

3.– 6. September 2012
in Nürnberg



Herbstcampus

Wissenstransfer
par excellence

Wolkenheim

Cloud mit Java konkret

Eberhard Wolff

adesso AG

Cloud Foundry



Cloud Foundry is a multi-tenant software platform that allows developers to build, deploy, and manage applications in the cloud. It provides a consistent environment for application development and deployment across different cloud providers.

amazon webservices Amazon Elastic Beanstalk

Amazon Elastic Beanstalk is a managed service that makes it easy to deploy and scale your applications on AWS. It automatically provisions, configures, and manages the infrastructure you need to run your applications.

PaaS Problems

- Pre-defined package
- E.g.: what about Oracle database
- Limited tuning
- PaaS strength: easy deployment
- Can we have easy deployment and more flexibility?

Cloud with Java in Praticce

Eberhard Wolff
Architecture and Technology Manager
adesso AG

PaaS Platform as a Service



Google App Engine

Google App Engine is a cloud platform for building and hosting web applications. It provides a managed environment for running your code, so you don't have to worry about infrastructure.

How Is Cloud Different?

Availability

- Individual servers might fail
- System must survive failure of individual nodes
- E.g. NoSQL databases
- E.g. no state on web servers
- But: Multiple data center
- End result: Very high availability

Scaling

- Pay-as-you-Go on Public Cloud
- Sizing not for maximum load
- Need to start / stop servers depending on load
- I.e. deliver software as VM images
- ...or automated installations



Chef

Resource Provider Policy

Recipes

<http://bit.ly/mcode-opsentraining>

Vagrant

Cloud with Java in Practice

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How Is Cloud Different?

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About me

- Eberhard Wolff
- Architecture & Technology Manager at adesso
- adesso is a leading IT consultancy in Germany
- Speaker
- Author (e.g. first German Spring book)
- Blog: <http://ewolff.com>
- Twitter: @ewolff
- <http://slideshare.com/ewolff>
- eberhard.wolff@adesso.de



IaaS – PaaS – SaaS

Infrastructure as a Service

- Virtual Servers
- Similar Virtualization
- Manage Everything Yourself

Platform as a Service

- Virtual App Server
- Handles Scale-Out
- Mostly Managed by Provider

Software as a Service

- Software or Service that you use
- Components that you add/integrate into your app

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Software as a Service

- Software or Service that you use
- Components that you add/integrate into your app

Why Cloud?

- Flexibility
 - Much easier to start new servers
 - Just an automated process over a complex, manual process
 - IMHO the main benefit

Cost reduction

- Pay-as-you-go for Public Cloud
- No real story for Private Cloud

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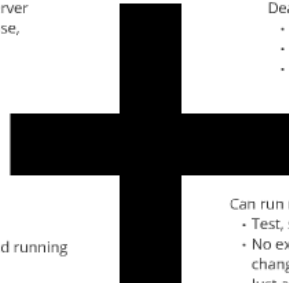
- I.e. deliver software as VM images
- ...or automated installations

PaaS

Platform as a Service

More than an Application Server

- Includes services (database, messaging ...)



Deals with Cloud issues

- Scaling (up / down)
- Provisioning
- Fault tolerance / restarting server

Good Foundation
for Continuous Delivery

Easy to get something up and running

- ...on the Internet
- ...on a proven infrastructure
- ...that easily scales

Can run multiple environments

- Test, staging, production
- No extra configuration or changes to code
- Just a mouse click away

Predefined package

- What if a service is missing?
- What about fine tuning the environment?



More dependencies / Lock In

- Complete package usually available from one source only
- Proprietary services lead to lock in
- My take: You will be locked in anyway
- Even with standard compliant Java EE servers

PaaS

Platform as a Service

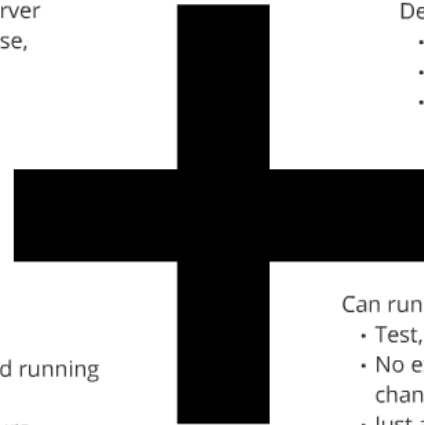
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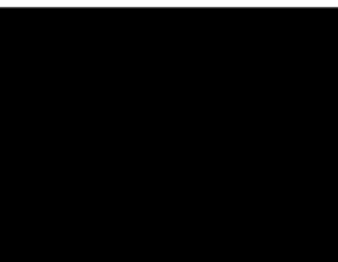
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Amazon Elastic Beanstalk

Amazon Web Services

- Public Cloud
- Selection of Cloud offerings, mostly IaaS
- Elastic Compute Cloud (EC2), Virtual Computers
- Elastic Load Balancer
- Auto Scaling: Start and stop machines as needed
- Simple Storage Service: S3, Necessary for large files, logs, deployment artifacts
- Elastic Block Storage (EBS): Virtual hard disks

Amazon Web Services Beyond IaaS

- Elasticache: Memcached based service
- RDS (Amazon Relational Database Service) for Oracle and MySQL
- DynamoDB, SimpleDB
- Third party offerings e.g. for MongoDB and for CouchDB
- Infrastructure Building blocks
- Kube AWS very valuable

Amazon Elastic Beanstalk

- EC2
- Auto Scaling
- Elastic Load Balancer
- Tomcat + Linux + OpenJDK
- Web Console

Alternative Stacks

- PHP 5.3 or Python with Apache HTTPD vs JSP
- Windows Server 2008 R2 and IIS 7.5 for .NET
- Windows Web Deploy ZIP

Amazon Elastic Beanstalk Challenges

- No support for full Java EE - Tomcat only
- Scales resource groups based on EC2 instances
- Need to pay each machine

Amazon Elastic Beanstalk Advantages

- Standard programming model i.e. Tomcat / Java Services
- Can embed basic operating system if needed
- Very flexible: Can change Tomcat configuration or even install and have image
- Proven Foundation: AWS i.e. EC2, Auto Scaling, Elastic Load Balancer etc.

- Broad range of other services available in the Amazon cloud by Amazon and partners - including Oracle and MySQL
- Can install new versions of your software without downtime
 - by switching environments
 - Versions of deployment artifacts handled - i.e. can easily roll back to a previous version
 - Can start logging files on S3



as Problems

Amazon Web Services

- Public Cloud
- Collection of Cloud Offerings (mostly IaaS)
- Elastic Compute Cloud (EC2): Virtual computers
- Elastic Load Balancer
- Auto Scaling: Start and stop machines as needed
- Simple Storage Service (S3): Repository for large files (logs, deployable artifacts)
- Elastic Block Storage (EBS): Virtual hard disks

Amazon Web Services Beyond IaaS

- Elasticache: Memcached based service
- RDS (Relation Database Service) for Oracle and MySQL
- DynamoDB, SimpleDB ...
- Third party offerings e.g. for MongoDB and for CouchDB
- Predefined building blocks
- Make AWS very valuable

Amazon Elastic Beanstalk

- EC2
- + Auto Scaling
- + Elastic Load Balancer
- + Tomcat + Linux + OpenJDK
- + Web Console

**Elastic Load Balancer
Auto Scaling**

**EC2 Server
Linux
OpenJDK
Tomcat**

**EC2 Server
Linux
OpenJDK
Tomcat**

...

