Software Defined Infrastructure 전략 및 사례

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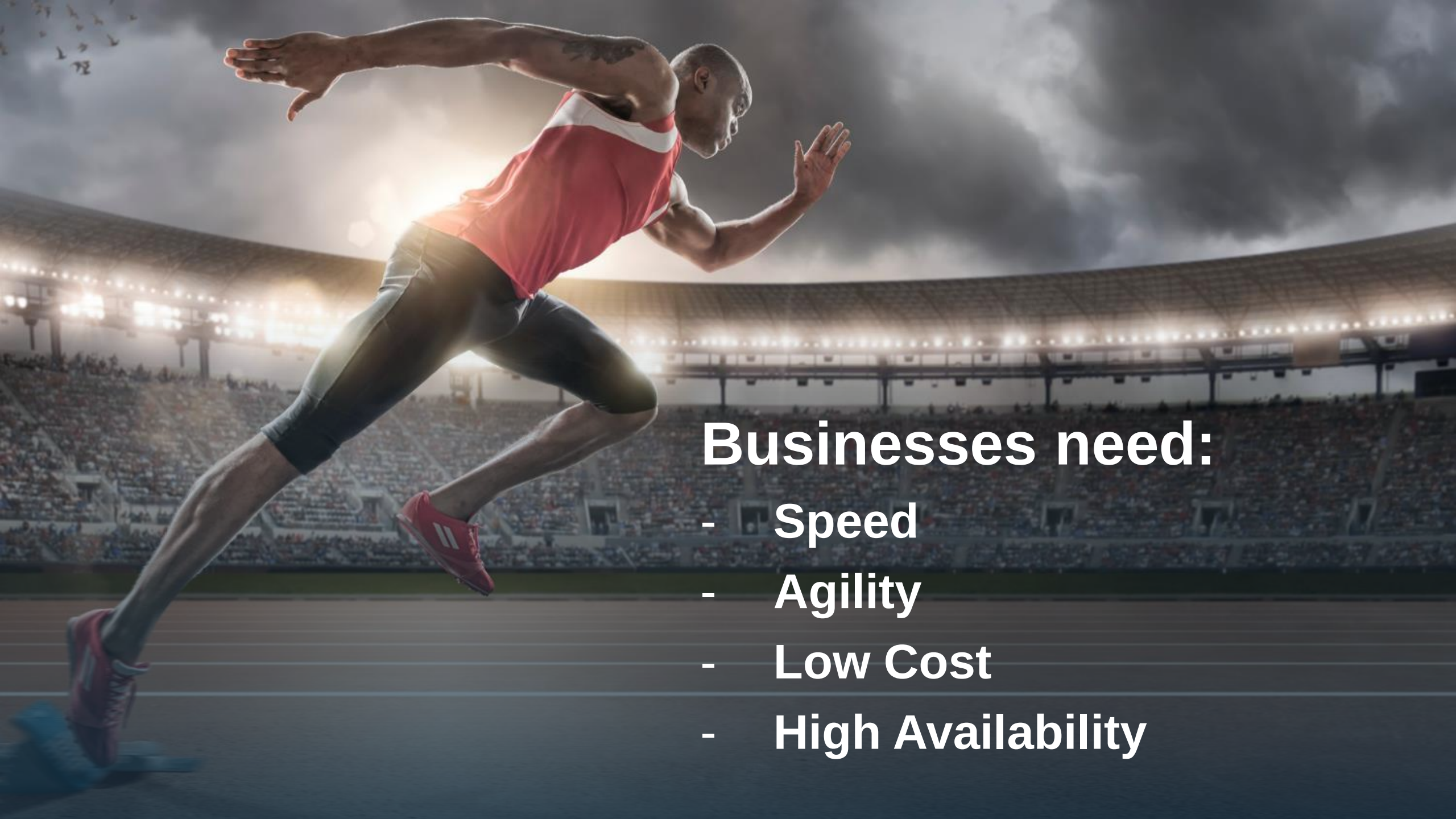
목차


Businesses need:
- Speed
- Agility
- Low Cost
- High Availability

변화하는 데이터 센터

In 2015

93%

Believed that infrastructure-as-a-service was the future of the data center

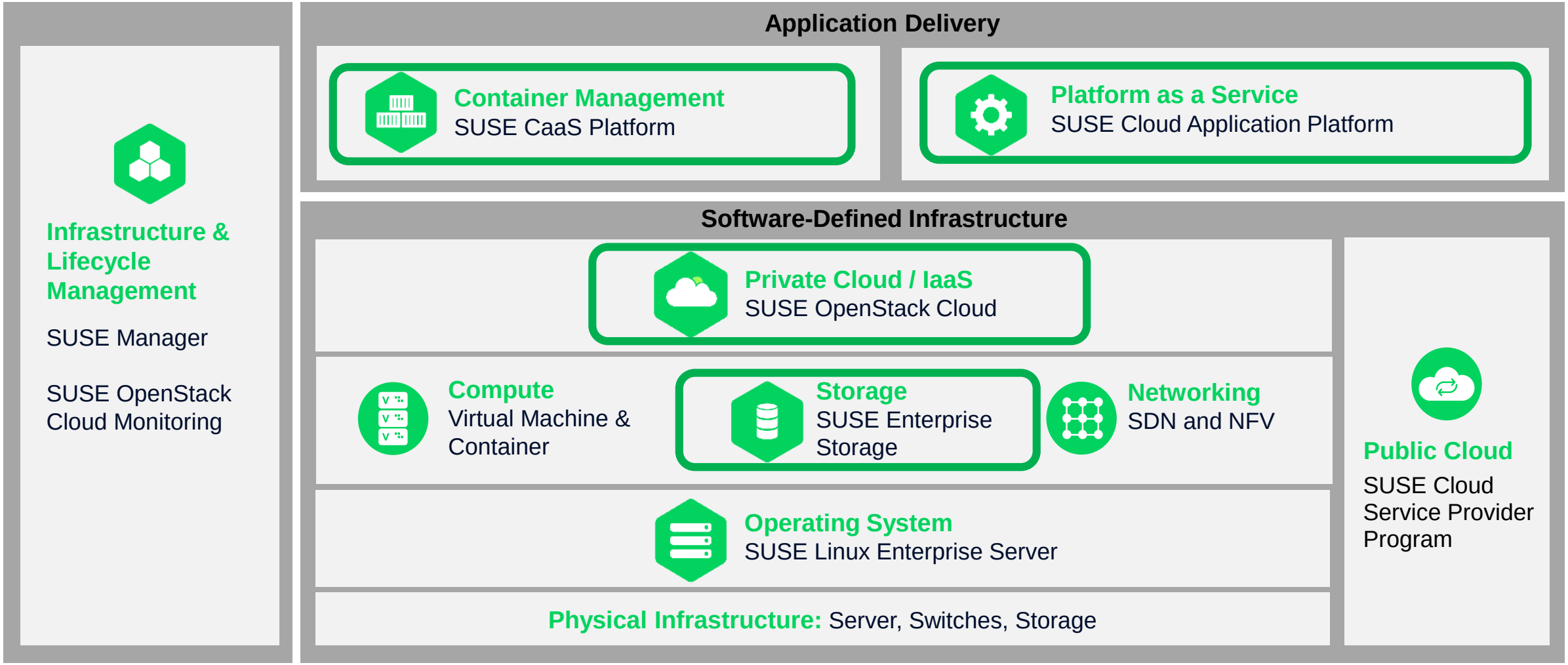
In 2017

95%

Believe that software-defined infrastructure is the future of the data center

Source: SUSE Global Cloud Research
June 2017

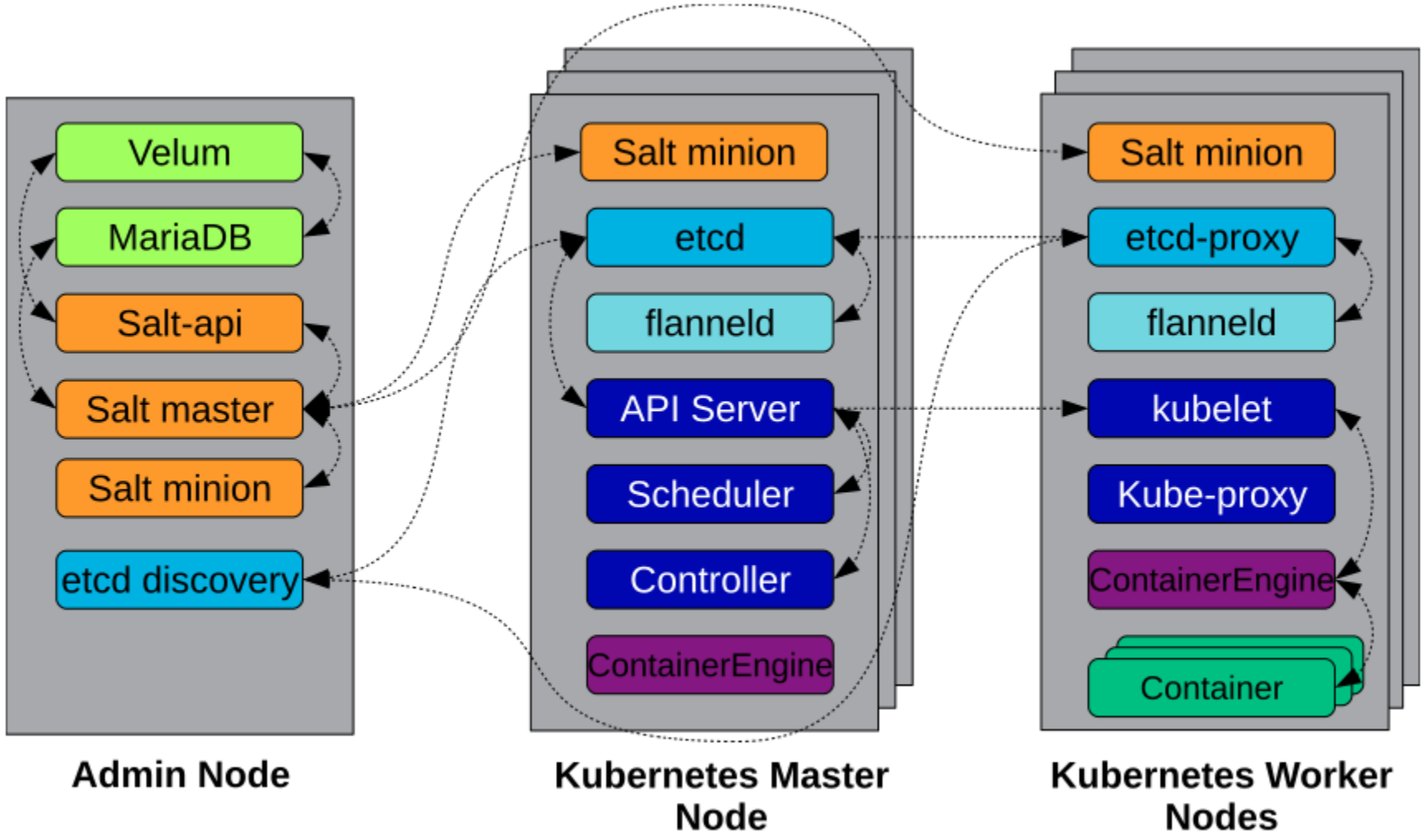
SUSE Software-Defined Infrastructure and Application Delivery Approach



