

# Container Platform at Scale with

## Docker Enterprise Edition and IBM Z and LinuxONE

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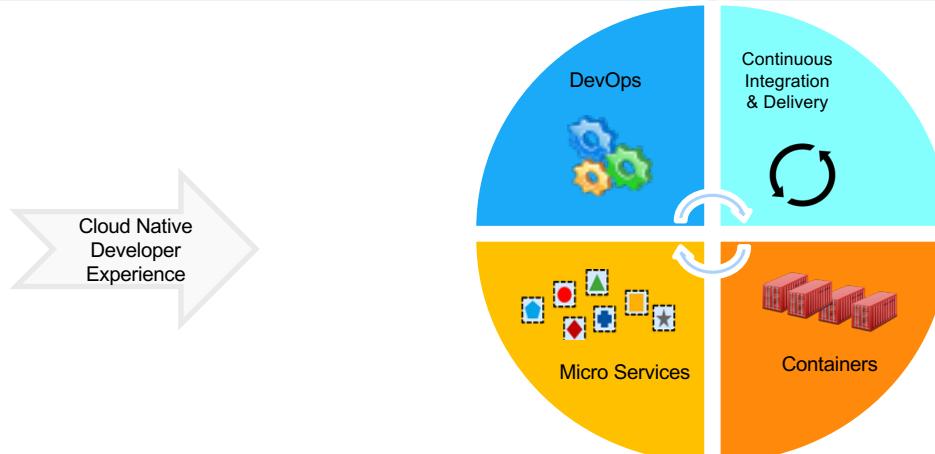
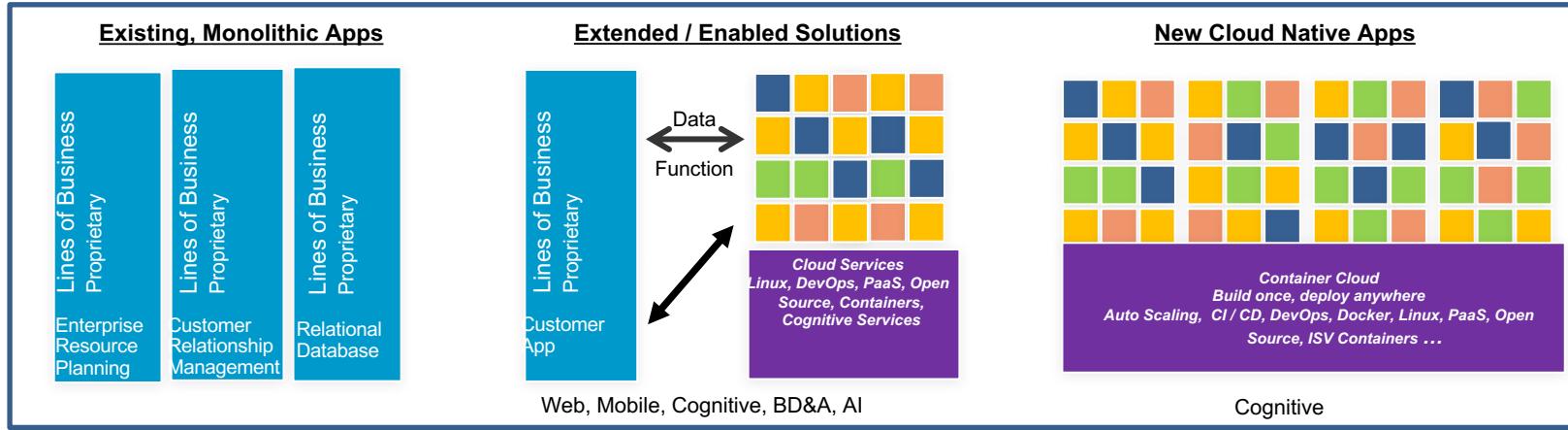
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# Agenda

- Market trend towards cloud native and containers
- How container technology solves digital transformation challenges
- Speed, Scale and Security with Docker Enterprise Edition on IBM Z and LinuxONE
- Technical Demo

# Cloud is changing how workloads are built and delivered



# Containers the “Fastest Growing Cloud Enabling Technology”



“By 2020, more than 50% of global organizations will be running containers in production.”

-Gartner



# Maintenance and Complexity Drains the Budget, So Innovation Suffers



\* Average number infrastructures in the enterprise (on-prem and cloud)

