



HOW WE TOOK OUR SERVER-SIDE APPLICATION TO THE CLOUD...

...and liked what we got

www.jfrog.com

Agenda



- ✓ Where we started
- ✓ What we did
- ✓ Paradigm shift

First Things First





BACKGROUND



Who's talking?

github.com/noamt
@NoamTenne

Noam Tenne

Senior Developer at JFrog Ltd.

Israel | Computer Software

Current

Previous

JFrog - Home of Artifactory, The Open University of Israel
AlphaCSP (MalamTeam group), Israel Defense Forces



JFrog Where?



JFrog Where?



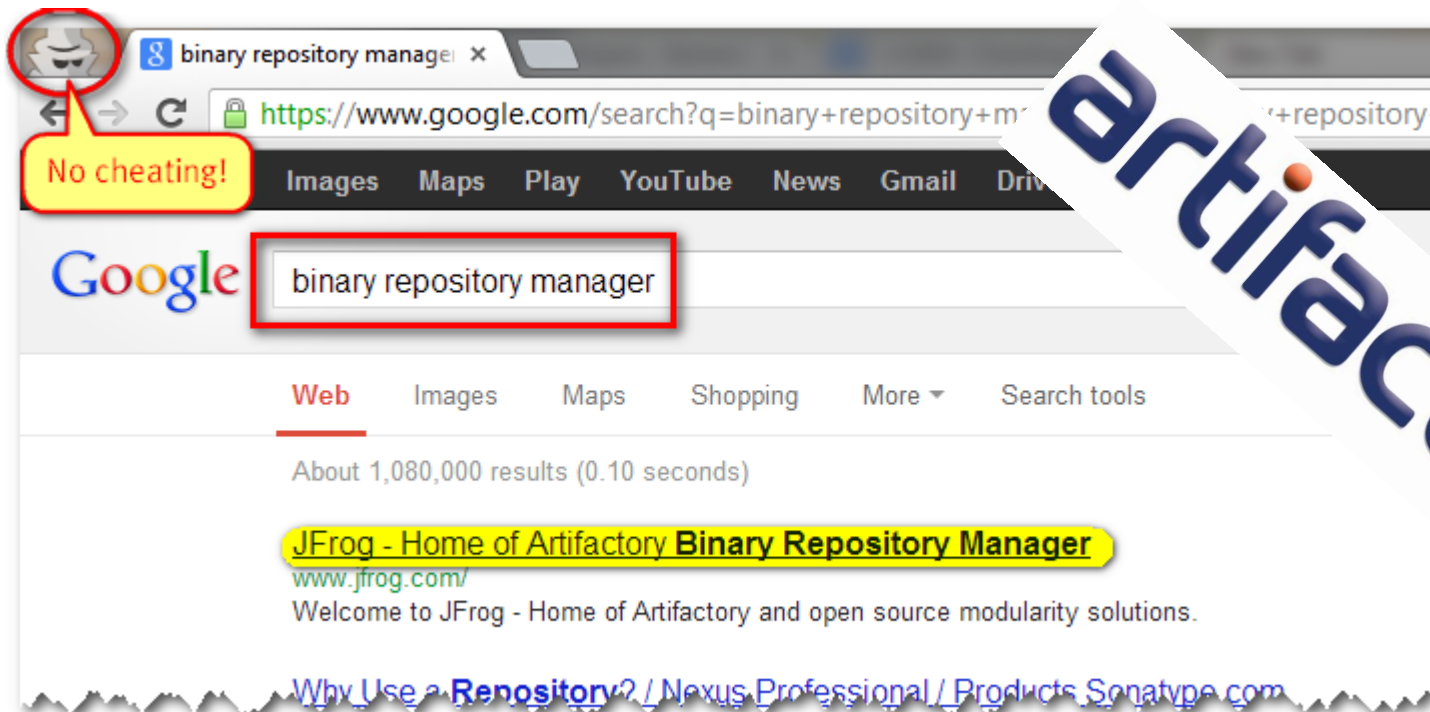
JFrog Where?



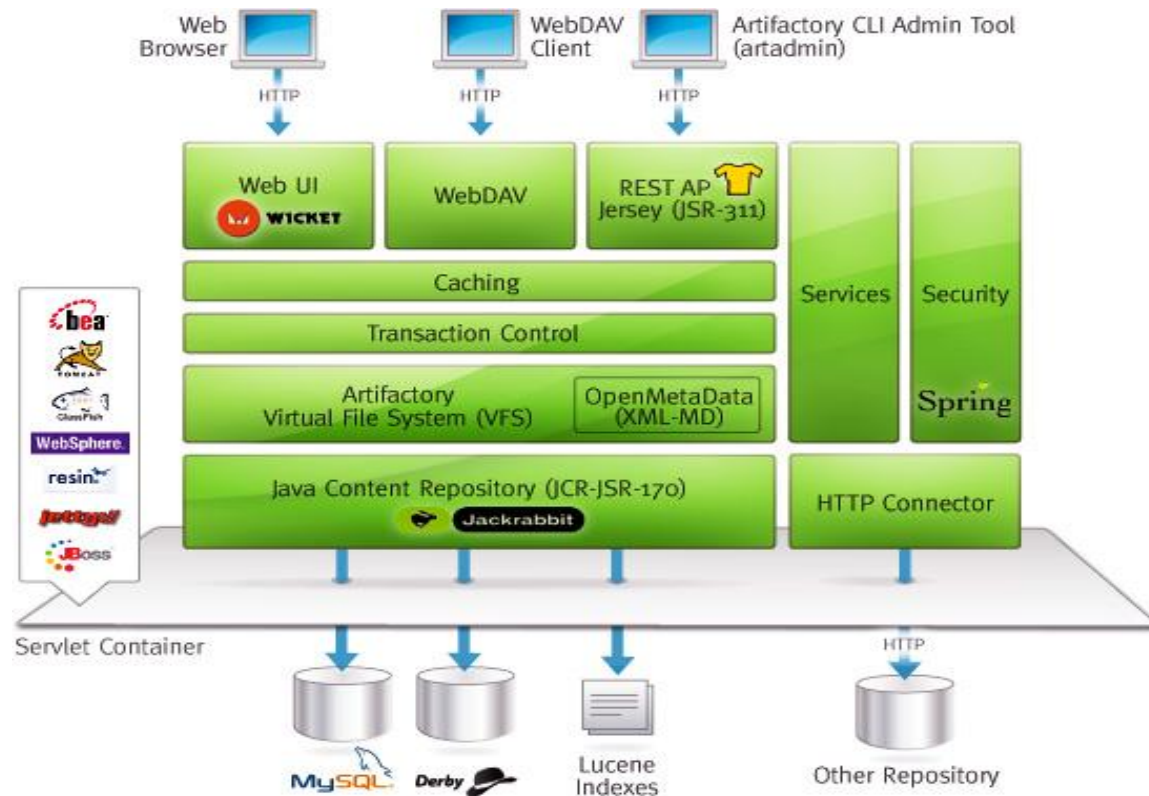
JFrog Where?



