Element Management System

Looking for an EMS solution, outsourcing or consulting service?

SMALL SCALE

100+ devices
e.g. a school, hospital, mall, office...

MEDIUM SCALE

1.000+ devices
e.g. a multi-branch corporation

LARGE SCALE

10.000+ devices
e.g. a region of an ISP

With 15+ years of experience about world-class EMS products, we can design, deliver & maintain an EMS which:

- Reduces the operational cost
- Improves the performance
- Maintains the reliability

Sample requirements

- Hide the complexities inside the devices and network protocols, provide an abstract view which is service-oriented and human-friendly
- Bulk operations to quickly provision, manage and control large amount of devices
- Keep track of device status, raise alarms, generate reports, draw the graphical charts
- Analyze the data, predict the potential issues (by augmented intelligent) to mitigate the risks
- Automate the operations to reduce human effort
- Compatible with devices from various vendors via extension support
- User management which supports multiple roles & permissions

Characteristics

- Security & stability
- Cloud-native for availability & scalability
- SDN, IBN ready

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Technology Stack

EMS Clients

EMS Microservices

Manager | Monitor | Controller

EMS Common Applications

System Health	Action Manager	Data Migration
Licensing	User Activity Log	NETCONF Client
NETCONF Browser	Alarms Manager	Extension Manager

EMS Framework

NETCONF Stack | Logging | Resource Manager | Statistics Manager | Data Connectors