CaaS

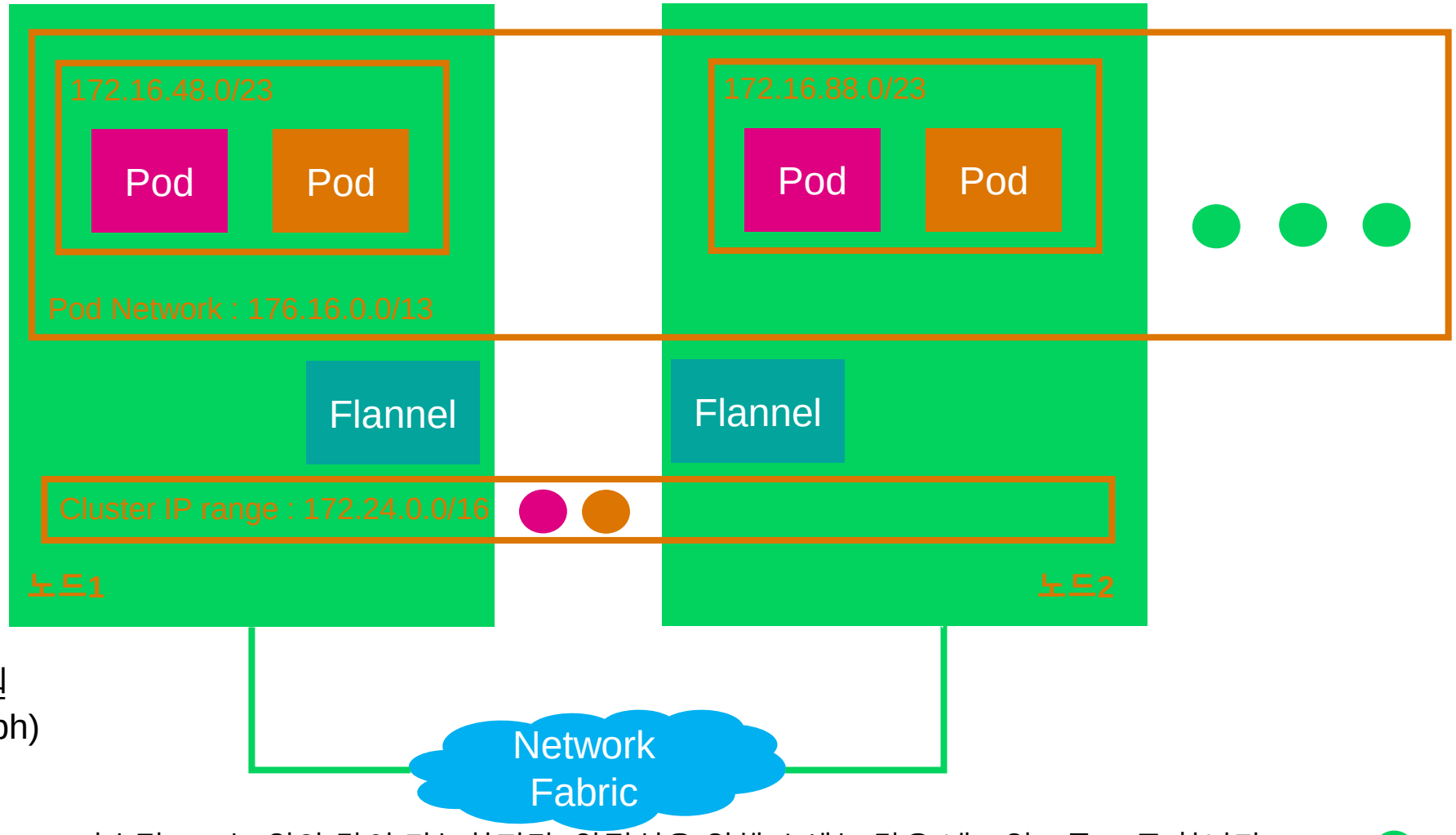
SUSE Container as a Service Platform(Kubernetes)

노드 종류와 노드 종류별 컴포넌트



Kubernetes 네트워크, 스토리지

Scaling이 쉬운 네트워크 구조
- 클러스터 내의 네트워크가 물리 네트워크와 분리된 구조
- pod network(overlay network)
  - Pod당 1개의 IP
  - Pod사이 통신 가능
  - 노드 간 통신은 Flannel
- Cluster IP
  - 클러스터 내에서만 접속 가능한 Virtual IP
  - 특정 그룹의 Pod에 매핑
  - Kube-Proxy에 의해 설정, 되며 Iptable로 동작



Scalable 한 스토리지 지원
- Persistent volume로 다음 지원
- SUSE Enterprise Storage(Ceph)
- NFS
- Cinder

* 기술적으로는 위와 같이 가능하지만, 안정성을 위해 수세는 같은 네트워크를 요구 합니다.
* 위는 Default설정이며 최초 배포 시 변경 가능

기능 종합 설명

SUSE CaaS Platform

Platform management

- Install, Configure, Update, Scale (Salt)
- Dashboard (Velum)

Application Services

- SUSE Registry
- Secure SUSE base Images
- Private Registry offline mode

APIs and Integrations

- Package Mgt (Helm)
- Kubernetes API
- Salt API

Kubernetes 1.9

- Certified conformant
- Docker 17.09
- CRI-O(Tech Preview)

Extensions & Complementary Svcs

- Networking (CNI using Flannel)
- Storage (SUSE Enterprise Storage, NFS, Cinder)
- Authentication(Open LDAP)
- Role Based Access Control

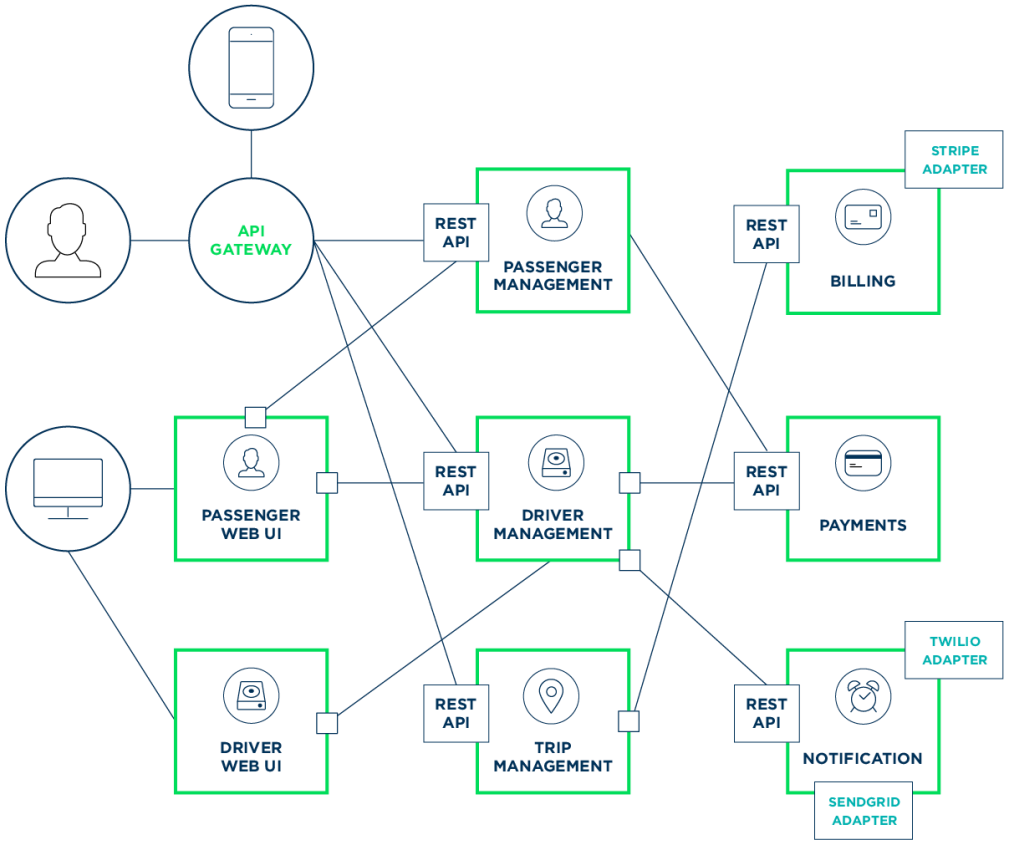
SUSE Micro OS

- Transactional update/rollback(Btrfs)
- Security(Apparmor)

Enterprise Grade - integrated - tested - maintained

Microservice와 Devops 활성화

Microservice 방식 가능



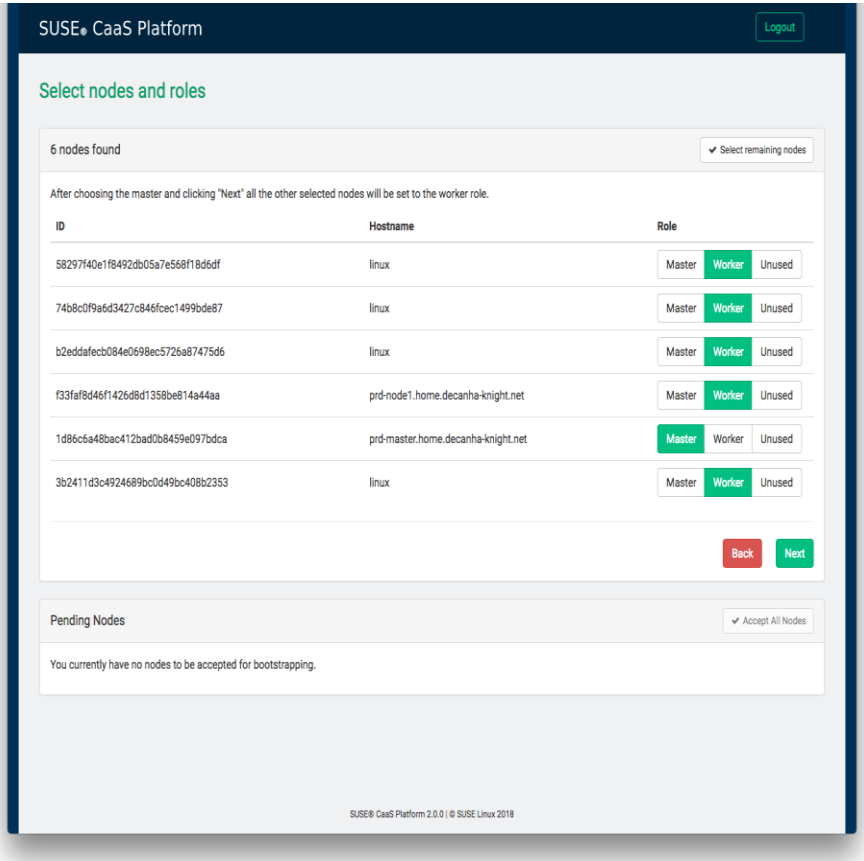
Kubernetes 로 Devops 활성화

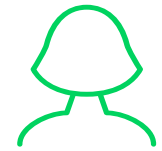
- 컨테이너 오케스트레이션 툴
- Google에 의해 디자인
- Cloud Native Computing Foundation의 일부로 안정된 지원

kubernetes

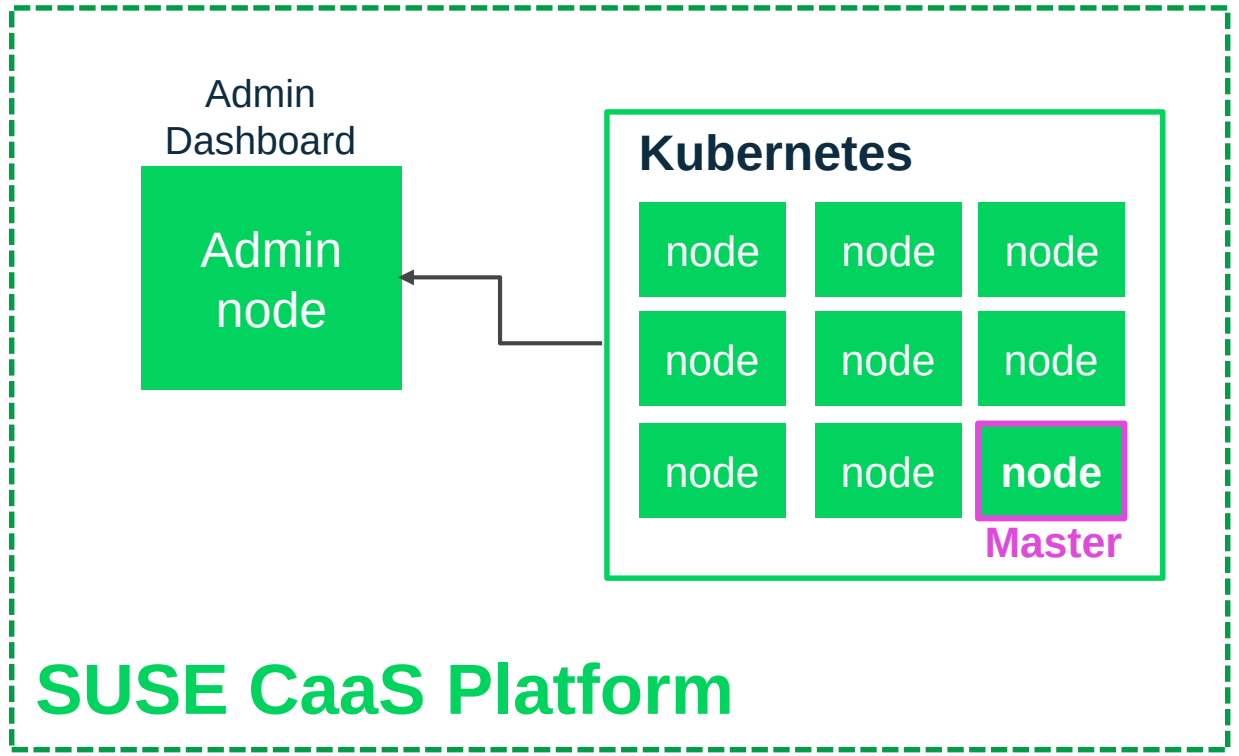
Kubernetes 클러스터 구축 자동화

쉽지 않은 k8s 구축을 UI를 통해 가능





IT Ops/
DevOps



1 Admin node 설치
MicroOS one step installation
Create AutoYaST profile
Set up Admin Dashboard

2 Admin Dashboard 로 연결

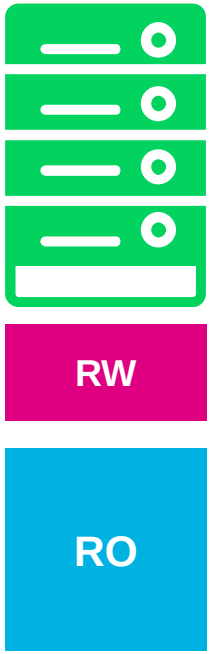
3 노드 OS 설치
Uses AutoYaST profile

4 클러스터 설치
Set up kubernetes, etcd, flannel,...

