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shaping tomorrow with you

Development and Operations: Continuous Delivery in Practice

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at Fujitsu EST

Enchantée

- Studied computer science in Aachen, Germany
- Majored in Human-Computer Interaction
  - Tangible Interaction on Tabletops
- PhD at Université Paris Sud, France
  - Information visualization for astrophysicists
- 6 month Post-doc at Télécom ParisTech, France
- 2 year Post-doc at LMU University, Munich, Germany
- Now UX-researcher at Fujitsu Enabling Software Technology

Find more projects on www.ux-designer.in

Fujitsu Enabling Software Technology

http://www.fujitsu.com/

FUJITSU Enabling Software Technology GmbH

- **Headquarter: Munich**
- **Founded in 2002, acquisition from BMW/Softlab**
- **Subsidiary of Fujitsu Ltd. Japan**
- **Global development center**
  - *45 employees*
  - *Joint development with Japan, USA, India, Poland*
- **UX team**
  - *User studies in collaboration with Japan*
  - *Teaching user-centered design practices*
  - *Implementation in collaboration with technical teams*
- **Main Expertise**
  - *Cloud integration and PaaS*
  - *Enterprise Stores / Hybrid Cloud Management*

Overview

- Part 1: Cloud Computing Basics
  - What is a cloud? Cloud service stack? …and what does Fujitsu contribute to the stack?
  - Why are businesses interested in using the cloud?
- Part 2: Deployment basics
- Part 3: DevOps
  - What is DevOps?
  - What is the goal? What is Continuous delivery?
  - The PICCO team as an example DevOps culture.
  - Why did we choose to use Angular over Polymer?
- Part 4: Let’s get your code deployed on Bluemix.

Part 1: Some Cloud Computing basics

Question: Which cloud services do YOU use?

Cloud Computing

- Focus primarily on services, rather than technology.
- cloud services that are made up of orchestrated technology and/or application
- Cloud services can be sourced from internal IT teams or third parties providing private or public clouds.
- Future for many organizations will involve hybrid clouds.
- Service users can place service requests via self-service and are billed for what they use.

Quelle: Gartner, Technology Research. www. Gartner.com

Why are businesses interested in using the cloud?

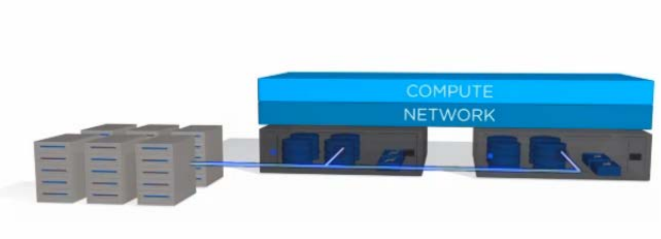
Cloud Business Perspective

- Small companies outsource the IT team to save money.
  - No infrastructure
  - No need for operations (monitoring and maintaining)
  - However, your data is not in your had. Would a bank host services on google?
- Larger companies demand on premise clouds for security reasons.
  - Virtualization (**efficient** use of ‘ingredients’ (storage, processing power, etc.))
    - Abstract, pool and automate
  - Automation (eliminating manual human effort)

Virtualization: abstract, pool, automate

- Step 1: Virtualize Compute resources
- Step 2: Virtualize Network and make available to the compute layer for on-demand consumption.
- Step 3: Virtualize Storage area network.

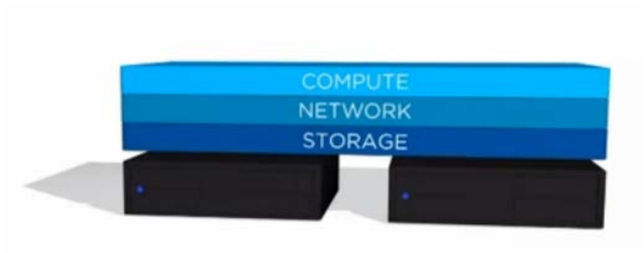
VM
VM
VM
vSphere



COMPUTE
NETWORK
STORAGE

http://www.vmware.com/products/datacenter-virtualization.html

Automate



MANAGEMENT - AUTOMATION
COMPUTE
NETWORK
STORAGE
EFFICIENCY

- Increase resource utilization
- Dynamically allocating resources to apps and services