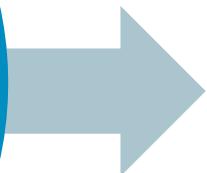
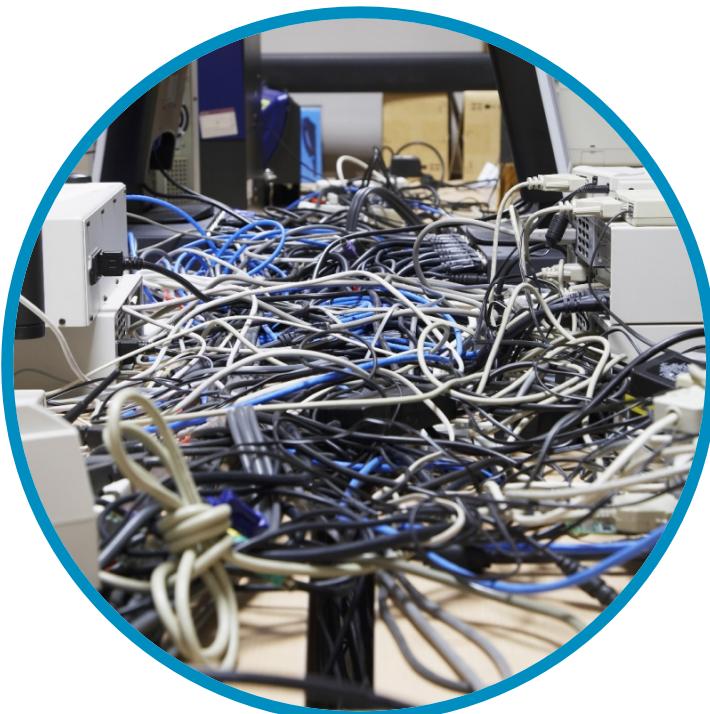
\*\* Forrester, CIO and the emerging Digital Crisis, 2018

\*\*\* CloudPhysics, Global IT Data Lake Report, Q4, '16

Sources: IDC "The Cost of Retaining Aging IT Infrastructure", RightScale 2017 State of the Cloud Report



## Complexity Comes From Dependencies



# The “Matrix from Hell” Breeds Complexity

Static Website								
Web Frontend								
Background Workers								
User DB								
Analytics DB								
Queue								
	Desktop 	Test/QA Cluster 	Production Cluster 	Public Cloud 	Data Center 	Mainframe 	Windows Server 	Edge Device 



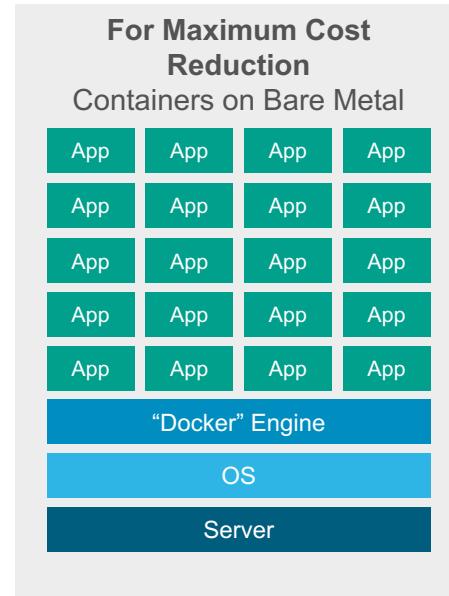
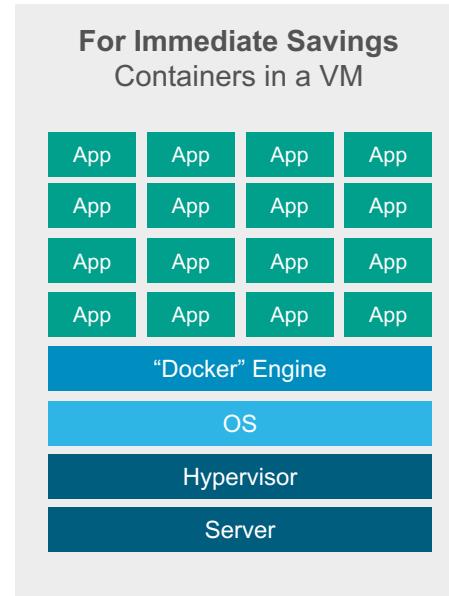
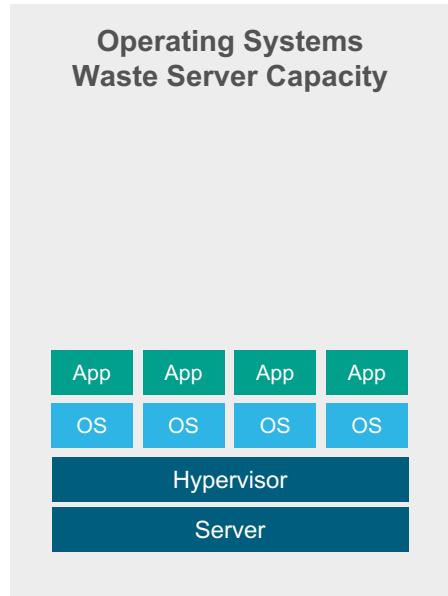
# The “Matrix from Hell” Breeds Complexity — Containers Cut Complexity

Static Website								
Web Frontend								
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Analytics DB								
Queue								
	Desktop 	Test/QA Cluster 	Production Cluster 	Public Cloud 	Data Center 	Mainframe 	Windows Server 	Edge Device 