클러스터 / Application 업그레이드 와 롤백

클러스터 : 트랜잭셔널 업데이트

- 한번에 업데이트
  서비스 운영 중 업데이트된 페키지는 운영 시스템에 영향을 안줌
- 롤백 가능
  업그레이트가 실패하거나, 적합하지 않으면 쉽게 롤백 가능



Application

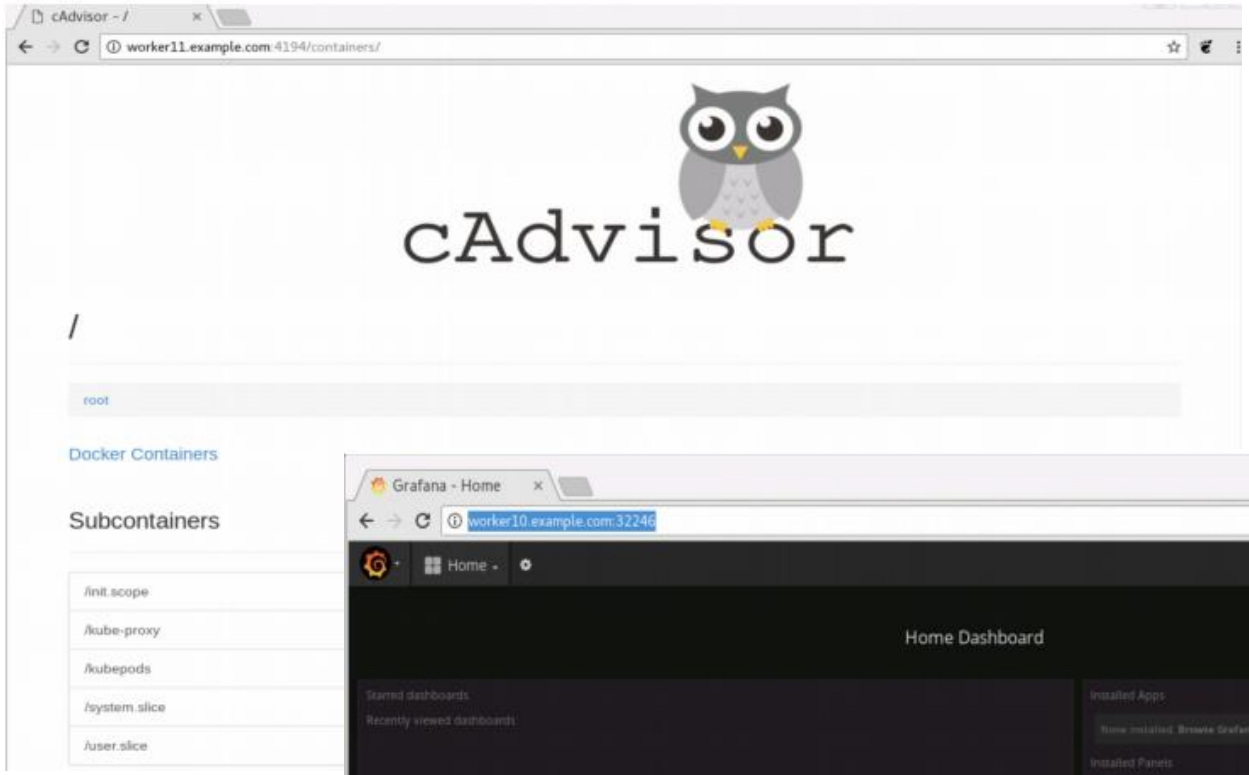
- Manifest 파일에서 이미지 버전 변경
- kubectl apply –f <manifest file> 로 변경내용 반영

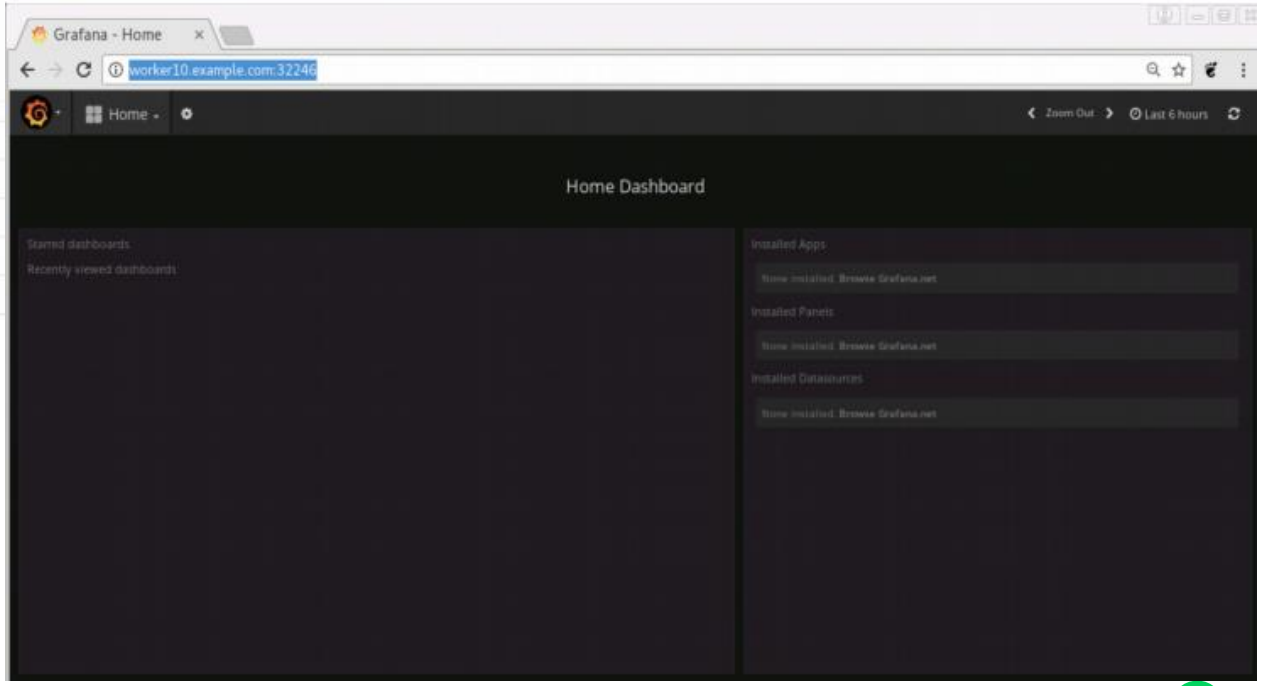
모니터링 기능

cAdvisor
- 노드의 상태 정보를 생성
- 노드에 직접 접속하여 확인 가능

Heapster
- cAdvisor정보를 수집하고 분석
- influxDB에 수집 및
  분석 데이타 저장

Grafana
- influxDB의 정보를 그래픽으로 보여줌





PaaS

SUSE Cloud Application Platform

SUSE Application Delivery Platforms

Application delivery를 위한 두가지 접근

Cloud Foundry

Productivity

Kubernetes

Flexibility

SUSE Cloud Application Platform

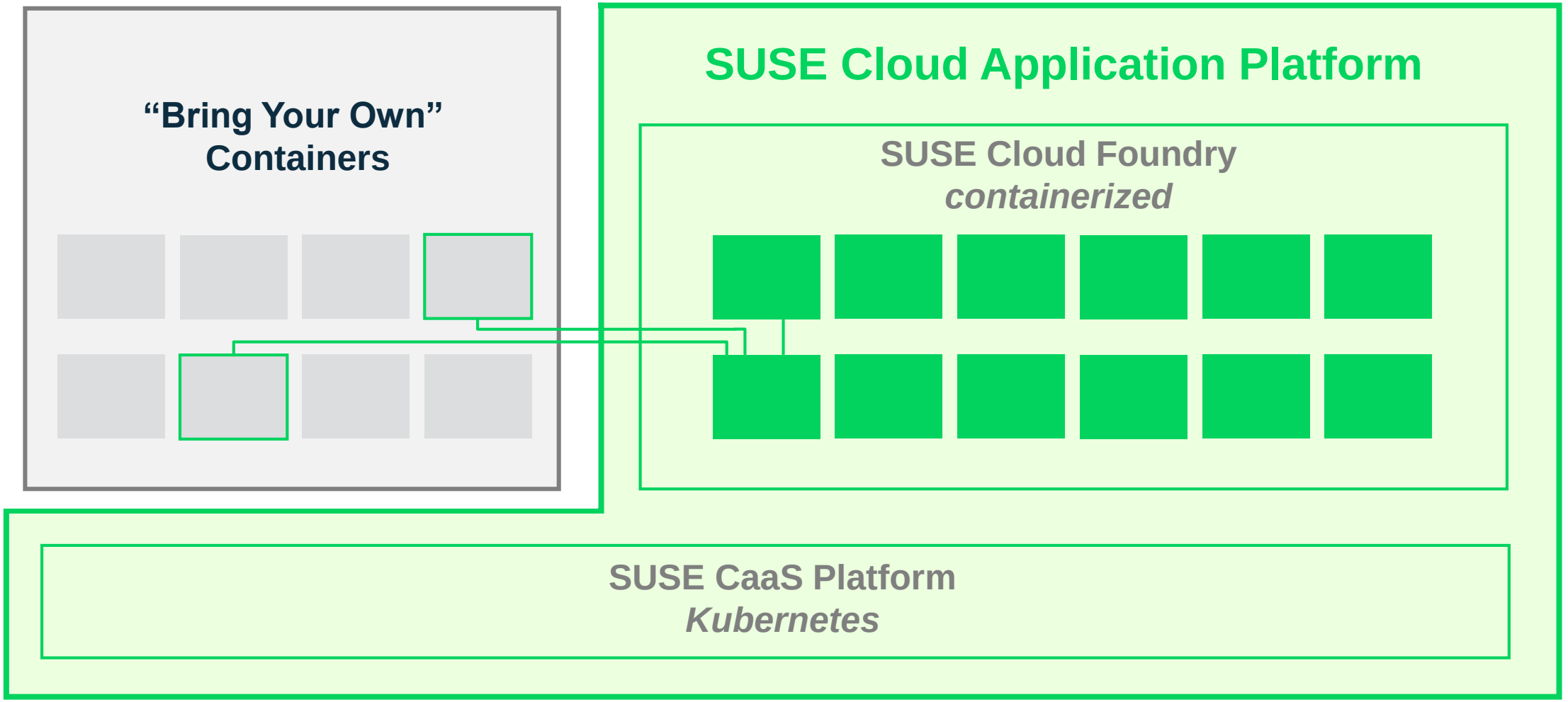
- Accelerate end-to-end application development and delivery at scale
- Maximize productivity with abstractions, patterns, and full lifecycle automation

SUSE CaaS Platform

- Simplify deployment and management of containers and containerized applications