WAR
S3



Alternative Stacks

- PHP 5.3 or Python with Apache httpd via git
- Windows Server 2008 R2 und IIS 7.5 for .NET
- Windows Web deploy ZIP

Amazon Elastic Beanstalk: Advantages

- Standard programming model i.e. Tomcat / Java Servlets
- Can even tweak operating system if needed
- Very flexible: Can change Tomcat configuration or even virtual machine image
- Proven foundation: AWS i.e. EC2, Auto Scaling, Elastic Load Balancer etc

- Broad ranges of other services available in the Amazon cloud by Amazon and partners – including Oracle and MySQL
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Amazon Elastic Beanstalk: Challenges

- No support for full Java EE – Tomcat only
- Scales coarse grained: based on machines
- Need to pay each machine

AWS
Elastic BeanstalkAmazon
S3Amazon
EC2Amazon
VPCAmazon
CloudWatchAmazon
Elastic MapReduceAmazon
CloudFrontAWS
CloudFormationAmazon
RDSAmazon
SNSAWS
IAM

US East

You do not have any AWS Elastic Beanstalk applications launched. AWS Elastic Beanstalk makes it even easier to deploy and manage scalable and fault-tolerant applications on the AWS cloud, while retaining the ability to control the underlying resources. To get started, simply upload your application to AWS Elastic Beanstalk and within minutes access your application running on AWS's infrastructure services. [Learn more about creating and launching your applications using AWS Elastic Beanstalk](#)→

Create my first application

- Launch a sample application
Launch a sample application to learn how AWS Elastic Beanstalk works. You can create and upload your own application later.
- Upload your own application

[Launch Application](#)

AWS
Elastic BeanstalkAmazon
S3Amazon
EC2Amazon
VPCAmazon
CloudWatchAmazon
Elastic MapReduceAmazon
CloudFrontAWS
CloudFormationAmazon
RDSAmazon
SNSAWS
IAM

US East

Create New Application

Cancel

APPLICATION DETAILS ENVIRONMENT DETAILS CONFIGURATION DETAILS REVIEW

To create a new application, enter the details of your application below.
[Learn more about creating new applications using AWS Elastic Beanstalk.](#)

Application Name:

BeanstalkDemo

Description: (optional, 200 char maximum)

Application Source:

- Use the Sample Application
- Upload your Existing Application

Datei auswählen beanstalk-demo.war

Continue

Create New Application

Cancel X

APPLICATION DETAILS

ENVIRONMENT DETAILS

CONFIGURATION DETAILS

REVIEW

Enter the details of your environment below. If you choose to not launch an environment now, no details are needed. You can always launch environments after this application has been created. [Learn more about launching new environments.](#)

- Launch a new environment running this application

Environment Name:

adessoBeanstalk

Environment URL:

http://adessobeanstalk.elasticbeanstalk.com

Description: (optional, 200 char maximum)**Container Type:**

32bit Amazon Linux running Tomcat 7

[< Back](#)

US East

You do not have...
even easier to dep...
retaining the abilit...
AWS Elastic Beans...
services. Learn m...

eanstalk makes it...
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structure...
eanstalk→

Create New Application

Cancel

APPLICATION DETAILS ENVIRONMENT DETAILS CONFIGURATION DETAILS REVIEW

We will be launching your environment with the following default configuration. Modify the defaults before launch or just click **Continue**.

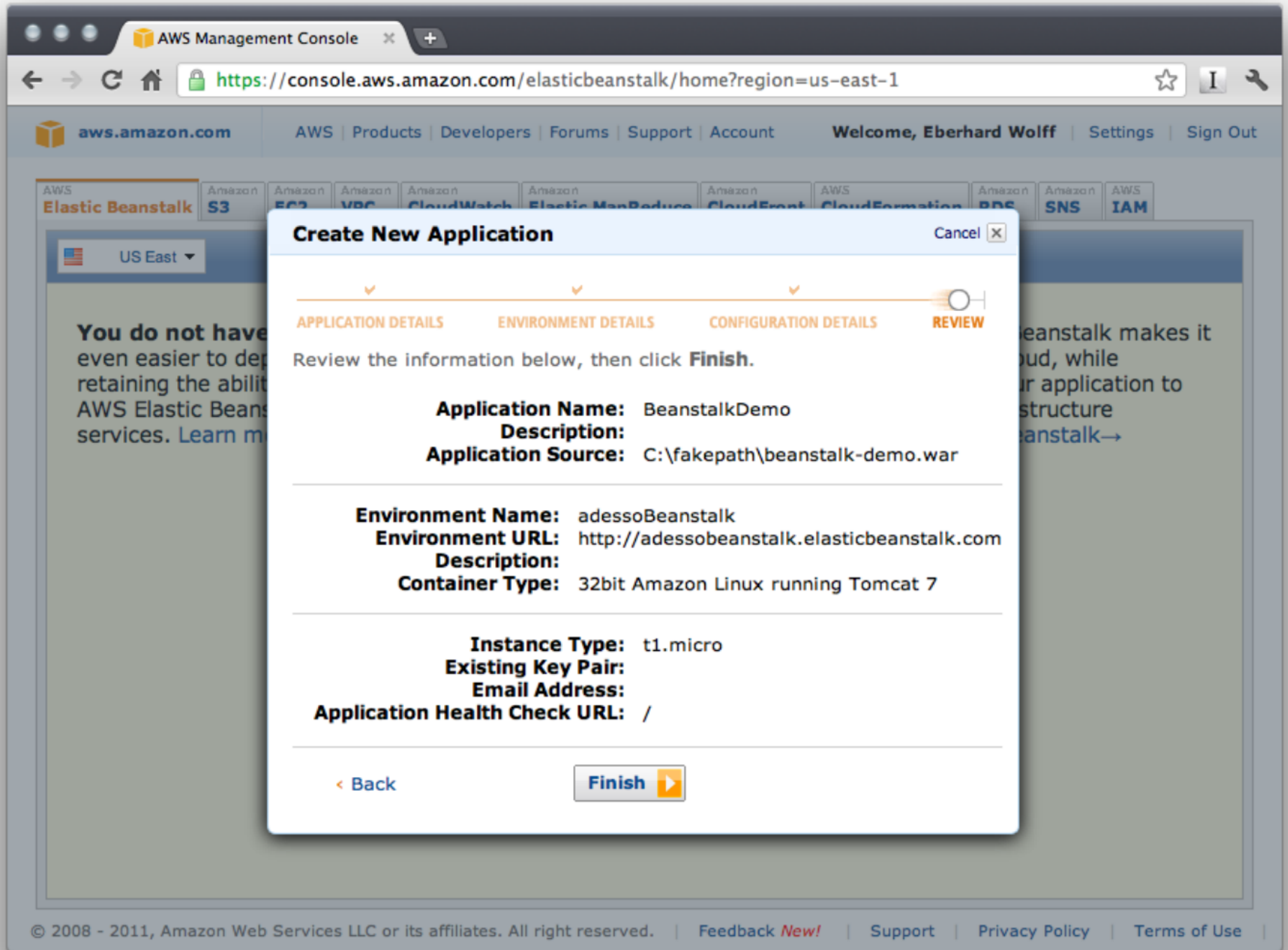
Instance Type:
The instance type determines the processing power of the servers in your environment.