Artifactory what?



Yet Another Java Server App



Moving Forward



artifactory
Open Source



Moving Forward



Moving Forward



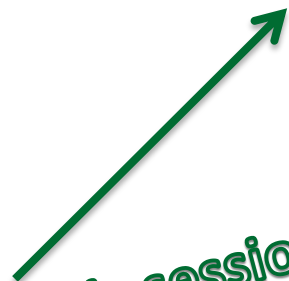
Moving Forward



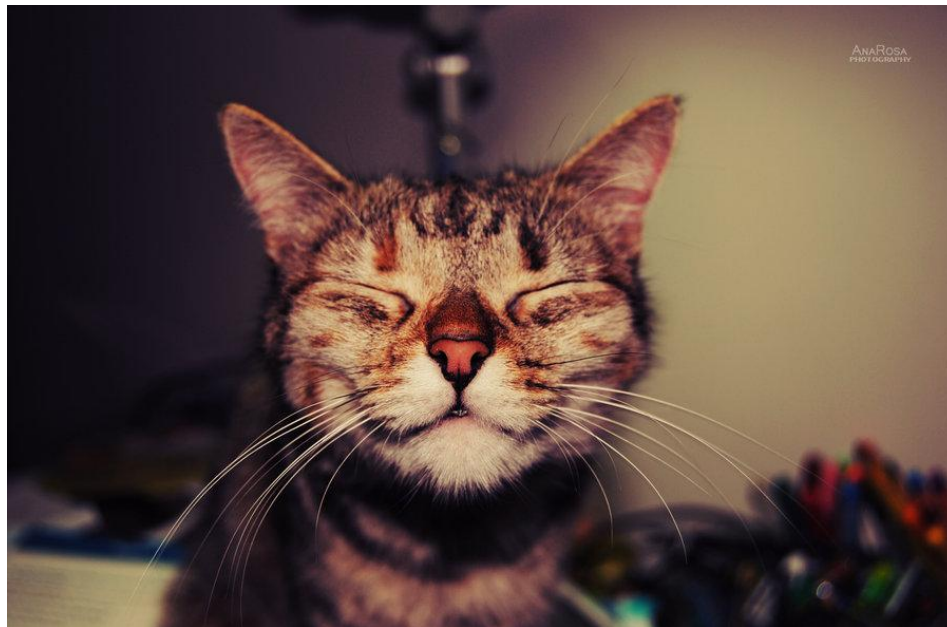
Moving Forward



That's what this session is about!



Artifactory SaaS

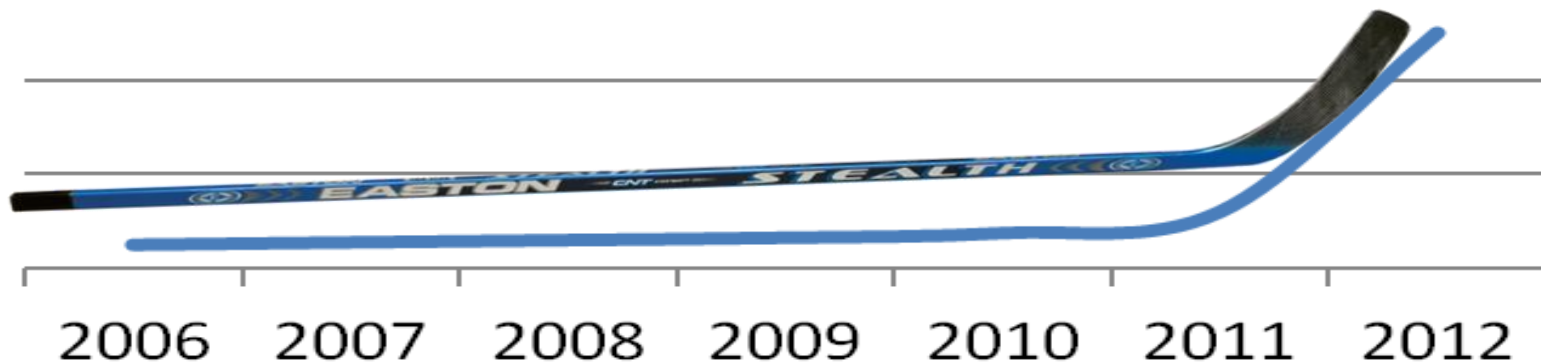


Artifactory SaaS



etc.

Moving Forward



A load of Artifacts!



The Spring Artifactory interface shows a green header with the "spring" logo. The main content area displays a "Welcome" message stating "Artifactory is happily serving 381238 artifacts." The number "381238" is circled in red. Below the welcome message, there is a warning icon and text: "You are currently not logged-in. You may [browse](#) Artifactory anonymously. Please [log in](#) for more options." A link for "Artifactory Updates..." is also present. The left sidebar includes links for "Home", "Client Settings", and "Maven Settings".

The Jenkins Artifactory interface shows a green header with the "Jenkins" logo. The main content area displays a "Welcome" message stating "Artifactory is happily serving 108575 artifacts." The number "108575" is circled in red. Below the welcome message, there is a warning icon and text: "You are currently not logged-in. You may [browse](#) Artifactory anonymously. Please [log in](#) for more options." A link for "Artifactory Updates..." is also present. The left sidebar includes links for "Home", "Client Settings", and "Maven Settings".

The Typesafe Artifactory interface shows a green header with the "Typesafe" logo. The main content area displays a "Welcome" message stating "Artifactory is happily serving 645326 artifacts." The number "645326" is circled in red. Below the welcome message, there is a warning icon and text: "You are currently not logged-in. You may [browse](#) Artifactory anonymously. Please [log in](#) for more options." A link for "Artifactory Updates..." is also present. The left sidebar includes links for "Home", "Client Settings", and "Maven Settings".

The Gradleware Artifactory interface shows a green header with the "gradleware" logo. The main content area displays a "Welcome" message stating "Artifactory is happily serving 1038180 artifacts." The number "1038180" is circled in red. Below the welcome message, there is a warning icon and text: "You are currently not logged-in. You may [browse](#) Artifactory anonymously. Please [log in](#) for more options." A link for "Artifactory Updates..." is also present. The left sidebar includes links for "Home", "Client Settings", and "Maven Settings".