http://www.vmware.com/products/datacenter-virtualization.html

Virtualization – **efficient** use of resources

Without

- 20 servers
- 20% usage

- Manual setup

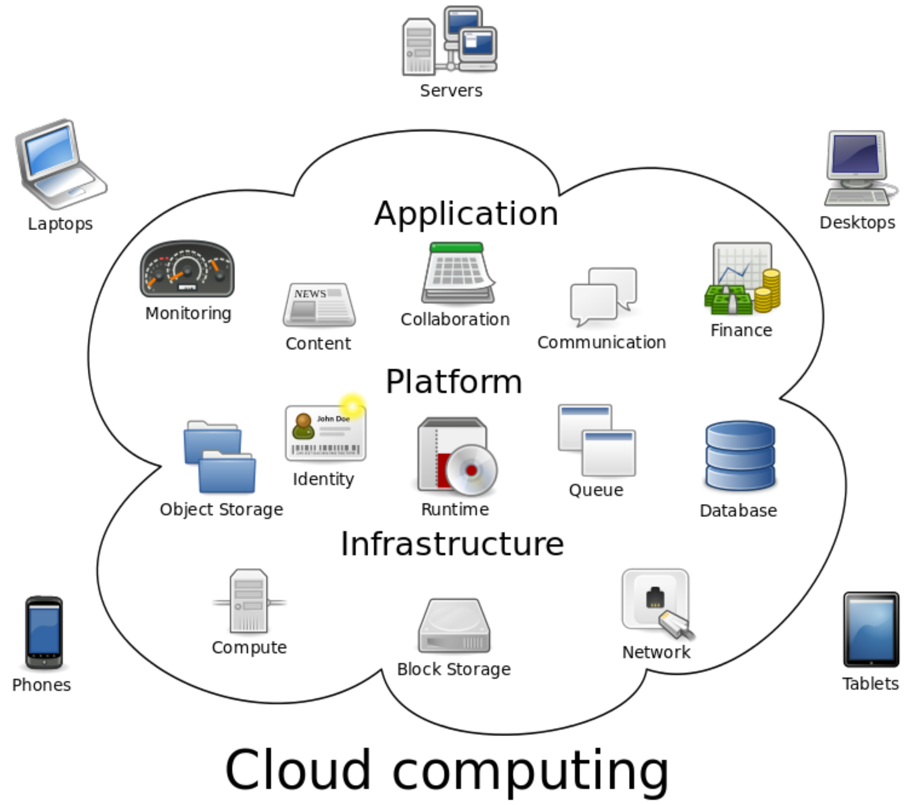
With

- 5 servers
- 80% usage

- Automatic setup

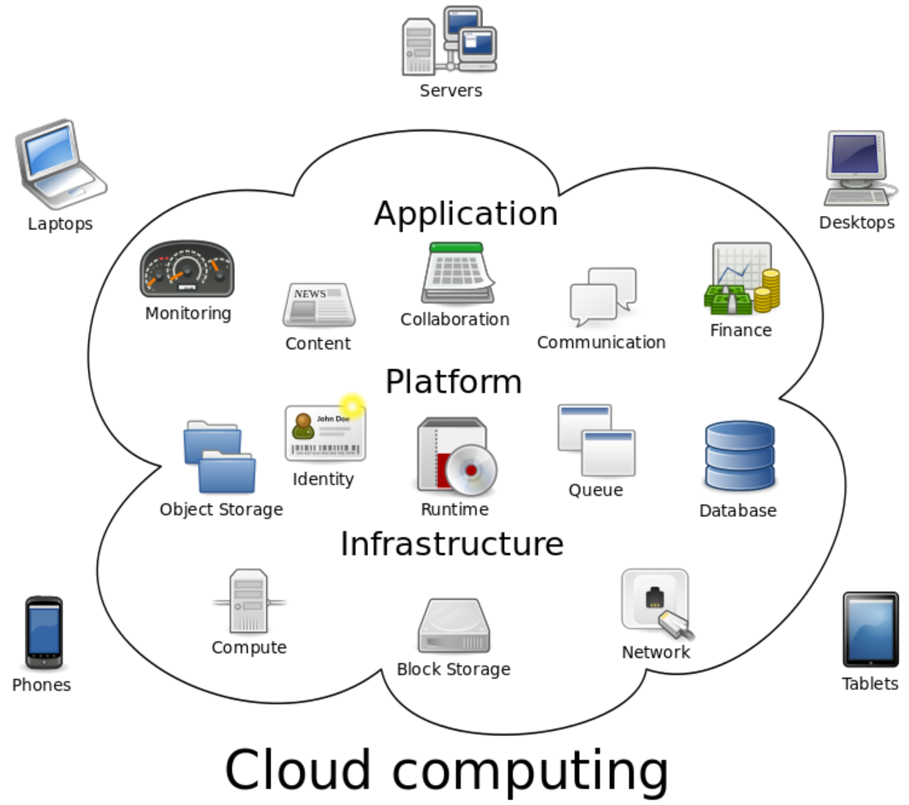
Cloud Computing Service stack

- Infrastructure as a Service
  - Fujitsu's Infrastructure Manager (UX field studies in Datacenter)
- Platform as a Service
- Software as a Service: gives costumers access to software and online storage via remote servers.



