Container-native Applikationsentwicklung in der Cloud

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Entwicklungsmuster für Applikationen

**Container Native**
- Serverless
- docker

**Enterprise Java/DB**
- Java EE

**Cloud Native PaaS**
- Java
- php
- python
- js

**Visual/Low Code**
- Personenabbildung
- Diagramm
Anwenderspektrum und Anforderungen

Container Centric
User: DevOps / SRE
- granular control
- highly scriptable
- deep introspection
- open

PaaS
User: Web/Mobile Dev
- limited control
- prescriptive
- limited introspection
- short/efficient onramp
- affixed to environment

Enterprise Java/DB
User: Operations
- tightly controlled for consistency
- uniform tooling
- designed for seamlessness

Visual/Low Code
User: Line of Business
- no exposure to controls
- intuitive / UI based
- integrated into a suite
- low/no complexity

High Control/Productivity vs Prescriptive/Productivity

Serverless
f(x)
Container – Eine Reise in drei Phasen

Phase I
- Developer Focus
- Container Adoption
- Docker

Phase II
- DevOps Focus
- Application Deployment
- Kubernetes

Phase III
- Business Focus
- Business Integration
- Container DevOps
Microservices Architektur

**Monolithische Architektur**

- User Interface
- Business Layer
- Data Interface

**Microservice Architektur**

- Microservice UI
- Microservice
- Microservice
- Microservice

Unabhängige Service-Kommunikation mit synchr. API’s oder asynchr. Events

Single Deployment Entity
Docker

• Lightweight
  – No HW Specification

• Portable

• Layering for Optimization
  – UID’s for Each Layer

• Lives in a Registry
  – wcr.io

• Easy to Deploy
  – Consistent Environment
  – All Dependencies Included

Application Image

Vendor Provided
Cached
Reused

Application
WebTier
Binaries
Libraries
Kubernetes

- Orchestrator
  - Manages Lifecycle
- Eventual Consistency
- Declarative vs. Imperative
  - Traceable, Reproducible Environment Changes
- Statelessness and Persistence
- Scales On Demand
  - Smaller containers makes for more efficient scaling operations
- Easy to Connect to Services
- Resiliency
  - Makes sure your App is always running
Kubernetes Konstrukte

• Wie die Kubernetes Konstrukte untereinander verbunden sind
  – Deployment
  – Container
  – Service
  – Ingress
  – Secret
  – Node
  – Namespace

Cluster

Node

Pod

Container

Image

Deployment

Secret

Service

Ingress

Registry

Image
Oracle Strategie für Container-Based-Infrastruktur

• Deliver a container based capabilities that are complete, integrated and open
  – Orchestration/Scheduling, CI/CD, Management/Operations, Analytics/Introspection
  – With application development platform for serverless and microservices

• Based on community driven open source technology
  – Investing in open source communities and foundations (Kubernetes, Docker, CNCF) via
    engineering resources, code contributions & sponsorship

• Differentiated on quality of service and operational excellence
  – Full, transparent management
  – Deployed to Oracle Cloud Infrastructure
  – Enterprise grade security, HA and governance
Oracle & Open Source Community

- **Oracle’s participation in open source community**
  - Active Participation – Cloud Native Compute Foundation and Kubernetes
  - No forked code – straight from the source
  - Continue precedence of Java, MySQL, Linux

- **Lead by example**
  - Oracle software on Docker Store
  - Kubernetes engineering in CNCF

- **Innovate in open source**
  - Utilities like K8S installer, smith, railcar, crashcart

- **Sponsor & contribute to key conferences**
  - DockerCon, Kubecon, CoreOS Fest, others
Oracle & Open Source und Container Native Tools
Build, Deploy, Operate – Offene, Standards-basierte, Cloud neutrale AppDev Plattform
Kubernetes in der Oracle Cloud Infrastruktur (OCI)
Eigenverantwortlich, Pre-Built-Installer, Managed Service
Oracle Container Engine und Container Registry
Managed Kubernetes

• Container Native
  – Standard Kubernetes; Fully Managed Lifecycle; Integrated Registry

• Developer Friendly
  – Simple, Streamlined User Interface; Rich API; Helm and DNS Built-in

• Enterprise Ready
  – Bare Metal Performance; Highly Available; Secure with Access Controls
Oracle Container Engine und Registry
An Open, Fully-Managed Kubernetes Platform & Private Registry

- **Container Native**: Standard Kubernetes (1.7.4); Fully Managed Lifecycle; Integrated Registry
- **Developer Friendly**: Simple, Streamlined User Interface; Rich API; Helm, Dashboard and DNS Built-in
- **Enterprise Ready**: Oracle Cloud Infrastructure Performance; Highly Available; Secure with Access Controls
Oracle Container Native Microservices
An open (CNCF and Istio based), cloud neutral, platform makes it easy to develop microservices applications

• Adaptive and standardized
  – Open Source, Cloud Native Computing Foundation stack using Istio

• Developer Friendly
  – Opinionated but Open; API first platform

• Enterprise Class
  – Built on Kubernetes with Service Mesh, Service Broker and API Registry; Ops Built In
Oracle Container Native Microservices Architektur

- Order Service
- Shopping Cart Service
- Catalog Service
- Foo1 Service
- Foo2 Service
- API Registry
- Event Management
- Open Service Broker

Service Mesh:
- Automatic service registration and discovery
- Inter-service communication security
- Automatic diagnostics data feeds to ops tools