# Advantage #1: Infrastructure

## Containers Expand Budgets by Delivering Savings



Server Count ↓

VM and OS Licenses ↓

Power, Space, Cooling ↓

Admin ↓

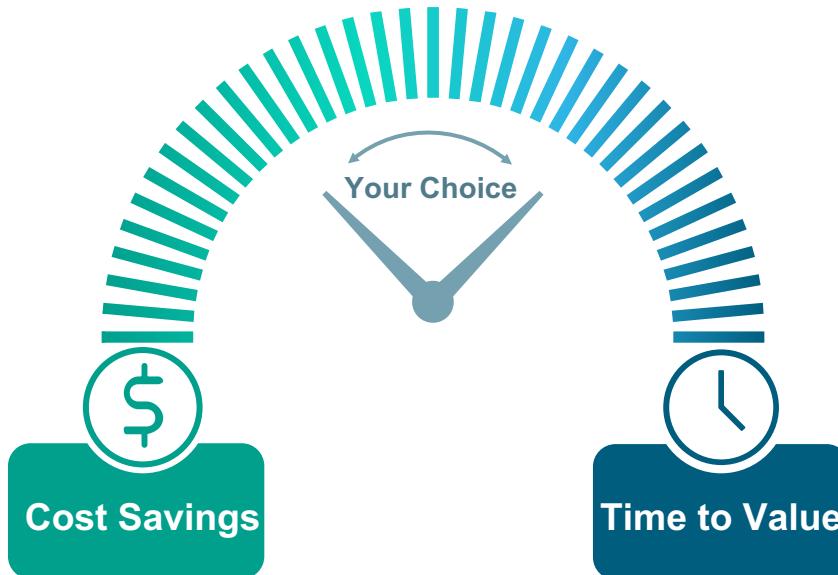


## Advantage #2: Productivity

Agility and Time-to-Market Value Often Dwarf Infrastructure Savings

### OPERATIONS

-  Fewer Servers
-  Fewer VMs
-  Faster, Easier Scalability
-  One Operating Model
-  Cut Downtime



### DEVELOPMENT

-  Build Fast
-  Test Fast
-  Deploy Anywhere
-  Onboard Quickly
-  Increase Agility



# Top Enterprise Initiatives ...



Modernize Existing Applications



Faster Application Development  
and Delivery



Cloud Strategies  
without getting locked-in



Modernize Software Supply Chain



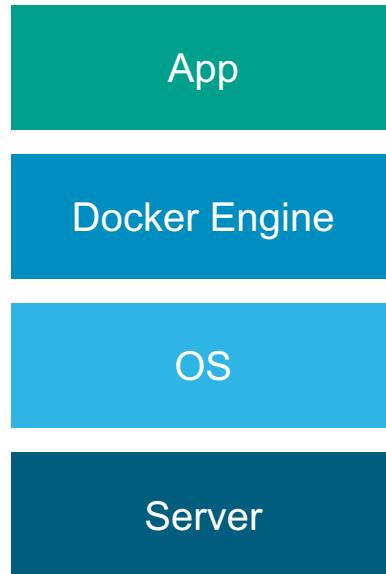
Reduce Data Center Expenses



Secure Software Distribution  
To any remote office, customer environment, or device



... Demand More Than Our Widely-Adopted Open-Source Engine ...



# ... They Require an Enterprise-Ready Container Platform ...

App	 <b>Security</b>	 <b>Governance</b>	 <b>Automation</b>	 <b>Support and Certification</b>
Docker Engine	<ul style="list-style-type: none"><li>Automated Threat Scanning</li><li>Controlled Code Deployment</li><li>Encrypted Communications</li><li>Secrets Mgmt</li><li>Image Mgmt</li><li>Support for 3<sup>rd</sup> party security tools</li></ul>	<ul style="list-style-type: none"><li>Role-based access control (RBAC)</li><li>Policy Mgmt and Enforcement</li><li>App Config Enforcement</li><li>Forensic Image History</li><li>Controlled Code Deployment</li></ul>	<ul style="list-style-type: none"><li>Kubernetes orchestration</li><li>Built-in app reliability/High Avail.</li><li>Policy-based automation</li><li>Auto health check</li><li>Auto restore</li><li>Auto load balance</li><li>Autoscale (coming)</li></ul>	<ul style="list-style-type: none"><li>Enterprise-grade support</li><li>Certified Plug-ins and Infrastructure</li><li>Certified ISV apps as containers</li><li>Certified professionals</li></ul>
OS				
Server				



## ... Delivering the Three Core Enterprise Requirements



### Choice

- Any app, any cloud, including Hybrid
- No lock-in
- Your own pace
- Flexible and extensible
- Use Docker native tools ...  
*or almost any you prefer*



### Security

- Governance
- Risk Mitigation
- Provenance
- Integrated and automated



### Agility

- Standardized and unified operations
- Dev to Ops consistency
- Rapid Delivery and response
- Cost efficient
- Future-proof

“ ...Everyone wants to work with Docker and it's a change of mindset in the company.