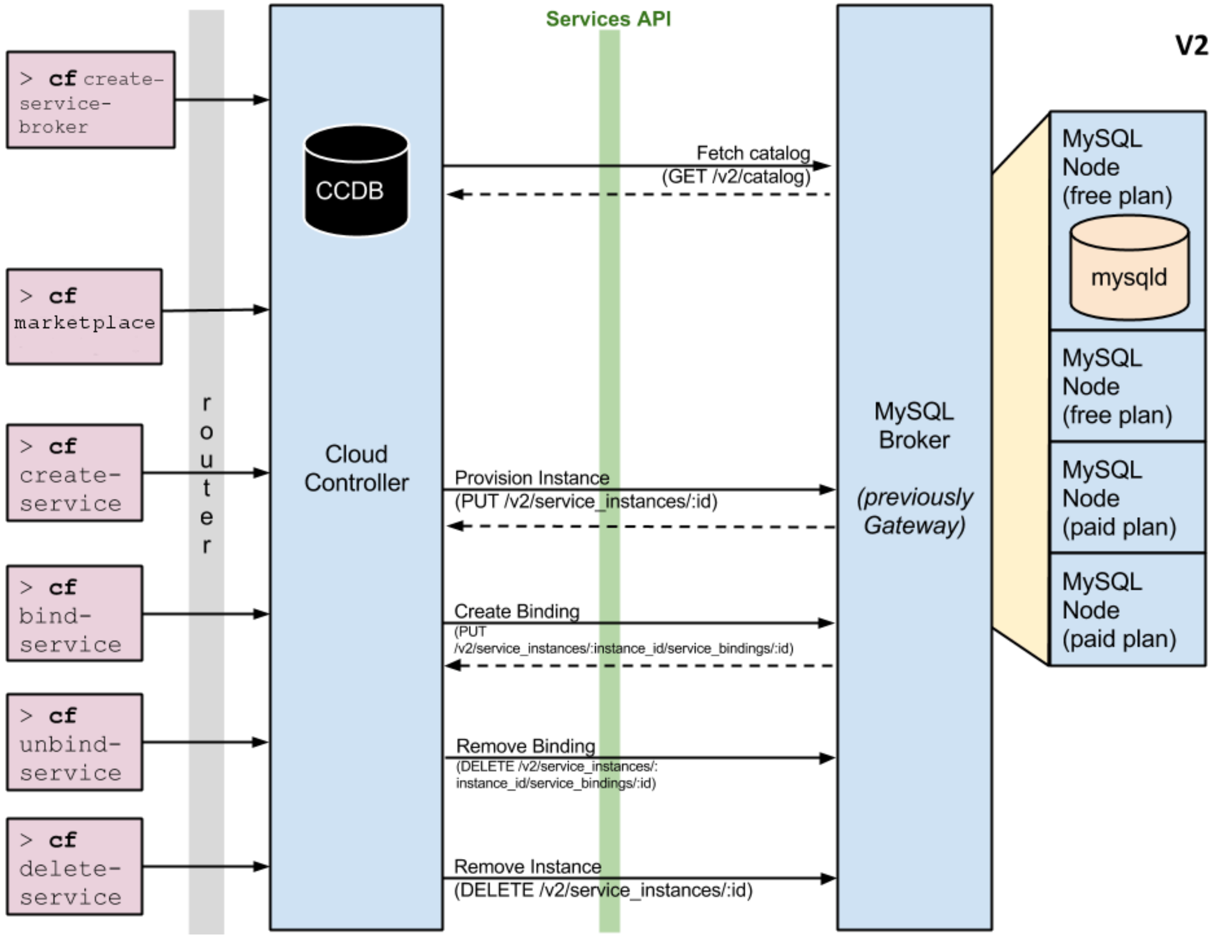
Cloud Computing Protocols

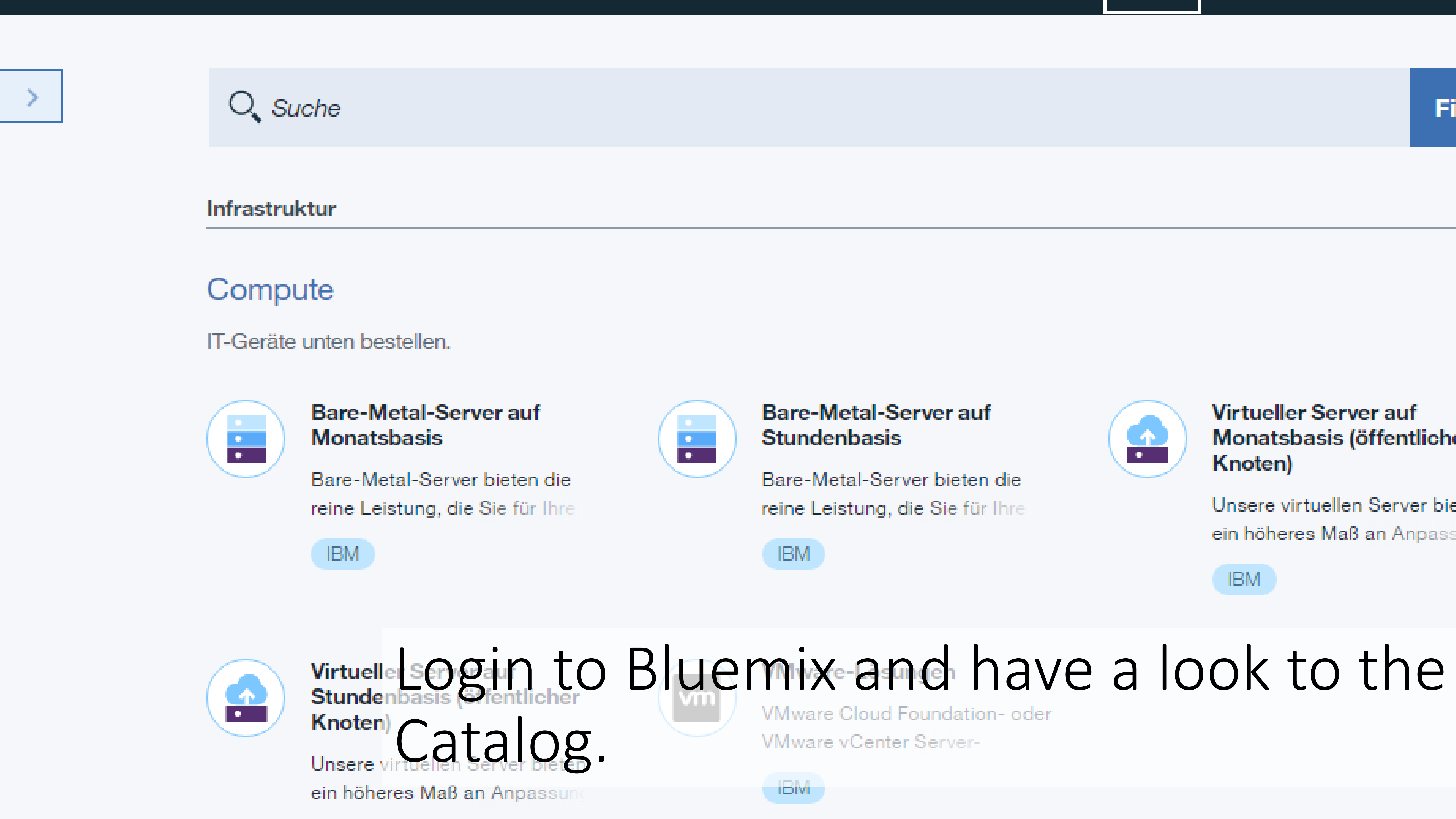
- TOSCA: between infrastructure and platform
- Cloud Foundry: between platform and application