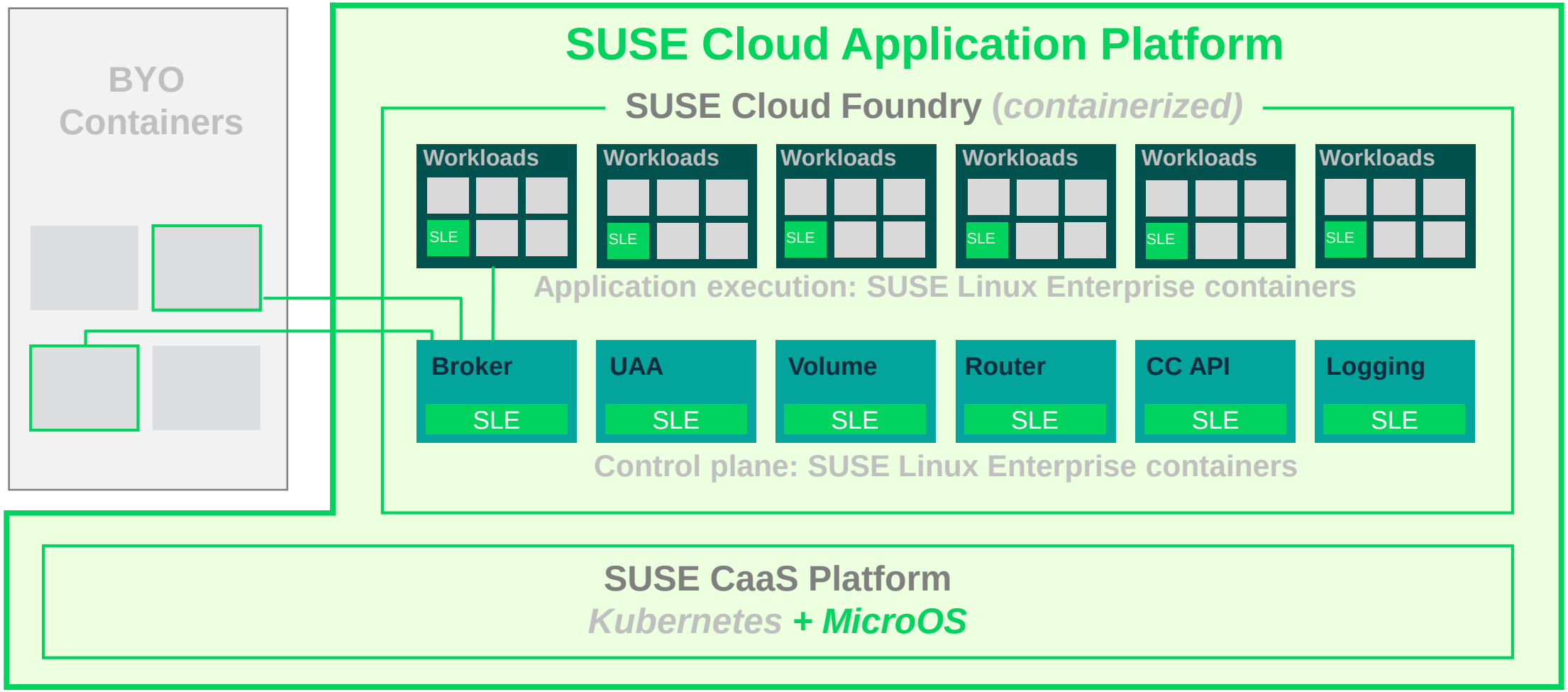
SUSE Cloud Application Platform

구성 및 특징



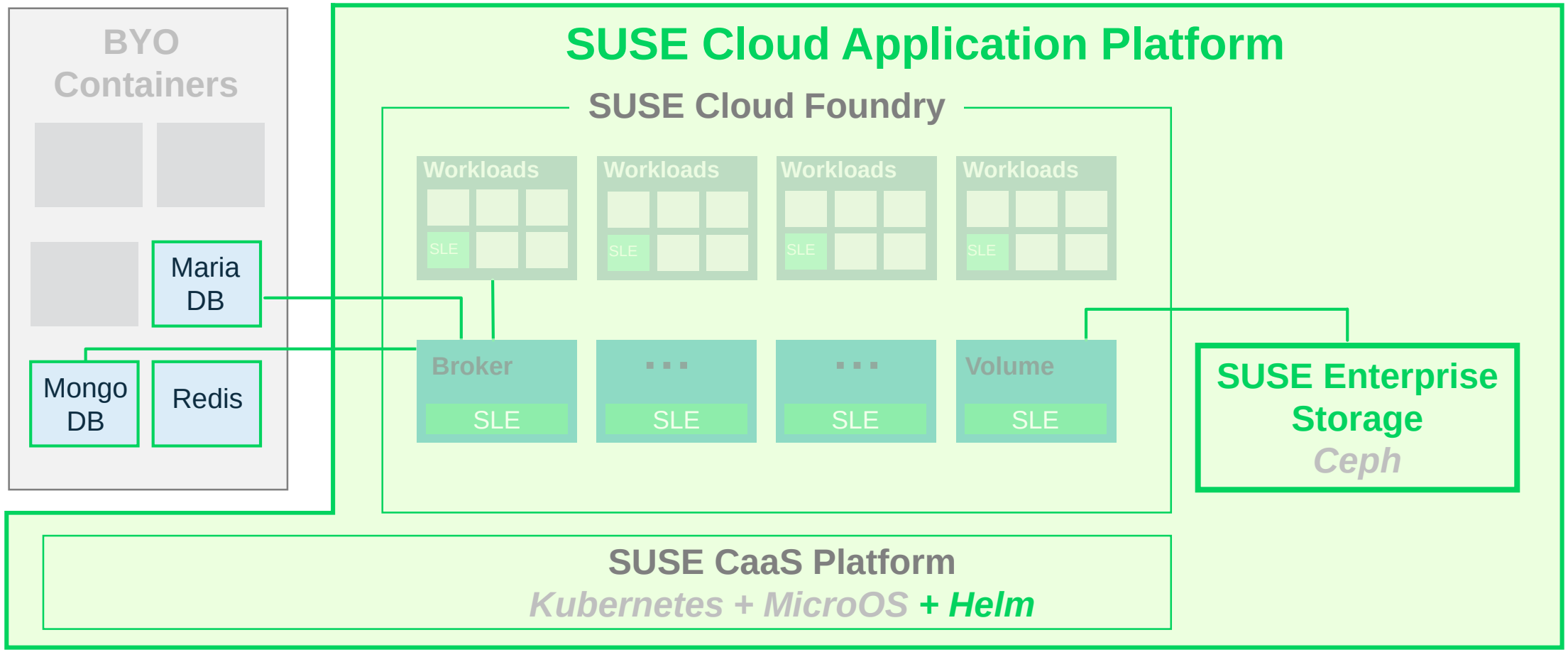
SUSE Cloud Application Platform

SUSE Linux Enterprise 기반



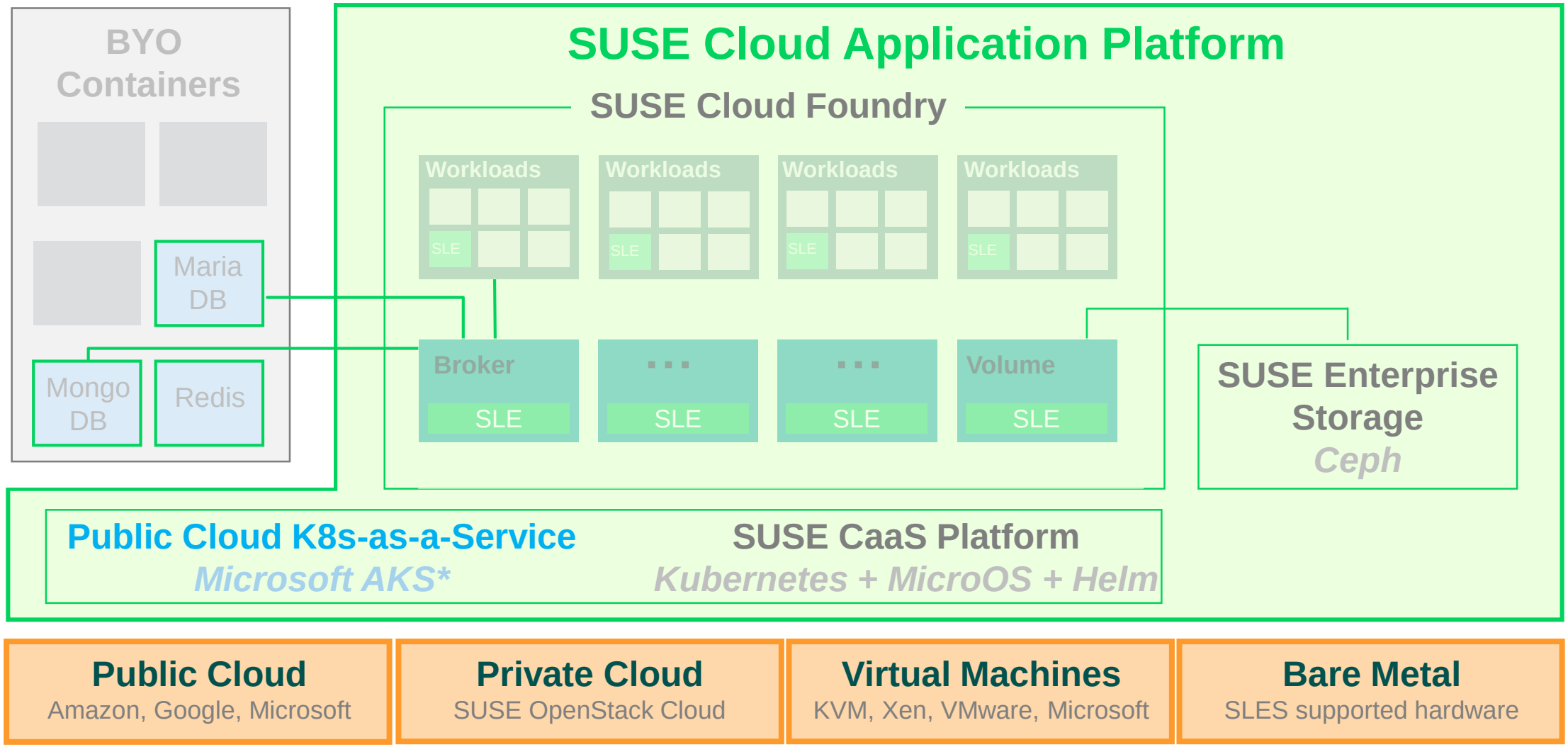
SUSE Cloud Application Platform

스토리지, 데이터 서비스 그리고 Helm



SUSE Cloud Application Platform

다양한 기반위에 설치 가능



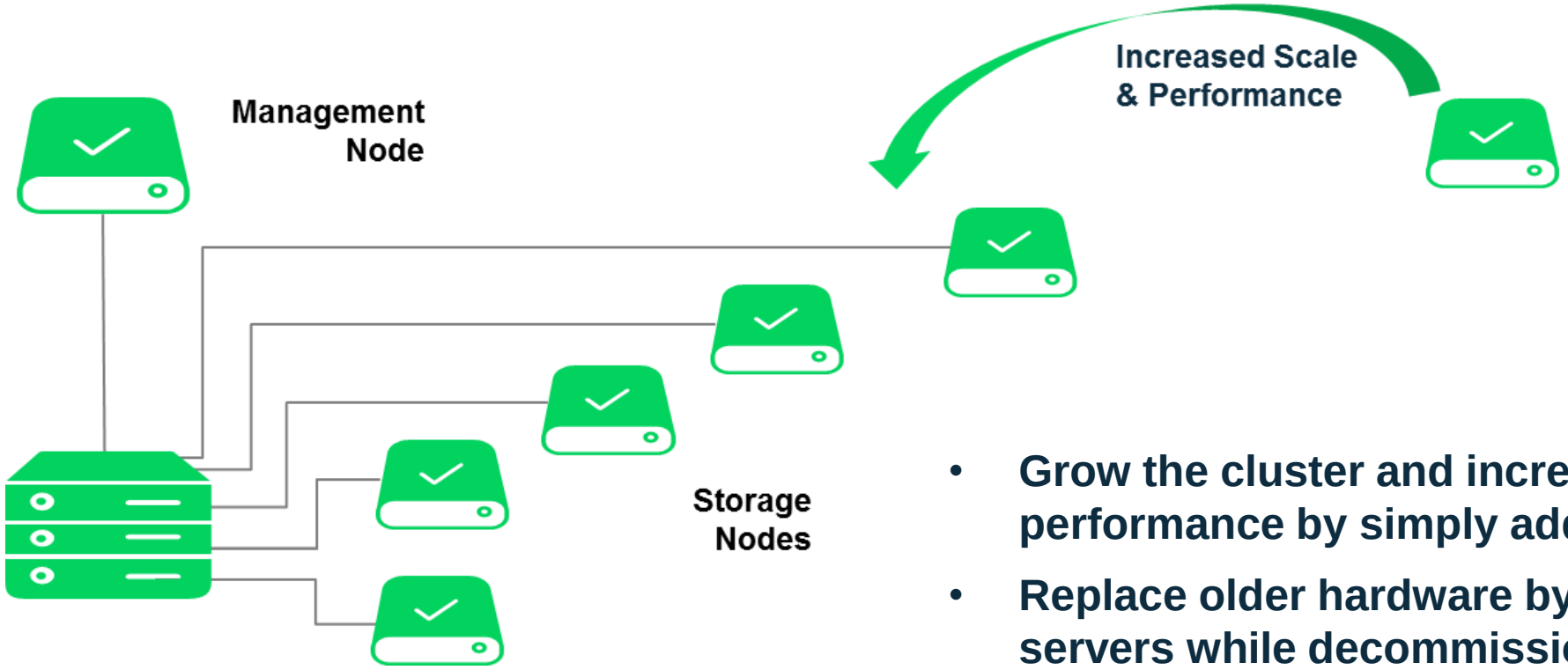
** Support for more cloud providers to follow*

Software Defined Storage

SUSE Enterprise Storage(Ceph)

