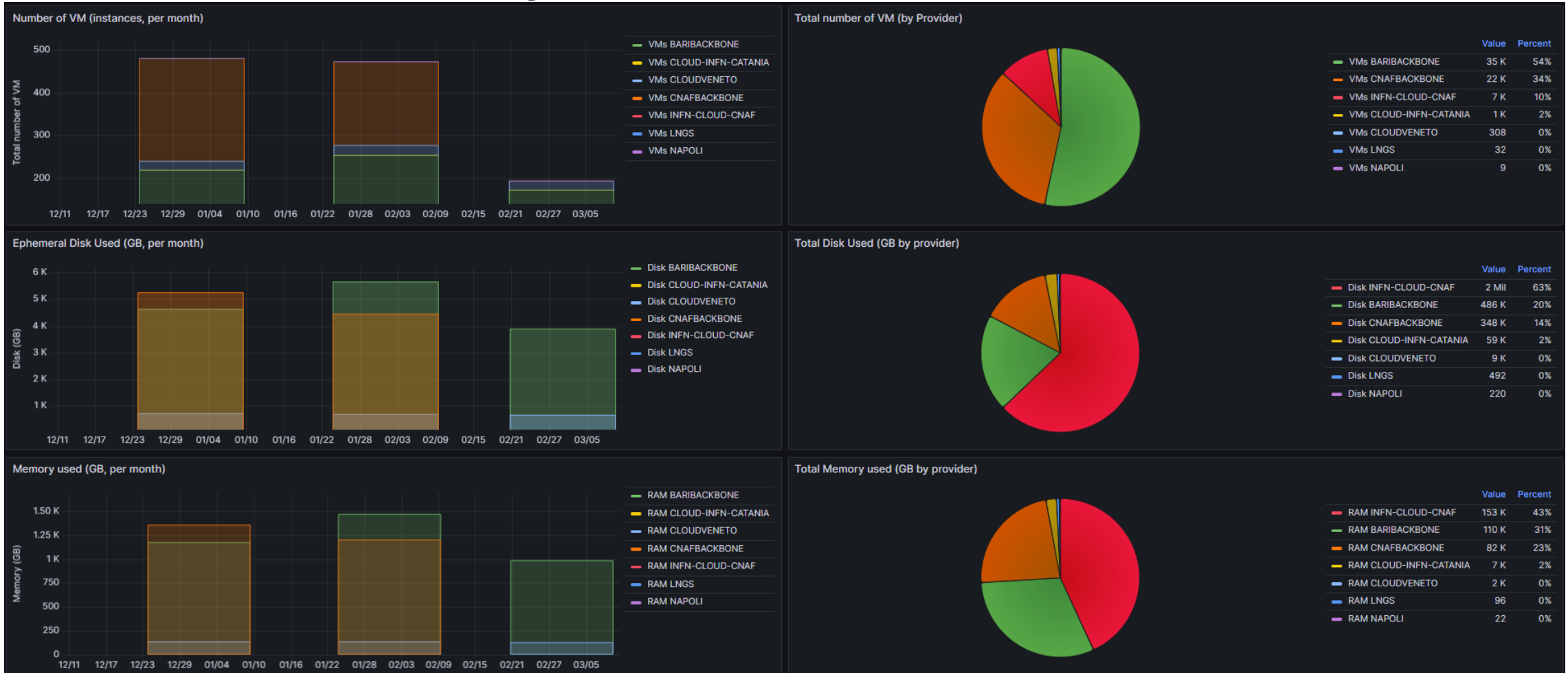
Schema



Schema



Dashboard output

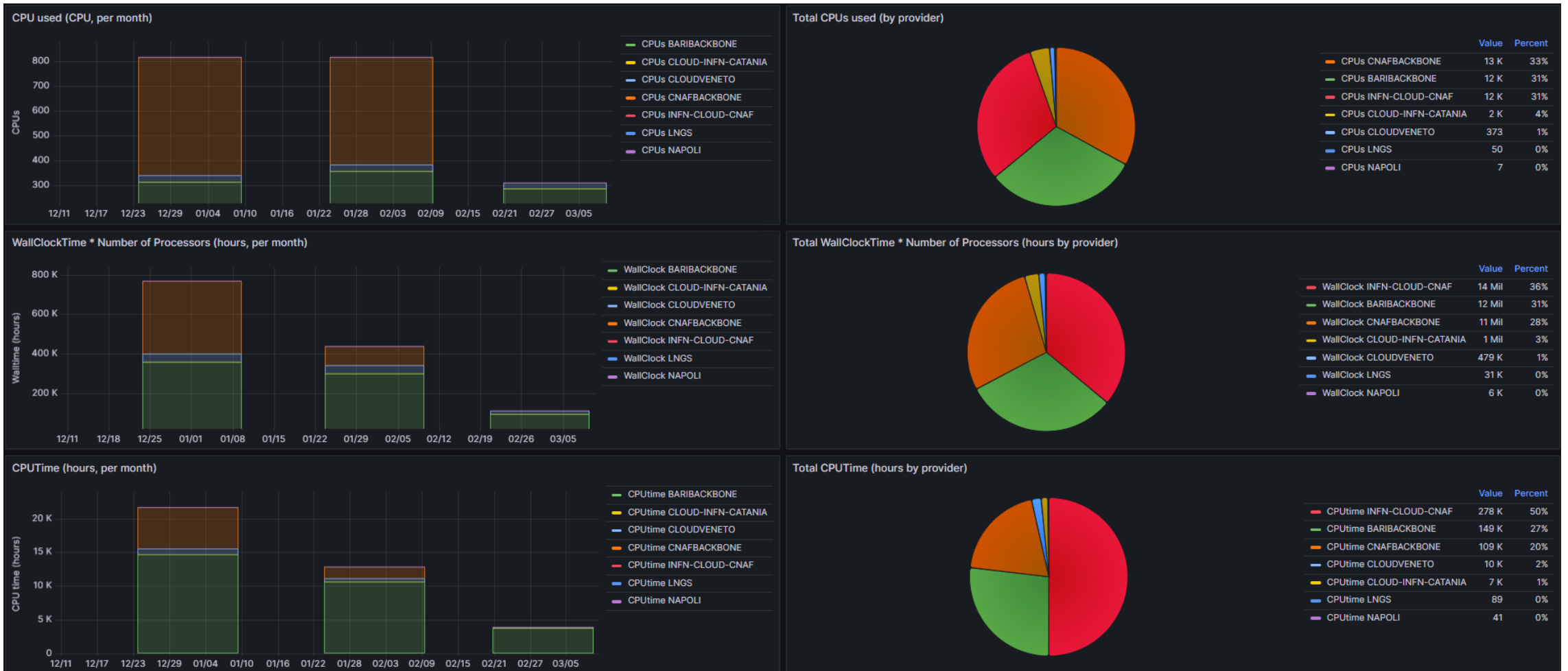