Cloud Foundry – Service Brokers

- Industry standard for Cloud Applications
- When a developer provisions and binds a service to an application, the service broker for that service is responsible for providing the service instance.





Suche

Fi

Infrastruktur

Compute

IT-Geräte unten bestellen.

Bare-Metal-Server auf Monatsbasis

Bare-Metal-Server bieten die reine Leistung, die Sie für Ihre

IBM

Bare-Metal-Server auf Stundenbasis

Bare-Metal-Server bieten die reine Leistung, die Sie für Ihre

IBM

Virtueller Server auf Monatsbasis (öffentliche Knoten)

Unsere virtuellen Server bie ein höheres Maß an Anpass

IBM

Virtueller Server auf Stundenbasis (öffentlicher Knoten)

Unsere virtuellen Server bieten ein höheres Maß an Anpassun

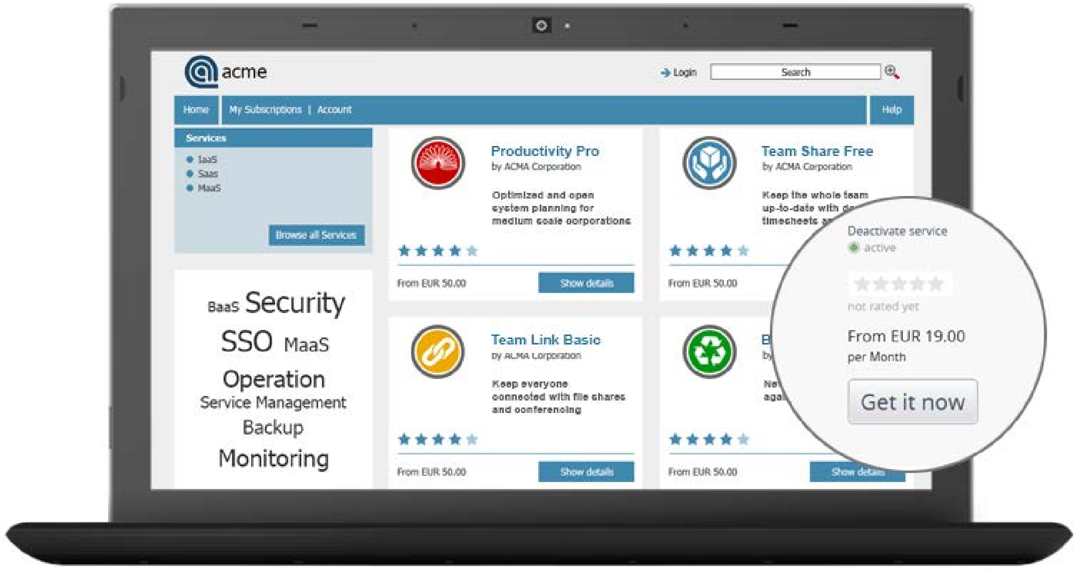
VMware-Lösungen

VMware Cloud Foundation- oder VMware vCenter Server-

IBM

Login to Bluemix and have a look to the Catalog.