JOURNEY TO THE CLOUD





THE *AAS BUZZ

Cloud computing bullshit bingo				
SOA	SaaS	PaaS	Private Cloud	HPC
IaaS	Security	On demand	REST API	SOA
Public cloud	OaaS	Best Practices	AWS	SOAP
expertise	paradigm	Platform	Scalability	VPN

* As A Service



Self Service



Multi-tenant



GaaS: Google as an Example



Product	Self Service	Multi-tenant	*aaS
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GaaS: Google as an Example



Product	Self Service	Multi-tenant	*aaS
Gmail	✓	✗	Not *aaS, web-app

GaaS: Google as an Example



Product	Self Service	Multi-tenant	*aaS
Gmail	✓	✗	Not *aaS, web-app
Google Apps	✓	✓	SaaS

GaaS: Google as an Example



Product	Self Service	Multi-tenant	*aaS
Gmail	✓	✗	Not *aaS, web-app
Google Apps	✓	✓	SaaS
Google App Engine	✓	✓	PaaS

GaaS: Google as an Example



Product	Self Service	Multi-tenant	*aaS
Gmail	✓	✗	Not *aaS, web-app
Google Apps	✓	✓	SaaS
Google App Engine	✓	✓	PaaS
Google Compute Engine	✓	✓	IaaS

AaaS: Amazon as an Example



Product	Self Service	Multi- tenant	* aaS
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AaaS: Amazon as an Example



Product	Self Service	Multi-tenant	*aaS
Amazon store	✓	✗	Not *aaS, web-app

AaaS: Amazon as an Example



Product	Self Service	Multi-tenant	*aaS
Amazon store	✓	✗	Not *aaS, web-app
aStore	✓	✓	SaaS

AaaS: Amazon as an Example



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Amazon store	✓	✗	Not *aaS, web-app
aStore	✓	✓	SaaS
Amazon Elastic Beanstalk	✓	✓	PaaS

AaaS: Amazon as an Example



Product	Self Service	Multi-tenant	*aaS
Amazon store	✓	✗	Not *aaS, web-app
aStore	✓	✓	SaaS
Amazon Elastic Beanstalk	✓	✓	PaaS
Amazon Elastic Cloud	✓	✓	IaaS

The SaaS Pains - Overview



- ✓ Multi-tenancy
- ✓ Platform selection
 - > PaaS or IaaS
- ✓ DB schema updates



Multi-tenancy



Java 9 Already!



Java SE 9 (and beyond...)

Cloud

- Multi-tenancy support
- Resource management

ORACLE

Wait for it?!



- ✓ Two-year release cycle
- ✓ Java 7: 07 2011
- ✓ Java 8: 09 2013
- ✓ Java 9: Late 2015

ORACLE®

n 7
6 8 9

2006

2010

2012

2020?

Wait for it?!



- ✓ Two-year release cycle
- ✓ Java 7: 07 2011
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ORACLE®



Multi Tenancy Types



Muli-tenancy Type

Multi Tenancy Types



Multi-tenancy Type

Data Separation

Multi Tenancy Types



Multi-tenancy Type

Data Separation

Application Separation

Multi Tenancy Types



Muli-tenancy Type

Data Separation

Application Separation

Process Separation

GaaE for Multi Tenancy Types



Product	Multi-tenancy Type
---------	--------------------

GaaS for Multi Tenancy Types



Product	Multi-tenancy Type
Google Apps	Data Separation

GaaS for Multi Tenancy Types



Product	Multi-tenancy Type
Google Apps	Data Separation
Google App Engine	Application Separation

GaaS for Multi Tenancy Types



Product	Multi-tenancy Type
Google Apps	Data Separation
Google App Engine	Application Separation
Google Compute Engine	Process Separation

Comparing the Strategies



Strategy	Pros	Cons
Separating data	✓ Normal Java Application	✓ Manual state separation ✓ Complicated and critical schema

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Comparing the Strategies



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Separating processes	✓ No shared state ✓ Simple transition from existing	✓ JVM per tenant!



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Comparing the Strategies



Strategy	Pros	Cons
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Comparing the Strategies



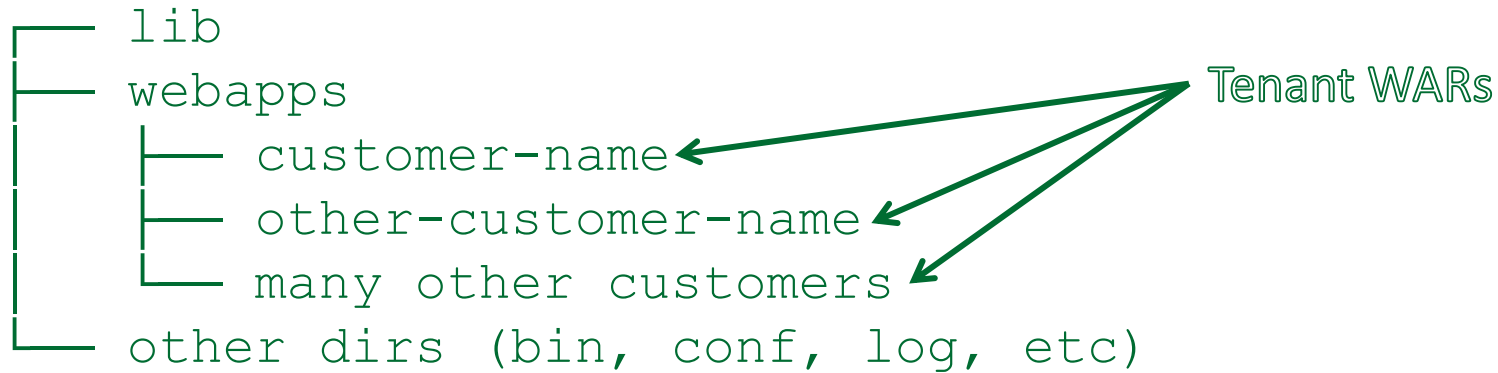
Strategy	Pros	Cons
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Separating application 	✓ No shared state ✓ Or is it? ✓ Simple transition from existing	
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Comparing the Strategies

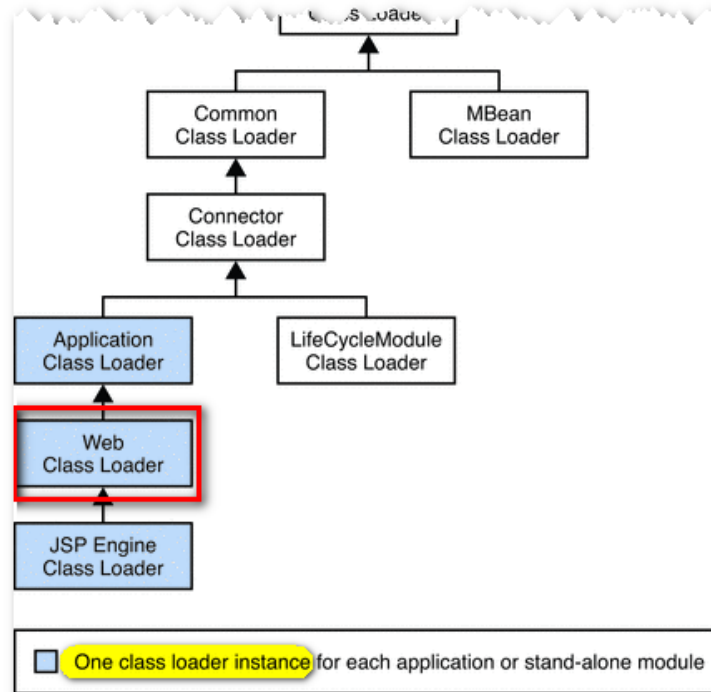


Strategy	Pros	Cons
 Separating data	✓ Normal Java Application	✓ Manual state separation ✓ Complicated and critical schema
Separating application 	✓ No shared state ✓ Or is it? ✓ Simple transition from existing	✓ Stay tuned...
 Separating processes	✓ No shared state ✓ Simple transition from existing	✓ JVM per tenant!