쉬운 스토리지 용량 확장

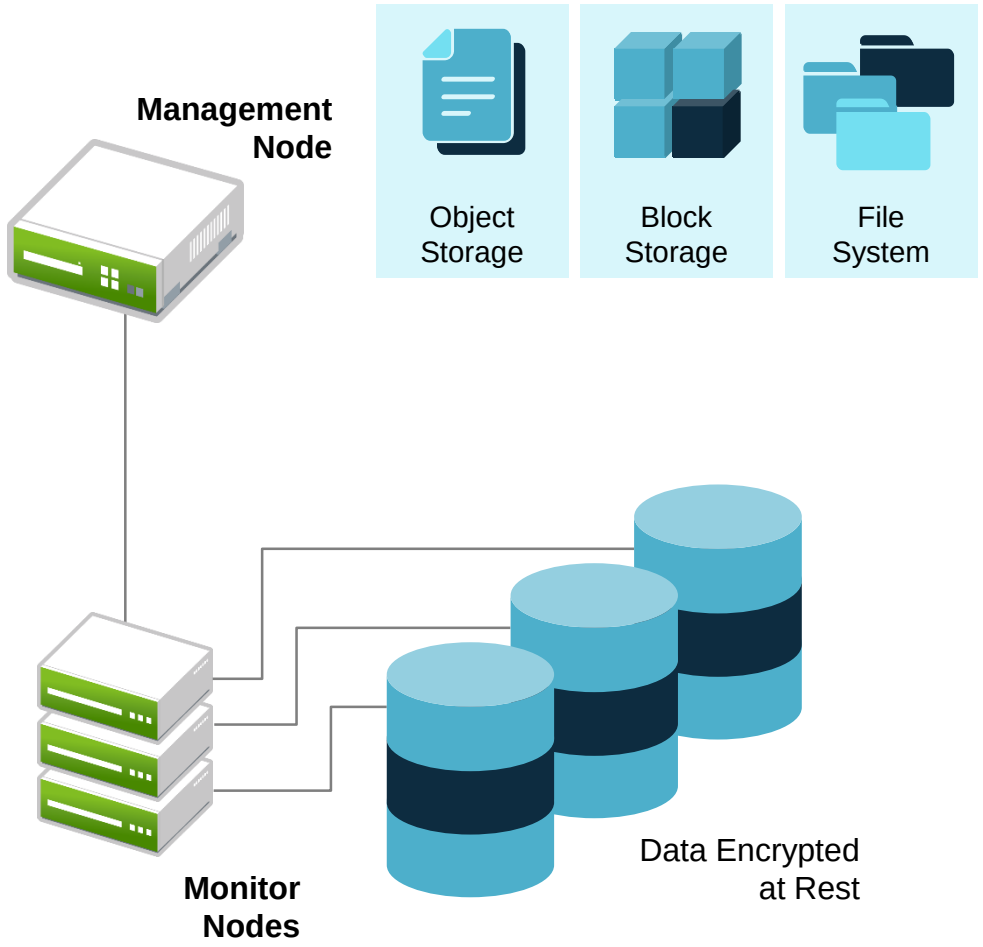
Scale-out



- Grow the cluster and increase its performance by simply adding new servers.
- Replace older hardware by adding new servers while decommissioning older out-of-warranty servers.

다양한 인터페이스 지원

Supports Object, Block and File System Storage in the Same Cluster

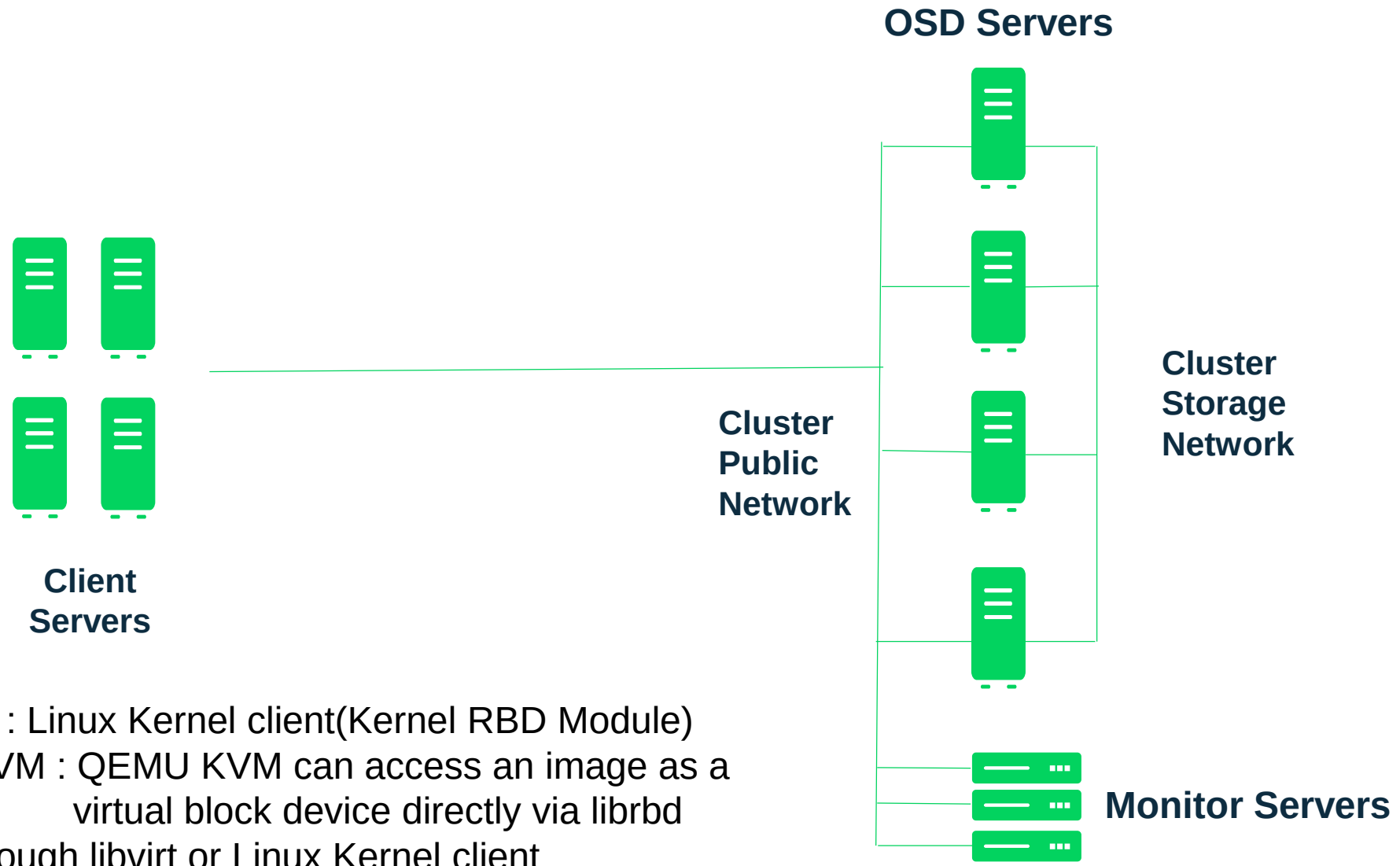


Automated management

Heterogeneous OS Access

Various Usage with one solution

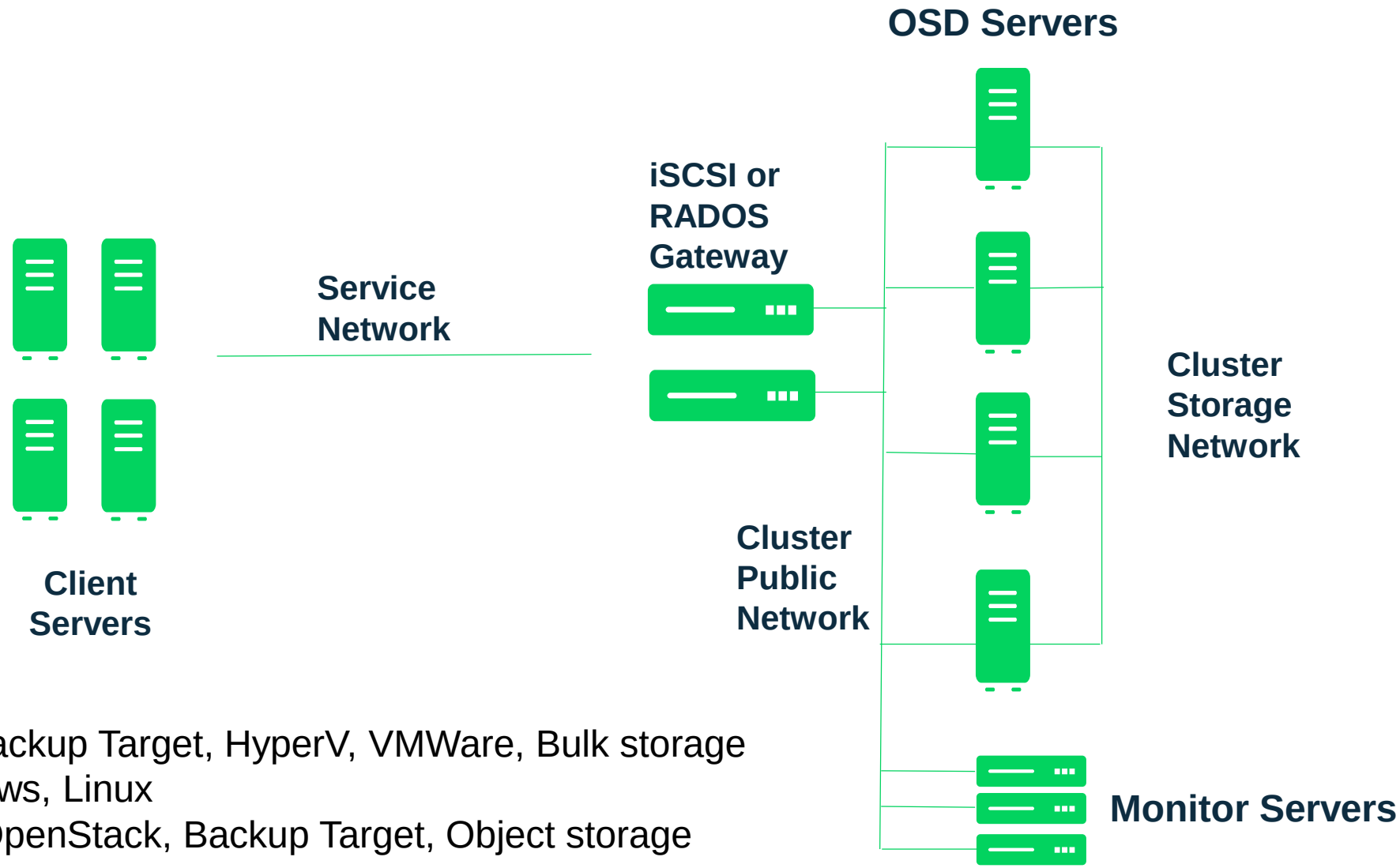
RBD(RADOS Block Device)



- Linux OS : Linux Kernel client(Kernel RBD Module)
- QEMU KVM : QEMU KVM can access an image as a virtual block device directly via librbd
- Xen : Through libvirt or Linux Kernel client