Thomas Boussardon, Societe Generale



# Docker Enterprise Edition Overview



# Docker EE Positioning

- Best Practice deployment of running containers at scale in the enterprise
- Receive enterprise support for the entire platform:
  - Container Runtime
  - Orchestration Layer (i.e. Swarm Mode and K8s)
  - Management Interface
  - Enterprise Grade Registry
- Built-in enhanced security features for running containers in enterprise systems:
  - Image Security Scanning
  - Digital Signature Policy enforcement - Docker Content Trust Enforcement
  - Role Based Access Control - container resource and node level

# Docker EE Architecture

CI/CD

Images

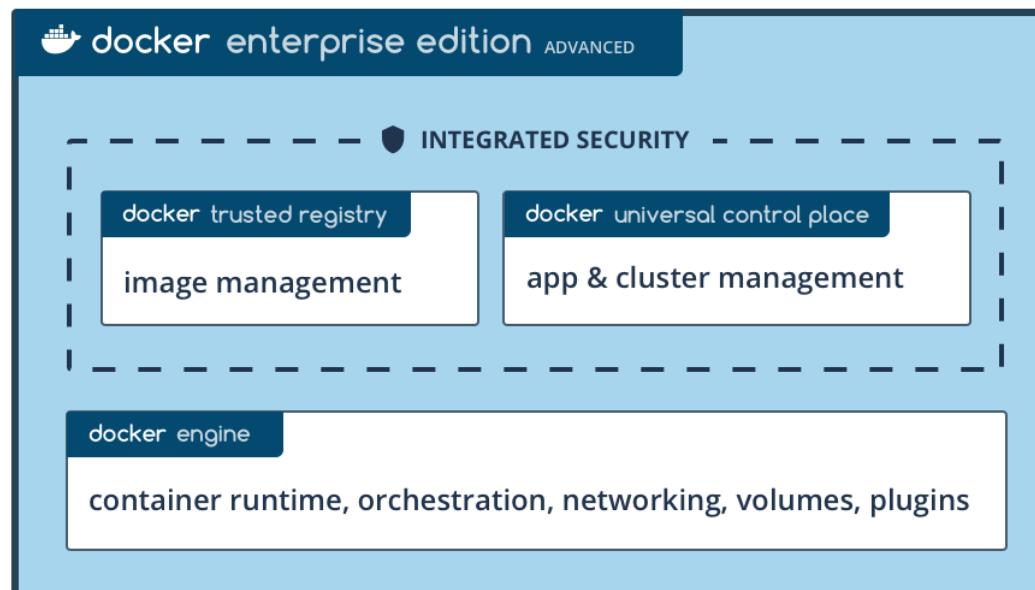
Operating Systems

Volumes

Monitoring

Logging

more...