Existing Key Pair:
Key pairs are used to enable remote login to your instances.

Email Address:
We can notify you via email of any major changes to your environment.

Application Health Check URL:
We continually monitor your application to make sure it's available. What relative URL would you like us to monitor?

< Back Continue >



- AWS Elastic Beanstalk
- AWS S3
- AWS EC2
- AWS VPC
- AWS CloudWatch
- AWS Elastic MapReduce
- AWS CloudFront
- AWS CloudFormation
- AWS RDS
- AWS SNS
- AWS IAM

US East

You do not have
 even easier to dep
 retaining the abilit
 AWS Elastic Beans
 services. Learn m

Create New Application

Cancel X

APPLICATION DETAILS

ENVIRONMENT DETAILS

CONFIGURATION DETAILS

REVIEW

Review the information below, then click **Finish**.

Application Name: BeanstalkDemo
Description:
Application Source: C:\fakepath\beanstalk-demo.war

Environment Name: adessoBeanstalk
Environment URL: http://adessobeanstalk.elasticbeanstalk.com
Description:
Container Type: 32bit Amazon Linux running Tomcat 7

Instance Type: t1.micro
Existing Key Pair:
Email Address:
Application Health Check URL: /

< Back

Finish >

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 ur application to
 structure
 eanstalk→


AWS Elastic Beanstalk | Amazon S3 | Amazon EC2 | Amazon VPC | Amazon CloudWatch | Amazon Elastic MapReduce | Amazon CloudFront | AWS CloudFormation | Amazon RDS | Amazon SNS | AWS IAM

US East | BeanstalkDemo | Upload New Version | Launch New Environment | Create New Application

Application Details
Overview | Events | Versions

Application Description:
Created on: 2011-08-08 18:49 GMT+0200
[Edit Application Description](#) | [Delete This Application](#)

BeanstalkDemo Environments [Refresh](#)

 **adessoBeanstalk**
Latest Event: Waiting for an EC2 instance to be launched... (Note: Launching your environment may...)
[View Running Version](#) | [Actions](#)

Environment Details

Application Details

Overview Events Versions

Application Description:

Created on: 2011-08-08 18:49 GMT+0200

Edit Application Description | Delete This Application

BeanstalkDemo Environments

Refresh

adessoBeanstalk Successfully running version First Release.

View Running Version Actions

Environment Details

AWS Management Console

https://console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1

aws.amazon.com | AWS | Products | Developers | Forums | Support | Account | Welcome, Eberhard Wolff | Settings | Sign Out

Elastic Beanstalk | US East | adessoBeans

Application Details

Overview | Events | Versions

Application Description:

Created on: 20

adessoBeanstalk Environment

adessoBeanstalk

Successfully running version

Environment Details

Upload New Version

Cancel

Upload a new file, and give this version of your application a label and a description. You may choose to simply upload this new version or upload it and deploy it to an existing environment.

Upload Your New Version

Version Label:

2.0

Description: (optional, 200 char maximum)

Upload Application:

File auswählen beanstalk-demo.war

Deployment

Upload but do not deploy to any environment

Deploy to an existing environment after upload

adessoBeanstalk

Cancel | Upload New Version

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https://console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1

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[Elastic Beanstalk](#)
[S3](#)
[EC2](#)
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[CloudFront](#)
[CloudFormation](#)
[RDS](#)
[ElastiCache](#)
[SNS](#)
[IAM](#)

US East |
[Upload New Version](#)
[Launch New Environment](#)
[Create New Application](#)

Application Details

[Overview](#)
[Events](#)
[Versions](#)

[Upload New Version](#)
[Deploy Version](#)
[Delete Version](#)
[Show/Hide](#)
[Refresh](#)

Viewing: All | | 1 to 2 of 2 Items

	Version Label	Description	Running on	Created on	Location
<input checked="" type="checkbox"/>	2.0		-	2011-08-25 16:13 GMT+0200	2011237q
<input type="checkbox"/>	First Release		adessoBeanstalk	2011-08-25 15:35 GMT+0200	20112373

adessoBeanstalk Environments [Refresh](#)

adessoBeanstalk
 Successfully running version **First Release**.
 [View Running Version](#)
[Actions](#)

Environment Details

Launch New Environment

Cancel X

ENVIRONMENT DETAILS

CONFIGURATION DETAILS

REVIEW

Enter the details below to create and launch a new environment for your application. Launching a new environment may take several minutes. [Learn more about launching new environments.](#)

Environment Name:

newAdessoBeanstalk

Environment URL:

http://newadessobeanstalk.elasticbeanstalk.com

Check Availability

✔ URL is available

Description: (optional, 200 char maximum)

Version:

- Select an existing application version

2.0

- Upload and use a new application version

Datei auswählen Keine ausgewählt

Container Type:

32bit Amazon Linux running Tomcat 7

Continue ▶

AWS Management Console

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US East | adessoBeanstalk | Upload New Version | Launch New Environment | Create New Application

Application Details

Overview | Events | **Versions**

Upload New Version | Deploy Version | Delete Version | Show/Hide | Refresh

Viewing: All | 1 to 2 of 2 Items

	Version Label	Description	Running on	Created on	Locat
<input type="checkbox"/>	2.0		newAdessoBeanstalk	2011-08-25 16:13 GMT+0200	2011:
<input type="checkbox"/>	First Release		adessoBeanstalk	2011-08-25 15:35 GMT+0200	2011:

adessoBeanstalk Environments | Refresh

newAdessoBeanstalk
Successfully running version 2.0. | View Running Version | Actions

Environment Details

adessoBeanstalk
Successfully running version First Release. | View Running Version | Actions

Environment Details

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US East | adessoBeanstalk | Upload New Version | Launch New Environment | Create New Application

