Deploying Oracle WebLogic Server on Kubernetes

Antonio Nappi
What is CERN?
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**Member States:**
Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland and United Kingdom

**Associate Members in the Pre-Stage to Membership:**
Cyprus, Slovenia

**Associate Members:**
India, Pakistan, Turkey, Ukraine

**Observers to Council:**
Japan, Russia, United States of America, the European Commission, Joint Institute for Nuclear Research and UNESCO
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~ 3 000 members of personnel
Users from 100 different countries

*Budget ~ 1 100 MCHF per year*
CERN: a unique environment
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Study fundamental particles
   How they interact
   Understand the fundamental laws of nature

Large Hadron Collider (LHC)
   Largest particle collider in the world
   27 km in circumference
   Thousand of magnets
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Place where the Web was born

Science for peace
   Melting pot
WebLogic at CERN

WebLogic on VMs (12.1.3)

~ 358 Clusters

~ 100 Applications

DEV / TEST / PREPROD / PROD

Web Profile application Stateful

No Java Message Service
No Enterprise JavaBeans

Developers

Engineers
Administration
IT
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WebLogic on Kubernetes

Different versions

   12.1.3
   12.2.1

~ 60 deployment

   18 DEV
   18 TEST
   12 PREPROD
   12 PROD
Why Kubernetes

- **Immutable**
  - Versioning
  - Easier to track

- **Portable**
  - On Premise
  - Public Cloud
  - Disaster Recovery Plan easier

- **High Availability**
  - Self-Healing

- **Fast Provisioning**
  - Increase productivity
Constraints
Constraints

Transparent for developers

Replicate VM model
Logging
Monitoring
Constraints

**Transparent for developers**
- Replicate VM model
- Logging
- Monitoring

**CERN Infrastructure**
- OpenStack Private Cloud
- Built for physics workloads
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Current architecture

Kubernetes provisioning
  Private Cloud/OpenStack Magnum
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HA Production scenario
  Application spread across 3 AZS
    Weighted Round Robin
  Canary deployments
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  Pacemaker & Corosync
  Discriminate traffic based on url
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- The only point of access
- No LoadBalancer service type
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- Firewall no customizable
- Share a secret

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GET / HTTP/1.1
Host: k8s-anappi-test.cern.ch
Connection: keep-alive
User-Agent: Mozilla/5.0
Accept: text/html
X-Jeedy-Secret: our_secret
Logging

Pod
Logging
Logging

Pod

Ship, add custom fields

Pod
Logging

15/01/2020

Pod

Ship, add custom fields

Filter, parse and ship

3P

Developers

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Logging

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Visualize

Developers
Metrics

Pod
Pod
Pod
Metrics
Metrics
Metrics

Pod

Pull

Pod

Ship
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Grafana

Visualize

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Developers

3P

Visualize

Pod

Pull

Pod

Ship

3P

influxdb

ORACLE
WEBLOGIC
Jenkins
Telegraf
InfluxDB
Collaboration with Oracle

Testing different opensource products

- WebLogic Kubernetes Operator
- WebLogic Deploy Tooling
- WebLogic Image Tool
WebLogic Deploy Tooling

Faster
- Decreases sensitively our configuration time

Domain config in YAML file.

Configuration at runtime
- Don’t need to store the domain in a Docker image

Works with different WebLogic versions
- 12.1.3
  - Problem related to Single Sign On configuration
  - Bug in WLST
WebLogic Image Tool

Faster
  Avoid to build our own packages (RPMs)

Easier
  Execution of two commands

Possibility to base WLS images on custom ones

Integration will happen in Q2

Credit: Lukas Gedvilas
WebLogic Kubernetes Operator

Opensource!!
Way to do it
  Operator
  Custom Resource Definition
Use of deploy tooling
  Extremely fast
  Simpler
Currently not used at CERN
  No support for old version (12.1.3)
  Evaluate again during 2020
Next Steps : Part 1

Complete the migration of environments to Kubernetes (ongoing)

12.2.1.3 WebLogic only in Kubernetes

Prometheus
  WebLogic Exporter

Replace Logstash and Filebeat with Fluentd

Disaster Recovery on the Cloud ( OCI )
  Container Engine for Kubernetes
Lessons learned

Production environments can run on containers
  Kubernetes standard de facto
    Huge support from community
Increased portability and dynamicity of the system
  Open new doors
  Let us focus on developers needs
  No vendor lock-in

Infrastructure flexibility
  Each piece can be changed with one of same logic

Security is tricky

It isn’t painless

All that glitters is not gold
  Everyday new tools
    Not jump too fast on them
Images credits

https://plus.maths.org/content/round-peg-square-hole-or-square-peg-round-hole
https://giphy.com/gifs/aumanimation-8BkrxepXlKaWMbt5pK
THANK YOU
QUESTIONS?
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