Public Cloud

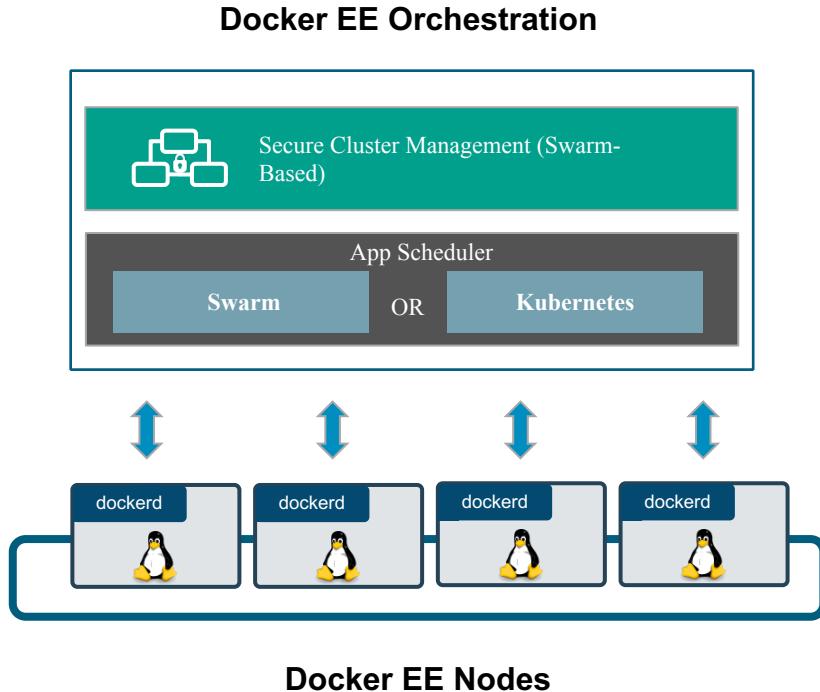


Virtual



Physical

# Kubernetes Orchestration with Docker EE

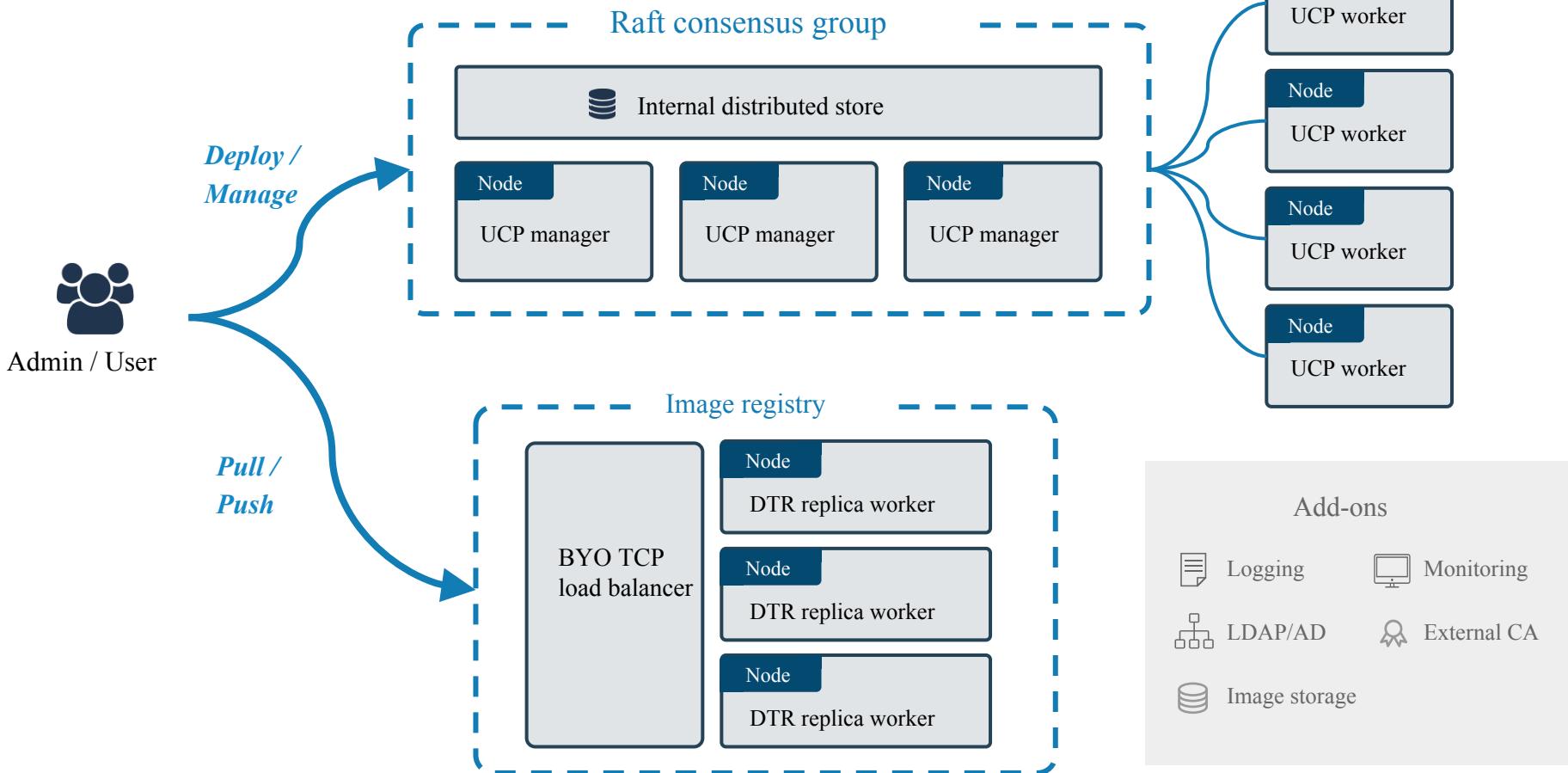


Docker EE is designed to support multiple orchestrators:

- EE Manager Nodes are both Swarm managers and Kubernetes masters to enable high availability
- Every worker node is both Kubernetes API- and Swarm API-ready
- One management plane driving:
  - Secure software supply chain
  - Secure multi-tenancy
  - Secure and highly available node management

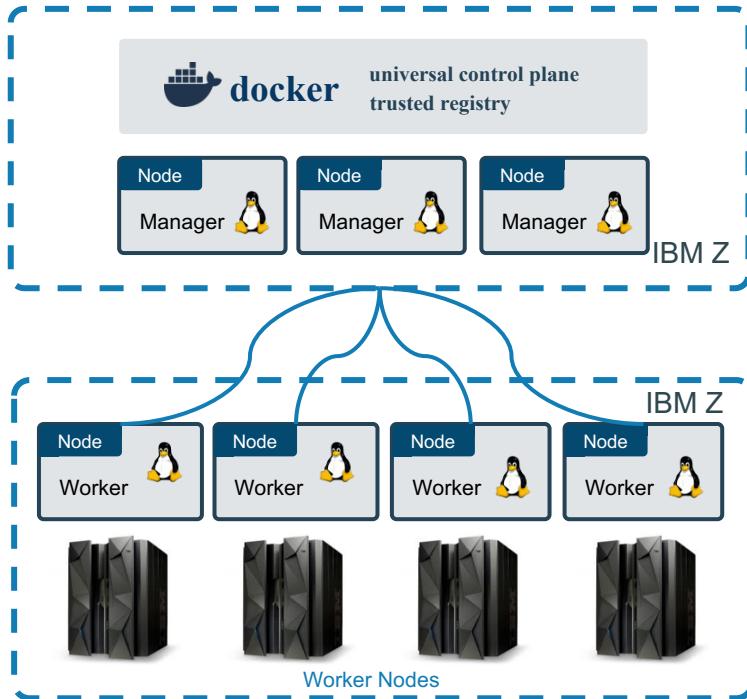


# Docker EE Architecture (continued)



# Run Docker on IBM Z and x86 – Speed and Agility

## GET THE BENEFITS OF CONTAINERS FOR APPS ON IBM Z/LinuxONE



### KEY FEATURES

- Support Docker on SLES, Ubuntu, and RHEL hosted on IBM Z/LinuxONE and x86
- Extend enterprise security features like image signing, image scanning, and secrets management to Linux apps on IBM Z
- Leverage the same LDAP/AD integration and RBAC rules across all nodes
- Visualize all apps in the same environment

### BENEFITS

- Incur less management overhead with centralized management across x86 and IBM Z apps
- Improve maintenance and patching and reduce downtime with containerized applications
- Improve resource utilization on IBM Z while standardizing the software supply chain



# Choosing an enterprise container deployment platform

What matters?