Upload New Version | Deploy Version | Delete Version | Show/Hide | Refresh

Viewing: All | 1 to 2 of 2 Items

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<input type="checkbox"/>	First Release		adessoBeanstalk	2011-08-25 15:35 GMT+0200	20

adessoBeanstalk Environments Refresh

newAdessoBeanstalk
Successfully running version 2.0. View Running Version Actions

Environment Details

adessoBeanstalk
Successfully running version First Release. View Running Version Actions

Environment Details

Overview | Logs | Monitoring | Events

URL: http://adessobeanstalk.elasticbeanstalk.com

Running Version: First Release

Container Type: 32bit Amazon Linux running Tomcat 7

Changed on: 2011-08-25 16:15 GMT+0200

Deploy a Different Version | Edit Configuration

- Deploy a Different Version
- Edit/Load Configuration
- Save Configuration
- Swap Environment URL
- Restart the App Server(s)
- Rebuild this Environment
- Terminate this Environment

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https://console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1

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Elastic Beanstalk | S3 | EC2 | VPC | CloudWatch | Elastic MapReduce | CloudFront | CloudFormation | RDS | ElastiCache | SNS | IAM

US East | adessoBeanstalk | Upload New Version | Launch New Environment | Create New Application

Swap Environment URL

Swapping an environment's URL with another environment's URL allows you to deploy versions with no downtime. [Learn more >>](#)

Warning: Swapping the environment URL will modify the Route 53 DNS configuration which may take a few minutes. Your application will continue to run while the changes propagate.

Environment Details

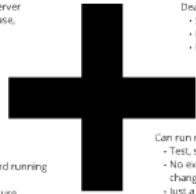
Environment Name: adessoBeanstalk
Environment URL: adessobeanstalk.elasticbeanstalk.com

Select an Environment to Swap

Environment Name:
Environment URL: newadessobeanstalk.elasticbeanstalk.com

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- End result: Very high availability



Google App Engine

Google App Engine: What is it?
 • Pioneers way only in the market
 • Support for Python, Go, experimental Java (limited)
 • Public Cloud
 • "Tier" PaaS
 • Complete abstraction
 • ...Access to OS, Web server etc.
 • Therefore Limited possibilities for tuning
 • Production ready

Google App Engine: Additional Services
 • NoSQL (Bigtable, Memcache)
 • Cloud SQL (experimental MySQL like)
 • Memcache
 • Blobstore
 • Image Manipulation
 • SMTP Chat
 • ...

Roadmap
 • Outboard systems support
 • Java Servlet 3.0 support
 • Mapreduce API (new)
 • Blobstore migration tool
 • ...

Google App Engine: Advantages
 • Built by production with many applications
 • Don't access to other Google services
 • No migration with no build time for small applications
 • The grand model for scaling available from scratch

Google App Engine: Challenges
 • Only data centers in the US
 • Java: Very limited white list of classes (OSaaS)
 • Therefore: Lock in
 • Google changed pricing recently (in some cases much more costly now)
 • Very restrictive environment
 • Java classes which list
 • Limited sandbox
 • Focus on NoSQL - 800MB experiment only
 • Limit on speed of time of application etc.
 • Limit on response time (30 seconds)
 • No control of access to operating system
 • Not even the web server
 • Some special and frameworks have been created (Swifty for Grizzly)



• Chef cooks VMs for you
 • Ruby based DSL
 • i.e. flexible and powerful

Chef server
 Opscode hosted Chef
 Chef solo

Google App Engine:

What is it?

- Pioneer: Very early in the market
- Support for Python, Go (experimental), Java (limited)
- Public Cloud
- “True” PaaS
 - complete abstraction
 - no access to OS, web server etc
- Therefore: Limited possibilities for tuning
- Production-ready

Google App Engine: Additional Services

- NoSQL Key / Value with JDO / JPA
- Cloud SQL (experimental) MySQL like)
- Memcache
- Blobstore
- Image Manipulation
- XMPP Chat
- ...

Roadmap

- Outbound sockets support
- Java Servlet 3.0 support
- Mapreduce API (Java)
- Blobstore migration tool

Google App Engine: Advantages

- Stable in production with many applications
- Fast access to other Google services
- Nice integration with Android
- Free for small applications
- Fine grained model for scaling – smaller than machines

Google App Engine: Challenges

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- Very restrictive environment
 - Java classes white list
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- Even specialized frameworks have been created (Gaelyk for Groovy)

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Cloud Foundry



Cloud Foundry What is it?

- Open Source Project lead by VMware
- Apache License
- Community (ActiveState, AppFog, Joyent...)
- Public Cloud in beta
- Private offering announced by VMware and Akamai stacks
- Micro Cloud
- Support for Java, Scala, Groovy, Ruby, Erlang, Node.js, Python, PHP
- Support in Ubuntu / jps to set up a cluster of Cloud Foundry machines on AWS
- Images for Amazon EC2 (Rightscale)
- .NET port: Inofoundry
- BOSH: Software used to manage CloudFoundry.com

Cloud Foundry & Services

- Services are provided for the applications by Cloud Foundry - no config or network needed
- Messaging: RabbitMQ
- HTTP(S): Progress, Loggly
- NoSQL: Redis, Redis, MongoDB
- Novel: Integration in the framework
- e.g. Cloud response in Spring
- and configurations in Spring
- Also supported: PostgreSQL
- or APIs

Cloud Foundry: Advantages

- Low or zero setup / installation
- PaaS Cloud only
- Minimal build for each deployment / deploy
- Stateless build: Deployment is fast / simple / production without changes
- DEPENDENCY
- Library loaded on the server - on the server
- Only the application code is deployed - no need to copy your source code
- Application can easily build or deploy anywhere
- Run on the box

Cloud Foundry: Challenges

- Public Cloud in beta and no pricing announced
- Private Cloud in beta / available
- Not support for Java EE
- Data center only in the US
- Not all OS or it's world wide on EC2
- Integrating additional services possible, but complex
- Therefore limited set of services
- Fragmented integration: application, therefore choice somewhat limited
- List of services
- Complete piece of software
- How are the services scaled?
- Mixed integration of all services into all frameworks

Cloud Foundry What is it?

- Open Source Project lead by VMware
- Apache License
- Community (ActiveState, AppFog, Joyent...)
- Public Cloud in beta
- Private offering announced by VMware and ActiveState stackto
- Micro Cloud
- Support for Java, Scala, Groovy, Ruby, Erlang, Node.js, Python, PHP
- PaaS (limited configuration possible e.g. memory)
- Support in Ubuntu / juju to set up a cluster of Cloud Foundry machines on AWS
- Images for Amazon EC2 (Rightscale)
- .NET port: Ironfoundry
- BOSH: Software used to manage CloudFoundry.com

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Cloud Foundry & Services

- Services are provided to the application by Cloud Foundry – no configuration needed
 - Messaging: RabbitMQ
 - RDBMS: Postgresql, MySQL
 - NoSQL: neo4j, Redis, MongoDB
- Need integration in the framework
 - e.g. cloud namespace in Spring
 - out configuration in Spring
- Also supported: Play! and Lift
- or API calls

Cloud Foundry: Advantages

- Lots of Open Source innovation
- Private Cloud story
- Micro cloud for test on laptop / desktop
- Services model: deployment to test / staging / production without changes
- Optimizations
 - Libraries cached on the server – small uploads
 - Server for database etc shared across applications – no need to start your personal server
 - Applications start quickly
- Standard programming model
 - Tomcat for Java

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- Lot of service:
Complex piece of software
- How are the services scaled?
- Need integration of all services into all frameworks

PaaS Problems

- Pre-defined package
- E.g.: what about Oracle database
- Limited tuning
- PaaS strength: easy deployment
- Can we have easy deployment and more flexibility?



