WebLogic Server 12c:
What You Should Know

~~12 Things about Oracle WebLogic Server 12.2.1~~

OTN Latam Tour

Dr. Frank Munz
munz & more

Dave Cabelus
Oracle WebLogic Server Product Management

July / August 2016

ORACLE

munz & more

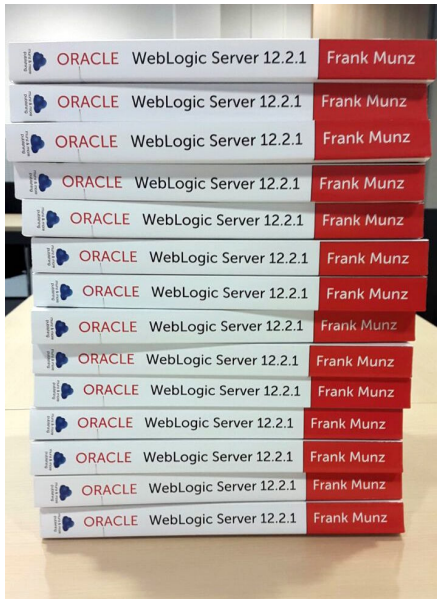
Who's that guy?

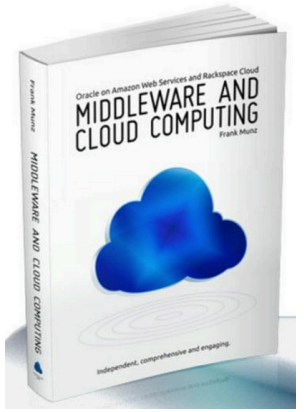
DOAG
AUSOUG

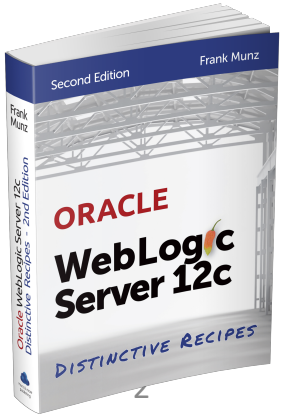
ORACLE ACE Director

- Dr. Frank Munz
- Founded munz & more in 2007
- 15 years Oracle WebLogic and Middleware
- Consulting and High-End Training
- Three Oracle / Cloud books
- @frankmunz on Twitter

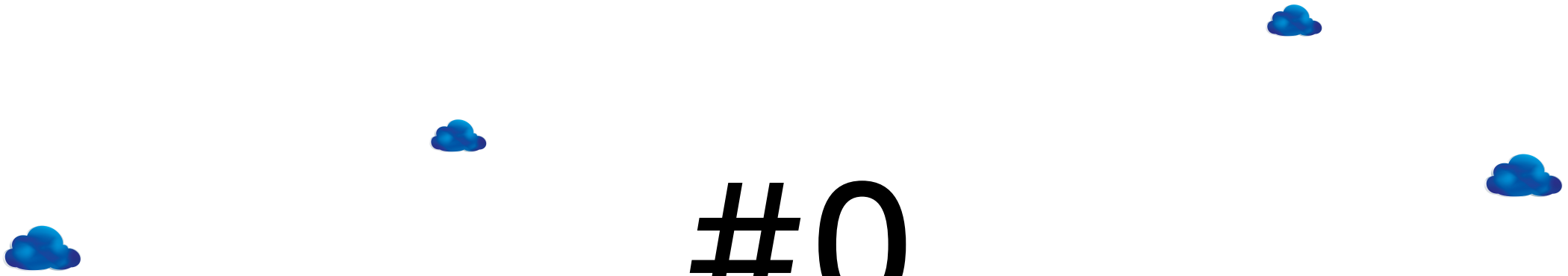
2011 Winner Oracle Excellence Award







13 new things,
no agenda ☺



#0
... download today!

#1

JDK 8

JDK 8

- WebLogic 12.2.1 supports JDK 8 only as runtime
- Startup scripts work out of the box (permspace is removed in JDK 8)

- JDK 8u40 introduces resource management used by WebLogic multitenancy with G1 GC

```
java  -XX:+UnlockCommercialFeatures
      -XX:+ResourceManagement
```

#2

Java EE 7

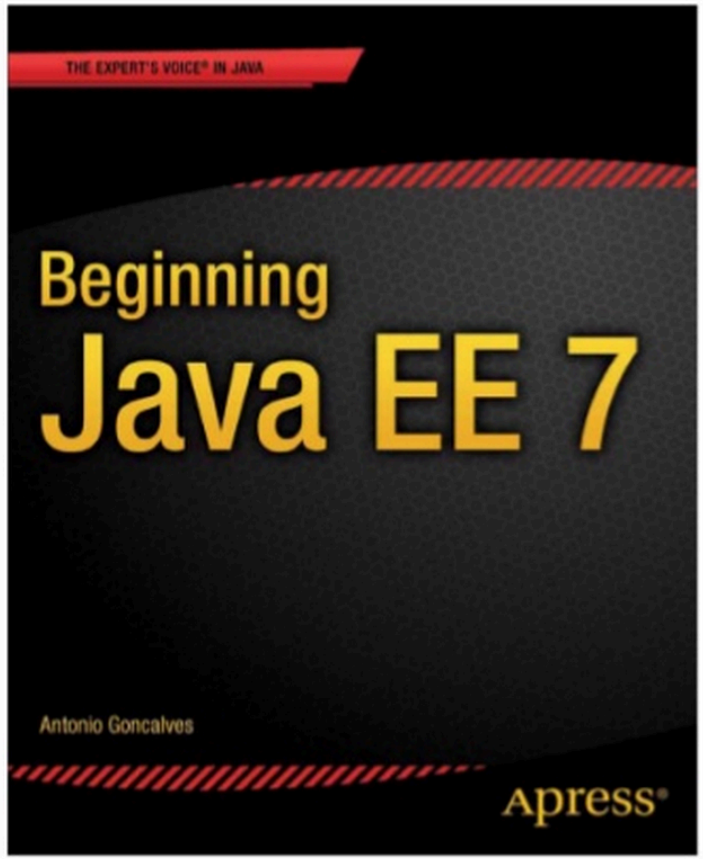
Java EE 7

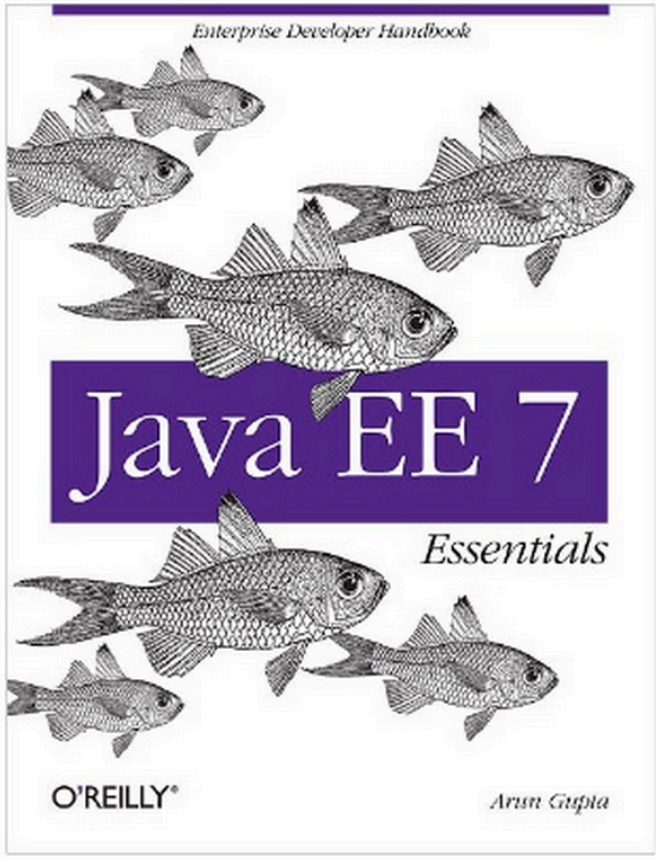
Every developer wants to use it!
improved standards / already in 12.1.3 / major new

- EJB 3.2
- Servlet 3.1
- JDBC 4.0
- WebSockets, JAX-RS 2.0, JSON-P 1.0
- Batch 1.0
- JMS 2.0
- Concurrency Utilities 1.0