EST Product 1: Open service catalog manager

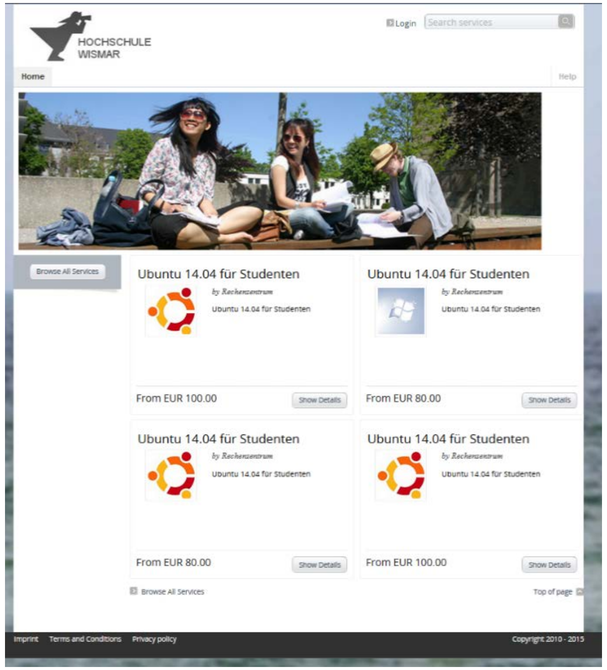


Optimized and open system planning for medium scale corporations

Keep the whole team up-to-date with de timesheets a

Keep everyone connected with file shares and conferencing

Example OSCM interface



Case Study: Booking VMs or database services for students of a course. Delete after time elapsed.

Private vs. public cloud vs. hybrid cloud

- Behind a firewall, fenced-in
- Dedicated specific resources
- Single-tenant

- Offers range of services to multiple clients on shared infrastructure
- E.g. Google drive, iCloud, Dropbox
- Multi-tenant

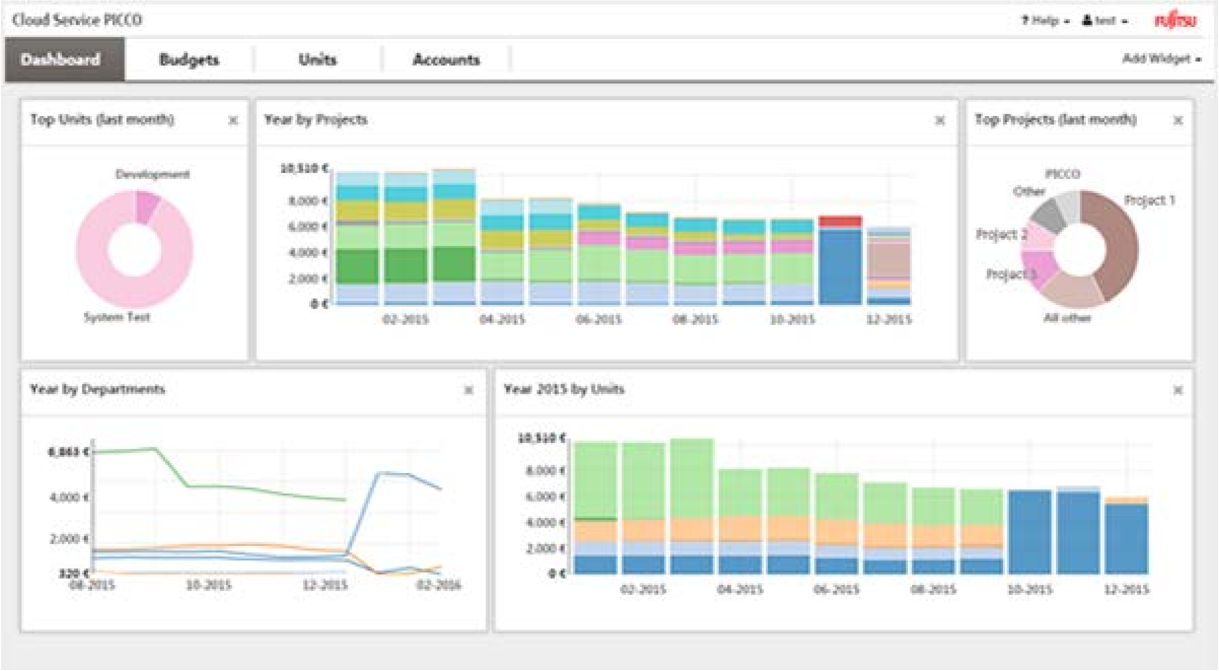
- Combines scalability with security
- Combination of both

Pay-for-use model for cloud computing

- Service over the Internet
- delivery of on-demand computing resources, from application to datacenter on pay-for-use basis.
- Private Cloud Computing: Client owns or leases hardware and provides the consumption model (keep track of cross-department services).
- Public cloud computing: users **pay for resources based on usage**.

