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Building containerized Spark on a solid foundation with Quobyte and Kubernetes

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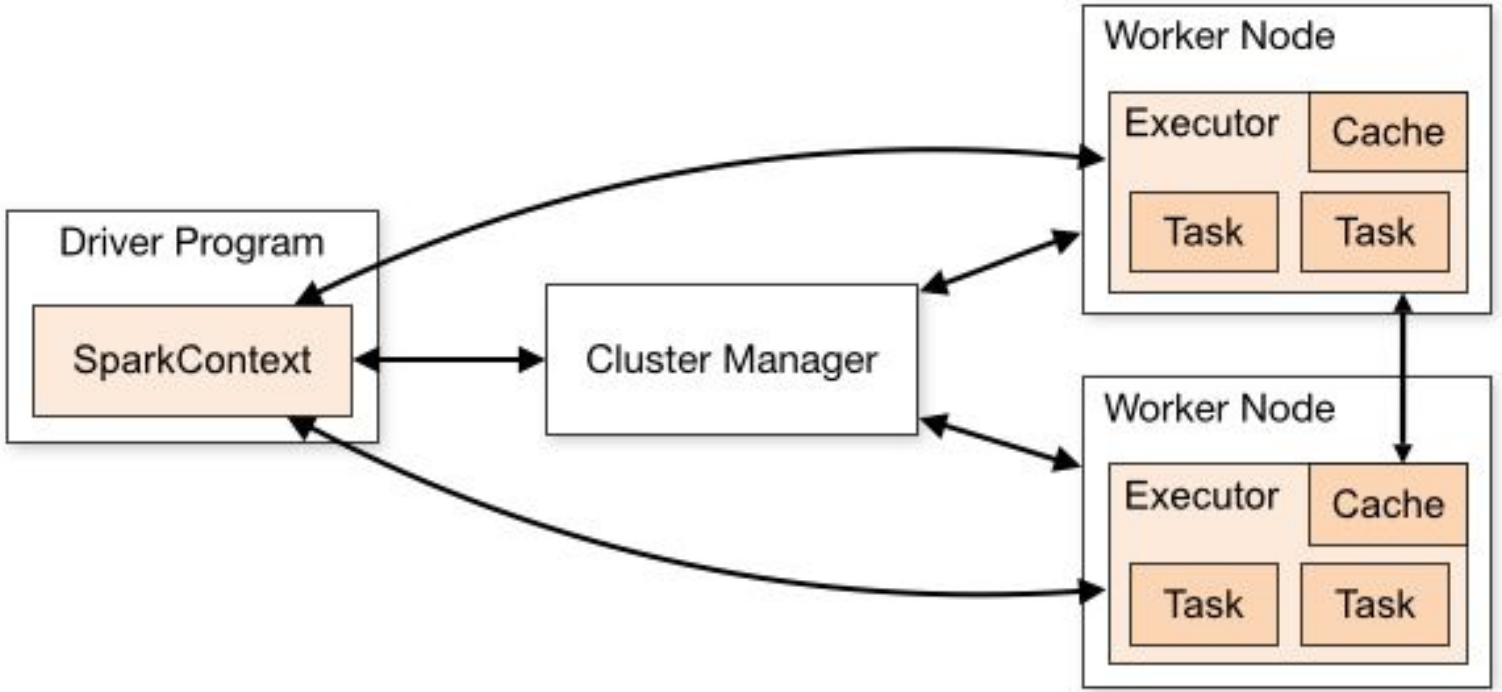
Scope

- Deploying isolated, ad-hoc Spark clusters on k8s
- Introducing a cloud native storage system
- Demonstrate a possible setup to build upon
- Example code