- Dynamic load balancing and health checks
- Resiliency with circuit breakers, timeouts and retries
- Dynamic request routing for canary releases, A/B tests, gradual rollouts

Managed Kubernetes
Serverless bringt Veränderung

- Serverless als Compute-Einheit
- Functions-as-a-Service (FaaS) bestimmt das Anwendungsentwicklungsmodell der Serverless-Architektur in Kombination mit den verwendeten Daten-Services
- Skalierbare Services pro Funktion
Oracle Container Native Serverless - Functions as Service
Eine funktionsbasierte Plattform

• Polyglotte Funktionsplattform mit Java Optimierungen
• Open Source
• Container Native mit lokaler Entwicklerunterstützung
  – On Premise & Cloud
• Cloud- und Scheduler-Neutral
Die bekannten Mechanismen mit DevOps benutzen
Build, deploy and publish services and APIs with your preferred tool chain

CI-CD/DevOps Pipelines

- Jenkins
- wercker
- Atlassian
- Hudson

Command Line tools or curl

> psm setup
> psm list services
> psm push app ...

> curl -i -X GET -H "Authorization:Joe@example.com:JoePassword" -H ...

Automation Tools

- Puppet
- CHEF
- Ansible
- Spinnaker
- Hashicorp

Oracle Container Native

REST API’s

Service API Catalog

Oracle Container Native

REST API’s for Oracle Cloud Services

- Event Manager
- State Manager
- Service Engine
- Managed Kubernetes
Bestenfalls mit einer führenden CI/CD & Container-Lifecycle-Lösung
Container Pipelines (Wercker) - easy to assemble and automated builds to registries and production-grade clusters

Git

Build ➔ Push to Registry ➔ Registry ➔ Deploy to Orchestration Scheduler

Test ➔ Push ➔ Deploy

OSS CLI ➔ Pipeline/Build Console ➔ Chatbot Integration with Slack (Walterbot) ➔ Oracle, Pivotal, Amazon, Google ...
Container Native Oracle Cloud - Demo

- Git Source Code
  - Commit changes
- Wercker
  - Build
  - Push to Docker Registry
  - Deploy to Orchestration Scheduler in Oracle Cloud Infrastructure
- Kubernetes Services
Container Native Plattform Architektur

Container Development
SRE Workbench

API Registry
Service/Fn Activation
Protocol Support
Client Libraries

CI/CD APIs
Events
APIs
Streams

Engineering and Ops
Logging
Tracing
Debugging

Open Service Broker
Cloud Services
3rd Party Services

Unified Serverless and Service Mesh
LB and Health
Service Discovery
Circuit Breaker
Event Mgmt
Security
Routing

Container Registry

Managed Kubernetes
Cluster Management
Docker Support
K8S Dashboard

Infrastructure

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Oracle Cloud-Native-Application-Entwicklungs-Plattform
Adaptiv mit Container-Native-Fähigkeiten

Container Pipelines
A market leading solution for application lifecycle management with a Docker centric product view

Container Engine
Fully managed container service based on Kubernetes running on Oracle Cloud Infrastructure Bare Metal

Container Microservices
A collection of services, frameworks and libraries for the modern cloud developer; based on Cloud Native Compute Foundation – Istio/Envoy

Container Functions
Open source, cloud neutral, community driven functions as a Service for any language, best of class for Java

Container Diagnostics
Unparalleled real-time observability and diagnostics for large scale distributed Java systems

Build --- Deploy --- Operate
Container-Native-Application-Entwicklungs-Plattform

Integrated Developer Experience UI

Git

Container Pipelines
Wercker CI/CD Service

Build

Push to Registry

Test

Push

Container Registry - "Releases"
Private Registry Service

Deploy to Kubernetes

Container Engine - "Clusters"
Fully-Managed Kubernetes Service

Kubernetes
Dashboard
Team
Full REST
Access
API
kubectl
CLI

Managed HA Control Plane

Orchestrate Your App

ORACLE Cloud Infrastructure

Enterprise Grade Performance & Security
Oracle Cloud Infrastruktur mit OCI-Container-Bausteinen (1)

- Native access within the Oracle Cloud Infrastructure console to container services
  - Deployment von Container-native Applikationen

- OCI - Container Engine for Kubernetes
  - Bezahlt werden nur die Ressourcen: Prozessoren, Storage, Netzwerk

- OCI - Container Registry
  - Bezahlt werden nur die Ressourcen: Storage
Oracle Cloud Infrastruktur mit OCI-Container-Bausteinen (2)

• Container Pipelines

https://cloud.oracle.com/containers/pipelines/features

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<td>$175.00</td>
<td>Container Pipelines CI/CD for container-native applications</td>
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<td>Service</td>
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Zusammenfassung – Oracle Container Native

• Open source, Cloud-neutral und von der Community getrieben
  – Nicht proprietär, Cloud-neutral, unterschiedliche Service-Qualität

• Leistungsfähige und evolutionäre Weiterführung von IaaS
  – Oracle-Cloud-Infrastruktur von der Basis konzipiert und aufgebaut für Performance,
    Sicherheit & Hochverfügbarkeit

• Optimiert für Java-Workloads
  – Tiefgreifende Diagnosemerkmale enthalten und eingebautes Performance-Tuning

• Container-Native-Entwickler-Umgebung
  – Nahtlos vom lokalen Laptop zu CI/CD, zum vollständig integriertem Site-Reliability-
    Engineering (SRE) in der Cloud
Danke!

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