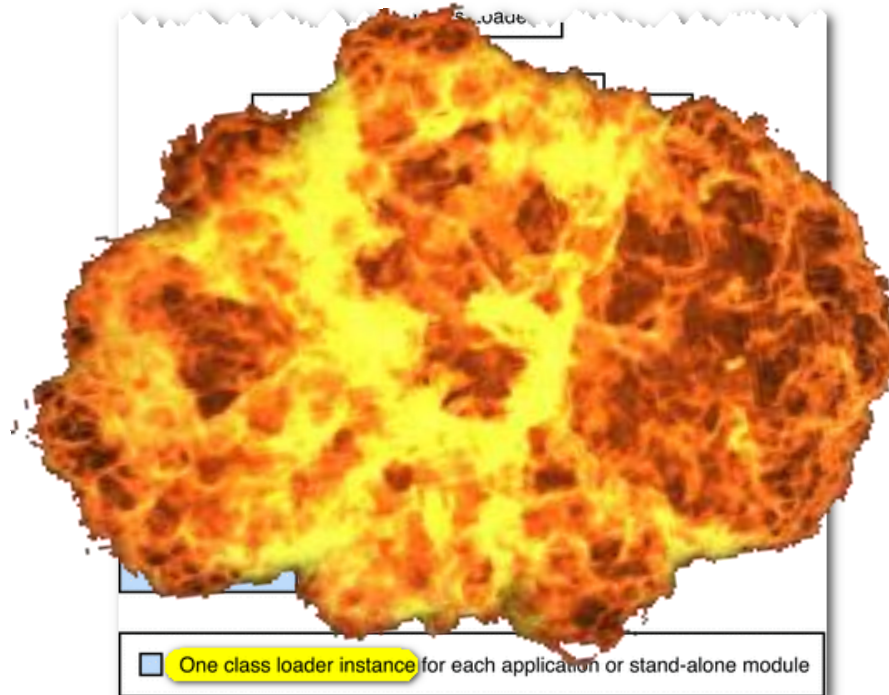
Separate Application: Tomcat Root



Separate Application



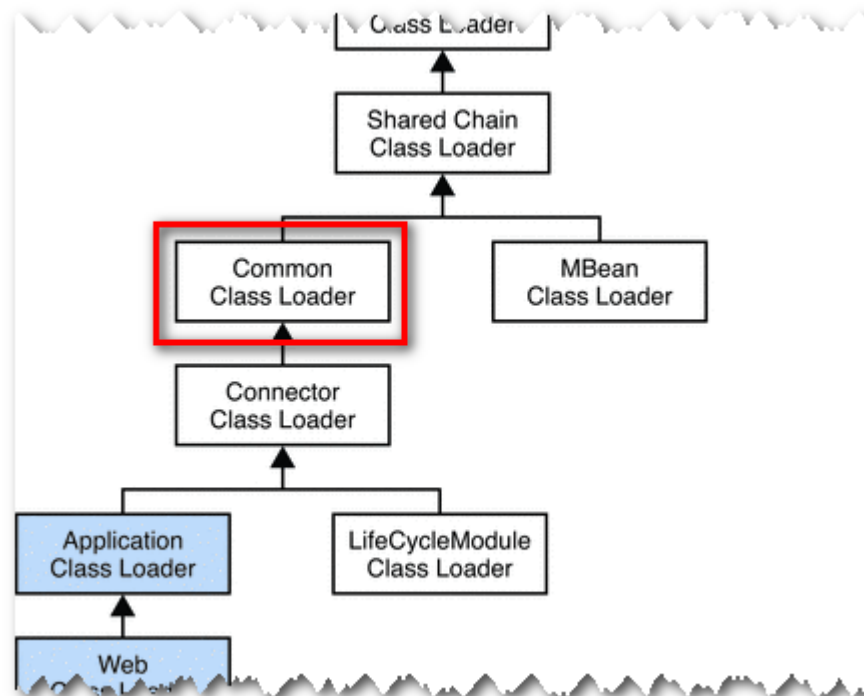
Separate Application



Too... many... classes...



Reuse!



Is it even possible?



- OBJECT STATE

Is it even possible?



- OBJECT STATE

- STATIC STATE



THE QUEST FOR SHARED LIBRARIES



Spring Framework



Spring Framework



```
public class AppCtxHolder implements ApplicationContextAware {  
    private static ApplicationContext ctx;  
  
    public AppCtxHolder() {}  
  
    public void setApplicationContext(ApplicationContext applicationContext) {  
        ctx = applicationContext;  
    }  
  
    public static ApplicationContext getApplicationContext() {  
        return ctx;  
    }  
}
```



Spring Framework



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        return ctx;  
    }  
}
```



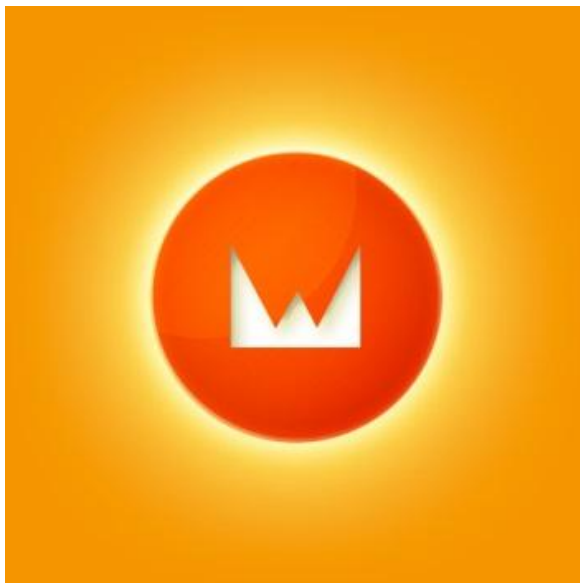
Spring Framework



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        ctx = applicationContext;  
    }  
  
    public static ApplicationContext getApplicationContext() {  
        return ctx;  
    }  
}
```