Cherf



- Chef cooks VMs for you
- Ruby based DSL
- i.e. flexible and powerful

Chef server

Opscode hosted Chef

Chef solo

- Fundamental configuration object
- Le files, Linux packages, files, directories etc
- Resources are made to comply with a **policy**


Resource

- Package "tomcat" should be installed
- User "adesso" should exist

Policy

Provider

- Execute idempotent actions through providers
- Determine current state of resources
- Can change state it to comply to a policy

- 
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- Execute idempotent actions through providers
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Recipes

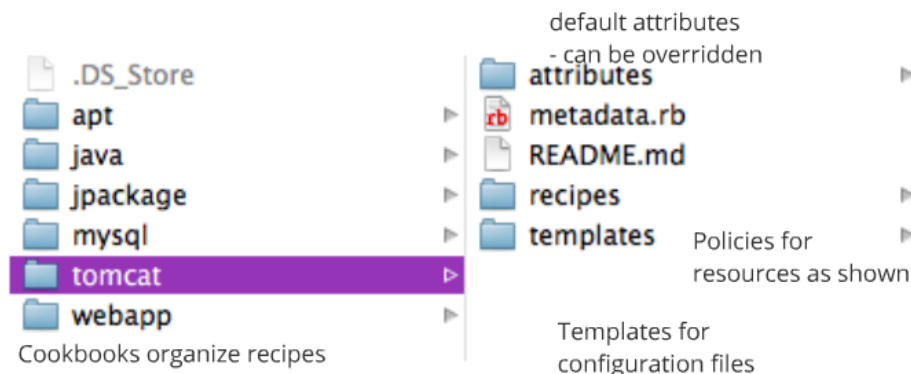
Recipes contain a combination of resources

For Tomcat

- Tomcat package is installed
- Java is installed
- Define the service
- Configuration defined in templates

Idempotent

- Policies defined
- ...and enforced
- i.e. install Tomcat only if not present
- i.e. change config file only if not as template defines



Cookbooks organize recipes

- <http://community.opscode.com/cookbooks>
- <https://github.com/opscode/cookbook> (used here)
- https://github.com/37signals/37s_cookbooks
- <https://github.com/engineyard/ey-cloud-recipes>

Recipes contain a combination of resources

For Tomcat

- Tomcat package is installed
- Java is installed
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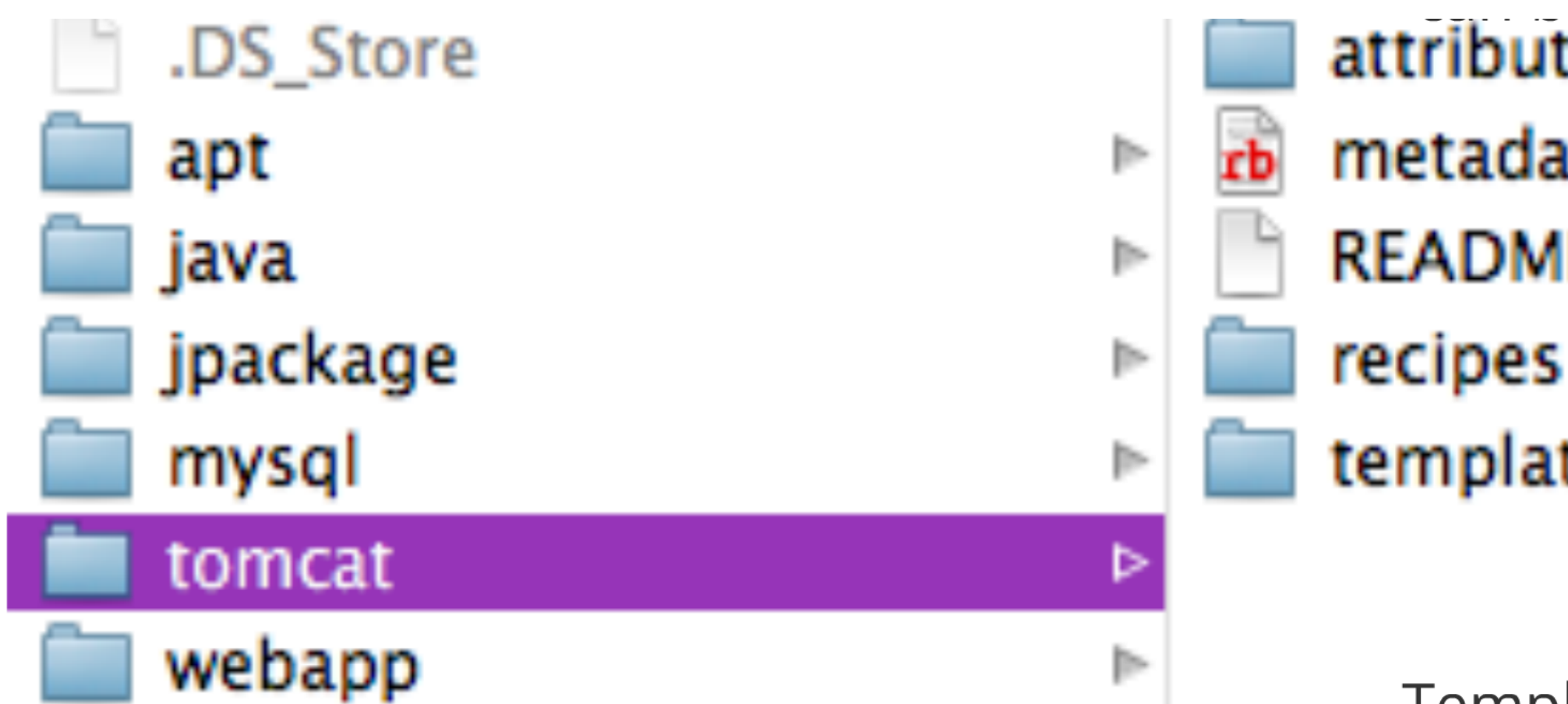


java is installed

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Idempotent

- Policies defined
 - ...and enforced
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Cookbooks organize recipes

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(used here)