Tip: Learn about Java EE 7
http://de.slideshare.net/glassfish/fifty-feature-of

Java EE Recommendation





#3

Download & IDE Integration

Download

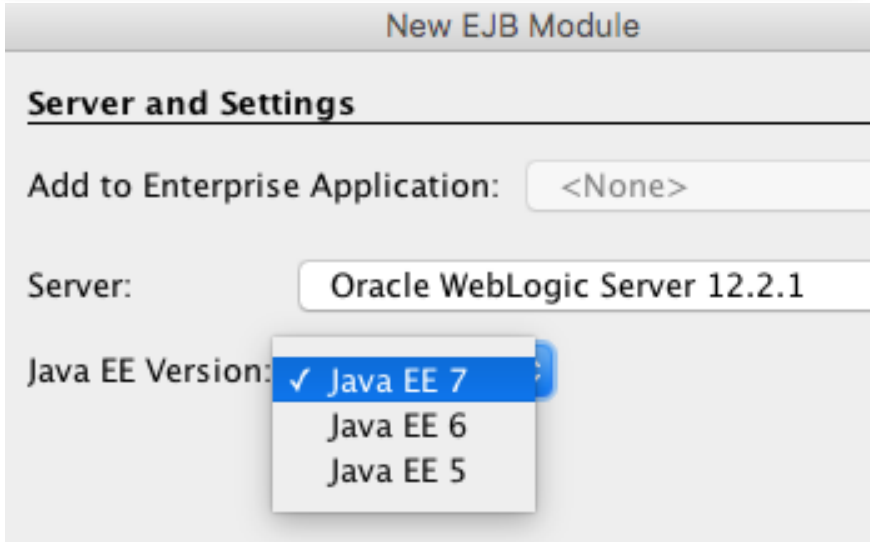
Dev Download with small 209 MB footprint:

Quick Installer intended for Oracle WebLogic Server and Oracle Coherence development only.

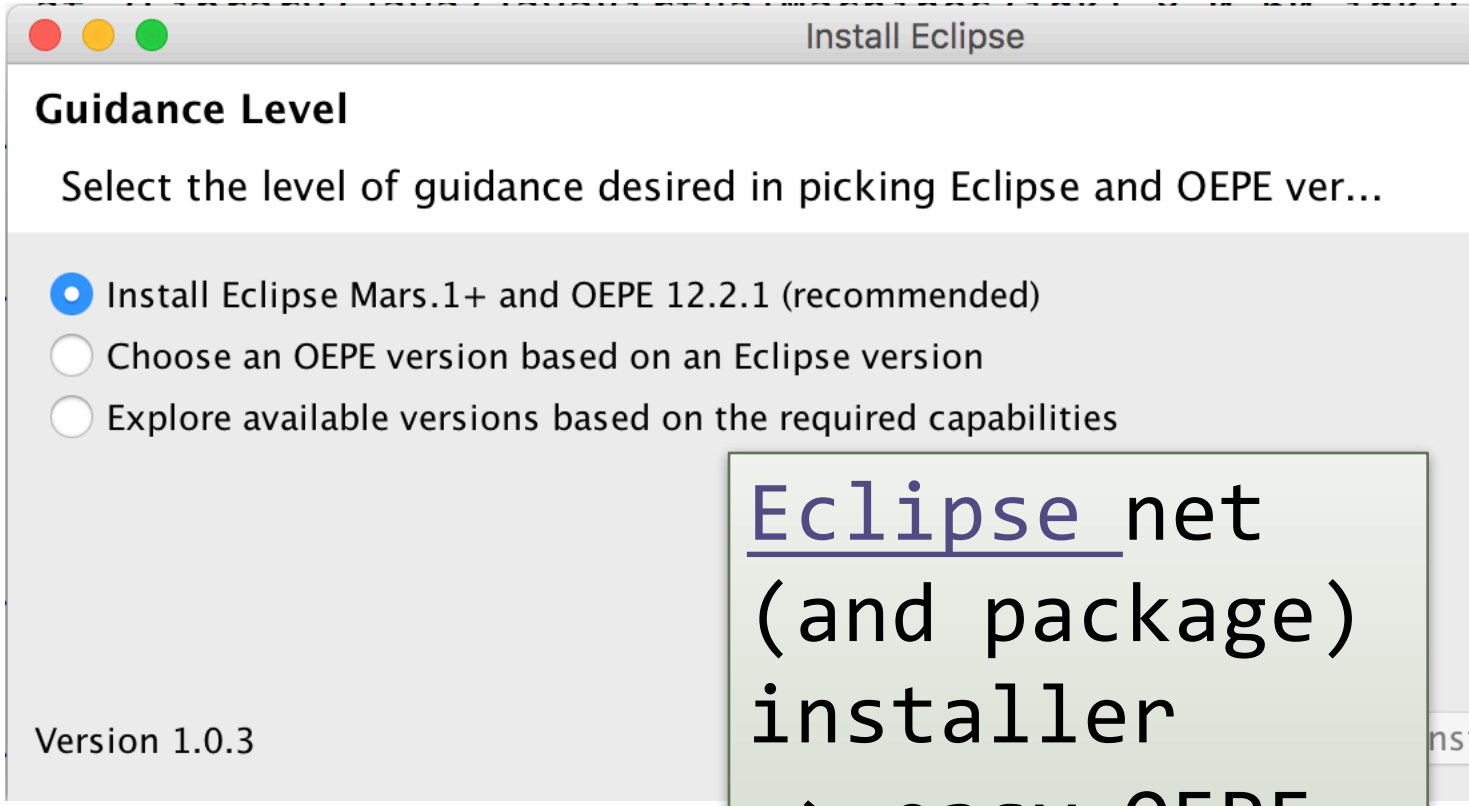
Quick Installer for Mac OSX, Windows and Linux (209 MB) | readme
Supplemental Quick Installer (225 MB) | readme

IDE Support

NetBeans 8.1 RC /Dev Build works with WebLogic 12.2.1



NEW! wlserver/server/bin/eclipse.sh



Eclipse net (and package) installer -> easy OEPE download & install

JDeveloper 12.2.1 available for OFM 12.2.1

#4

Console changes

Production Mode

You can revert production mode from console

Pending Changes

Showing 11 to 18 of 18 Previous | Next

Change	Type	Description	Restart Required
MemoryBufferSize	Log attribute	Modified in AdminServer from 500 to 10	
ProductionModeEnabled	Domain attribute	Modified in fm1test122b from true to false	Yes

#5

Deployment

Parallel Deployment

WebLogic 12.2.1 provides parallel deployment

- Multiple applications
- Single application with multiple modules
- Applications across multiple partitions

	Across Modules in Applications	Across Applications
Parallel Prepare	Available in WebLogic 11g	**New in WebLogic 12.2.1**
Parallel Activate	**New in WebLogic 12.2.1**	**New in WebLogic 12.2.1**

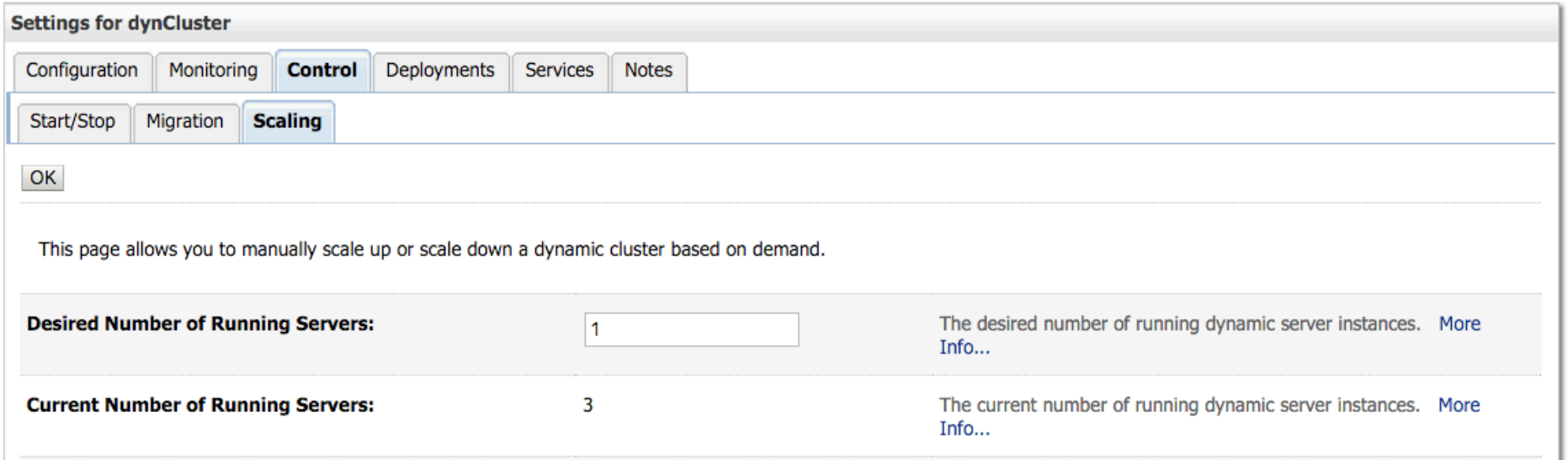
#6

Elastic Cluster

Elastic Cluster

WebLogic 12.1.2: Dynamic Cluster config

WebLogic 12.2.1: Elastic Cluster runtime + pre / post scaling callout to scripts



How to scale?

