HPE EZMERAL CONTAINER PLATFORM: CURRENT AND FUTURE

Tom Phelan/CTO Ezmeral
May 2021
• Ezmeral Container Platform
  • Overview
  • Current Roadmap
  • Future - High Performance Compute
HPE EZMERAL OVERVIEW

- Products have now been shipping for almost 2 years

- Ezmeral brand launched about 9 months ago and became umbrella name for run-time software

- Bring Technology Together
  - Kubernetes
  - BlueData
  - MapR
HPE EZMERAL: ONE PLATFORM FOR A DIVERSE SET OF WORKLOADS

Non-cloud native applications
Modernize your apps without costly refactoring—and gain efficiency, increase agility and provide application portability

Cloud-native applications
Streamline your development process and accelerate building cloud-native apps and deploying apps with DevOps and CI/CD

Data intensive workloads

HPE Ezmeral Software Platform
Self-service | Pay-per-use | Scale up and down | Managed for you

- DevOps
- Microservices
- Containers

- Security enablement
- Multi-tenancy
- Persistent storage for stateful apps

EDGE

CORE

CLOUD
DEPLOY ON MULTIPLE HOST PLATFORMS

Features
• Edge  Core  Cloud
• K8s on physical hosts, VMs, and Cloud instances
• Selectively place workloads on different hosts
• Bring your on K8s version
• Secure data and applications across edge, core, and cloud
HPE EZMERAL: CONTROL PLANE

CONTROL PLANE

GATEWAY (HA)

SSL

CONTROLLER (HA)

REST API

APACHE WS

MONITORING/_ALERT

Auth Proxy

Local/AD/LDAP

CNI - CANAL

CSI - MAPR/DF

PROMETHEUS

KUBEDIRECTOR

AGENT

(CUSTOM CONTROLLER)

KUBERNETES

Port re-map

Load balancing
(K8s Control plane)

Deploy/manage K8s

K8s Cluster 1.18
(Deployed)

EKS
(Cloud Imported)

K8s Cluster 1.17
(Local Imported)

User

Admin

Kubeconfig

Context and authentication header

Kubeconfig

Context and authentication header

TENANTS
HPE EZMERAL: ML OPS WORKFLOW

Data Prep

- Containerized sandbox environments
- Choice of ML/DL tools, interfaces and frameworks
- Secure access to shared data

Build

- Git integration
- Model registry
- Project repo

Monitor

- End-to-end visibility
- 3rd party integrations

Train

- Containerized ML/DL environments
- Elastic clusters
- Python, Spark, TensorFlow, ...

Deploy

- Containerized deployment with scalable endpoints
- Out of the box runtime engines
- Autoscaling and load balancing
HPE EZMERAL: ML OPS

HPE Ezmeral ML Ops

- Monitor
  - Data Processing
  - Build
  - Train
  - Deploy

HPE Ezmeral Container Platform

Multi-tenant multi-cluster management for containerized applications — with pre-integrated data fabric and persistent container storage

Compute
- CPUs
- GPUs

Storage
- NFS
- HDFS

On-Premises

Public Cloud
- AWS
- Azure
- Google Cloud

Data Prep

Sandbox

Training

Serving

NFS

HDFS

CPUs

GPUs

On-Premises

Public Cloud
HPE EZMERAL RUN-TIME SOFTWARE & HPE GREENLAKE STRATEGY

HPE Ezmeral Software

- Provide a cloud-like experience on-premises
- Modern Container Platform with open source K8s and data centric apps
- Edge-to-cloud scale-out data fabric for files and objects

HPE GreenLake offers Ezmeral capability as-a-Service

- On-premises consumption-based pricing
- Managed for you
- Self-service experience
- Marketplace of apps and solutions
**CENTRALIZED POLICY MANAGEMENT**

**Challenges**
- Maintaining control over sprawling Kubernetes clusters
- Inconsistent or lack of policies pose security threat
- Policy drifts are hard to govern leading to non-compliance
- Manual policy management is tedious and an ops burden

**Features**
- Git(Ops) integrated Centralized Policy management
- Fine grained policy enforcement via Policy Controller (OPA)
- Drift detection, reconciliation and automatic policy sync

**Benefits**
- Policy guardrails ensure consistent clusters across hybrid estate
- Continuous policy compliance, control and improved Ops efficiency
CONTAINER RUNTIME SECURITY

Challenges
• Vulnerability scanning (Shift Left) is good but not sufficient
• Never ending CVE exploits and malicious intrusions
• Microservices present wider attack surface
• Cannot react to threats if one can’t see it

Feature
• Runtime Security enabled by Default
• Automatic sync of new rules via Git
• Visual Alerting of policy violations

Benefits
• Improved container security & threat detection
• Reduced risk with immediate alerting
• Leverage most current detection rules for CVE/malicious exploits
HPE EZMERAL CONTAINER PLATFORM JOURNEY