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Templ
config

default attributes

- can be overridden



attributes



metadata.rb



README.md



attributes



metadata.rb



README.md



recipes



templates

Policies for
resources as shown




Templates for
configuration files

books

k

 recipes

 templates

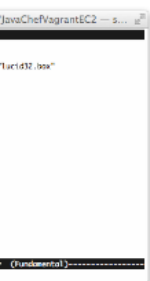
Policies fo
resources

Templates for
configuration files

books

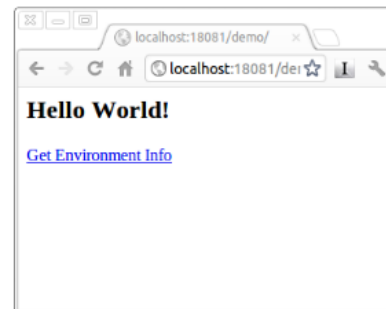
K

<http://bit.ly/opscode-opentraining>



```
wolff@wolff-ubuntu:~/JavaCheVagrantEC2$ vagrant provision
[default] Running provisioner: Vagrant::Provisioners::ChefSolo...
[default] Generating chef::JSON and uploading...
[default] Running chef solo...
stderr: is not a file
[Sun, 24 Jun 2012 14:29:00 +0200] INFO: *** Chef 0.10.10 ***
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Setting the run-list to ['recipe[apt]',
recipe[tomcat], 'recipe[webapps]'] from /etc/chef/solo.rb
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Run list is ['recipe[apt]', recipe[tomcat],
'recipe[webapps]']
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Run List expands to [apt, tomcat, webapp
s]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Starting Chef Run for lucid2
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Running start handlers
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Start handlers complete.
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Missing gem 'rsync'
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get-update] actio
n nothing [opts:default line 22]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get-update] actio
n nothing [opts:default line 30]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing package[update-notifier-como
n] action install [opts:default line 37]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get-update period
ic] action run [opt:default line 41]
```

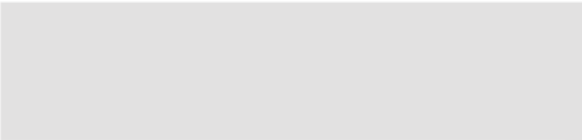

```
wolff@wolff-ubuntu:~/JavaCheVagrantEC2$
[tomcat:default line 42]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing service[tomcat] action start
[tomcat:default line 42]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing template[/etc/default/tomcat5
] action create [tomcat:default line 65]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing template[/etc/tomcat5/server.xml]
action create [tomcat:default line 72]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat5/server.xml] backed
up to /var/chef/backup/etc/tomcat5/server.xml.chef-20120624142910
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat5/server.xml] mode c
hanged to 644
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat5/server.xml] update
d contents
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing cookbook_file[/var/lib/tomcat
6/webapps/demo.war] action create [webapp:default line 24]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat5/server.xml] sendin
g restart action to service[tomcat] [delayed]
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing service[tomcat] action restart
[tomcat:default line 42]
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: service[tomcat] restarted
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Chef Run complete in 7.692542 seconds
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Running report handlers
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Report handlers complete
wolff@wolff-ubuntu:~/JavaCheVagrantEC2$
```



- Easily create a VM or set of VMs
- ...using a basic VM image
- Virtualization with VirtualBox
- Provision with e.g. Chef
- Vagrant ssh into the VM

Vagrant

<https://github.com/ewolff/JavaChefVagrantEC2>

- 
- Easily create a VM or set of VMs
 - ...using a basic VM image
 - Virtualization with VirtualBox
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 - Vagrant ssh into the VM
- 

nggrant

<https://github.com/ewolff/JavaChefVagrantEC2>

wolff — wolff@wolff-desktop: ~/JavaChefVagrantEC2 — s...

```
wolff@wolff-desktop:~/JavaChefVagrantEC2$ vagrant up
[default] Box lucid32 was not found. Fetching box from specified URL...
[vagrant] Downloading with Vagrant::Downloaders::HTTP...
[vagrant] Downloading box: http://files.vagrantup.com/lucid32.box
[vagrant] Progress: 7% (19677240 / 273836032)
```

```
[vagrant] Downloading box: http://files.vagrantup.com/lucid32.box
[vagrant] Extracting box...
[vagrant] Verifying box...
[vagrant] Cleaning up downloaded box...
[default] Importing base box 'lucid32'...
[default] The guest additions on this VM do not match the install version of
VirtualBox! This may cause things such as forwarded ports, shared
folders, and more to not work properly. If any of those things fail on
this machine, please update the guest additions and repackage the
box.
```

```
Guest Additions Version: 4.1.16
```

```
VirtualBox Version: 4.1.18
```

```
[default] Matching MAC address for NAT networking...
[default] Clearing any previously set forwarded ports...
[default] Forwarding ports...
[default] -- 22 => 2222 (adapter 1)
[default] -- 8080 => 18080 (adapter 1)
[default] -- 8081 => 18081 (adapter 1)
[default] Creating shared folders metadata...
[default] Clearing any previously set network interfaces...
[default] Booting VM...
[default] Waiting for VM to boot. This can take a few minutes.
```

```
□
```