- Console
- WLST
- REST
- Policy/Action
- Calendar based

#7

JMS

JMS

- JMS 2.0 support
- Elastic JMS scales with elastic cluster
- Simplified HA Configuration:
  WebLogic 12.2.1 JMS restrictions are removed
- Default CX-factory required per Java EE 7:
  `java:comp/DefaultJMSConnectionFactory`
  resolves to
  `weblogic.jms.XAConnectionFactory`

#8

WLST

New Command for Scaling

WLST command to scale dynamic cluster:

```
scaleUp/Down (
        clusterName,
        numServers,
        [updateConfiguration],
        [block],
        [timeoutSeconds],
)
```

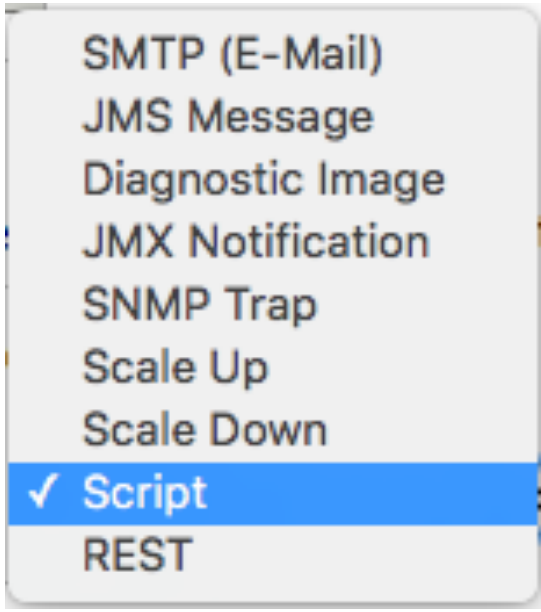
How many servers to add or remove

#9

WLDF

WLDF

- Watches and notifications are replaced by policies and actions
- Additional 4 WLDF actions
  - scale up / down
  - REST
  - Script
- Diagnostic image files are .txt or .xml
- Prepackaged smart rules with configurable parameters



Smart Rules

	Function Name	Group	Description
○	Cluster Low Average Throughput	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `Throughput` value of the `ThreadPoolRuntimeMBean` over the specified time interval is larger than the specified fraction
○	Cluster High Average Throughput	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `Throughput` value of the `ThreadPoolRuntimeMBean` over the specified time interval is larger than the specified fraction
○	Cluster Low Average Pending User Requests	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `PendingUserRequestCount` value of the `ThreadPoolRuntimeMBean` over the specified time interval is larger than the specified fraction
○	Cluster High Average Stuck Threads	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `StuckThreadCount` value over the specified time interval is larger than the specified fraction
○	Cluster Low Average Thread Pool Queue Length	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `QueueLength` value of the ThreadPoolRuntimeMBean over the specified time interval is larger than the specified fraction
○	Cluster High Average Pending User Requests	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `PendingUserRequestCount` value of the `ThreadPoolRuntimeMBean` over the specified time interval is larger than the specified fraction
○	Cluster High Average Idle Threads	Cluster	Returns true if the percentage of servers in the cluster satisfying the average ExecuteThreadIdleCount value of the ThreadPoolRuntimeMBean over the specified time interval is larger than the specified fraction
○	Cluster Low System Load Average	Cluster	Returns true if the percentage of servers in the cluster satisfying the average SystemLoadAverage value of the ***java.lang:type=OperatingSystem*** MXBean over the specified time interval is larger than the specified thresholds
○	Cluster High Thread Pool Average Queue Length	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `QueueLength` value of the ThreadPoolRuntimeMBean over the specified time interval is larger than the specified fraction
○	Cluster Low Average Heap Free Percent	Cluster	Returns true if the percentage of servers in the cluster satisfying the average HeapFreePercent condition over the specified time interval is larger than the specified fraction
○	Cluster High System Load Average	Cluster	Returns true if the percentage of servers in the cluster satisfying the average `SystemLoadAverage` value of the java.lang:type=OperatingSystem MXBean over the specified time interval is larger than the specified fraction
○	Cluster High Average Heap Free Percent	Cluster	Triggers if the average JVM free heap percentage exceeds a specified threshold on some percentage of servers across a cluster
○	Cluster Low Average Idle Threads	Cluster	Returns true if the percentage of servers in the cluster satisfying the average ExecuteThreadIdleCount value of the ThreadPoolRuntimeMBean over the specified time interval is larger than the specified fraction
○	Low Average Idle Threads	Server	Returns true if the average number of idle threads over specified interval is less than specified threshold
○	High Average Throughput	Server	Triggers if the average throughput on the local server over the specified interval is greater or equal to specified threshold
○	Low Average Pending User Requests	Server	Returns true if the average number of pending user requests over specified interval is less than specified threshold
○	High System Load Average	Server	Returns true if the average system load over specified interval is greater or equals to specified threshold
○	Low Thread Pool Average Queue Length	Server	Returns true if the average thread pool queue length over specified interval is less than specified threshold
○	Low Average Throughput	Server	Triggers if the average throughput on the local server over specified interval is less than specified threshold
○	High Thread Pool Average Queue Length	Server	Returns true if the average thread pool queue length over specified interval is greater or equal to specified threshold
◉	High Average Pending User Requests	Server	Returns true if the average number of pending user requests over specified interval is greater than specified threshold
○	High Average Heap Free Percent	Server	Returns true if percent free heap over the specified time interval is greater or equal to the specified threshold
○	High Average Stuck Threads	Server	Returns true if the average number of stuck threads over specified interval is greater or equal to specified threshold
○	Low System Load Average	Server	Returns true if the average system load over specified interval is less than specified threshold
○	Low Average Heap Free Percent	Server	Returns true if average percent free heap over the specified time interval is less than the specified threshold
○	High Average Idle Threads	Server	Returns true if the average number of idle threads over specified interval is greater or equal to specified threshold

Smart rules:

Predefined policies with open parameters

#10

RESTful Management

Why REST?

- Simplicity
- Language agnostic
- No JVM on client side, no WebLogic <->JMX
- Easy to tunnel through firewalls: HTTP
- Current tech trend (eg. mobile dev)

RESTful Management

- New generic WebLogic implementation:
  Full support for all resources (also JMS etc.)
- RESTful management is turned on per default
- Available on admin and managed Servers
- Modelled after WLST structure
  (real MBean names not required)
- Used throughout WebLogic documentation

Tech Details 1

- `domain|serverConfig, domain|serverRuntime, edit`
- `[exclude]fields=field1, field2`
- `[exclude]links=none, links=rel`
- `interaction=async-polling|sync`

Tech Details 2

- URL format has changed:
  …/wls/… was WebLogic 12.1.3, now:
  /management/weblogic/latest/…

- Edit sessions implicit: POST in `/edit`
  Or create manually with
  `/edit/changeManager/`
  `startEdit|cancelEdit|activate`

CRUDQ

Read

Get server name and state of managed server with name surf1 via admin server

```
GET (e.g. via web browser)

http://localhost:7001/management/weblogic/latest
/domainRuntime/serverLifeCycleRuntimes/surf1?links=none&fields=name,state
```

Response:

```
{ "name": "surf1", "state": "RUNNING" }
```

Create

Short way to create server surf7, with UNIX curl

```
curl -v --user weblogic:welcome1 \
-H X-Requested-By:MyClient \
-H Accept:application/json \
-H Content-Type:application/json \
-d "{ name: 'surf7' } "
-X POST \
http://localhost:7001/management/weblogic/latest
/edit/servers
```

Create Form

Request create form
(note, WebLogic 12.1.3 used HTTP `OPTION`)

`GET`

```
http://localhost:7001/management/weblogic/latest
/edit/serverCreateForm
```

Update

Update server surf7, with curl

```
curl ...
-d "{ listenPort: '9999' } "
-X POST \
http://localhost:7001/management/weblogic/latest/edit/surf7
```

Delete

Delete server surf7:

```
curl –v --user weblogic:welcome1 \
-H X-Requested-By:MyClient \
-H Accept:application/json \
-H Content-Type:application/json \
–X DELETE
http://localhost:7001/management/weblogic/latest/edit/servers/surf7
```

Query

```
{
  fields: [],
  links: [],
  children: {
    serverRuntimes: {
      name: [ 'AdminServer', 'Cluster-0-Server-2' ],
      fields: [ 'name' ],
      links: [ 'canonical' ],
      children: {

        applicationRuntimes: {
          name: [ 'myapp', 'BasicApp' ],
          fields: [ 'name' ],
          links: [ 'self' ],
          children: {
            componentRuntimes: {
              fields: [ 'name', 'type' ],
              links: [ 'parent' ]
            }
          }
        },

        serverChannelRuntimes: {
          name: [ 'Default[iiop]', 'Default[http]' ],
          fields: [ 'publicURL', 'channelName' ],
          links: []
        }
      }
    }
  }
}
```

Single bulk request queries to select and return specific subsets of tree.