Apache Wicket



Thread Pools



Logger



Logger



CATS Software



Jackrabbit



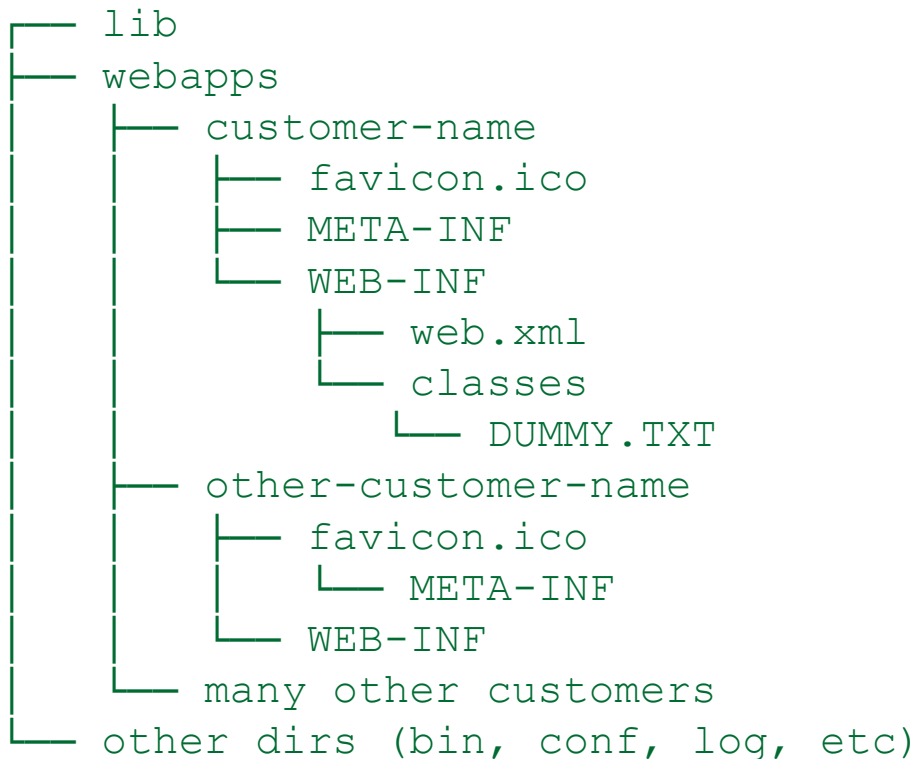
Heap-wide Caches



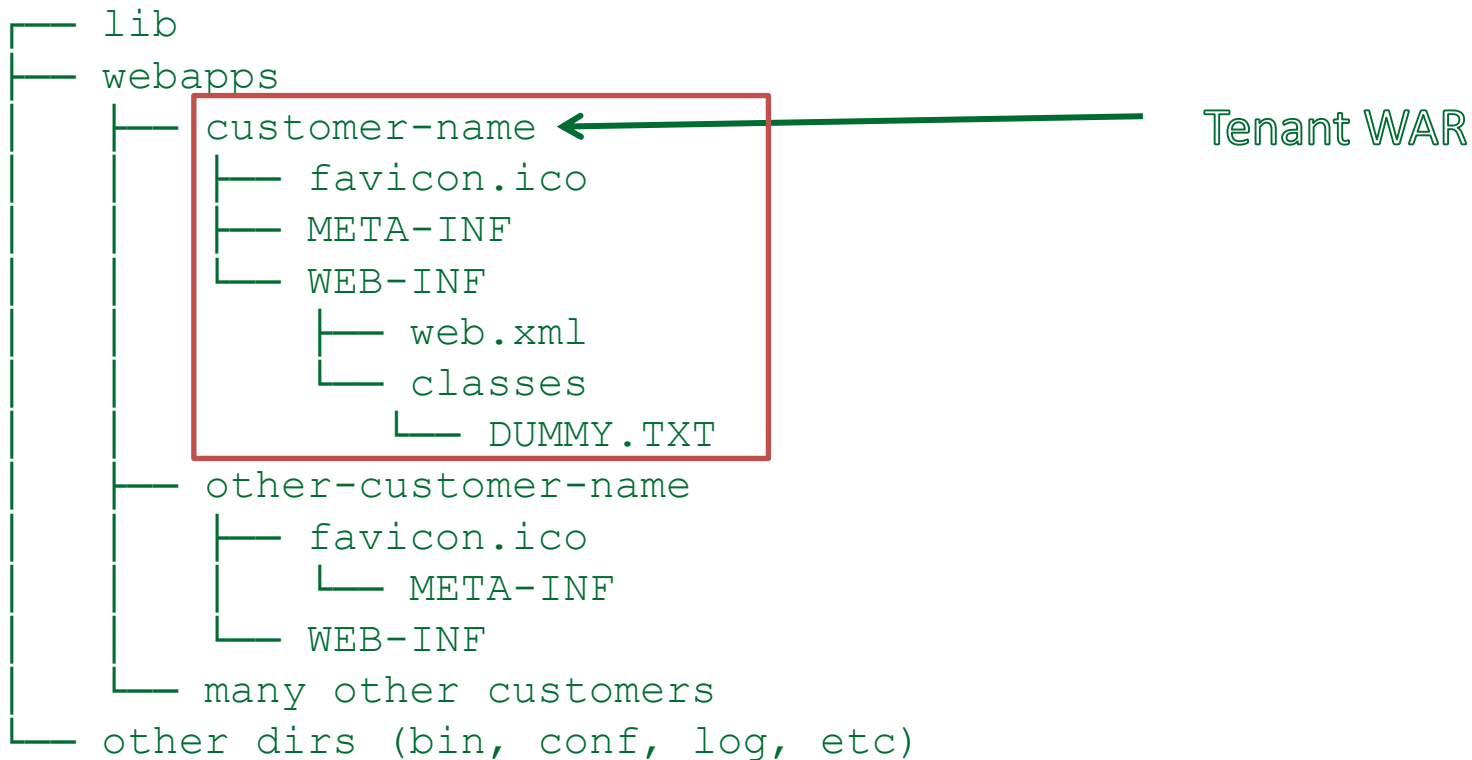


THE QUEST FOR SHARED LIBRARIES: RESULTS