Security

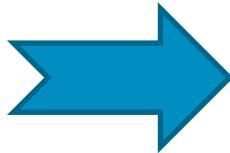
Resilience

Scalability



# IBM LinuxONE

IBM LinuxONE Emperor™



IBM LinuxONE Emperor II™



The world's  
premier  
Linux  
system for  
highly  
secured  
data  
serving

Foundation for Data  
Serving & Next  
Generation Apps

Engineered  
for  
performance  
and scale



Linux  
**YOUR  
WAY**

Linux  
**WITHOUT  
LIMITS**

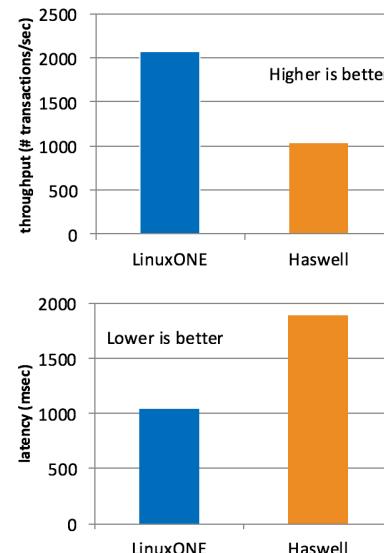
Linux  
**WITHOUT  
RISK**

# Run Docker on LinuxONE – Extreme Scale

**2x more containers per Docker engine while maintaining high throughput**

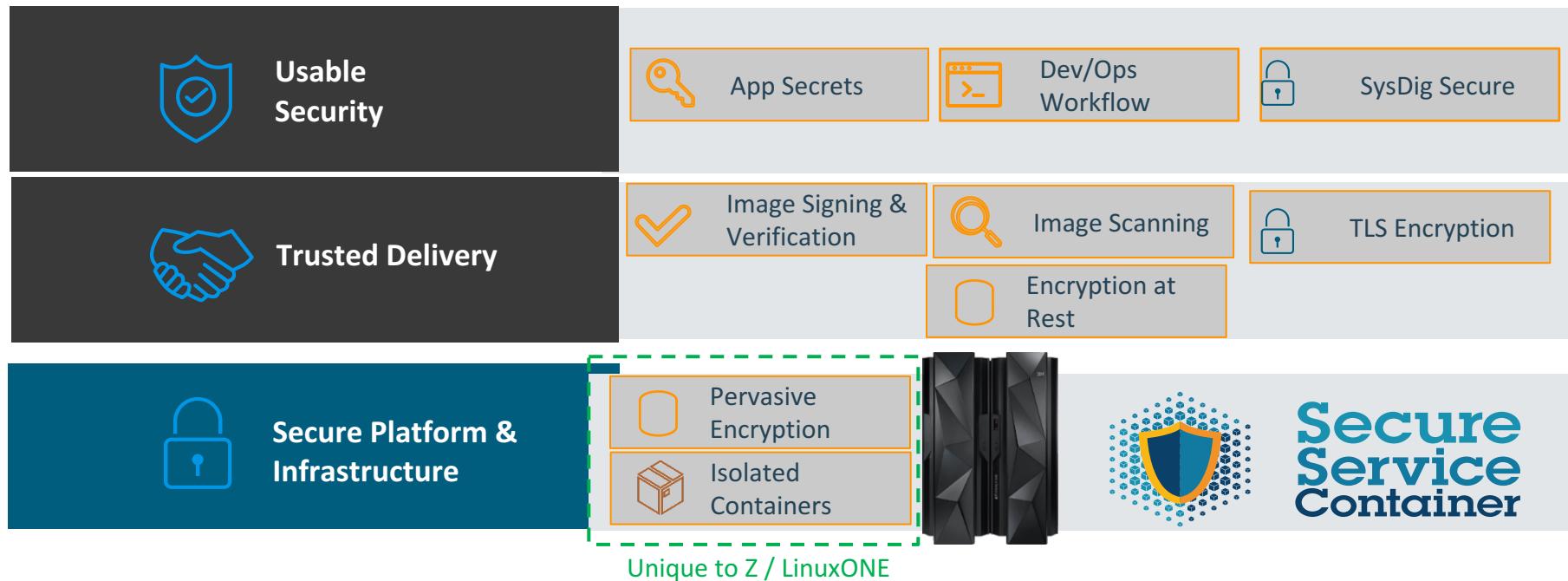
- Emperor II can run 2 million+ light containers!
- Runs **4K active** Docker containers with **2.0x** better throughput than comparable Haswell-based system!
- Host over 10K Docker containers with mixed (heavy & light) workloads

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*The throughput and response-time for a single Linux host running 4Kcontainers*