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Dashboard output



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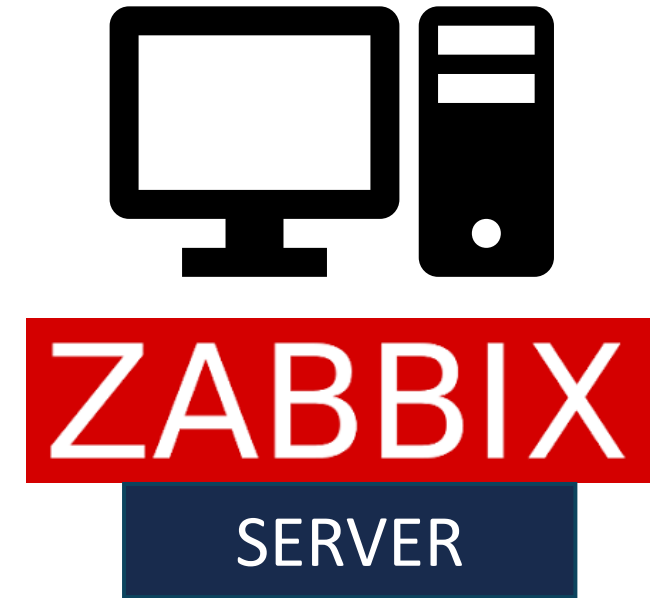
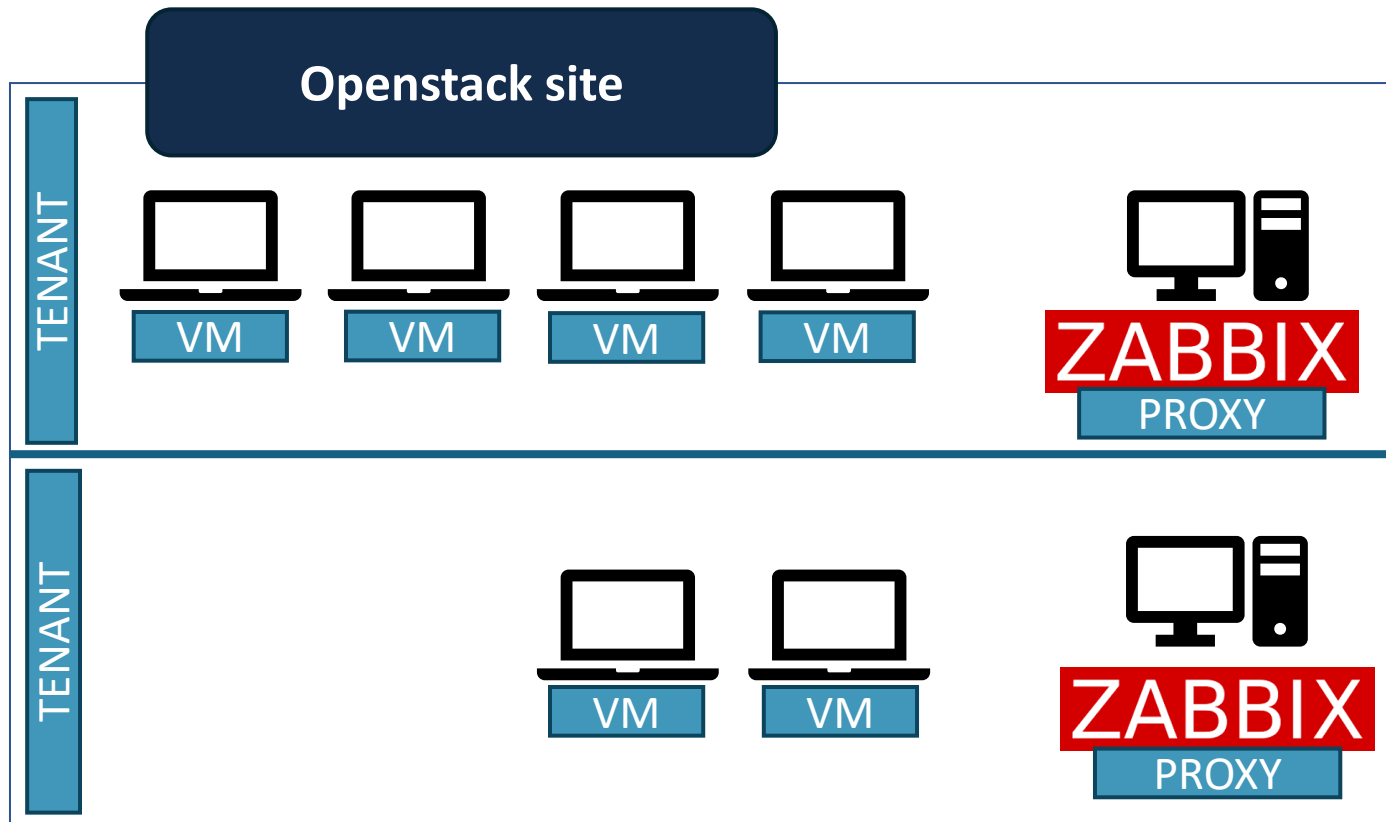