5.0  
(Q1CY20)

Platform Introduction
• Multi-cluster Enterprise grade K8s
• Multi-tenancy
• IAM, RBAC, Security
• Observability
• Data Fabric & Data Tap

5.1  
(Q3CY20)

Scalability
• 1000+ Nodes
• Upgrade optimization
• Responsive UI, Metrics
• OS Security - SE Linux

5.2  
(Q4CY20)

Hybrid, Multi-cloud & Data management
• Hybrid & Multi-cloud K8s mgmt.
  • EKS, AKS, GKE, PKS, CNCF K8s
• Istio Service Mesh
  • Observability & Visualization
  • Tenant granularity
• Data Fabric on K8s
## JUST THE FACTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS support</td>
<td>RHEL/CentOS 7.7, 7.8 SLES 15 SP2</td>
</tr>
<tr>
<td>Kubernetes Versions</td>
<td>1.18-1.20 (RHEL OS) 1.18.6 (SLES)</td>
</tr>
<tr>
<td>Policy Management</td>
<td>Git-integrated, Policy and drift management</td>
</tr>
<tr>
<td>Runtime Security</td>
<td>OSS Falco based, Threat detection and alerting</td>
</tr>
<tr>
<td>Data Fabric on K8s</td>
<td>Stability improvements; Feature enhancements</td>
</tr>
<tr>
<td>Imported Clusters</td>
<td>EKS 1.18, 1.19, GKE 1.18.16-gke-302, 1.18.16-gke-502, AKS 1.18.14, 1.19.7, 1.2.0.2, PKS 1.7</td>
</tr>
</tbody>
</table>
## Looking Into the Future

### Near – Mid term (3-9 months)

<table>
<thead>
<tr>
<th>Manageability</th>
<th>Security</th>
<th>Data Services</th>
<th>OS and Runtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>K8s-native management plane</td>
<td>End-end Application Authentication (JWT)</td>
<td>Backup and Recovery – K8s control/Data plane</td>
<td>RHEL 8, SLES 15 SPx</td>
</tr>
<tr>
<td>Modern Observability stack – Prometheus, Grafana, FluentD</td>
<td>Platform OIDC authentication</td>
<td>Cluster data migration and data mobility</td>
<td>Containerd, CRI-O</td>
</tr>
<tr>
<td>Metrics aggregation and Log shipping</td>
<td>Secrets management (Vault)</td>
<td>Data Fabric Day 2 ops automation</td>
<td></td>
</tr>
<tr>
<td>UX/UI</td>
<td>Certificate management &amp; rotation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Image security and registry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Runtime security – Alert exports (Elastic, Prometheus)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Long term (9 months+)

<table>
<thead>
<tr>
<th>Manageability 2.0</th>
<th>Security (Zero Trust)</th>
<th>Observability</th>
<th>Data Services</th>
<th>Data Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine management &amp; Windows Containers</td>
<td>SPIRE integrated Service Mesh</td>
<td>Lifecycle management</td>
<td>Edge Optimization</td>
<td>Edge Optimization</td>
</tr>
<tr>
<td>Federated Management plane</td>
<td>Workload attestation (K8s and non K8s)</td>
<td>Application performance monitoring (Infosight)</td>
<td>Data Fabric Optimization</td>
<td>Data Fabric on Cloud</td>
</tr>
<tr>
<td>Multi-cluster service mesh (Global &amp; Federated)</td>
<td>OIDC Federation</td>
<td>Distributed tracing</td>
<td>1 click automated Disaster Recovery</td>
<td>DR to Cloud, Bursting</td>
</tr>
<tr>
<td>IT Edge optimization – K8s and Data Fabric</td>
<td>Hardware integrated security (SiROT)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Guidance only; Subject to Change*
HPE EZMERAL: ONE PLATFORM FOR A DIVERSE SET OF WORKLOADS

Non-cloud native applications

Cloud-native applications

Data intensive workloads

HPE Ezmeral Software Platform

- Self-service
- Pay-per-use
- Scale up and down
- Managed for you
- DevOps
- Microservices
- Containers
- Security enablement
- Multi-tenancy
- Persistent storage for stateful apps

EDGE

CORE

CLOUD
HPE EZMERAL: ONE PLATFORM FOR A DIVERSE SET OF WORKLOADS

Non-cloud native applications

Cloud-native applications

Data intensive workloads

HPC workloads

HPE Ezmeral Software Platform

- DevOps
- Microservices
- Containers

- Security enablement
- Multi-tenancy
- Persistent storage for stateful apps

- Singularity Containers
- SLURM Scheduler

Self-service

Pay-per-use

Scale up and down

Managed for you

EDGE

CORE

CLOUD