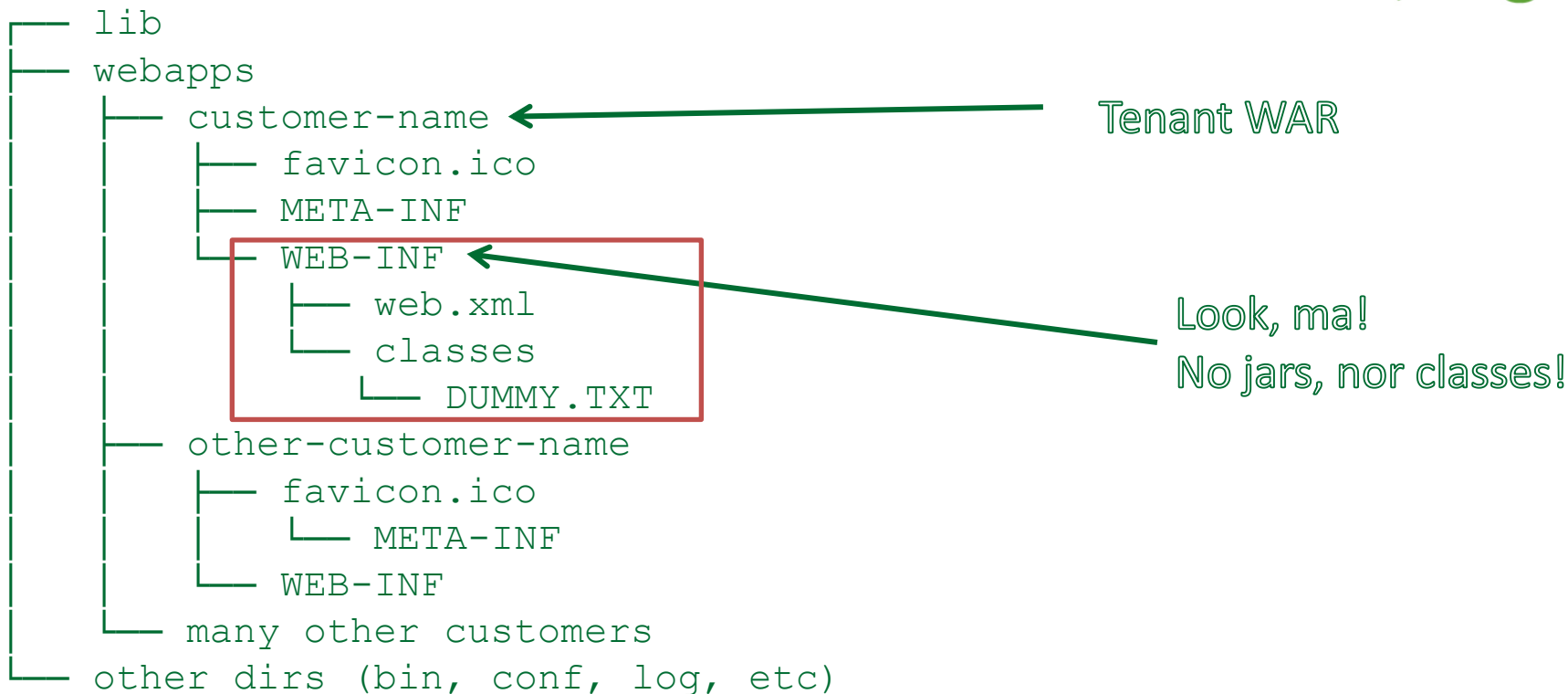
Tomcat Root - Where's the JARs?



Tomcat Root - Where's the JARs?



Tomcat Root - Where's the JARs?

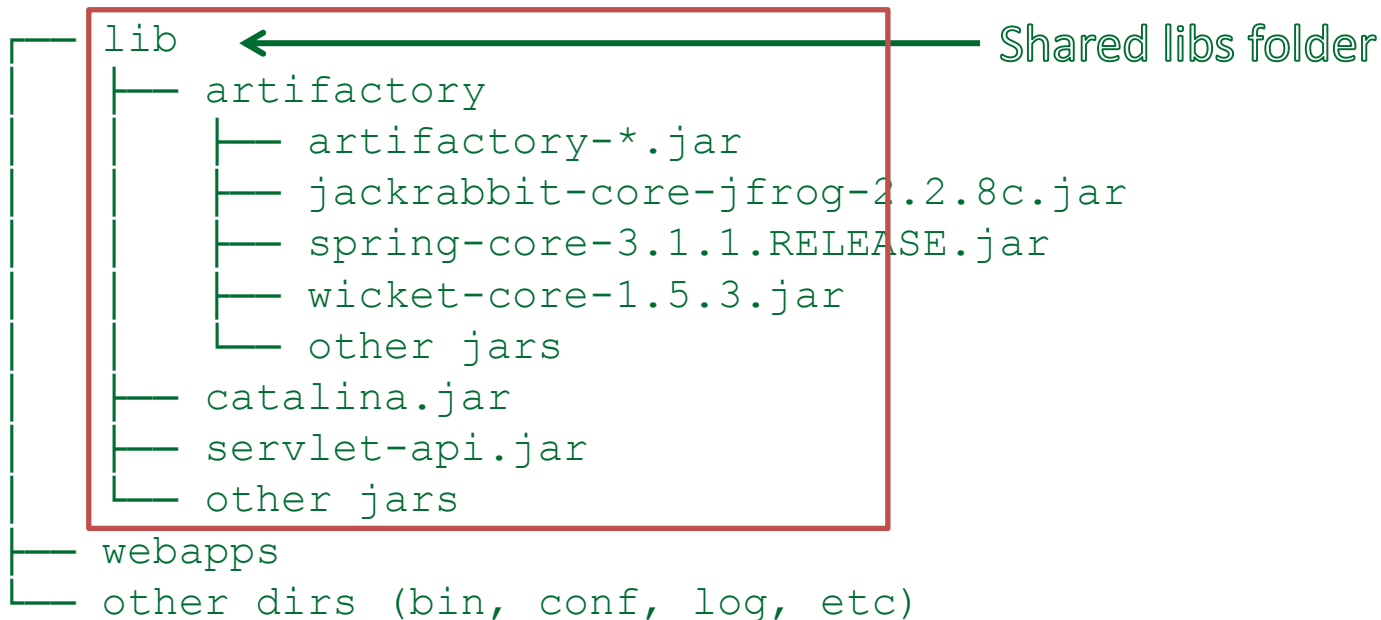


Tomcat Root - In Global Lib!