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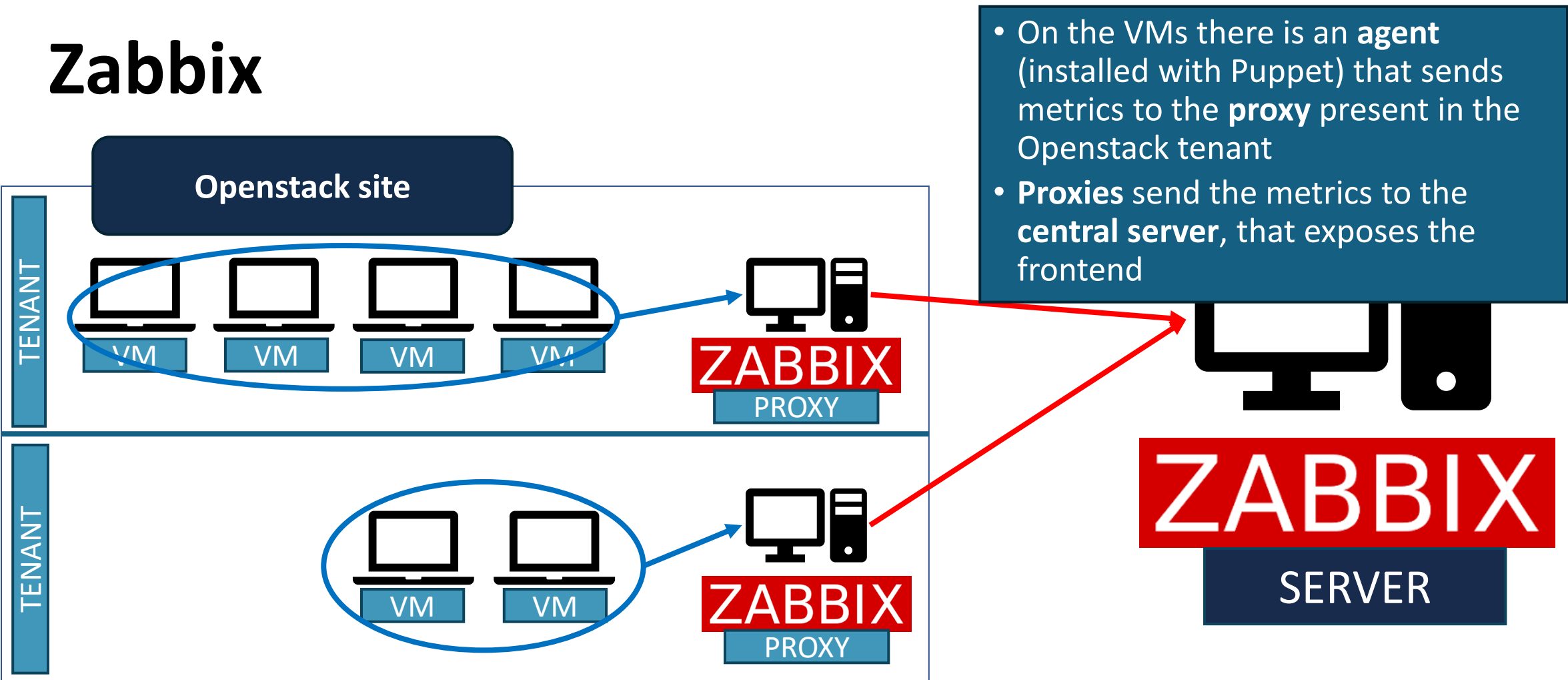
Monitoring