Various Usage with one solution

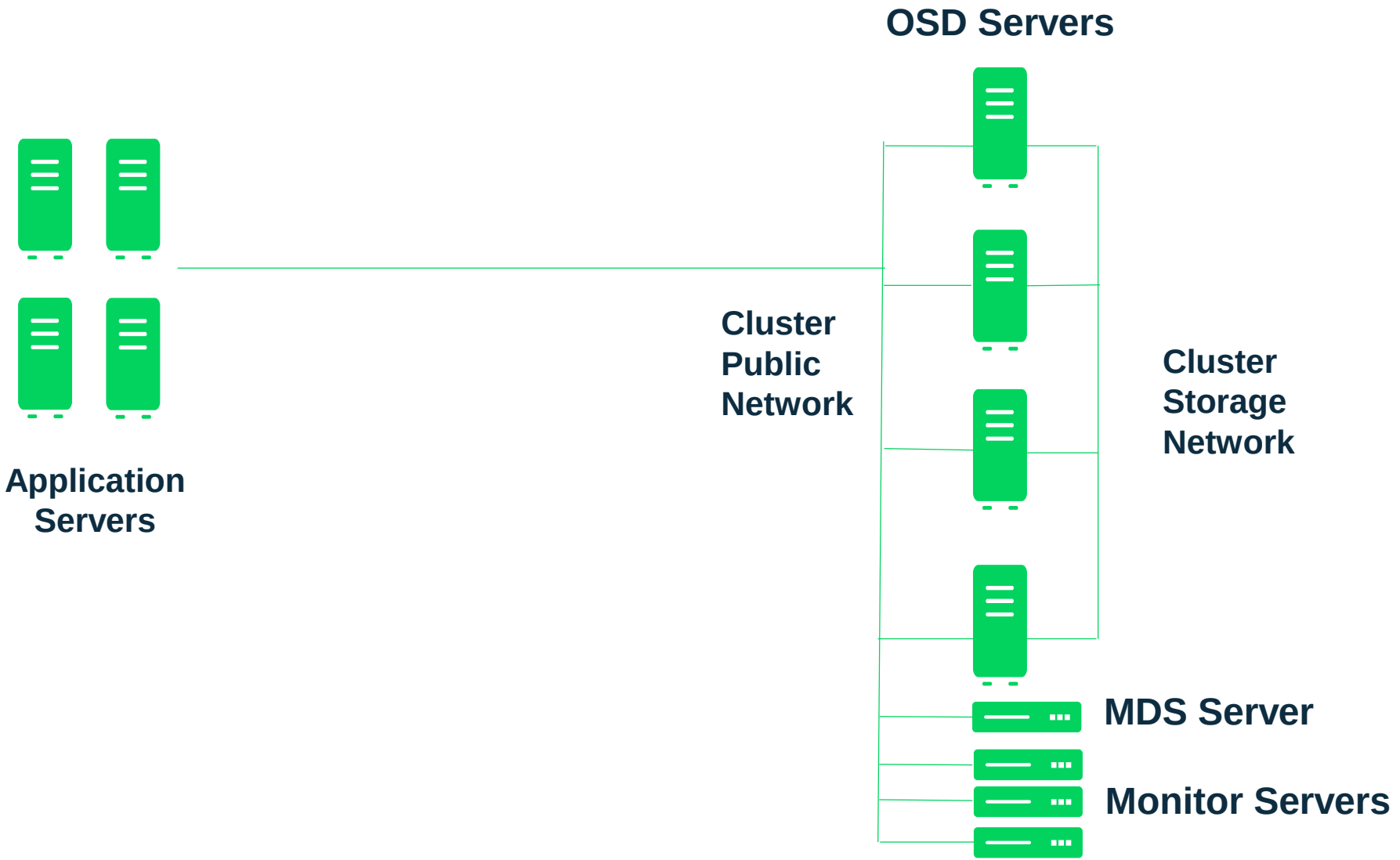
S3, Swift and iSCSI



- iSCSI : Backup Target, HyperV, VMWare, Bulk storage for Windows, Linux
- Object : OpenStack, Backup Target, Object storage

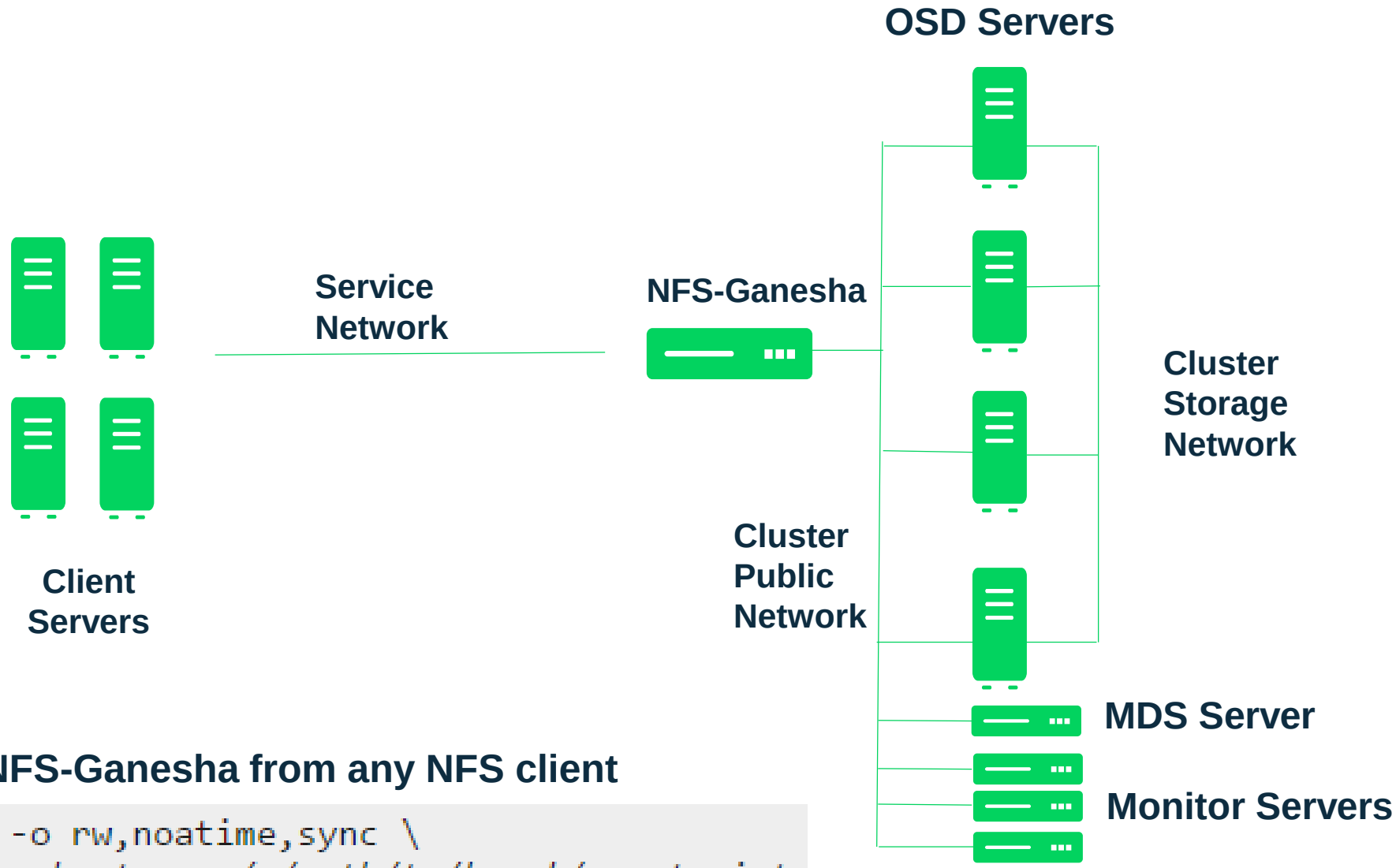
Various Usage with one solution

CephFS



Various Usage with one solution

NFS-Ganesha



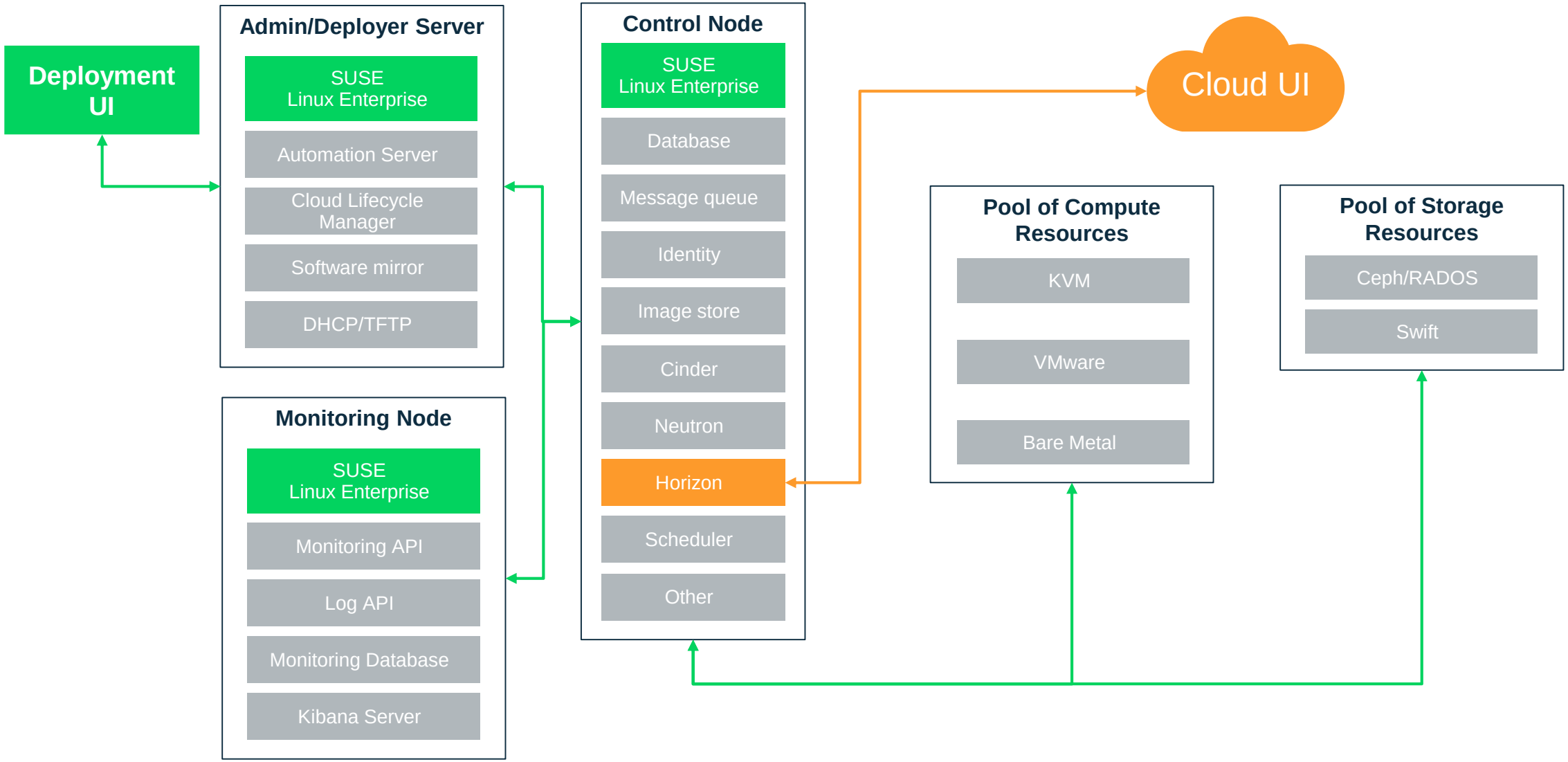
- Clients access NFS-Ganesha from any NFS client

```
sudo mount -t nfs -o rw,noatime,sync \
 nfs_ganesha_server_hostname:/ /path/to/local/mountpoint
```