Spark - Short Overview

Spark - Cluster-Manager



Spark - Storage

APACHE HBASE

HDFS

APACHE Spark™

S3

MAPR-FS

cassandra

Running Spark in containers

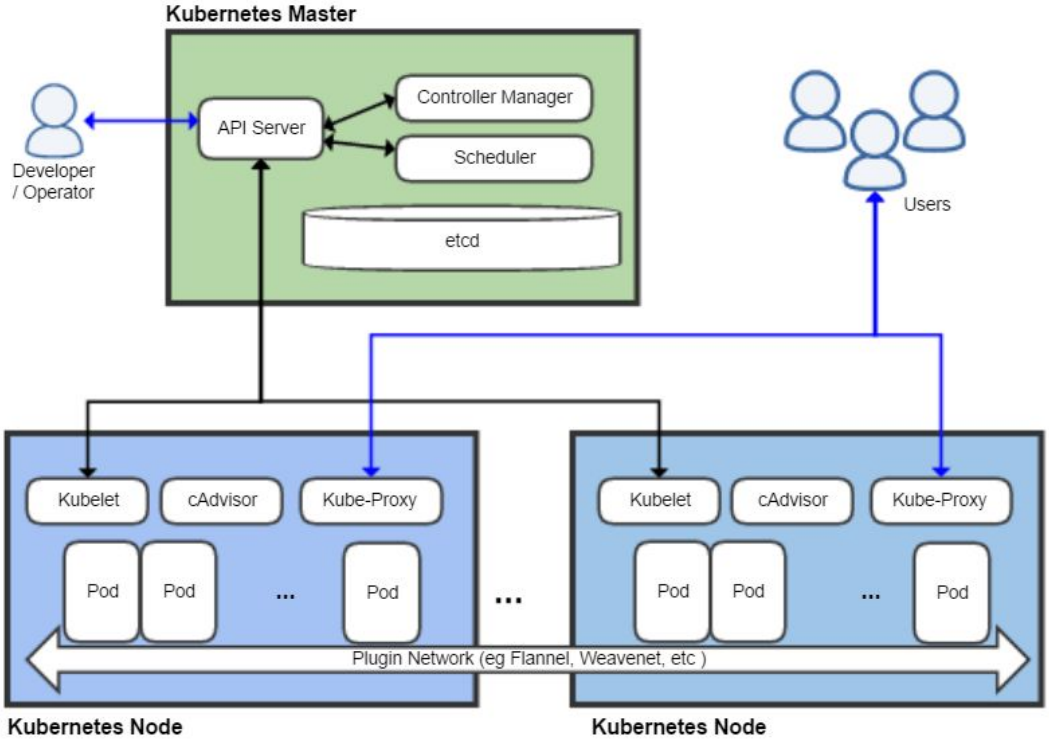
- Required to use Spark with Kubernetes
- Separate Spark from Hardware
- Running as Container is lightweight and flexible

Kubernetes (k8s) - Overview

Kubernetes - Intro

- Designed by Google and donated to CNCF
- Managing Containers across a cluster of nodes
- Kubernetes is portable, extensible and self-healing