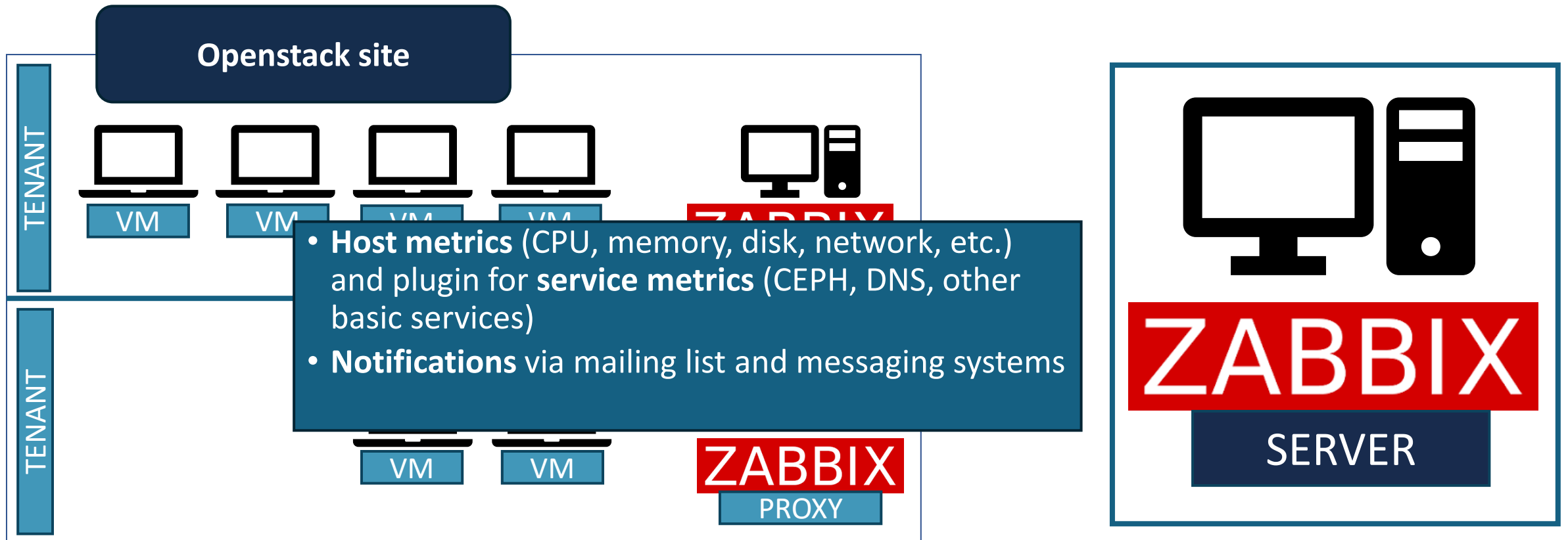
Zabbix

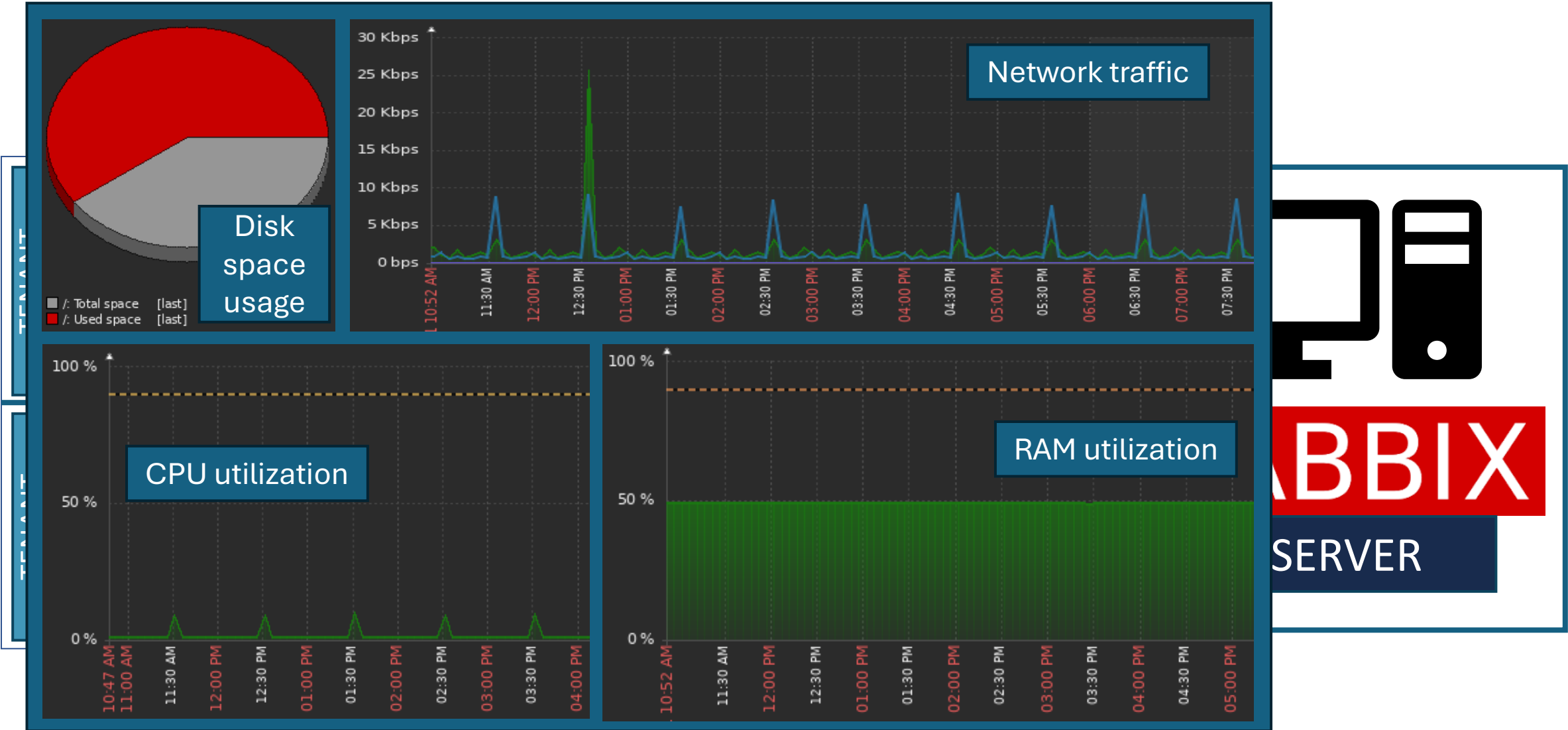