IaaS

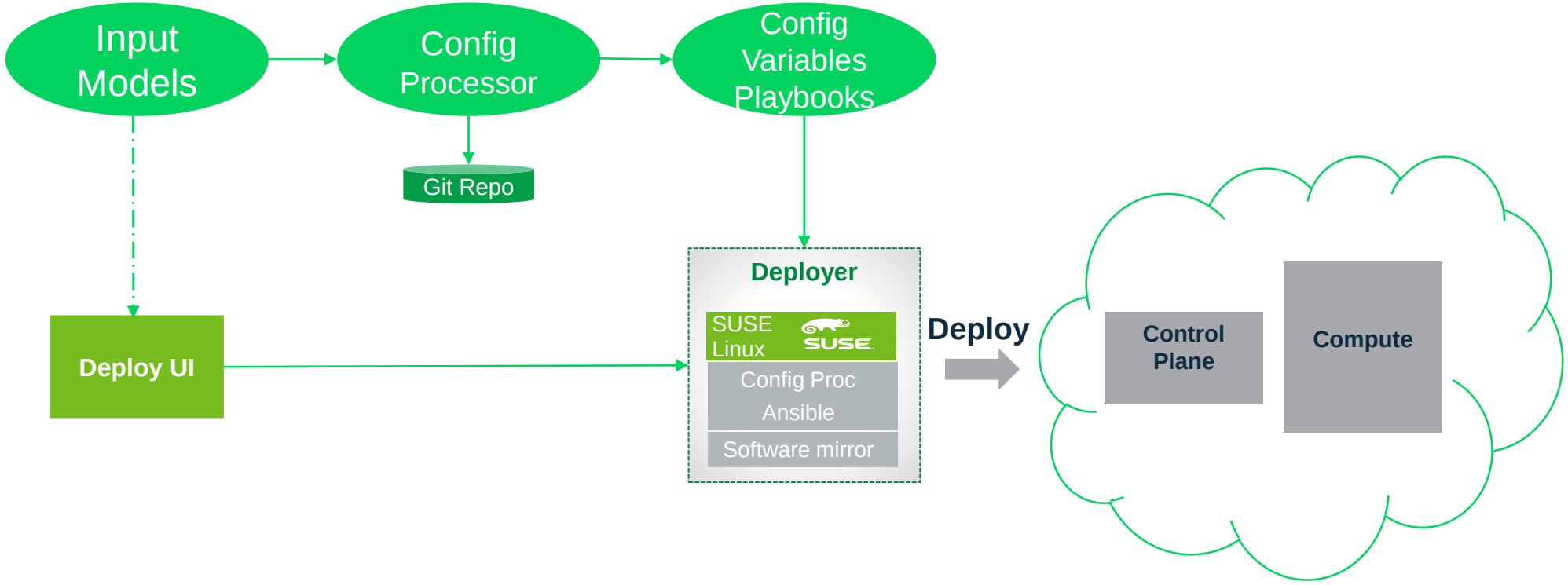
SUSE OpenStack Cloud

SUSE OpenStack Cloud Architecture

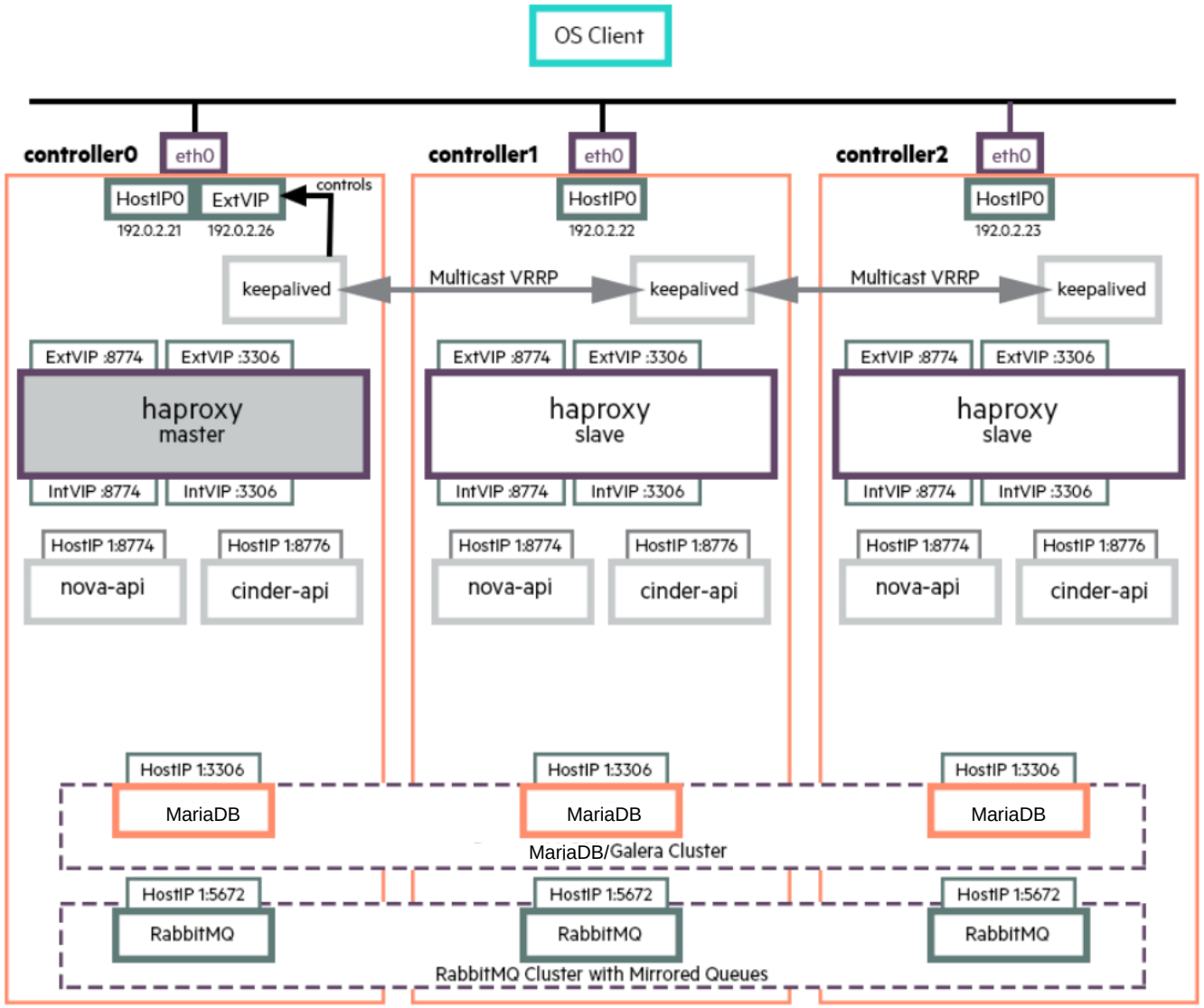


Cloud Lifecycle Manager

- Template-based cloud definition
- Version controlled / auditable using git repo
- Built-in configuration checker
- Repeatable, consistent, flexible, idempotent



High Availability: CLM Models



- CLM has built-in HA so failures are transparent
- Monasca produces alerts **for customer to address**

Cloud 8 - OpenStack Project Status - Page 1 of 2

Project	CLM	Notes
Aodh	X	
Barbican	✓	
Ceilometer	X	CLM supports Monasca-Ceilometer apis
Cinder	✓	
Designate	✓	
EC2	X	Specific use case; Deprecate in Cloud 8
Freezer	✓	Meant for control plane backup
Glance	✓	
Heat	✓	
Horizon	✓	
Ironic	✓	
Keystone	✓	
Magnum	✓	Bring your own image – Cloud 8

Cloud 8 - OpenStack Project Status - Page 2 of 2

Project	CLM	Notes
Manila	X	Plans to add to CLM in Cloud 8 Updates
Monasca	✓	CLM supports Monasca-Ceilometer apis
Monasca-Ceilometer	✓	
Murano	X	Dropped support in Cloud 8
Neutron	✓	
Neutron(LBaaSv2)	Octavia	
Neutron(VPNaaS)	X	
Neutron(Fwaas)	✓	
Nova	✓	
Octavia	✓	
Sahara	X	Plan to add to CLM in Cloud 8 updates
Swift	✓	
Trove	X	Declining in community; decided to drop

SUSE 와 HPE: win-win 파트너쉽

HPE 미션 : Hybrid IT를 손쉽게

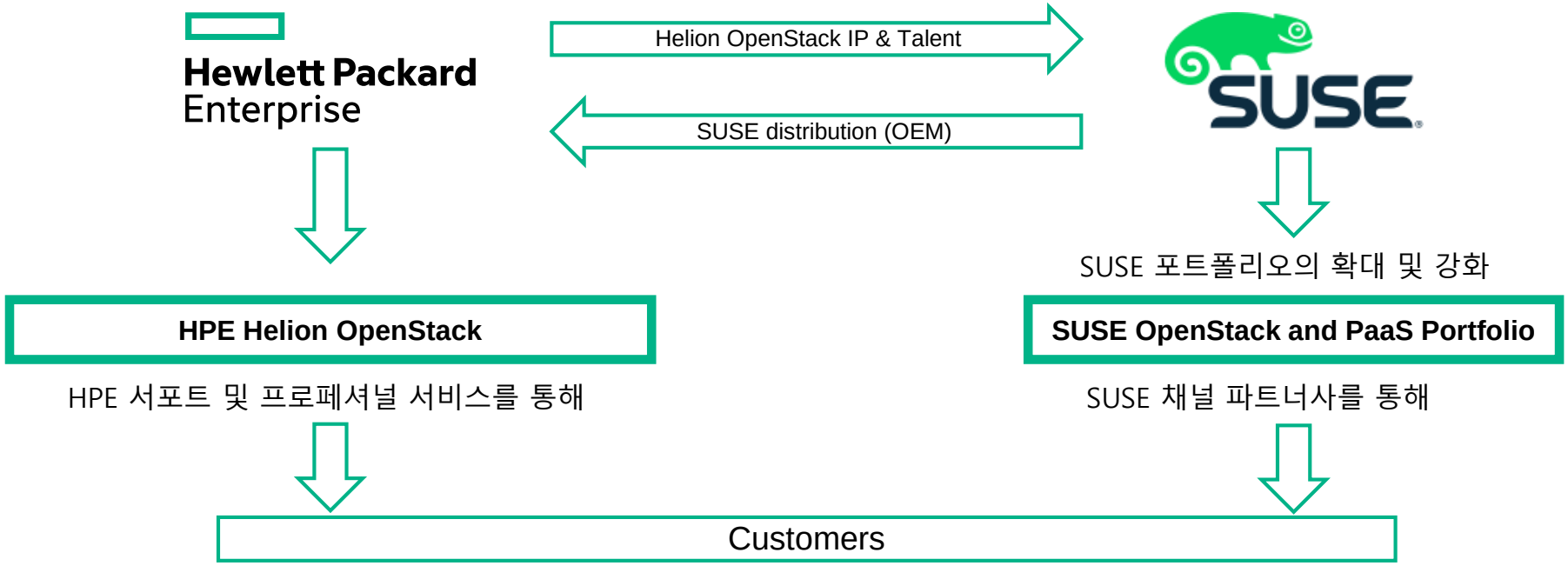
HPE의 미션인 “하이브리드 IT를 손쉽게”와 함께 HPE는 HPE 인프라스트럭쳐를 여러 다양한 오픈소스와 파트너 기술과 통합할 것입니다.

HPE는 오픈스택에 계속 헌신하지만, Code제공자에서 마켓메이커로 참여할 것입니다.”

SUSE: 오픈소스 소프트웨어계의 선구자

SUSE는 고객사에 엔터프라이즈 밸류를 전달하는 오픈소스 software-defined 인프라스트럭쳐를 제공하는데 헌신합니다.

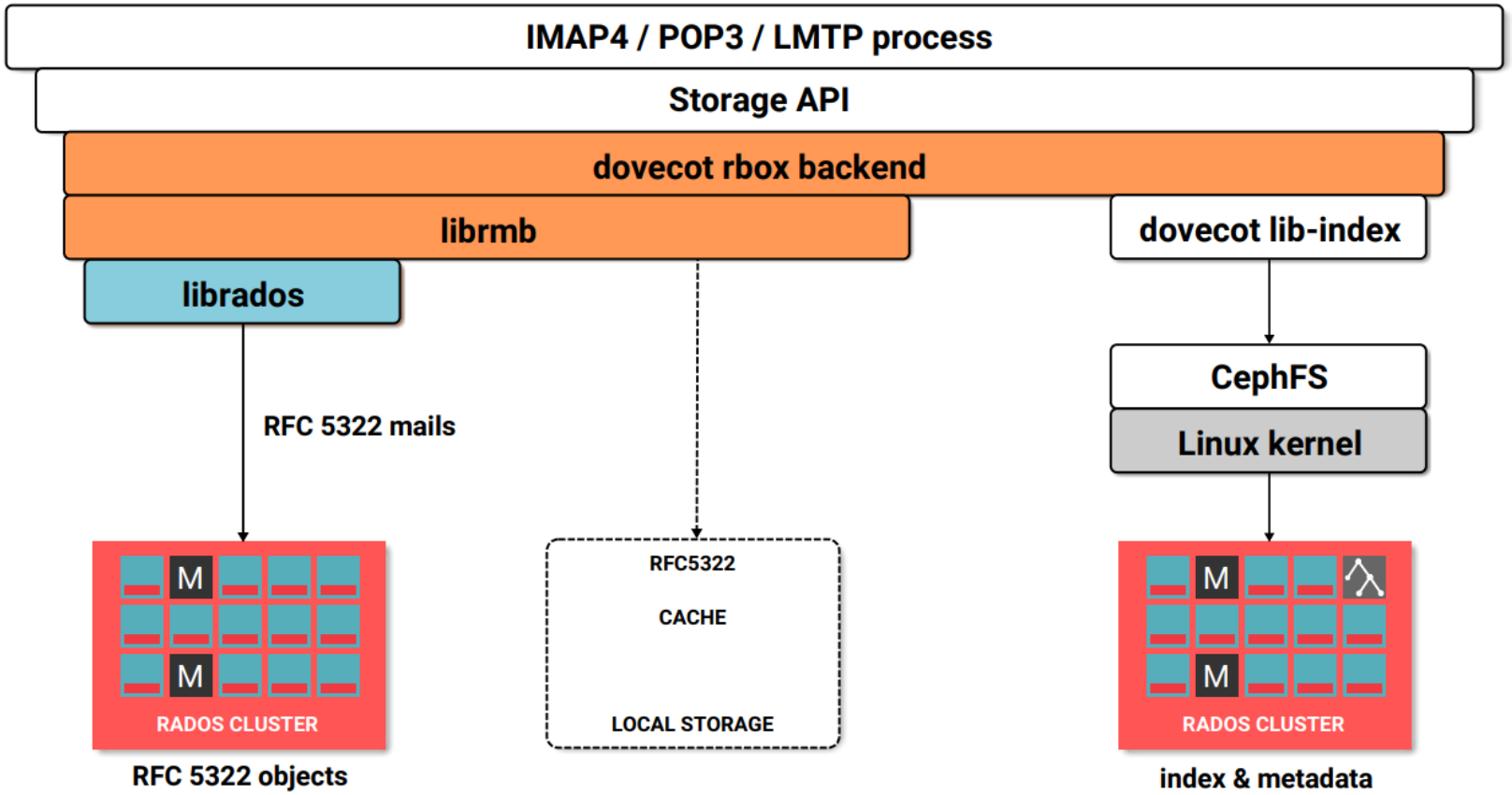
HPE 오픈스택 자산의 추가로 SUSE의 포트폴리오가 확대 및 촉진됩니다