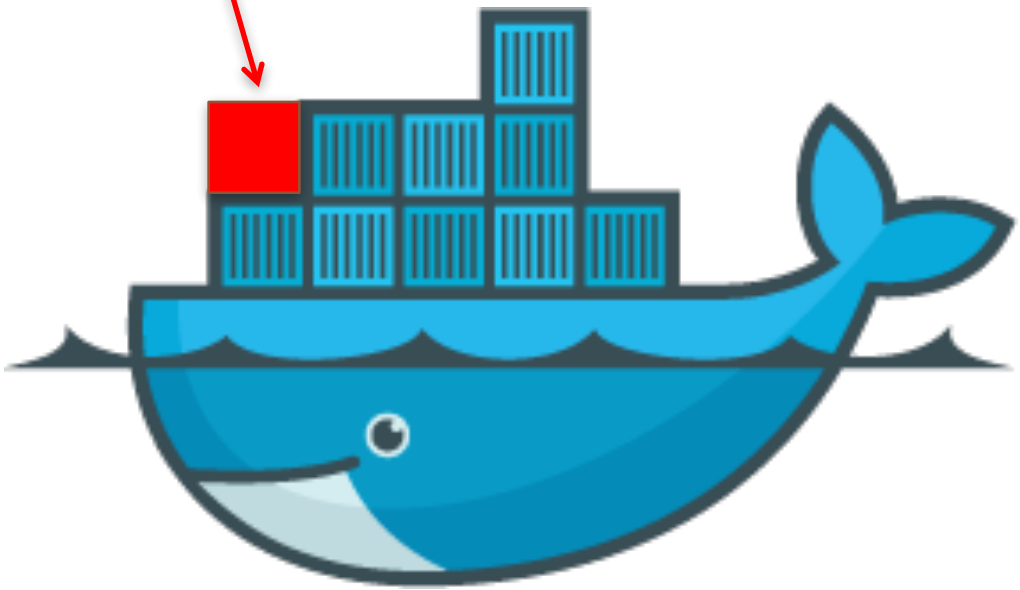
POST

http://localhost:7001/management/weblogic/latest/domainRuntime/search

#11

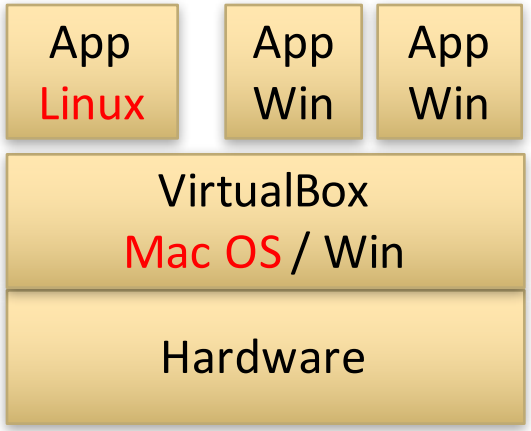
Docker

WebLogic
in a Docker
Container

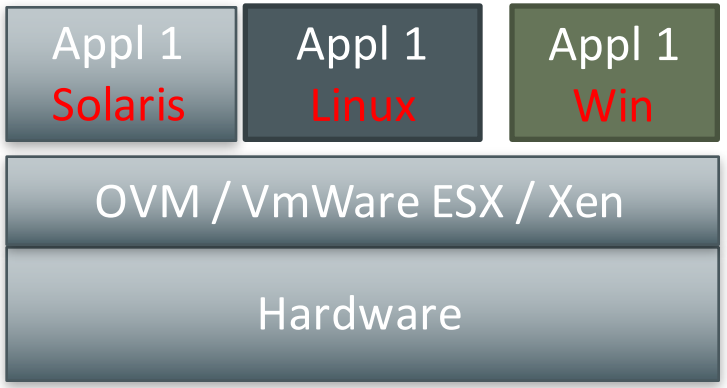


docker

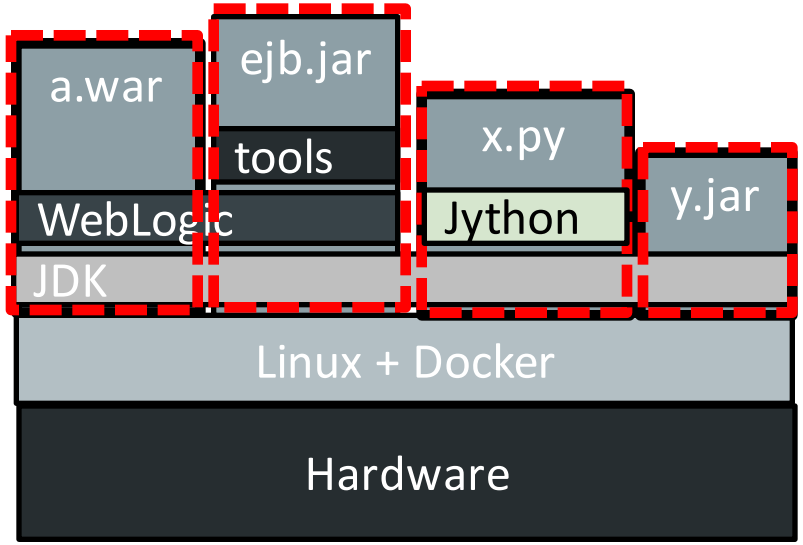
Virtualization vs. Isolation



Desktop Virtualization:
type 2 hypervisor
= with host OS

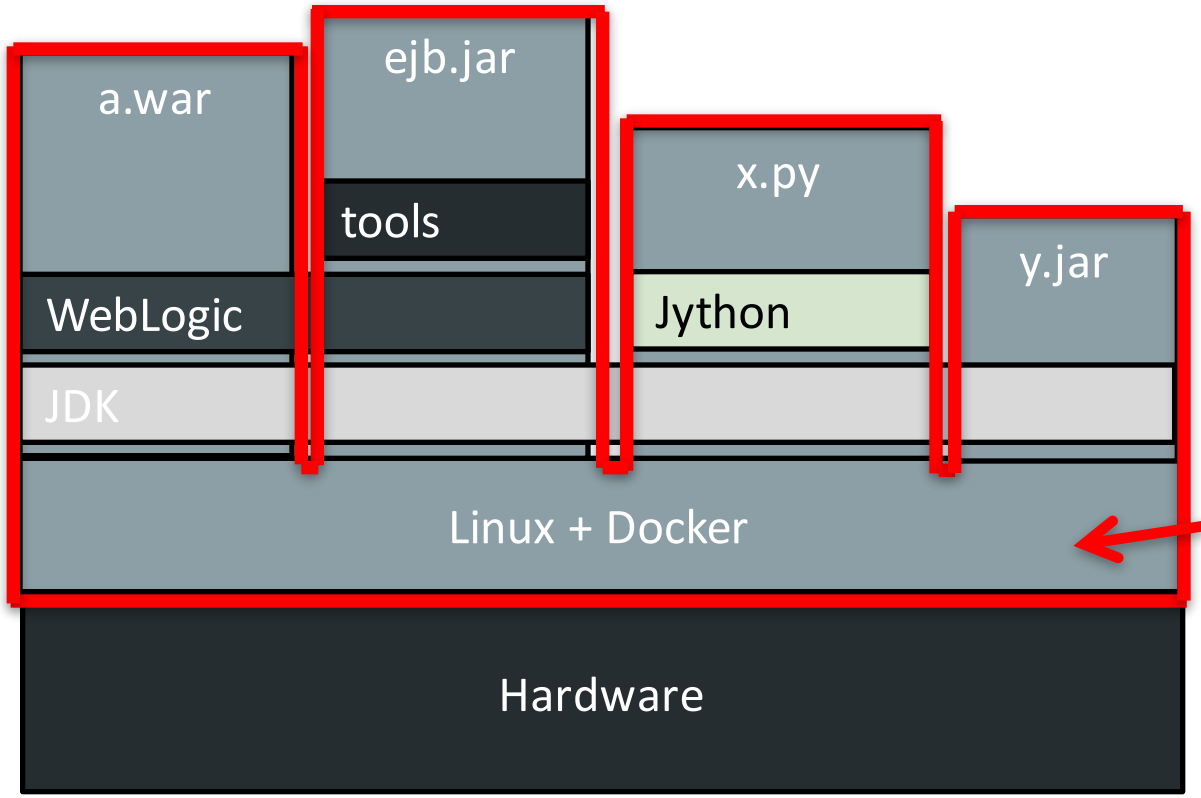


Server Virtualization
type 1 hypervisor
= on bare metal



Docker container in Linux
with own FS, network stack /
IP address, process space and
resource limits

Docker



Docker is not a lightweight VirtualBox - it's about isolation.