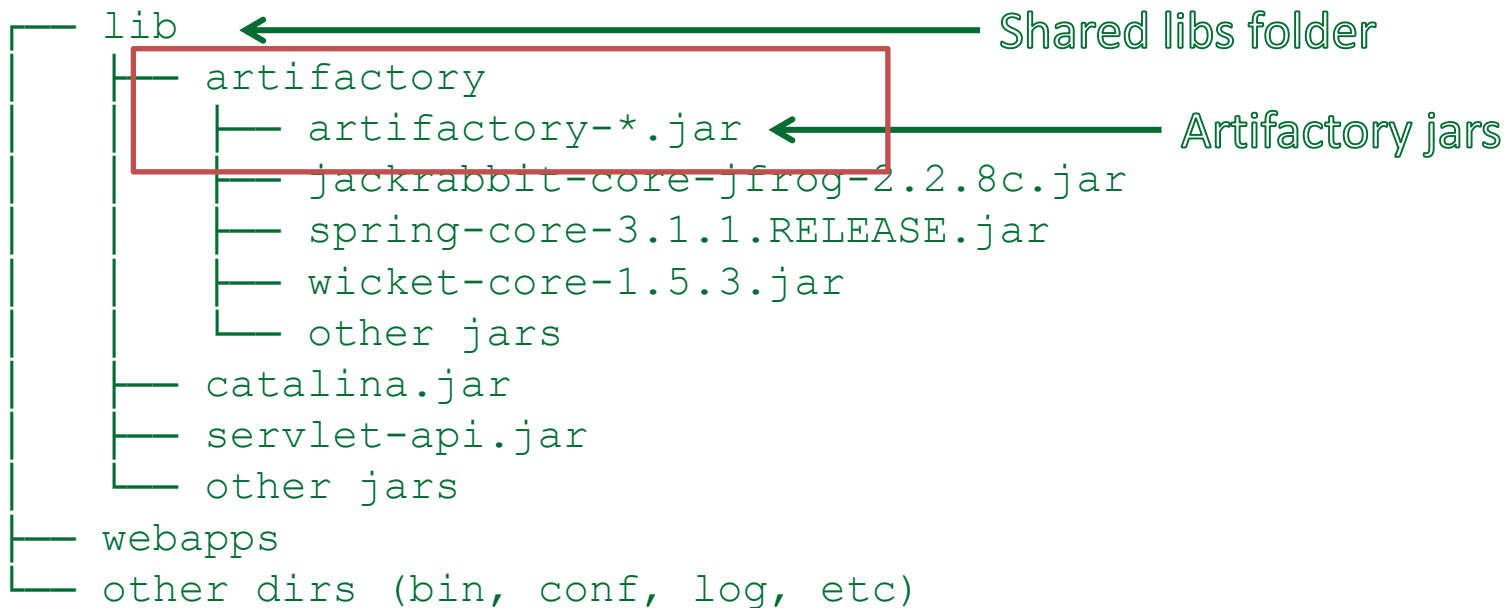


```
lib
├── artifactory
│   ├── artifactory-*.jar
│   ├── jackrabbit-core-jfrog-2.2.8c.jar
│   ├── spring-core-3.1.1.RELEASE.jar
│   ├── wicket-core-1.5.3.jar
│   └── other jars
├── catalina.jar
├── servlet-api.jar
└── other jars
webapps
other dirs (bin, conf, log, etc)
```

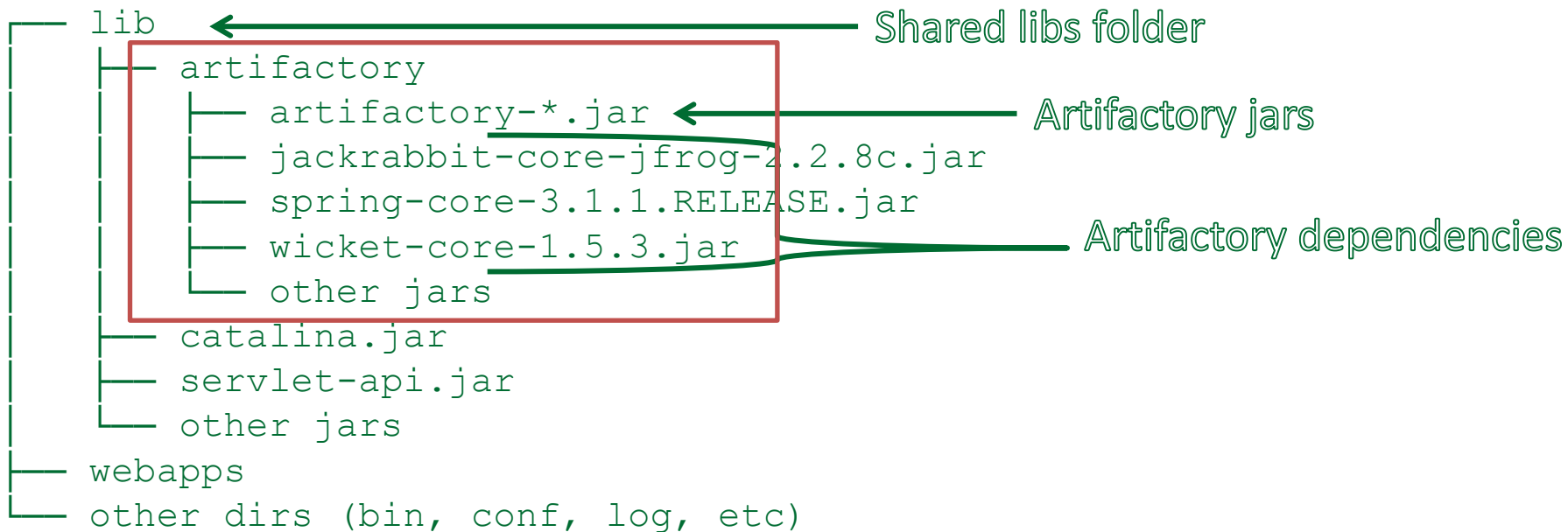
Tomcat Root - In Global Lib!



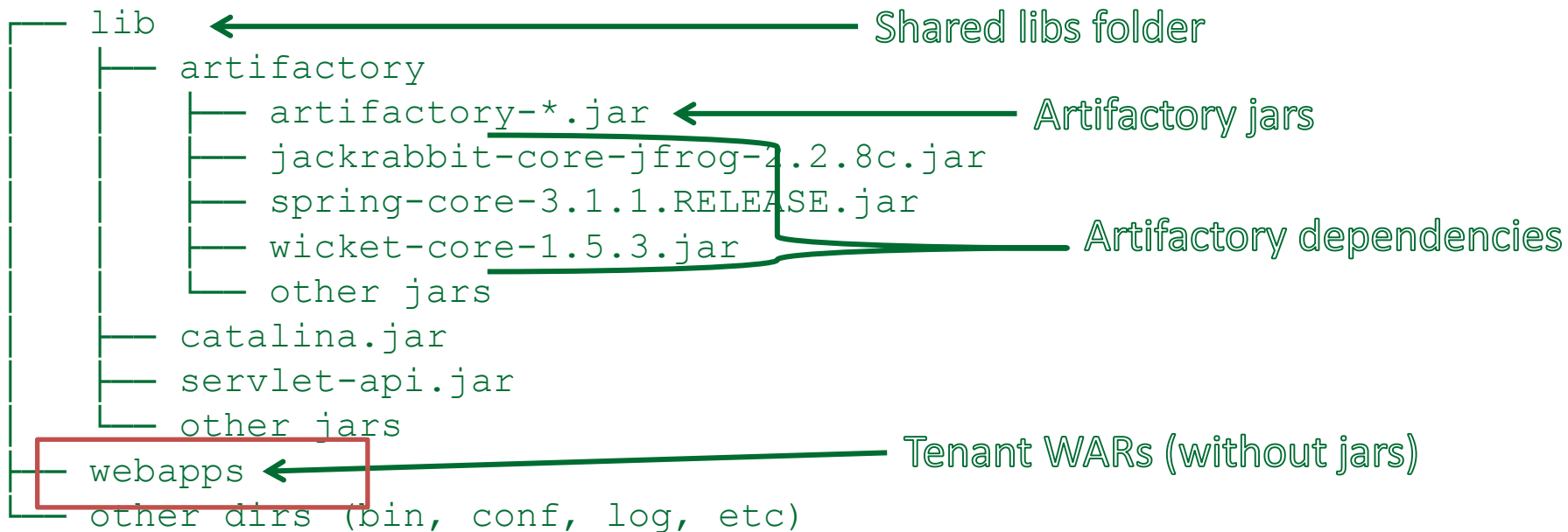
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Tomcat Root - In Global Lib!