# Docker EE & LinuxONE offers security at every level

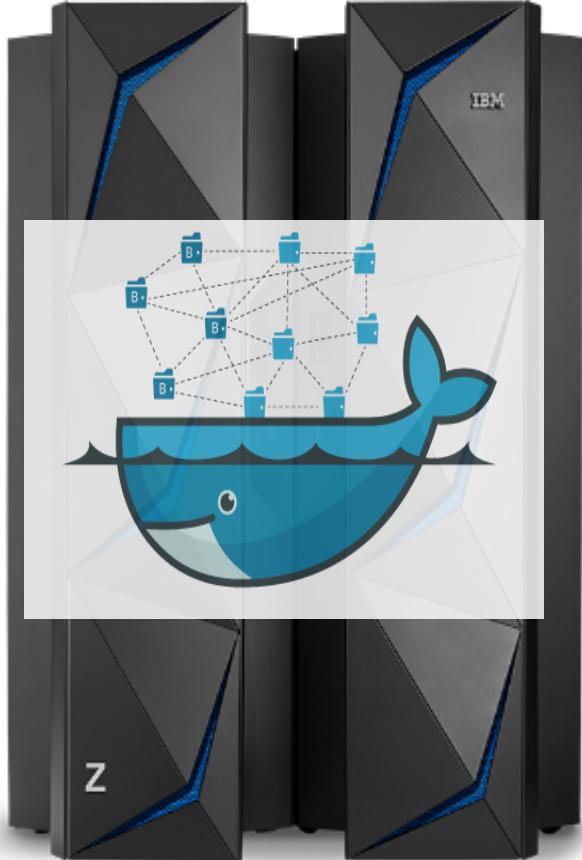


# Docker EE on LinuxONE – A Customer Use Case



- **Client**
  - Multinational Financial Services Bank in Canada
- **How is Docker EE used?**
  - On-prem blockchain application, a pilot to shadow the bank's legacy transaction monitoring ledger to monitor payments in real time as they pass between bank locations.
  - The fabric of global payments blockchain on Z is deployed in Docker containers (along with CouchDB and PostgreSQL) using IBM Docker Hub.

# Why was Docker EE and LinuxONE Chosen?



Rapid development and deployment

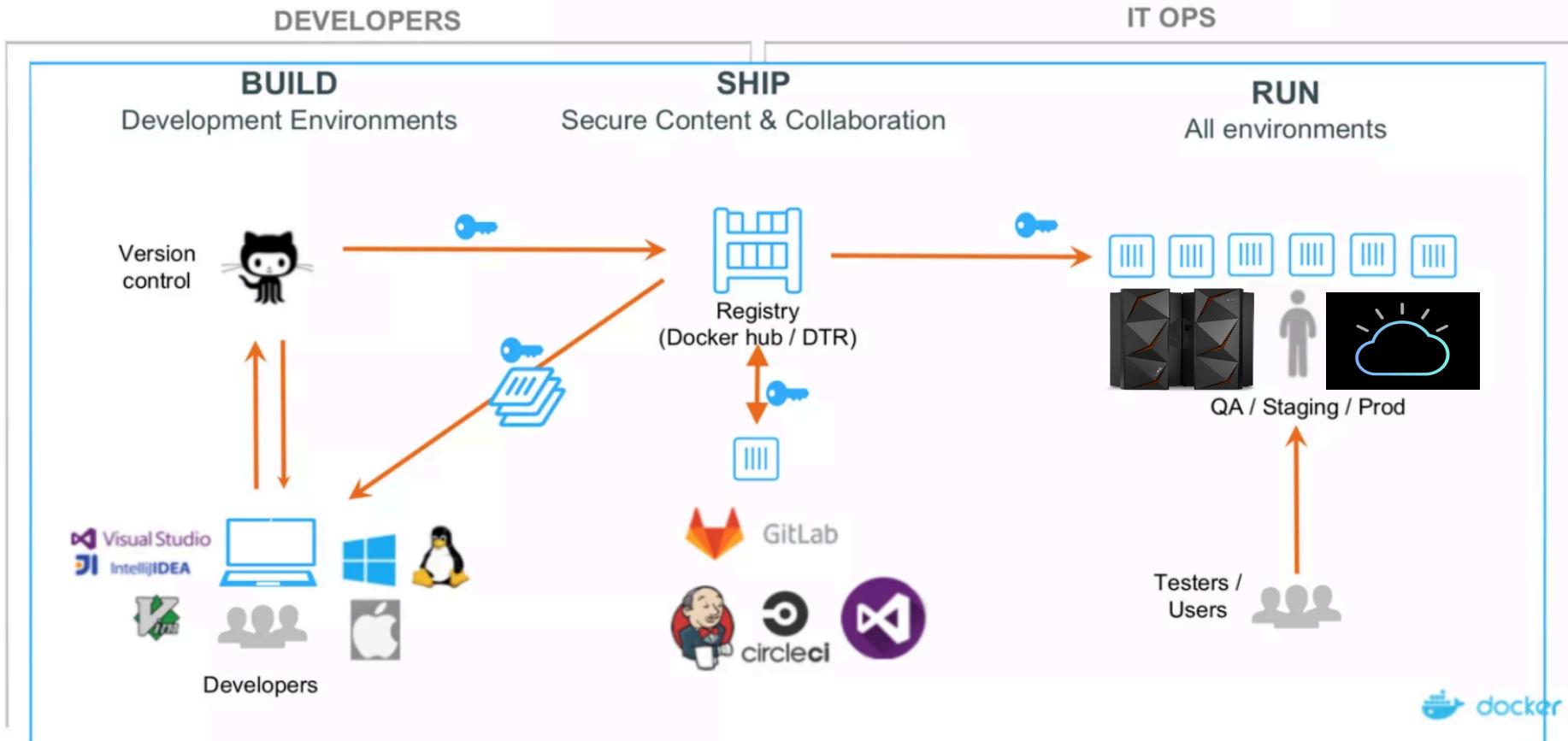
Enterprise support from Docker Inc and IBM