Containers run on Linux kernel of host

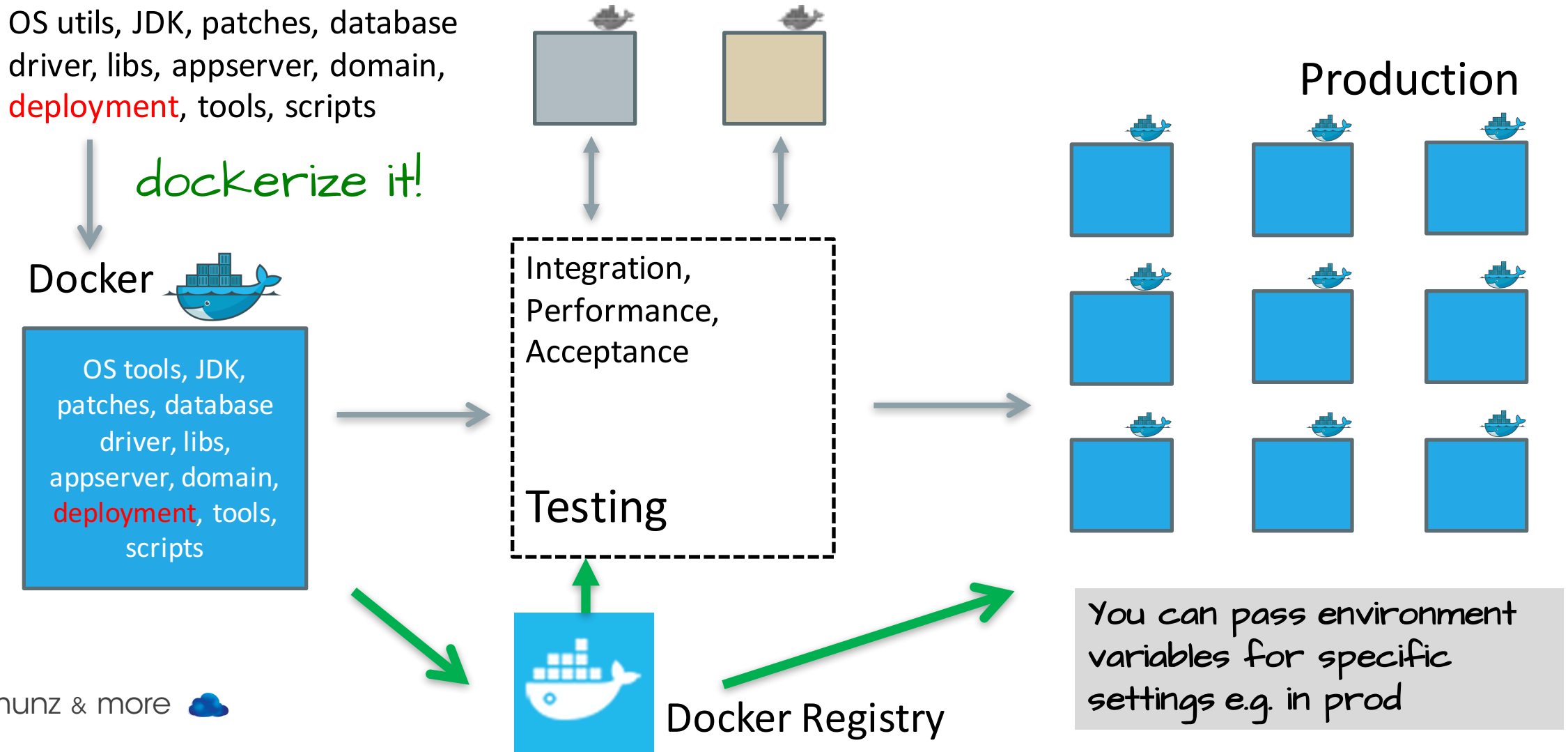
-> Containers are visible on host

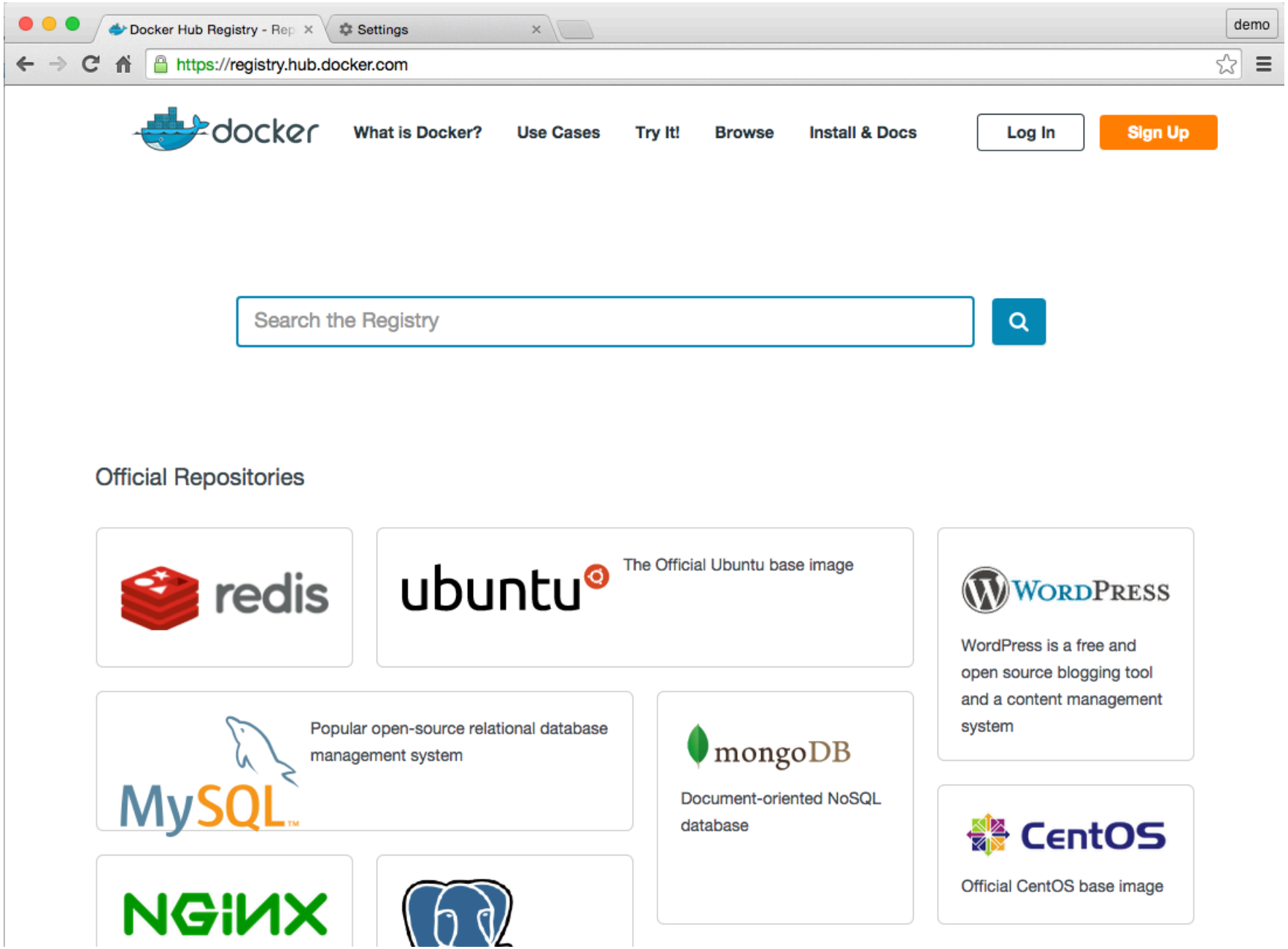
Docker Container

- Isolated runtime of Docker image
- Starts up in milliseconds
- Sandboxing uses Linux namespaces and cgroups -> isolated part of your Linux
- Open Container Standard / Linux Foundation

```
docker run -d -p 8080:9999 fmunz/micro
```