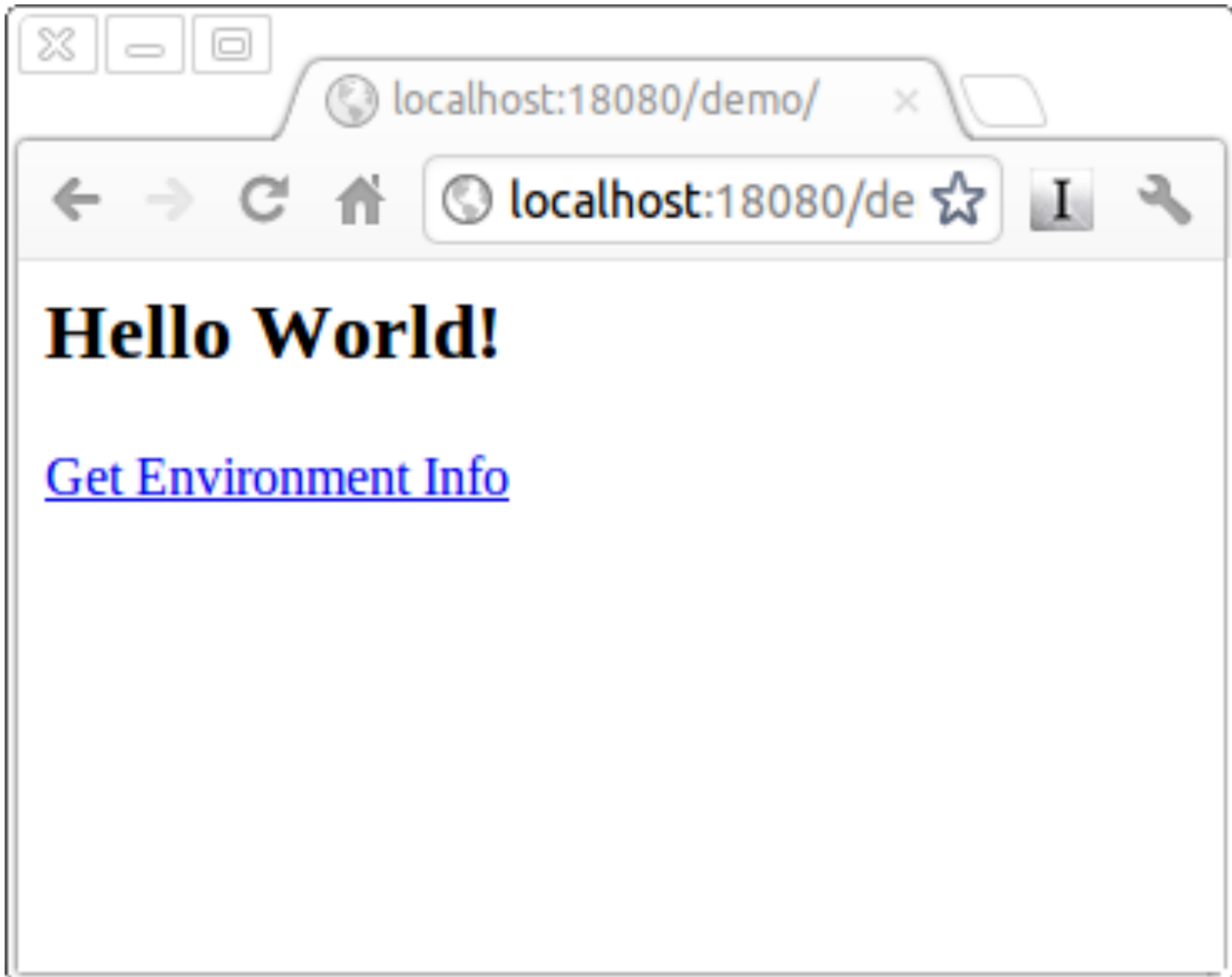
```
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: *** Chef 0.10.10 ***  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Setting the run_list to ["recipe[apt]",  
"recipe[tomcat]", "recipe[webapp]"] from JSON  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Run List is [recipe[apt], recipe[tomcat]  
, recipe[webapp]]  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Run List expands to [apt, tomcat, webapp  
]  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Starting Chef Run for lucid32  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Running start handlers  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Start handlers complete.  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Missing gem 'mysql'  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Processing execute[apt-get-update] actio  
n nothing (apt::default line 22)  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Processing execute[apt-get update] actio  
n nothing (apt::default line 30)  
[Sun, 24 Jun 2012 11:02:48 +0200] INFO: Processing package[update-notifier-commo  
n] action install (apt::default line 37)  
[Sun, 24 Jun 2012 11:02:50 +0200] INFO: package[update-notifier-common] installe  
d version 0.99.3ubuntu0.1  
[Sun, 24 Jun 2012 11:02:50 +0200] INFO: package[update-notifier-common] sending  
run action to execute[apt-get-update] (immediate)  
[Sun, 24 Jun 2012 11:02:50 +0200] INFO: Processing execute[apt-get-update] actio  
n run (apt::default line 22)
```



wolff — wolff@wolff-desktop: ~/JavaChefVagrantEC2 — s...

```
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: directory[/var/cache/local] mode changed to 644
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: Processing directory[/var/cache/local/preseeding] action create (apt::default line 51)
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: directory[/var/cache/local/preseeding] created directory /var/cache/local/preseeding
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: directory[/var/cache/local/preseeding] mode changed to 644
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: Processing execute[update-java-alternatives] action nothing (java::openjdk line 30)
[Sun, 24 Jun 2012 11:03:13 +0200] INFO: Processing package[openjdk-6-jdk] action install (java::openjdk line 38)
[Sun, 24 Jun 2012 11:05:31 +0200] INFO: package[openjdk-6-jdk] installed version 6b20-1.9.13-0ubuntu1~10.04.1
[Sun, 24 Jun 2012 11:05:31 +0200] INFO: Processing package[default-jdk] action install (java::openjdk line 38)
[Sun, 24 Jun 2012 11:05:32 +0200] INFO: package[default-jdk] installed version 1.6-34
[Sun, 24 Jun 2012 11:05:32 +0200] INFO: package[default-jdk] not queuing delayed action run on execute[update-java-alternatives] (delayed), as it's already been queued
[Sun, 24 Jun 2012 11:05:32 +0200] INFO: Processing package[tomcat6] action install (tomcat::default line 37)
```

```
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: Processing cookbook_file[/var/lib/tomcat6/webapps/demo.war] action create (webapp::default line 24)
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: cookbook_file[/var/lib/tomcat6/webapps/demo.war] mode changed to 644
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: cookbook_file[/var/lib/tomcat6/webapps/demo.war] created file /var/lib/tomcat6/webapps/demo.war
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: cookbook_file[/var/lib/tomcat6/webapps/demo.war] not queuing delayed action restart on service[tomcat] (delayed), as it's already been queued
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: package[openjdk-6-jdk] sending run action to execute[update-java-alternatives] (delayed)
[Sun, 24 Jun 2012 11:14:47 +0200] INFO: Processing execute[update-java-alternatives] action run (java::openjdk line 30)
[Sun, 24 Jun 2012 11:14:49 +0200] INFO: execute[update-java-alternatives] ran successfully
[Sun, 24 Jun 2012 11:14:49 +0200] INFO: template[/etc/default/tomcat6] sending restart action to service[tomcat] (delayed)
[Sun, 24 Jun 2012 11:14:49 +0200] INFO: Processing service[tomcat] action restart (tomcat::default line 42)
[Sun, 24 Jun 2012 11:14:57 +0200] INFO: service[tomcat] restarted
[Sun, 24 Jun 2012 11:14:57 +0200] INFO: Chef Run complete in 199.030841 seconds
[Sun, 24 Jun 2012 11:14:57 +0200] INFO: Running report handlers
[Sun, 24 Jun 2012 11:14:57 +0200] INFO: Report handlers complete
wolff@wolff-desktop:~/JavaChefVagrantEC2$
```



Hello World!