사례

이메일 스토리지 용도 SES(Ceph) - Deutsche Telekom AG

dovecot을 활용하여 email 스토리지로 사용



이메일 스토리지 용도 SES(Ceph) - Deutsche Telekom AG

서버 스펙

Storage Nodes

CephFS SSD Nodes

- **CPU:** E5-2643v4 @ 3.4 GHz, 6 Cores, turbo 3.7GHz
- **RAM:** 256 GByte, DDR4, ECC
- **SSD:** 8x 1.6 TB SSD, 25 DWPD, SAS, RR/RW 103k/69k iops

Rados HDD Nodes

- **CPU:** E5-2640v4 @ 2.4 GHz, 10 Cores, turbo 3.4GHz
- **RAM:** 128 GByte, DDR4, ECC
- **SSD:** 2x 400 GByte, 3 DWPD, SAS, RR/RW 108k/49k iops
  - for BlueStore database etc.
- **HDD:** 10x 4 TByte, 7.2K, 128 MB cache, SAS

Compute Nodes

MDS

- **CPU:** E5-2643v4 @ 3.4 GHz, 6 Cores, turbo 3.7GHz
- **RAM:** 256 GByte, DDR4, ECC

MON / SUSE admin

- **CPU:** E5-2640v4 @ 2.4 GHz, 10 Cores, turbo 3.4GHz
- **RAM:** 64 GByte, DDR4, ECC

이메일 스토리지 용도 SES(Ceph) - Deutsche Telekom AG

네트워크

Network

10G network

- 2 NICs / 4 ports per node
- SFP+ DAC

Multi-chassis Link Aggregation (MC-LAG/M-LAG)

- For aggregation and fail-over

Spine-Leaf architecture

- Interconnect must not reflect theoretical rack/FC bandwidth
- L2: terminated in rack
- L3: TOR <-> spine / spine <-> spine
- Border Gateway Protocol (BGP)

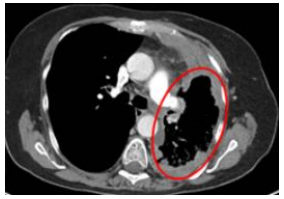
Reference

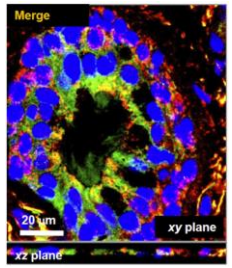
- https://susecon17.smarteventscloud.com/fileDownload//session/A13B6255699A30B15BFBE84EE80AE4B2/CAS127176%20Email%20Storage%20with%20Ceph%20@%20SUSE%20Enterprise%20Storage.pdf

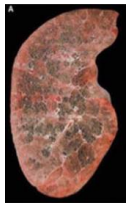
의료 데이터 저장 위한 SUSE Enterprise Storage

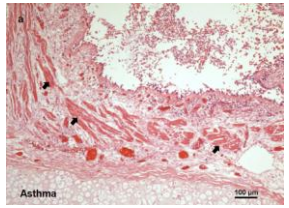
Heart Lung Innovation – UBC and St. Paul's Hospital

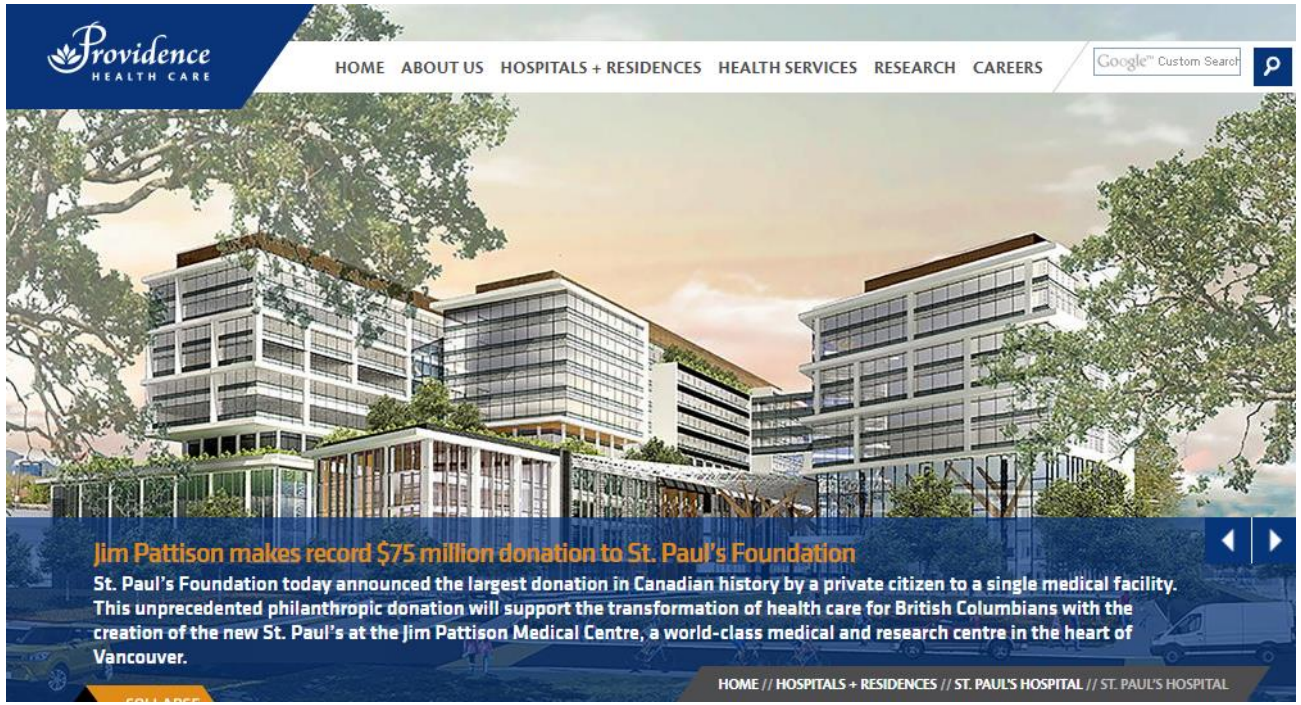
- Research data growth
- More than 25% per year
- Examples of data producers:
  - Micro-CT
  - Aperio Digital slide
  - Illumina gene sequencer
  - Leica Confocal Microscope
  - MRI











의료 데이터 저장 위한 SUSE Enterprise Storage

서버 스펙

Function	Description	Quantity
OSD Server	– 2 x E5-2650v3 cpu – 8 x 32 GB DDR4 – 2 x 120GB Boot SSD – 2 x Intel P3700 NVMe – 28 x 8 TB NL-SAS HDD – 2 x 40GBe	6
Monitor Node	– 2 x E5-2623v3 – 8 x 8GB DDR4 – 1 x 120 Boot SSD – 2 x 40GBe	3
Network	– 2 x 32 port 40GB-E QSFP switch	2

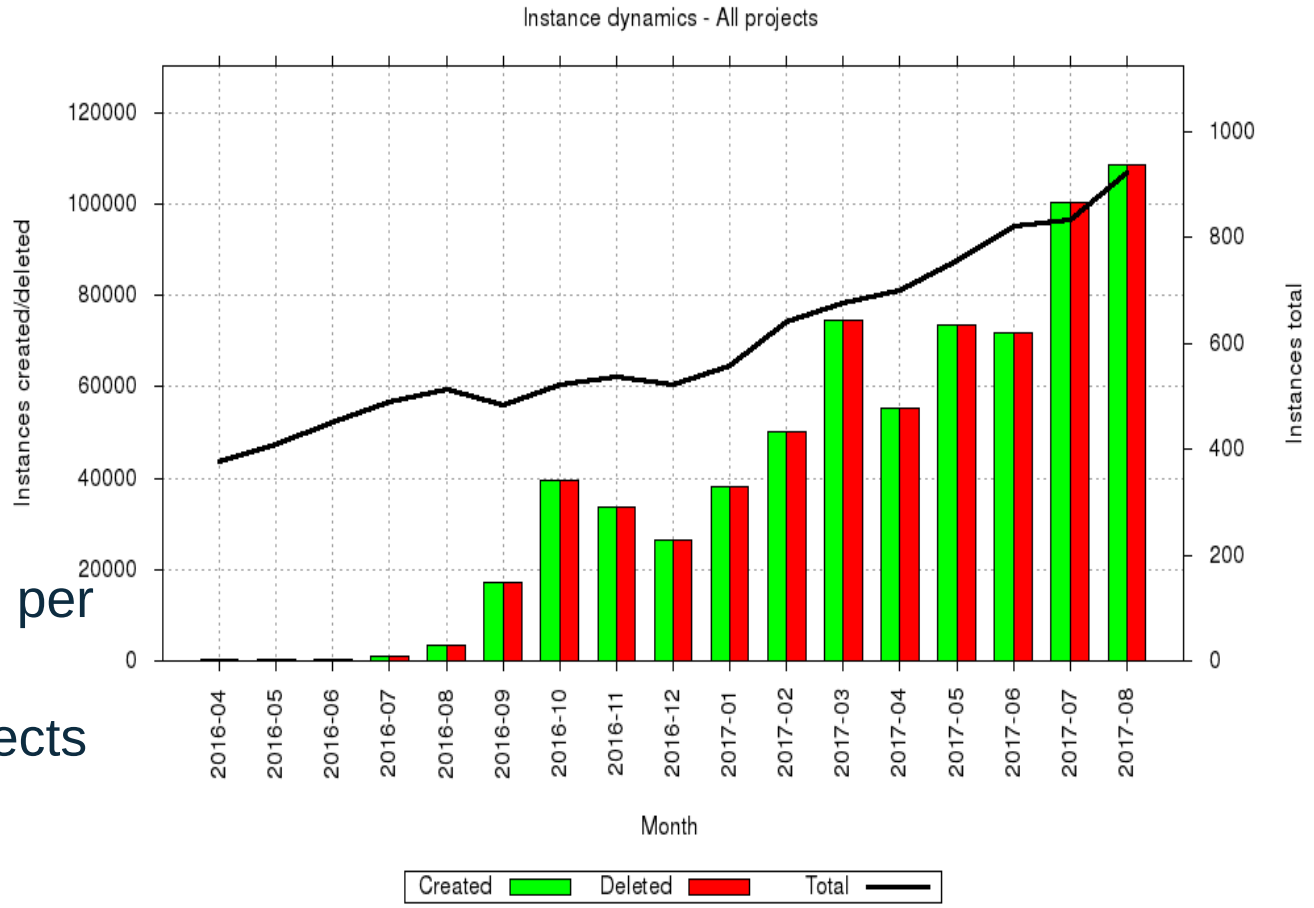
Reference

- https://susecon17.smarteventscloud.com/fileDownload//session/F35CE04E8F9EF41606D85E6DC0DAACDA/CAS127005%20The%20Case%20with%20Ceph%20NVMe's%20and%20Intel%20CAS.pdf

SUSE OpenStack Cloud

BMW Group

- Productive since April 2015
- More than 140 projects
- 100,000 instances per month created and deleted
- Currently one environment in Munich
  - 24 compute nodes (72 cores / 1 TB)
  - 26 storage nodes (Ceph based, 36 TB per node)
  - In average 3900 vCPUs bound in projects (quota: > 8800 vCPUs)



Reference

- https://susecon17.smarteventscloud.com/fileDownload//session/9808C426E741DE272B474083ED2FBD57/CAS126498%20Two%20Years%20of%20Successful%20OpenStack%20Operation%20within%20the%20BMW%20Group%20Insights%20and%20Experiences.pdf

CaaSP(Container as a Service Platform)

네덜란드의 Enterprise Blockchain Solution 회사

Challenge
- 빠르고 효율적인 서비스 딜리버리를 위해 Container를 결정 하였으나, Container와 orchestration 솔루션 운영 어려움
- 회사 성장에 따른 인프라 확장 등 운영 자동화 하여 솔루션에 집중

Solution
- CaaSP

Result
- 유연성과 데이타 보호 달성
- 기존 운영 시스템과 연동
- 빠른 고객 시스템 배포

https://www.suse.com/success/stories/tymlez/

영국의 통계 연구 회사

Challenge
- 다양한 복잡한 통계 모델의 증가
- 관리 복잡도를 증가 시키지 않고 컴퓨팅 리소스의 최대한 활용 방법 필요

Solution
- CaaSP

Result
- 개발 프로세스 효율화
- 인프로 운영 효율화 및 안정성 증가

https://www.suse.com/success/stories/smartodds/

Thank you!