solves the "Worked For Me!" issue





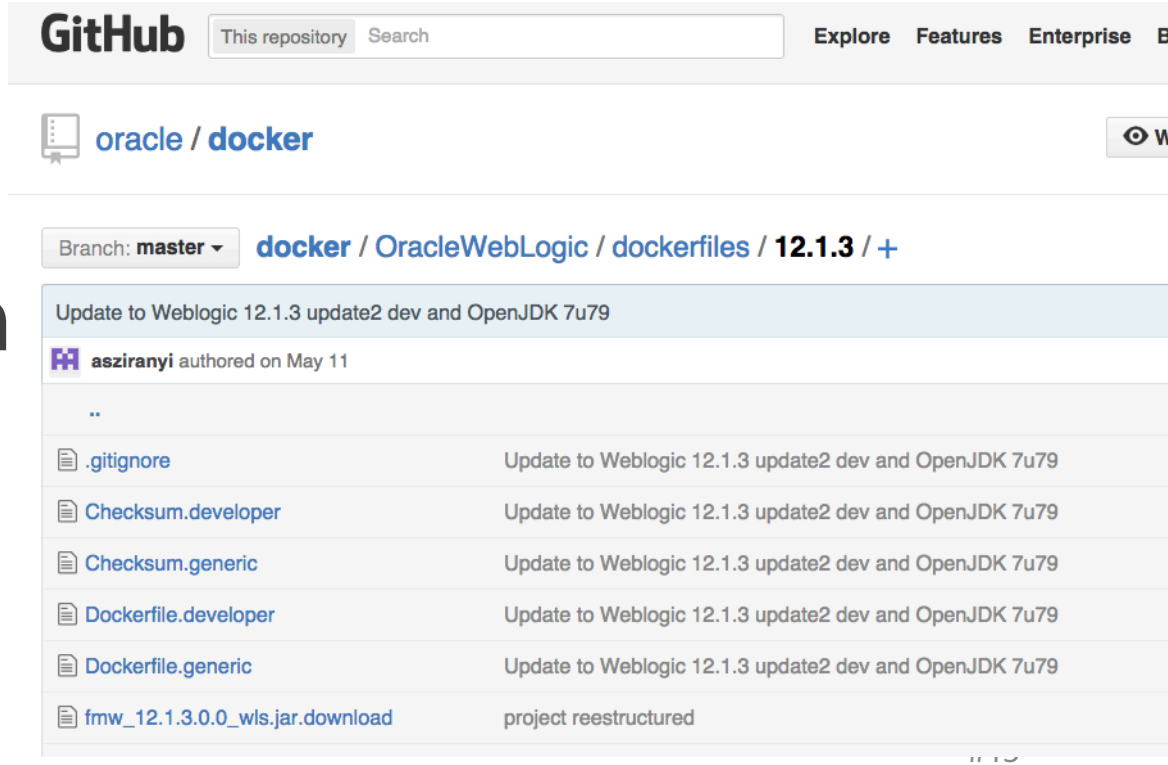
Docker Registry

what should be your biggest nightmare:

unknown and unofficial images (>14000)

What Do You Get?

- NOT WebLogic from Docker registry
- NO automatic build via github
- Github repo with scripts to set up WebLogic on Oracle Linux in Docker
- Dev or generic distribution
- Docker is a supported environment for WebLogic 12.2.1 / 12.1.3

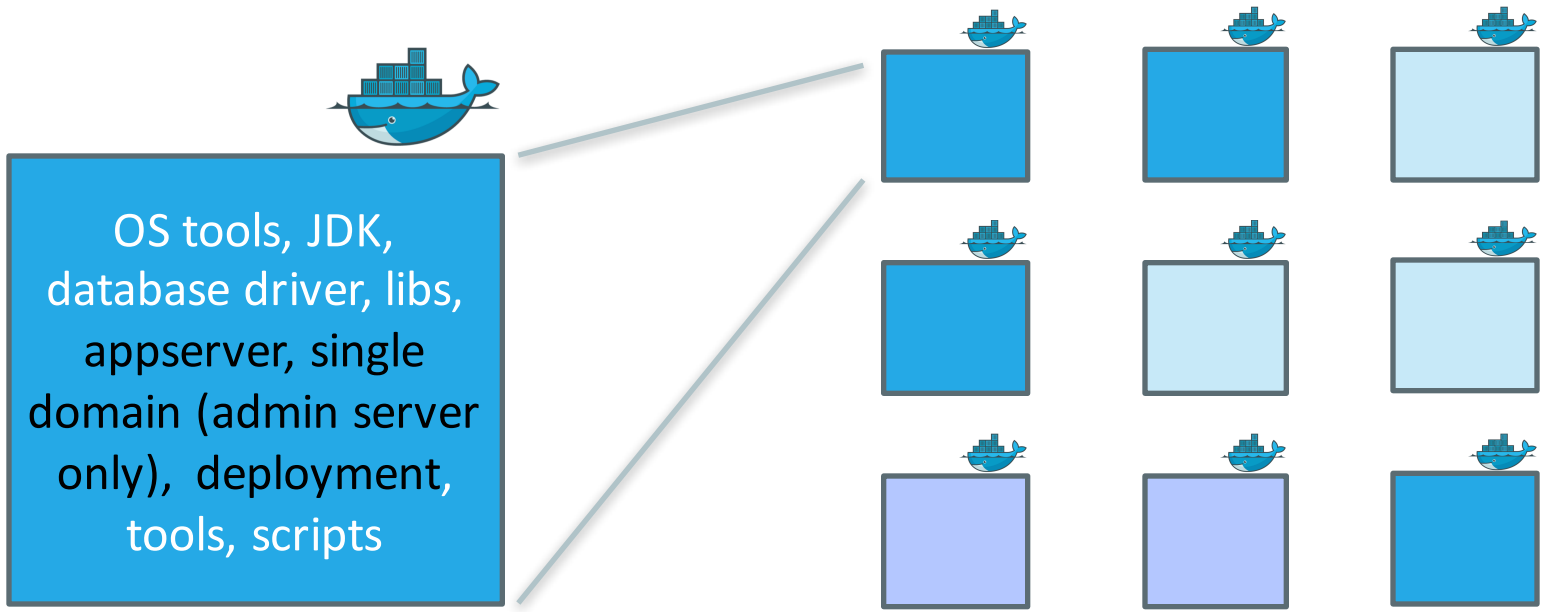


Oracle Product in Docker	Official Support
GlassFish	
MySQL	yes
NoSQL	
OpenJDK	
Oracle Linux	yes
OracleCoherence	yes
OracleDatabase	no
OracleHTTPServer	yes
OracleJDK	yes

Oracle support does not require you to use the provided Docker files

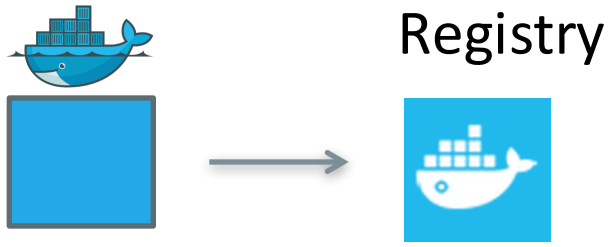
Docker Style

- Independent, standalone WLS domain
- Microservices style architecture
- Just add your favorite Docker cluster manager

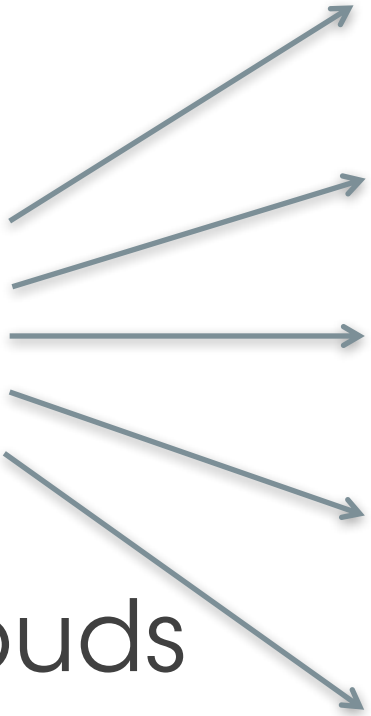


Docker in the Cloud?