Tomcat Root - In Global Lib!



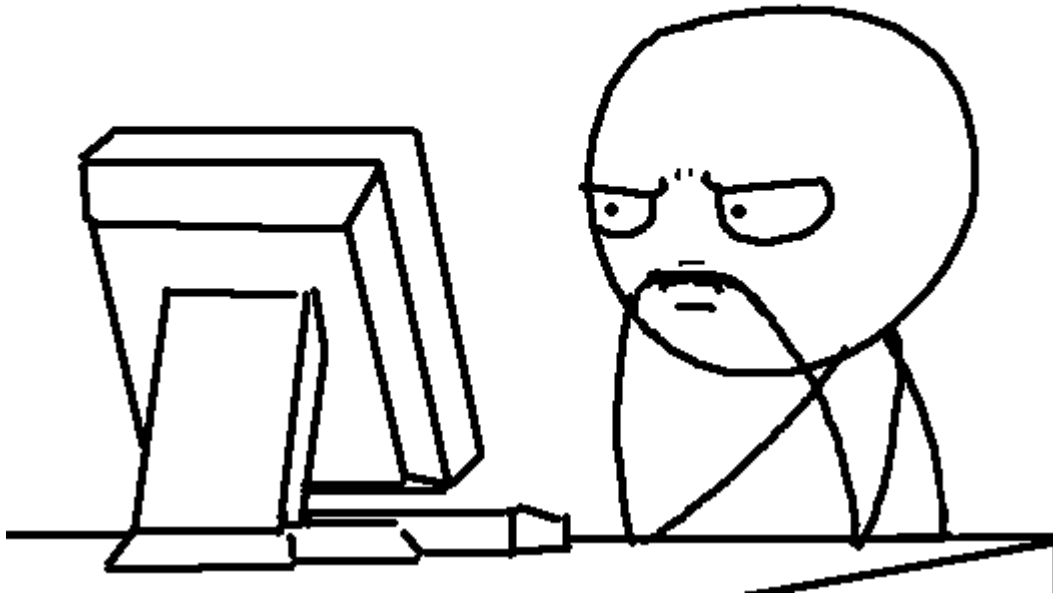
PaaS or IaaS?

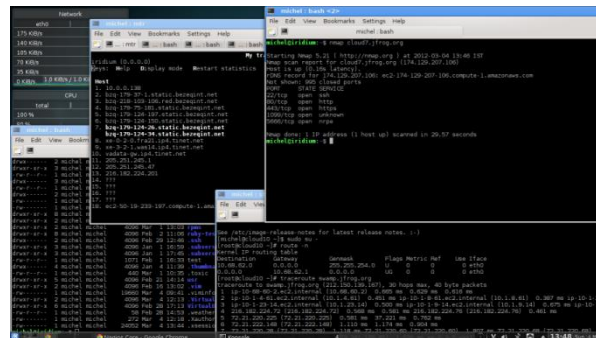


PaaS or IaaS?



What was it about DB upgrade?





Providing Self Service



Separating Concerns



Outcome: DevOps





THE PROCESS



Diversity



Recursive Slide (w. baby picture)



Right Tools for the Job



Right Tools for the Job



```
#!/bin/bash
#
setty -echo
while print "Enter your password: "; do
  read PASSWORD $& echo -e "\n"
  printf "re-enter password: "
  read PASSWORD2 $& echo -e "\n"
  if [ "$PASSWORD" = "$PASSWORD2" ]; then
    break
  else
    echo -e "PASSWORDS DON'T MATCH!!\n"
  fi
done
echo -e "your password is: $PASSWORD"
setty echo
exit 0
```

LiveRebel



Right Tools for the Job



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setty -echo
while print "Enter your password: "; do
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done
echo -e "your password is: $PASSWORD"
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exit 0
```

LiveRebel

artifactory

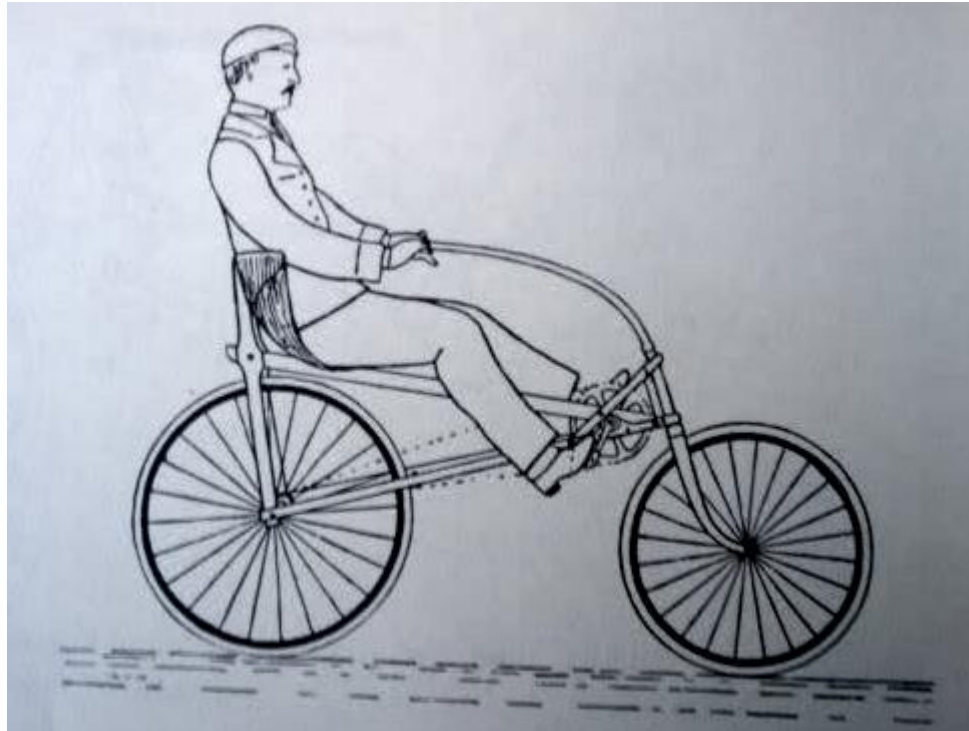




THE PARADIGM SHIFT



Reversing the Cycle



Reversing the Cycle



Consequences



Thank You!



artifactory