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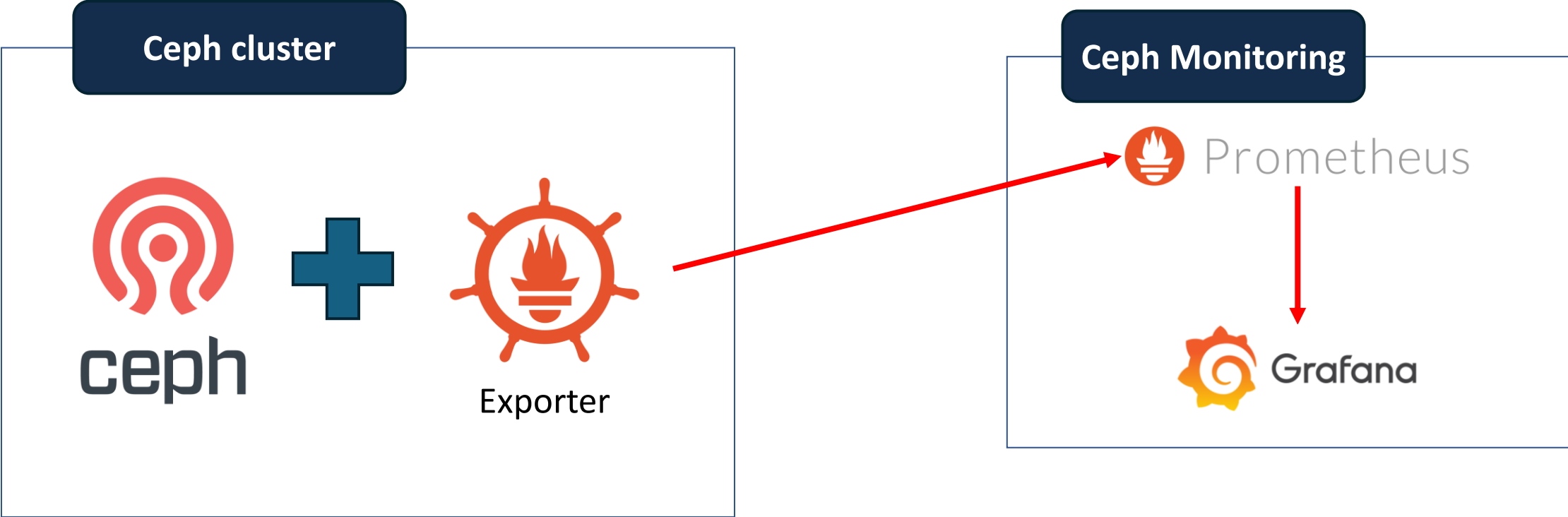