Supported by every major cloud provider:



Docker Registry



ORACLE CLOUD — Docker Container Service

amazon web services™ — EC2 Container Service

Google Cloud Platform — Google Container Engine

Microsoft Azure — Azure Container Service

IBM Bluemix — Bluemix Containers

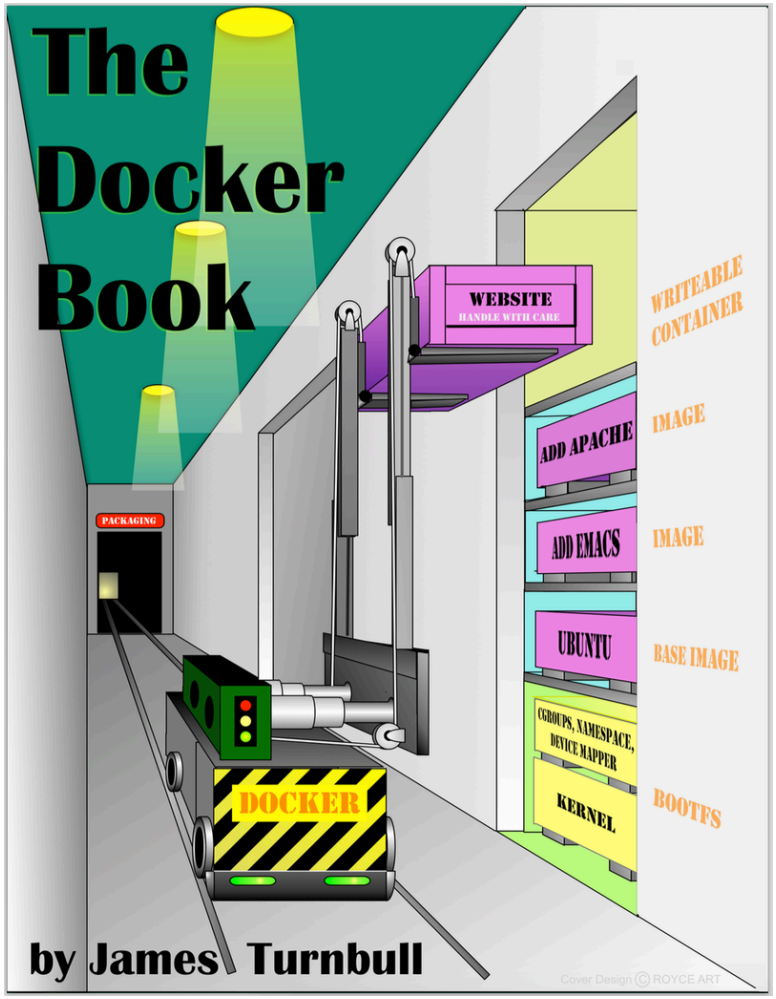
On premise -> all clouds

Oracle Whitepaper

WebLogic on Docker Containers

Docker book

by J. Turnbull (Docker 1.8)



Facts to Know

- Oracle supports WebLogic on Docker
- Docker networking is final now
- Docker cluster managers are still evolving:
  Docker Swarm, Kubernetes, Apache Mesos with Marathon, AWS ECS, CloudFoundry, etc.

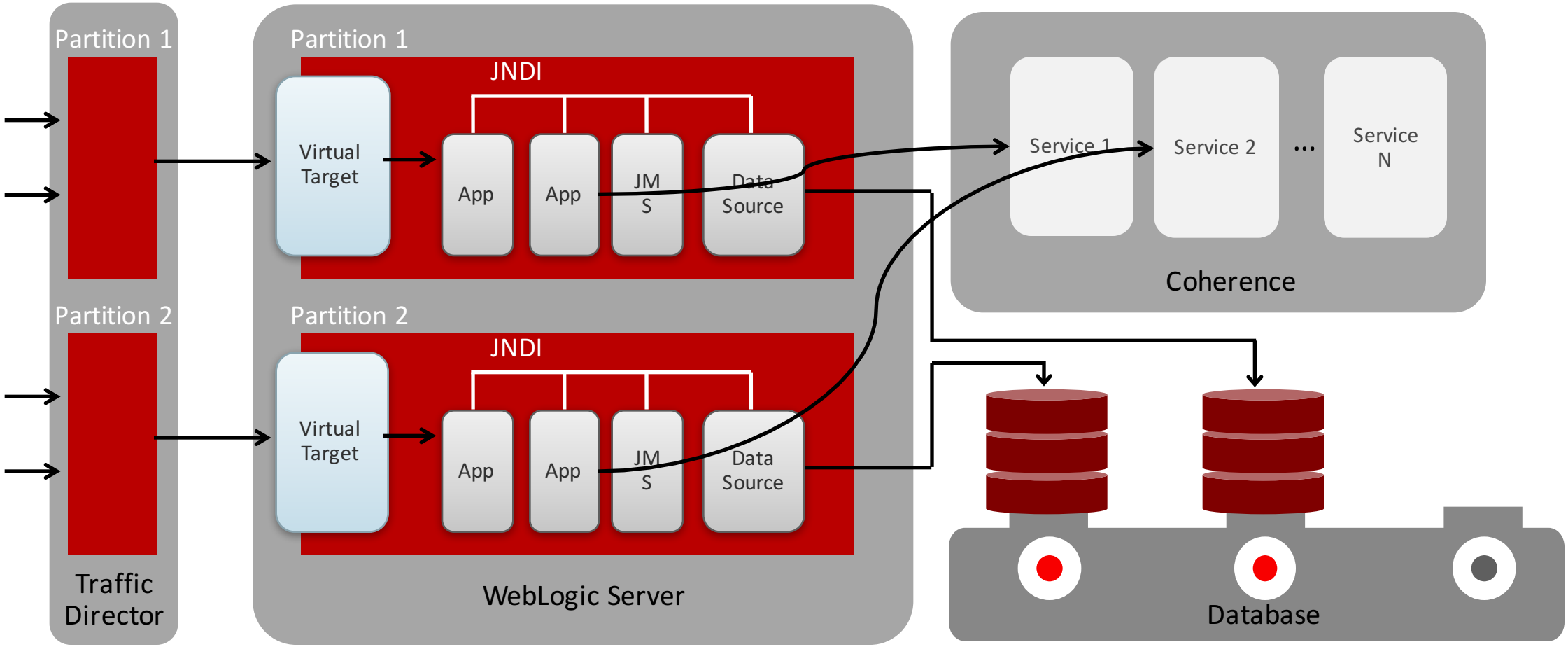
#12

Multi Tenancy

Domain Partitions

- Admin and runtime slice of domain
- Partition has its own apps, security, JDBC config etc.
- Partitions can be started and stopped individually
- Partition can be exported / imported
- Shared on same JVM, but separated

Key Technical Concepts



Benefit: Isolation

Tenants within one domain have isolation

- Runtime: JDK, heap, CPU
- Security: realm, user
- Admin: life cycle, roles
- Data / traffic: JNDI, JDBC, Coherence, requests

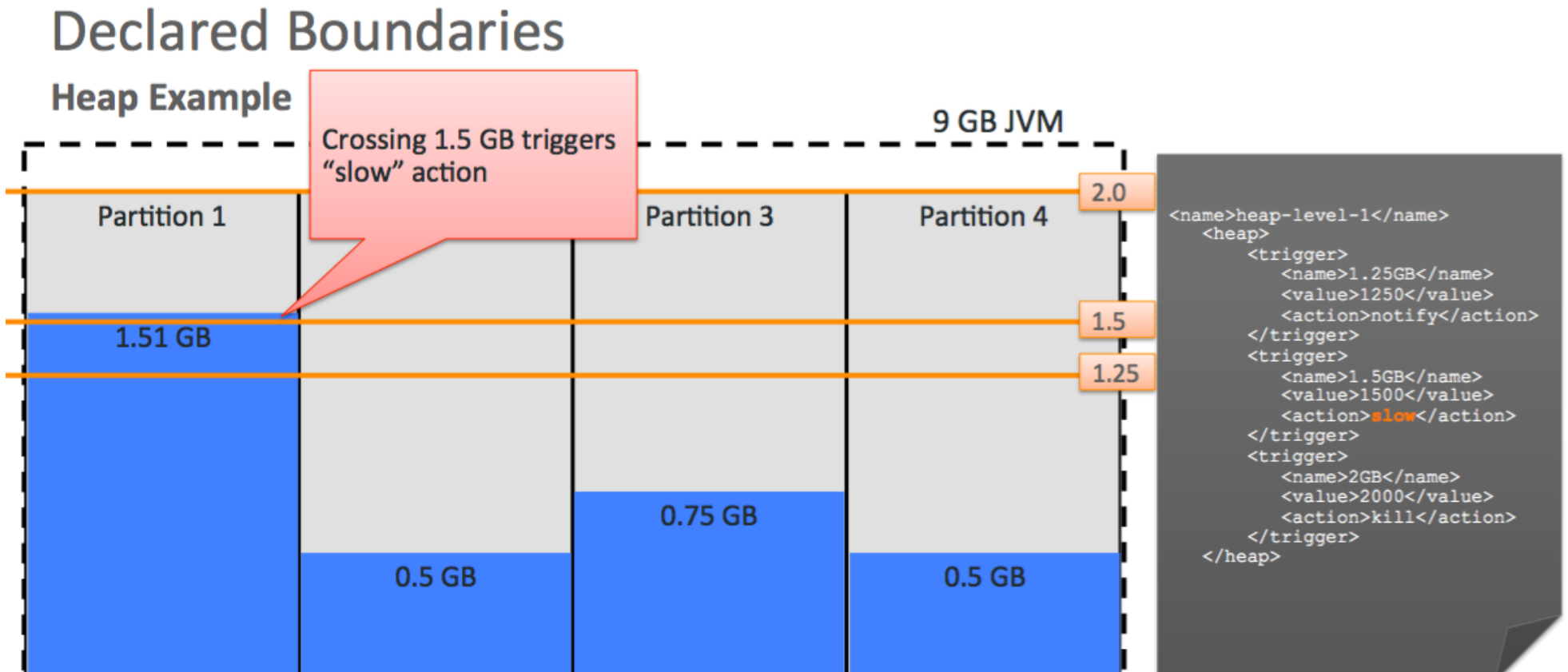
Separation

- HR and Finance can be separate partitions in one domain
- Mercedes and BMW are probably not suitable for one domain

