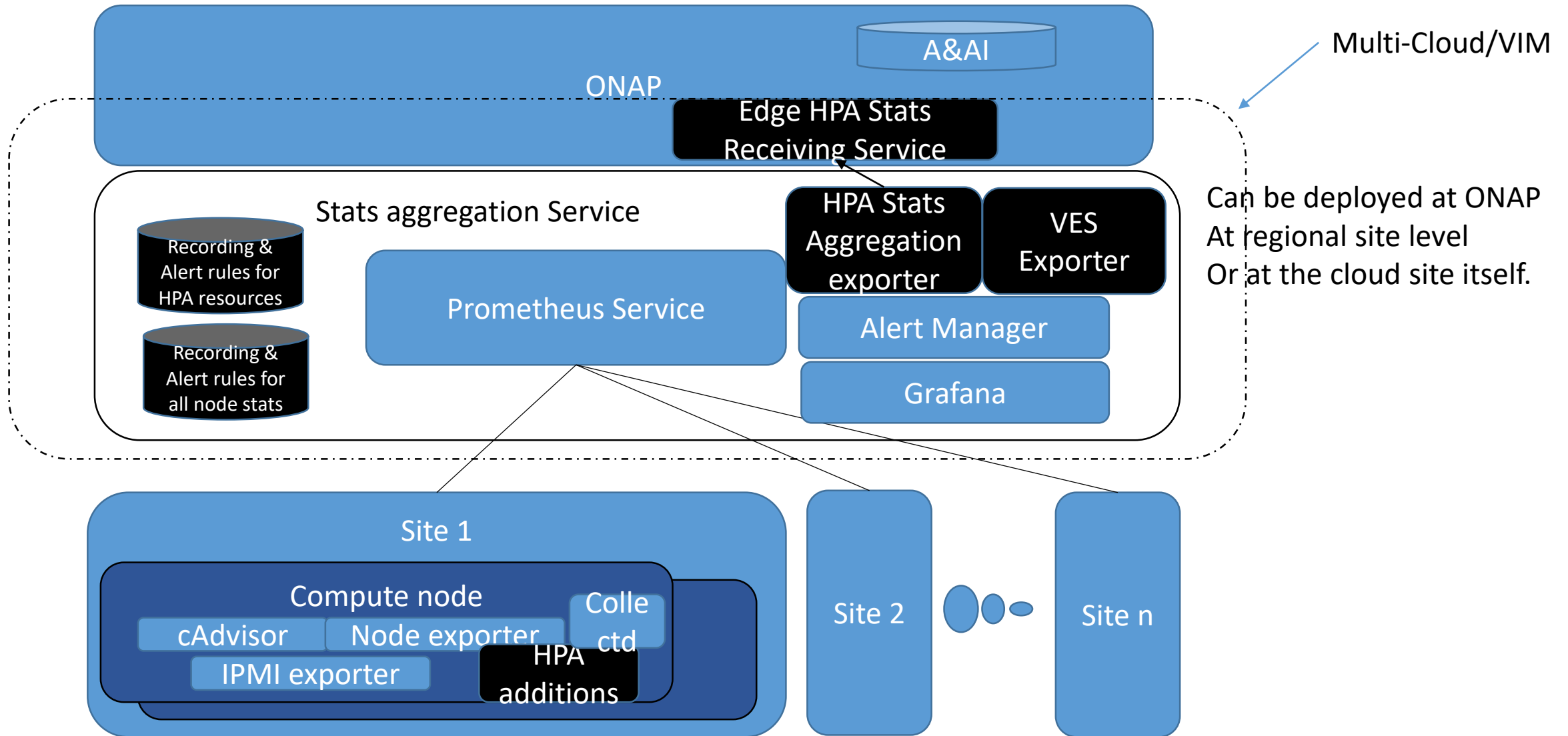# Telemetry Collection & Aggregation
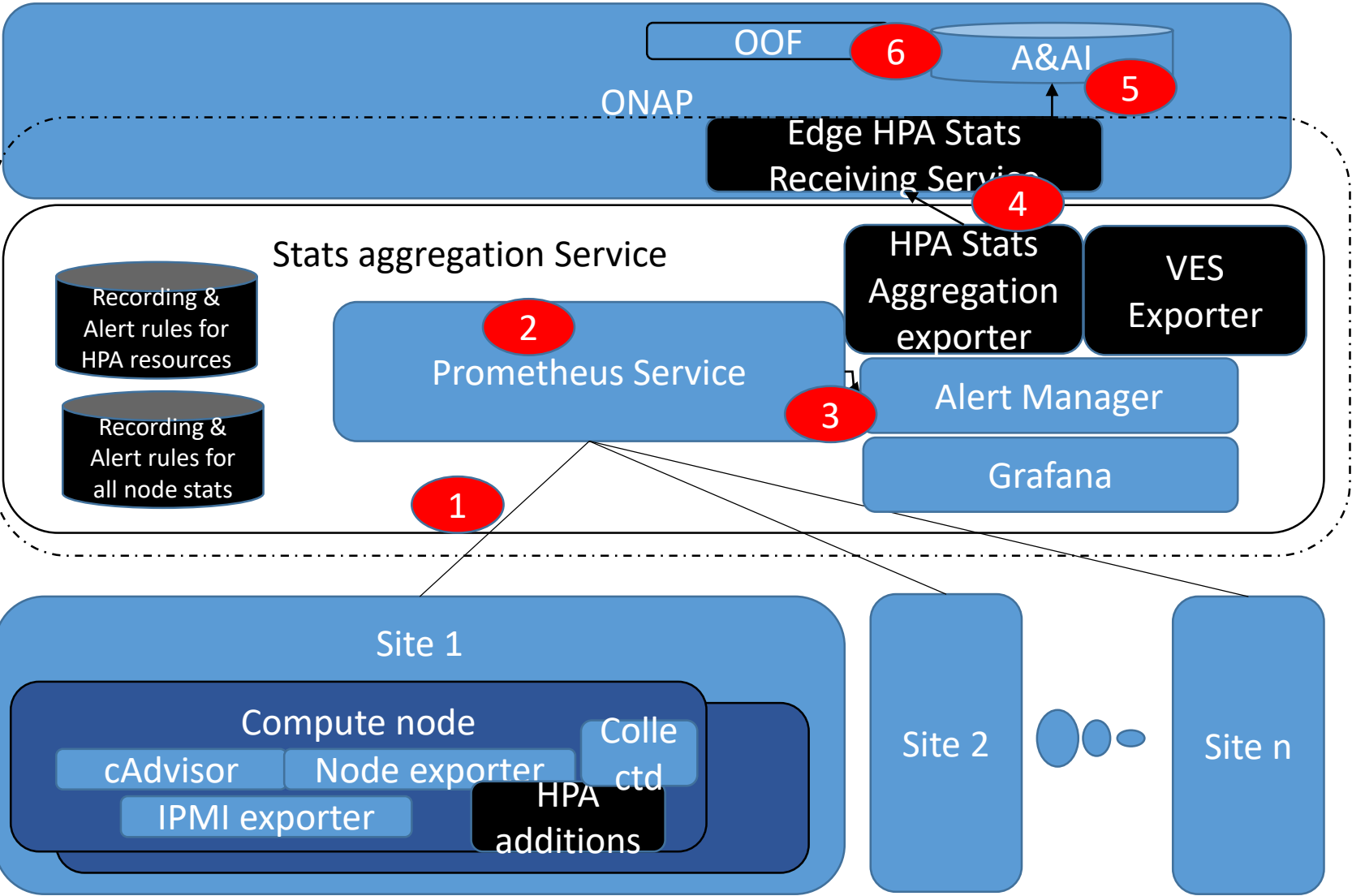# Infrastructure statistics & HPA telemetry