Zabbix





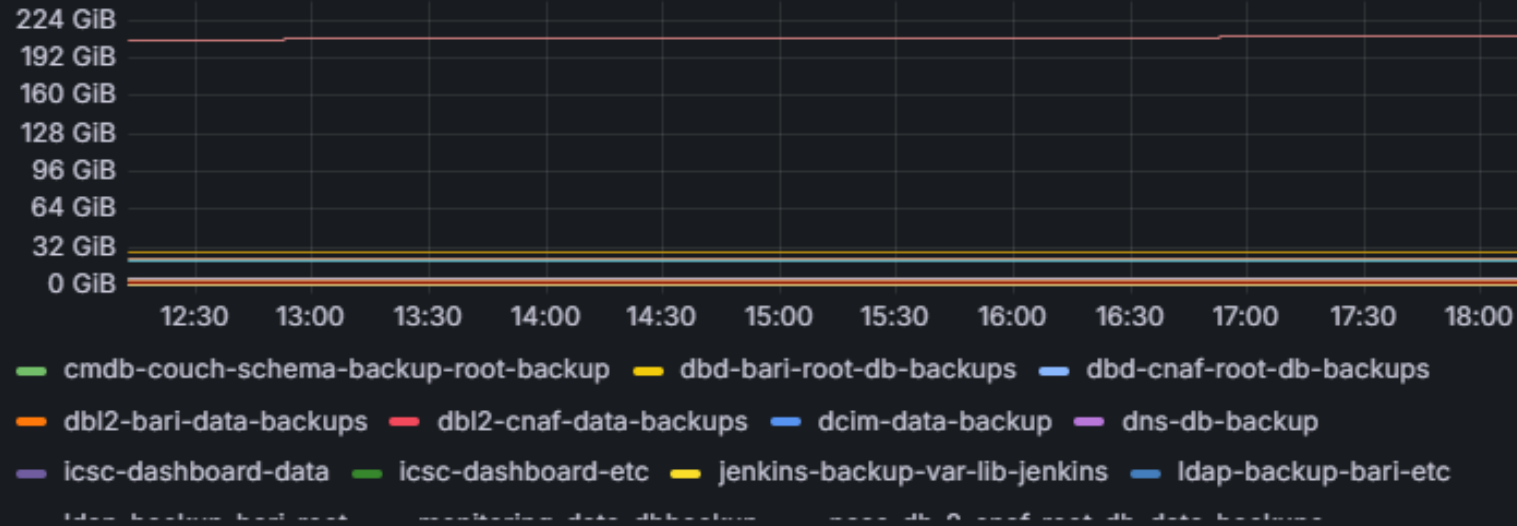
Ceph Storage



Ceph Storage

Ceph cluster

Folders in coreservices bucket - Size



Monitoring

Prometheus



Grafana

Rally

Rally is a **benchmarking-as-a-service** framework designed to test and measure performance across various components (Nova, Neutron, Cinder, Keystone, etc.) of an OpenStack instance.