Technically partitions are not 100% isolated <-> Docker container, VMs

Actions

Resource Consumption Manager: Boundaries for files, heap, and CPU + Actions



Actions:
- Notify
- Slow
- Kill

Not (yet) Supported

Other OFM products don't support
domain partitions
although they on top of WebLogic 12.2.1

#13

Zero Downtime (ZDT)

Rolling updates

- Rolling shutdown
- Rollout of new Java
- Rollout of patched ORACLE_HOME
- Rollout of patched apps

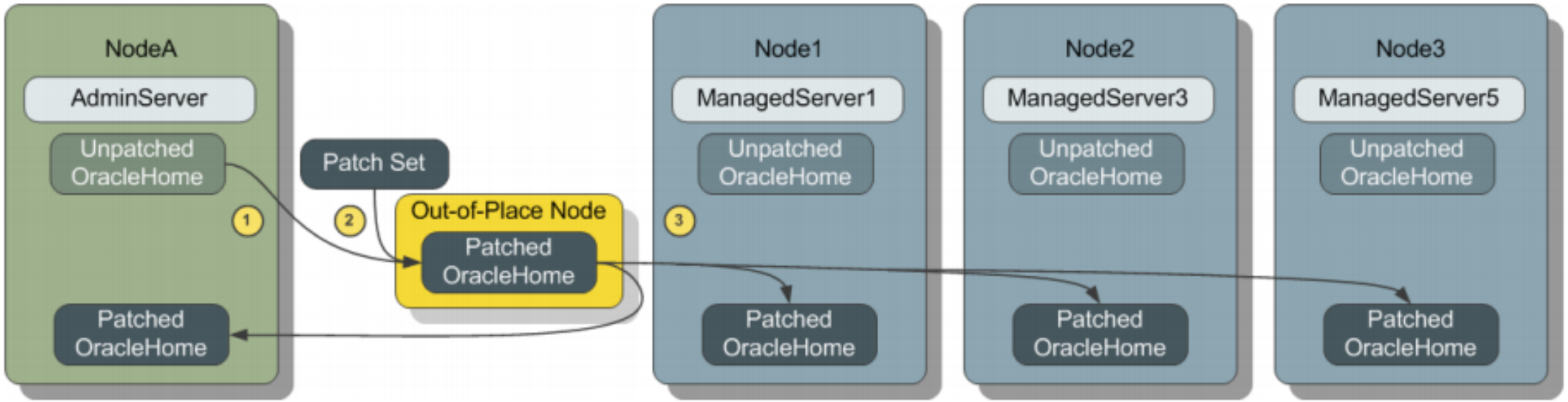
You have to prepare

- JDKs
- Patched ORACLE_HOME
- JSON files for apps update

Rollout is orchestrated by admin server

Rollout Oracle Home

Rollout OracleHome - Preparation



1. Copy OracleHome to Out-of-Place server
2. Apply patches and create archive
3. Distribute archive to nodes that will be updated
4. Initiate rollout

https://community.oracle.com/docs/DOC-996731

Workflow History

Configuration | Monitoring | Control | Security | Web Service Security | **ZDT Control** | Notes

Domain | Clusters | Servers | **Workflow Progress**

This table lists out all the Workflow Progress that are either Active (Executing or Reverting), or Stopped. Depending on the resume capable flag, the workflow can be resumed.

Customize this table

Workflow in Progress (Filtered - More Columns Exist)

Execute | Revert | Cancel | Delete — Showing 0 to 0 of 0 Previous | Next

Workflow ID	Task Type	Targets	Running	Resumable	Status	# of Completed Commands	# of Total Commands
There are no items to display							

Execute | Revert | Cancel | Delete — Showing 0 to 0 of 0 Previous | Next

This table lists out all the Workflow Progress that has been completed. They have finished running and are not eligible to be resumed. These workflows either completed successfully or reverted successfully

Customize this table

Completed Workflow (Filtered - More Columns Exist)

Delete — Showing 1 to 4 of 4 Previous | Next

Workflow ID	Task Type	Targets	Status
wf0001	rolloutJavaHome	surf1	REVERTED
wf0002	rollingRestart	AdminServer	SUCCESS
wf0003	rolloutJavaHome	dyn-1	SUCCESS
wf0004	rolloutJavaHome	dyn	REVERTED

Delete — Showing 1 to 4 of 4 Previous | Next

How Does it Work?

JKD Upgrades changes the following files:

```
bin/setNMJavaHome.sh
bin/setDomainEnv.sh
init-info/startscript.xml
init-info/domain-info.xml
```

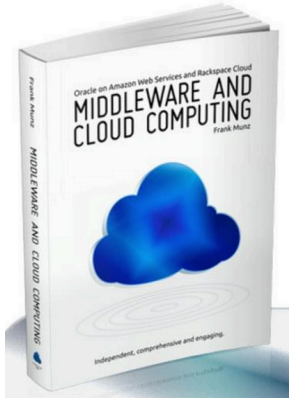
Summary

1. JDK 8
2. Java EE 7
3. IDE
4. Console
5. Deployment
6. JMS
7. Cluster
8. WLST
9. WLDF
10. REST
11. Docker
12. Multi Tenancy
13. ZDT

You can win a book

… if you promise to write a short review on Amazon.com

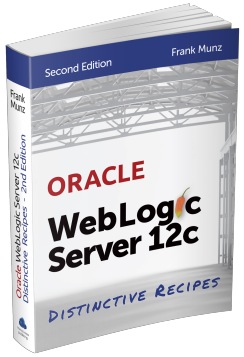
tweet to win!



#otntourla OR @soacommunity

@frankmunz

+picture?



www.munzandmore.com/blog

facebook.com/cloudcomputingbook

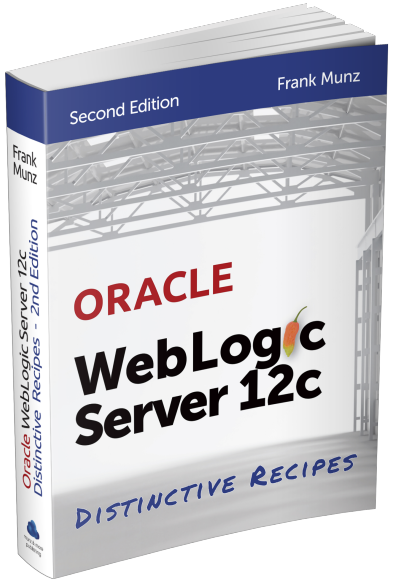
facebook.com/weblogicbook

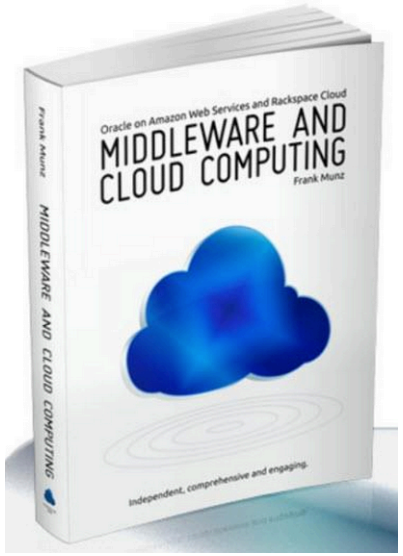
@frankmunz

youtube.com/weblogicbook

-> more than 50 web casts

Don't be shy ☺





Why Upgrade to WebLogic 12cR2

WebLogic Server 12cR2

- Microcontainers/multitenancy
- Multi data center/Continuous availability
- Automated elasticity for Dynamic Clusters
- Complete REST management
- Performance improvements
- Java EE 7
- Quick installer for dev
- Java SE 8

WebLogic Server 12cR1

- DB Integration
- Dynamic Clusters/Elastic JMS
- Unified Management
- RESTful Management APIs
- HA Optimizations
- Coherence/Toplink integration
- Maven integration
- Java EE 6
- Websockets (Java EE 7)
- Emulation Client/Server-Sent Events
- JAX-RS 2.0 (Java EE 7)
- JSON (Java EE 7)
- Lightweight Zip Installer