End-to-end security

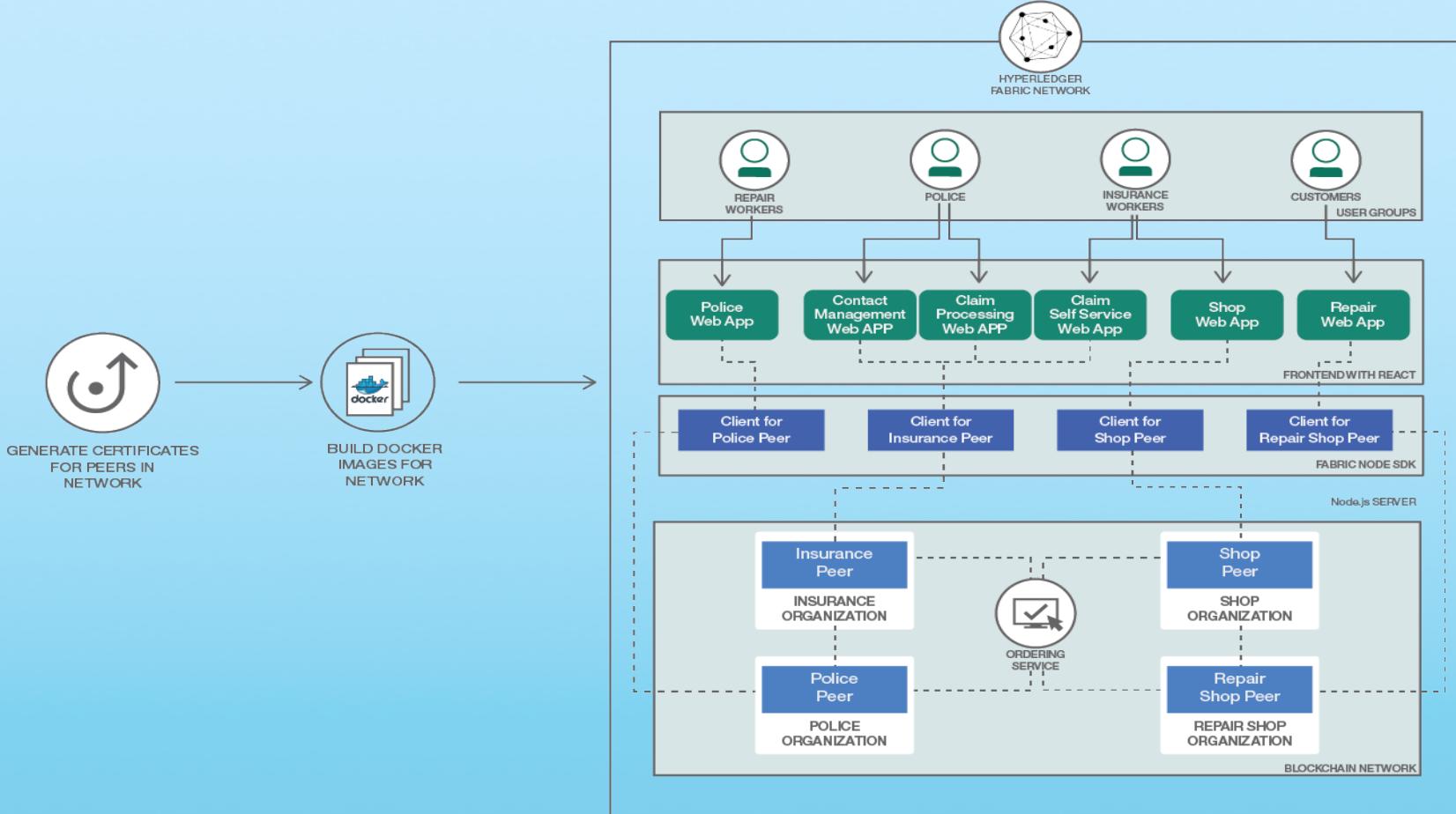
Platform resiliency and scalability

# **Docker EE on LinuxONE Demo for An Insurance Company**

# Continuous Integration & Delivery Workflow



# Architecture Diagram



# Interested to Know More?

- Reach out to Jim Mazzeo ([jim.mazzeo@docker.com](mailto:jim.mazzeo@docker.com)) and Enyu Wang ([enyuw@ca.ibm.com](mailto:enyuw@ca.ibm.com)) to work with Docker and IBM together
- Try Docker EE on Z:  
<https://store.docker.com/editions/enterprise/docker-ee-ibm-z>