[Get Environment Info](#)

File Edit Options Buffers Tools Help

```
Vagrant::Config.run do |config|
  config.vm.box = "lucid32"
  config.vm.box_url="http://files.vagrantup.com/lucid32.box"

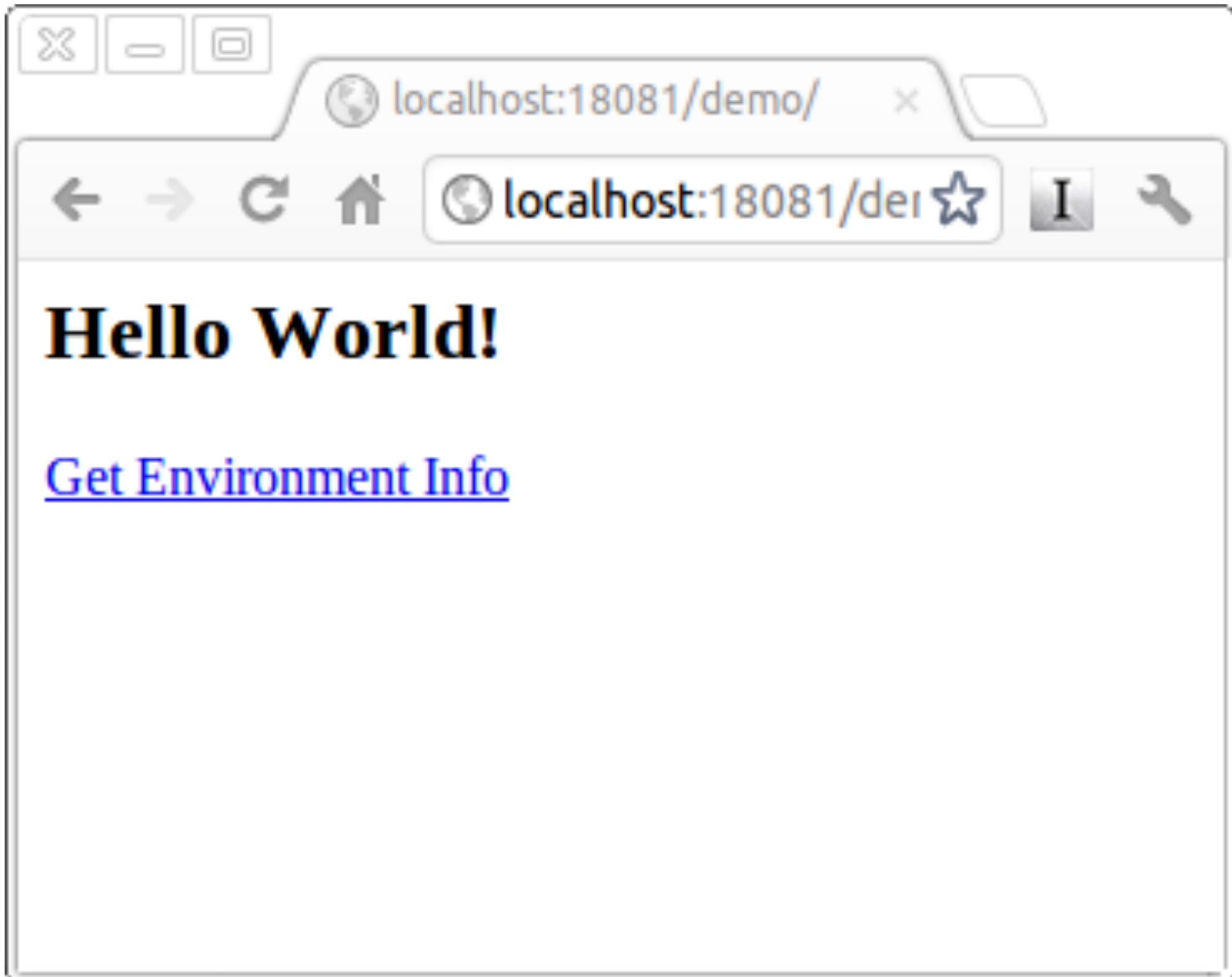
  config.vm.forward_port 8080, 18080
  config.vm.forward_port 8081, 18081

  config.vm.provision :chef_solo do |chef|
    chef.cookbooks_path = ["cookbooks"]
    chef.add_recipe("apt")
    chef.add_recipe("tomcat")
    chef.add_recipe("webapp")
    chef.json.merge!({
      :tomcat => {
        :port => 8081
      },
      :webapp => {
        :webapp => "demo.war"
      }
    })
  end
end
```



```
wolff@wolff-desktop:~/JavaChefVagrantEC2$ vagrant provision
[default] Running provisioner: Vagrant::Provisioners::ChefSolo...
[default] Generating chef JSON and uploading...
[default] Running chef-solo...
stdin: is not a tty
[Sun, 24 Jun 2012 14:29:09 +0200] INFO: *** Chef 0.10.10 ***
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Setting the run_list to ["recipe[apt]",
"recipe[tomcat]", "recipe[webapp]"] from JSON
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Run List is [recipe[apt], recipe[tomcat]
, recipe[webapp]]
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]
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[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get-update] actio
n nothing (apt::default line 22)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get update] actio
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[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing package[update-notifier-commo
n] action install (apt::default line 37)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing execute[apt-get-update-period
ic] action run (apt::default line 41)
```

```
(tomcat::default line 42)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing service[tomcat] action start
(tomcat::default line 42)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing template[/etc/default/tomcat6
] action create (tomcat::default line 63)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing template[/etc/tomcat6/server.
xml] action create (tomcat::default line 72)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat6/server.xml] backed
up to /var/chef/backup/etc/tomcat6/server.xml.chef-20120624142910
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat6/server.xml] mode c
hanged to 644
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat6/server.xml] update
d content
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing cookbook_file[/var/lib/tomcat
6/webapps/demo.war] action create (webapp::default line 24)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: template[/etc/tomcat6/server.xml] sendin
g restart action to service[tomcat] (delayed)
[Sun, 24 Jun 2012 14:29:10 +0200] INFO: Processing service[tomcat] action restar
t (tomcat::default line 42)
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: service[tomcat] restarted
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Chef Run complete in 7.695542 seconds
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Running report handlers
[Sun, 24 Jun 2012 14:29:17 +0200] INFO: Report handlers complete
wolff@wolff-desktop:~/JavaChefVagrantEC2$
```



Hello World!

[Get Environment Info](#)

Cloud Foundry



Cloud with Java in Practice

Eberhard Wolff
Architecture and Technology Manager
adesso AG



Amazon Elastic Beanstalk



PaaS Platform as a Service



How Is Cloud Different?

Availability

- Individual servers might fail
- System must survive failure of individual nodes
- E.g. NoSQL databases
- E.g. no state on web servers
- But: Multiple data center
- End result: Very high availability

Scaling

- Pay-as-you-Go on Public Cloud
- Sizing not for maximum load
- Need to start / stop servers depending on load
- I.e. deliver software as VM Images
- ...or automated installations

PaaS Problems

- Pre-defined package
- E.g.: what about Oracle database
- Limited tuning
- PaaS strength: easy deployment
- Can we have easy deployment and more flexibility?

Google App Engine



Chef

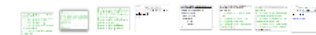
Chef server
Chef-based Chef
Chef client

Resource
Provider Policy

Recipes

<http://bit.ly/ospcode-opentraining>

Vagrant



3.– 6. September 2012
in Nürnberg



Herbstcampus

Wissenstransfer
par excellence

Vielen Dank!

Eberhard Wolff

adesso AG