Kubernetes - Intro

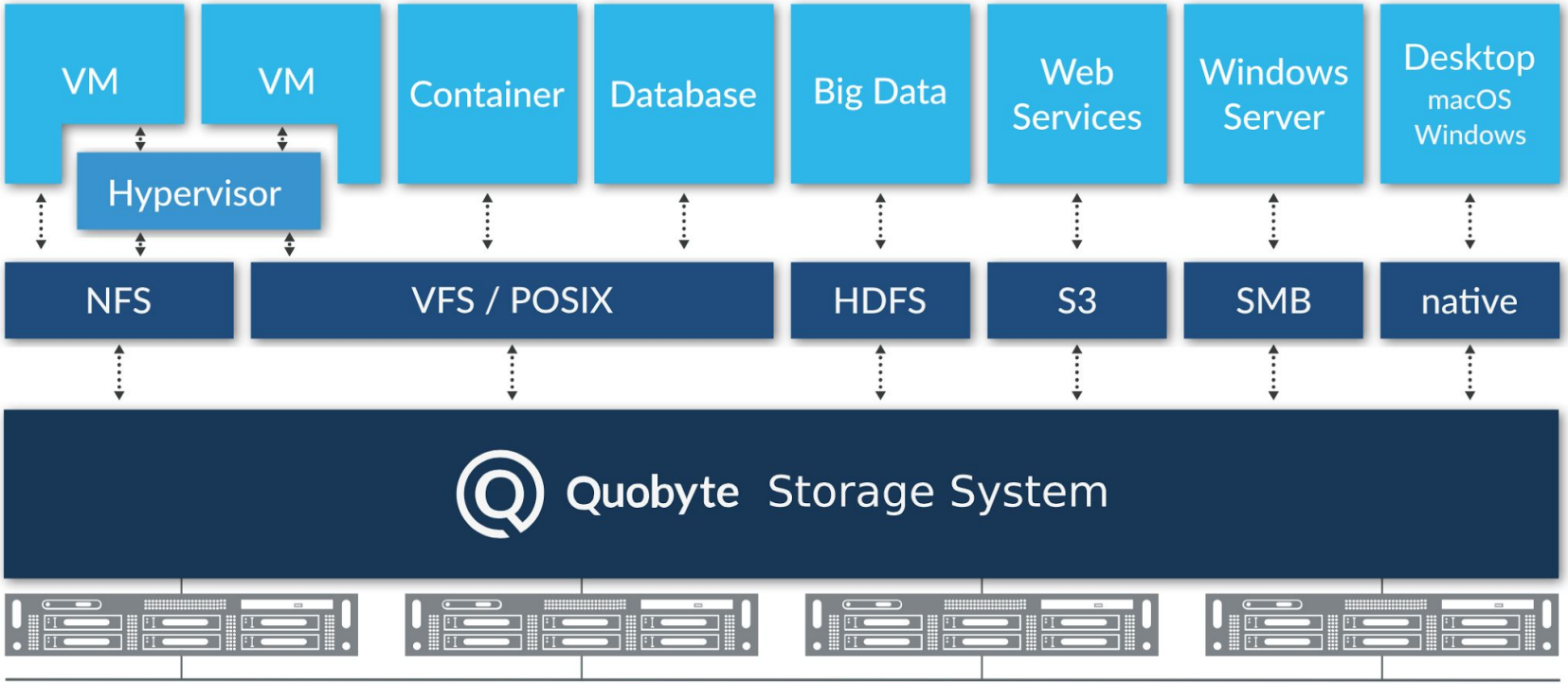


Why k8s?

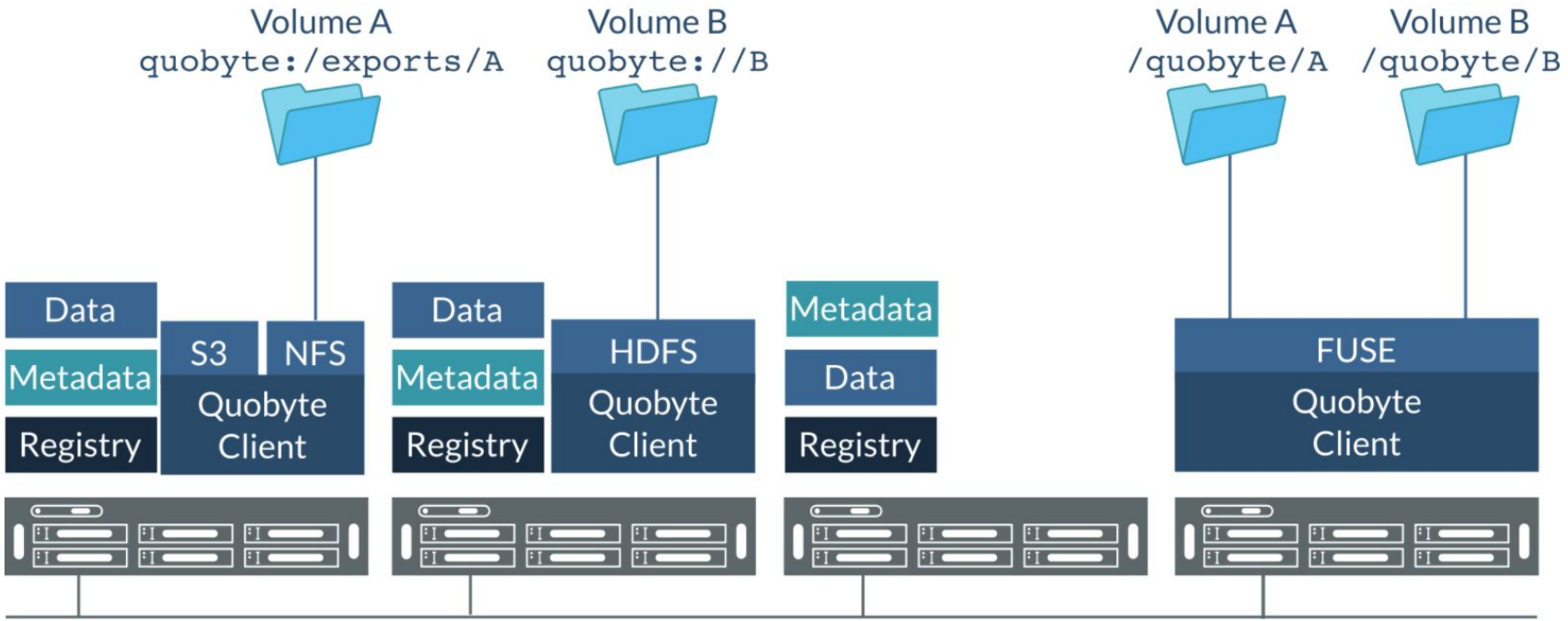
- Unified Cluster-Manager for all container applications
- Share nodes between Spark and Microservices
- Isolate and mix Workloads
- Facilitate autoscaling

Quobyte - Overview

Quobyte


VM
VM
Hypervisor
Container
Database
Big Data
Web Services
Windows Server
Desktop
macOS
Windows
NFS
VFS / POSIX
HDFS
S3
SMB
native
Quobyte Storage System