Third-Party Libraries

Netty, jetty, MINA, HIBERNATE, Log4J, Jersey, spring, Karaf, felix, JVM, python

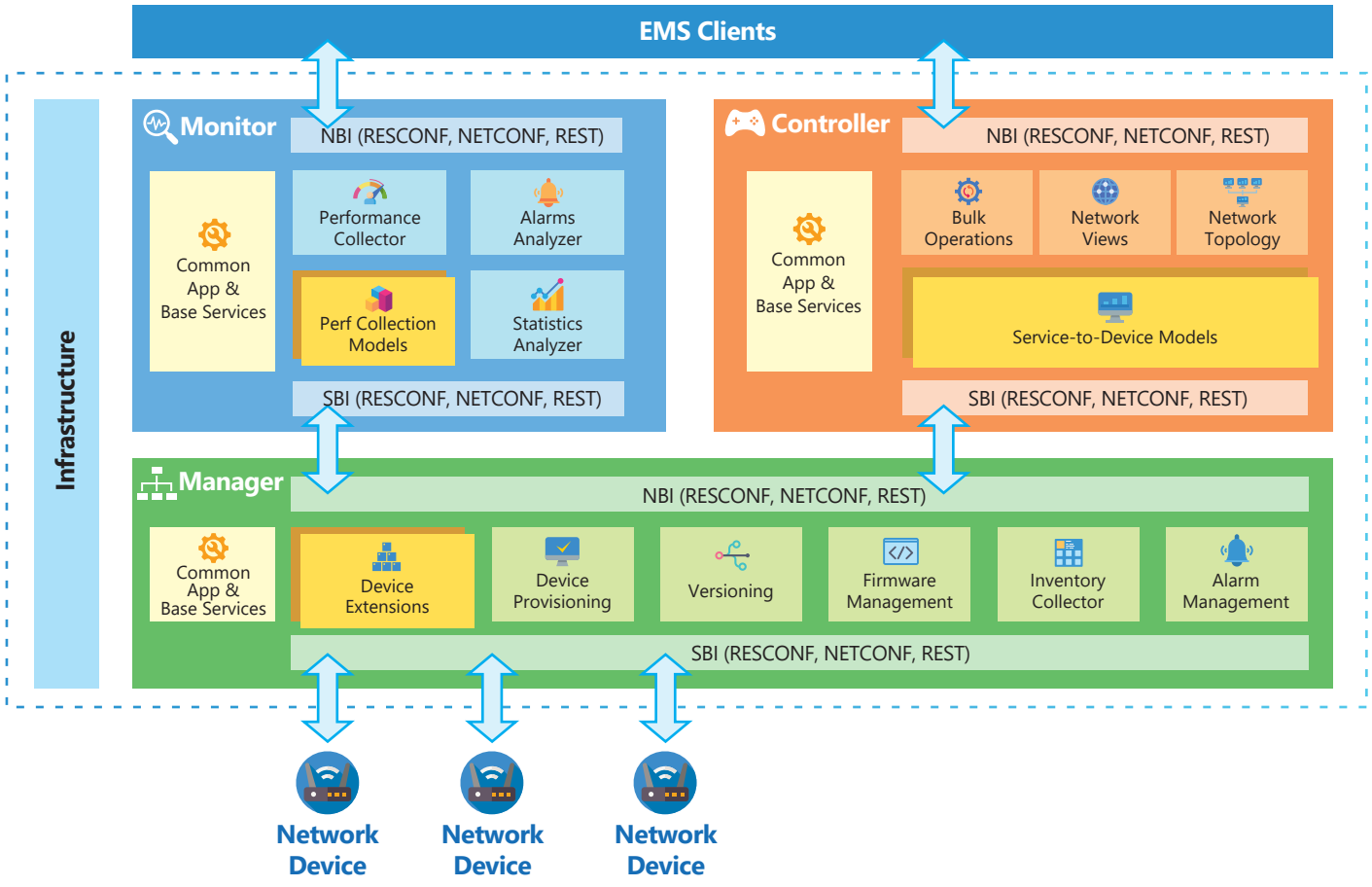
Infrastructure Microservices

kibana, Grafana, kafka, KEYCLOAK, N+, fluentd, logstash, redis, WebDAV, MariaDB, elasticsearch, HBASE, hadoop, ZooKeeper

Platform

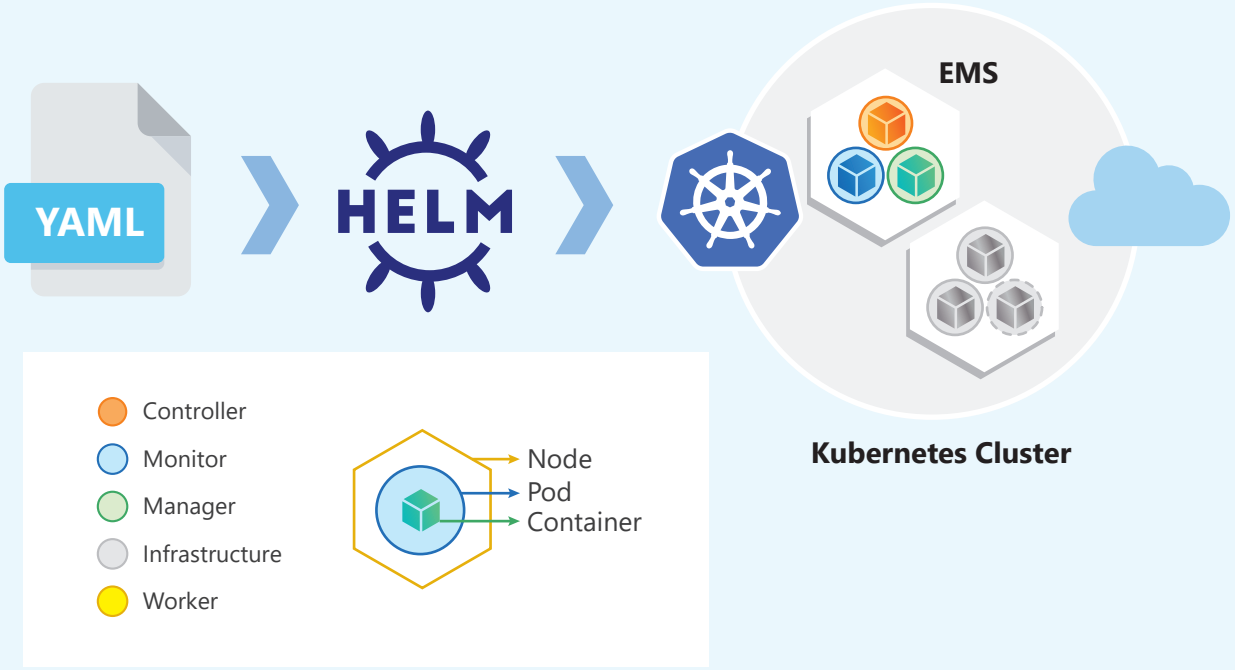
docker, kubernetes, HELM, ubuntu, AWS, openstack