It runs **preconfigured tests** (create/delete VM, volumes, snapshot, networks, routers, etc.) on OpenStack components, **simulating** real user workloads.

At the end of the test, it generates **detailed reports** with metrics on the executed tests.

Task overview

Scenario	Load duration (s)	Full duration (s)	Iterations	Runner	Errors	Hooks	Success (SLA)
Authenticate.keystone	0.276	1.172	1	constant	0	0	✓
CinderVolumes.create_and_attach_volume	230.214	246.967	1	constant	1	0	✗
CinderVolumes.create_and_delete_snapshot	4.581	14.586	1	constant	0	0	✓
CinderVolumes.create_and_delete_volume	4.588	7.888	1	constant	0	0	✓
CinderVolumes.create_and_delete_volume-2	4.674	9.146	1	constant	0	0	✓
CinderVolumes.create_and_delete_volume-3	4.567	7.772	1	constant	0	0	✓
CinderVolumes.create_and_extend_volume	6.896	9.944	1	constant	0	0	✓
CinderVolumes.create_and_list_snapshots	2.435	15.430	1	constant	0	0	✓
CinderVolumes.create_and_list_volume	2.775	9.448	1	constant	0	0	✓
CinderVolumes.create_and_list_volume-2	2.605	8.268	1	constant	0	0	✓
CinderVolumes.create_and_upload_volume_to_image	33.593	37.959	1	constant	0	0	✓
CinderVolumes.create_from_volume_and_delete_volume	4.650	15.310	1	constant	0	0	✓
GlanceImages.create_and_delete_image	4.735	6.480	1	constant	0	0	✓
GlanceImages.create_and_list_image	3.976	8.883	1	constant	0	0	✓
GlanceImages.list_images	0.067	1.570	1	constant	0	0	✓
NeutronNetworks.create_and_delete_networks	0.634	5.793	1	constant	0	0	✓
NeutronNetworks.create_and_delete_ports	0.836	7.083	1	constant	0	0	✓
NeutronNetworks.create_and_delete_routers	6.916	15.296	1	constant	0	0	✓
NeutronNetworks.create_and_delete_subnets	0.841	7.527	1	constant	0	0	✓
NeutronNetworks.create_and_list_networks	0.566	7.117	1	constant	0	0	✓
NeutronNetworks.create_and_list_ports	0.756	8.894	1	constant	0	0	✓
NeutronNetworks.create_and_list_routers	3.076	15.815	1	constant	0	0	✓
NeutronNetworks.create_and_list_subnets	0.703	9.049	1	constant	0	0	✓
NeutronNetworks.create_and_update_networks	0.552	7.365	1	constant	0	0	✓
NeutronNetworks.create_and_update_ports	0.994	9.454	1	constant	0	0	✓
NeutronNetworks.create_and_update_routers	4.592	16.508	1	constant	0	0	✓
NeutronNetworks.create_and_update_subnets	1.149	9.833	1	constant	0	0	✓
NovaKeypair.boot_and_delete_server_with_keypair	9.867	29.866	1	constant	0	0	✓
NovaKeypair.create_and_delete_keypair	0.445	3.397	1	constant	0	0	✓
NovaKeypair.create_and_list_keypairs	0.675	5.143	1	constant	0	0	✓
NovaServers.boot_and_bounce_server	288.752	319.464	1	constant	0	0	✓

Conclusion

Summary, issues and future prospects



Summary

- Accounting and Monitoring are useful tools for **controlling** an infrastructure
- Easy **scalability**



Issues

- APEL **incompatible** with new CASO versions, which introduces new metrics regarding FloatingIP, volumes and accelerators (GPU and FPGA)
- Organize the monitoring part, divided into too many **different tools**



Future prospects

- Trying to make a **PR to the APEL repository** to manage the metrics collected by CASO
- Use monitoring to automatically **failover** geographically duplicated services
- Integrate Rally and Zabbix metrics to help the orchestrator **scheduling algorithm** find the best federated cloud to deploy a service



Thank you

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