Quobyte - High-Level-Architecture



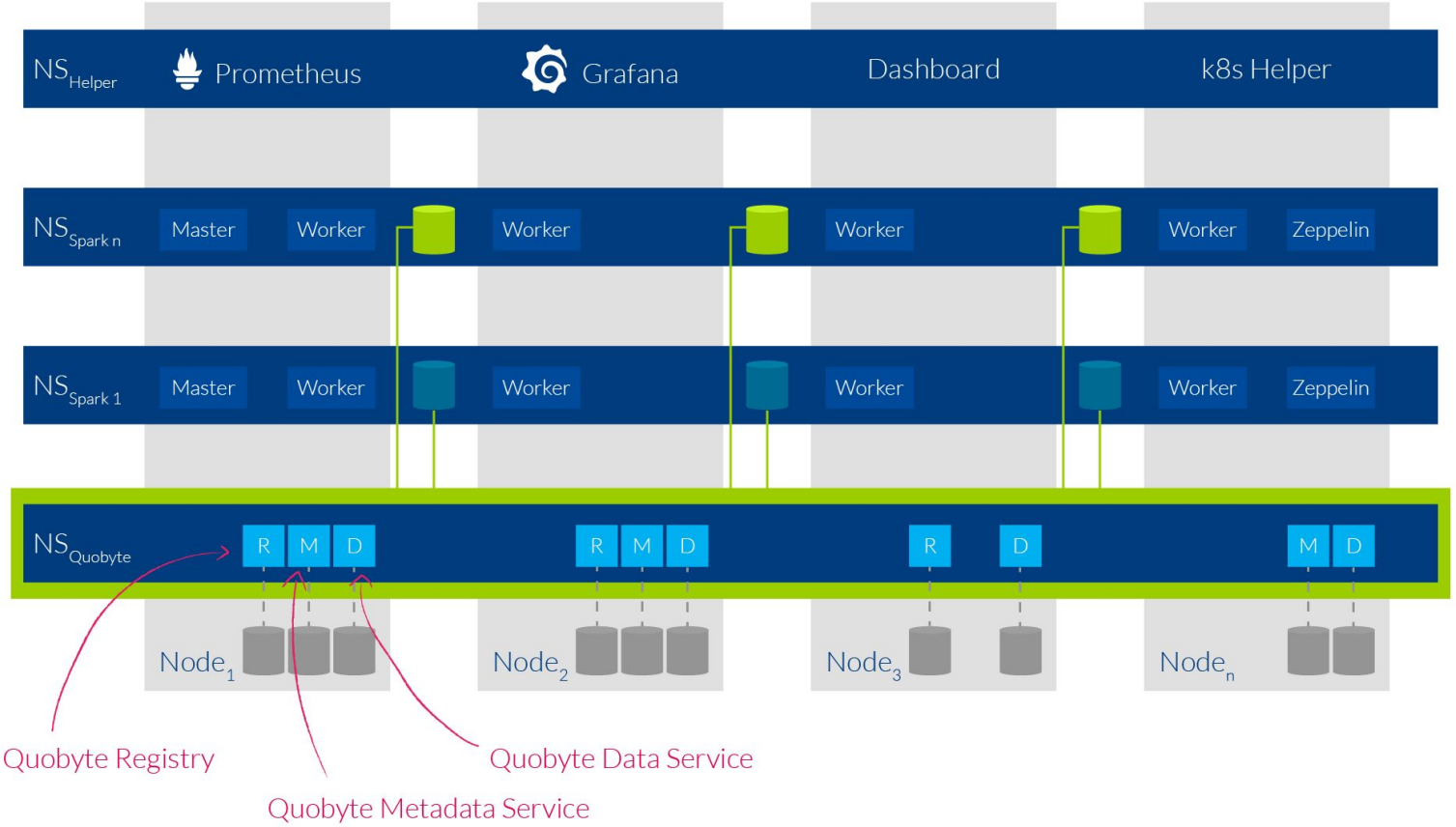
Quobyte

Why bother?

- Unified filesystem (access via HDFS, S3, NFS, native, …)
  - with distinct volumes for separation
- Most flexible file placement due to a powerful placement engine
  - Exceeding the possibilities of HDFS
- SPOF-free, linearly scalable, end-to-end checksums
-

Setup and Demo

Architecture of the Demosystem



Summary & Outlook

Summary

- Combining Spark with k8s and Quobyte provides a flexible solution
- We are able to almost instantly spawn separate Spark clusters with associated volumes
- Run different Spark clusters with different versions at the same time

Outlook

- Kubernetes Spark Scheduling in development (SPARK-18278)
- Multiple options for access and ingest
- Authorization / Authentication (RBAC)

Q&A

GitHub Resources

GitHub Resources

- GitHub-Repo with code for assembling k8s on AWS
  - https://github.com/inovex/kubernetes-demo
- GitHub-Repo with code for assembling Spark on k8s
  - https://github.com/inovex/spark-k8s-strata

Vielen Dank

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