Sample Block Diagram

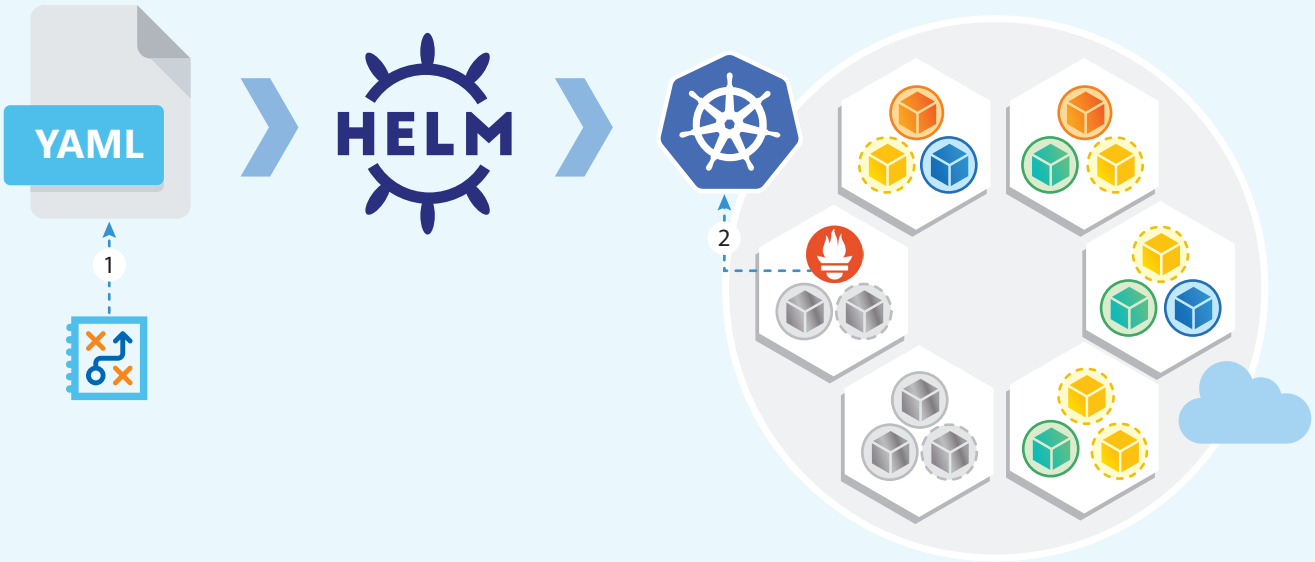


Sample Deployment Models

Simplex



Scaling



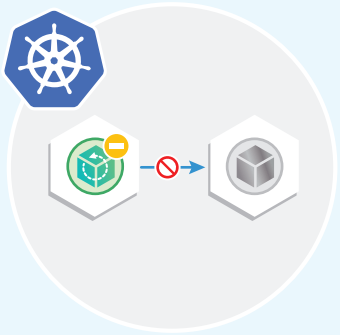
1. Scaling Strategies defined in HELM Charts
2. ... and driven by Application Metrics

StatefulSet
ReplicaSet

Sample High-Level Designs

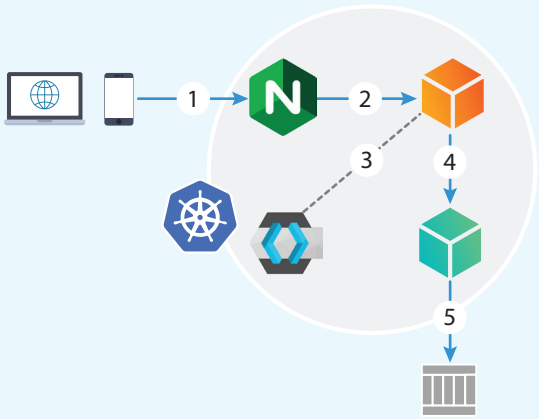
Availability

- 0. Liveness Checks defined
- 1. Liveness Probe running
- 2. Failure detected
- 3. Failed Pod restarted



- 0. Dependencies defined
- 1. Dependency Checks running
- 2. Required Pod unreachable
- 3. Dependent Pod degraded

Security



1. HTTP Interfaces protected by NGINX Ingress Controller
2. HTTP Requests distributed by NGINX Load Balancer
3. Authentication & Authorization confirmed by Keycloak
4. Connections between Services secured by TLS
5. TCP Connections to Devices secured by TLS

Data Protection

1. Sensitive Info stored in K8S Secrets
2. Sensitive Data filtered before logging