Requirements

- Collect hardware, infrastructure (Linux OS), Hypervisor and Kubelet statistics.
- Aggregate them for consumption
  - Via rules.
- Provide visualization of statistics
  - At site granularity level
  - At compute node granulairy level.
  - Historical level
  - Applying some formaulas
- Counter collection & aggregation service
  - At ONAP level.
  - At Regional Controller level
  - At Site level.
- Placement decisions based on HPA resource health/availability.

Architecutre components

Multi-Cloud/VIM

A&AI

ONAP

Edge HPA Stats Receiving Service

Can be deployed at ONAP
At regional site level
Or at the cloud site itself.

Stats aggregation Service

Recording & Alert rules for HPA resources

Recording & Alert rules for all node stats

Prometheus Service

HPA Stats Aggregation exporter

VES Exporter

Alert Manager

Grafana

Site 1

Compute node

cAdvisor

Node exporter

Colle ctd

IPMI exporter

HPA additions

Site 2

Site n

Simple flow – for quick understanding

1. Prometheus scrapes various targets of compute nodes periodically. Collects counters.
2. Prometheus applies recording rules to put relevant data in time series DB.
3. Promethus runs alerting rules and sends the alerts to "HPA Stats aggregation exporter".
4. "Aggregation exporter sends the stats to HPA stats receiver.

Note : If Site aggregation service is part of ONAP deployment, both exporter and receiving service need not be there as two different services.

5. A&AI DB is updated with HPA feature resource information.
6. OOF uses this information to ensure that VNFs are placed in sites that not only have capabilities, but also have enough resources.

Work items

- Create platform
  - Enable node exporter, cAdvisor, IPMI for compute nodes.
  - Enable Promethus service and Grafana Service
  - Enable existing Alert Manager for testing
  - Develop exporter (similar to Alert Manager service in Prometheus)

- Concentrate on HPA
  - Identify HPA features
    - Cores, Memory, Disk, Huge pages, PCIe devices
  - Identify the counters related
    - Current resource usage, free resources available (Free cores, Free memory, Free huge pages, Free VFs)
    - Health of the PCIe devices.
  - Create recording & alert rules.

- Exporter and Service to receive the exported functions
  - Put it in A&AI - A&AI Schema changes?
  - TBD – per compute node basis or per site basis or per flavor basis.

- Placement (OOF)
  - Check the health and resource availability in selecting the right site and flavor.

Phases

- Phase 1 (no new development)
  - Prometheus micro services
  - Node exporter in compute nodes
  - cAdvisor in compute nodes
  - Create recording and alerting rules to see alert manager alerts HPA related feature metrics.
  - Use Grafana to ensure system is working fine
- Phase 2
  - Everything else…??? More breakdowns to multiple phases??
- Future
  - Common rule format & conversions to allow multiple monitoring systems.