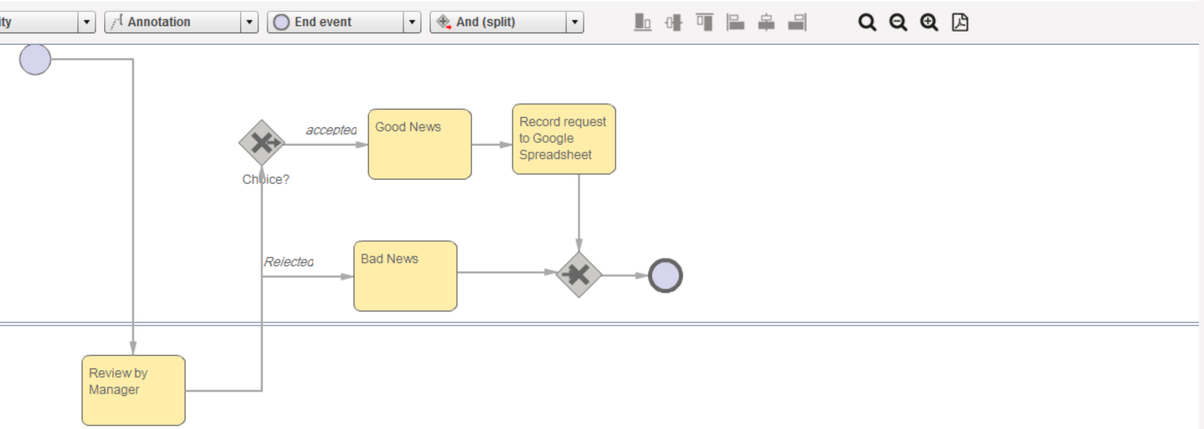
EST Product 2: Cloud Service PICCO

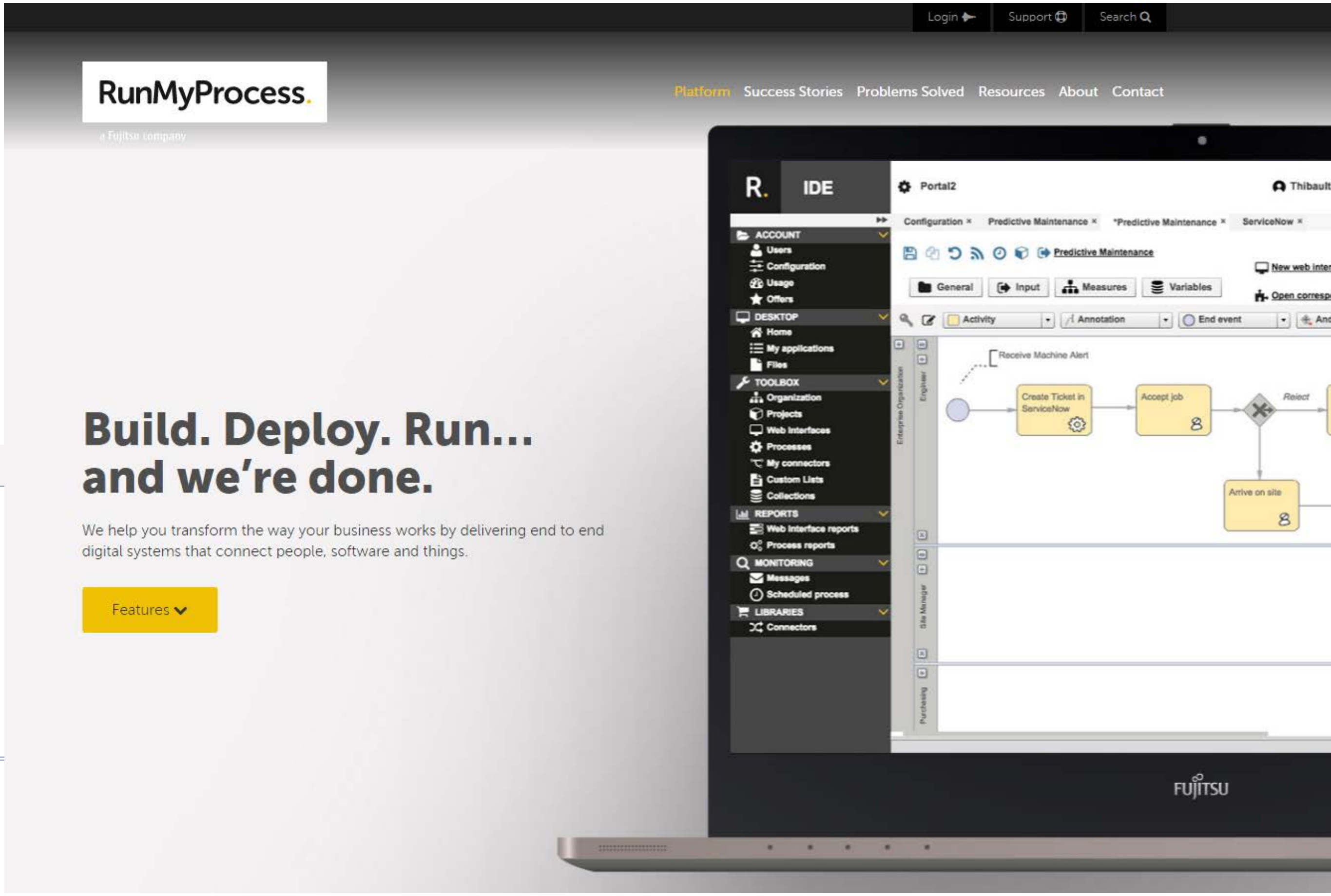
- Makes cloud costs (usage) transparent.
- Several users:
  - Administration: budget-forecasts
  - Manager: Cost overview
  - Developer: feedback if service behaves correctly



EST Product 3: RunMyProcess

- Visual programming of processes.
- Example: Vacation request





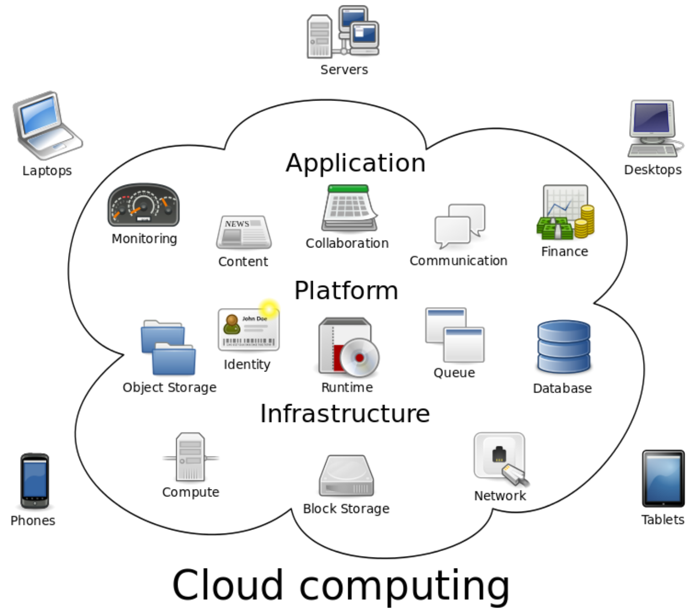
Build. Deploy. Run… and we're done.

We help you transform the way your business works by delivering end to end digital systems that connect people, software and things.

Features

Summary

- Cloud infrastructure management
- Cloud Computing Service stack
- Cloud Foundry as a protocol



Part 2: Some deployment basics

What is Docker?

- Executable binary, run by the host OS under a set of restrictions (e.g. process isolation).
- Kernel supported ability to run executables under strict restrictions.
- Docker is one of many container technologies
- Popular for the repository (Docker Hub) and management tools, extremely easy to work with.

Docker images vs. Containers

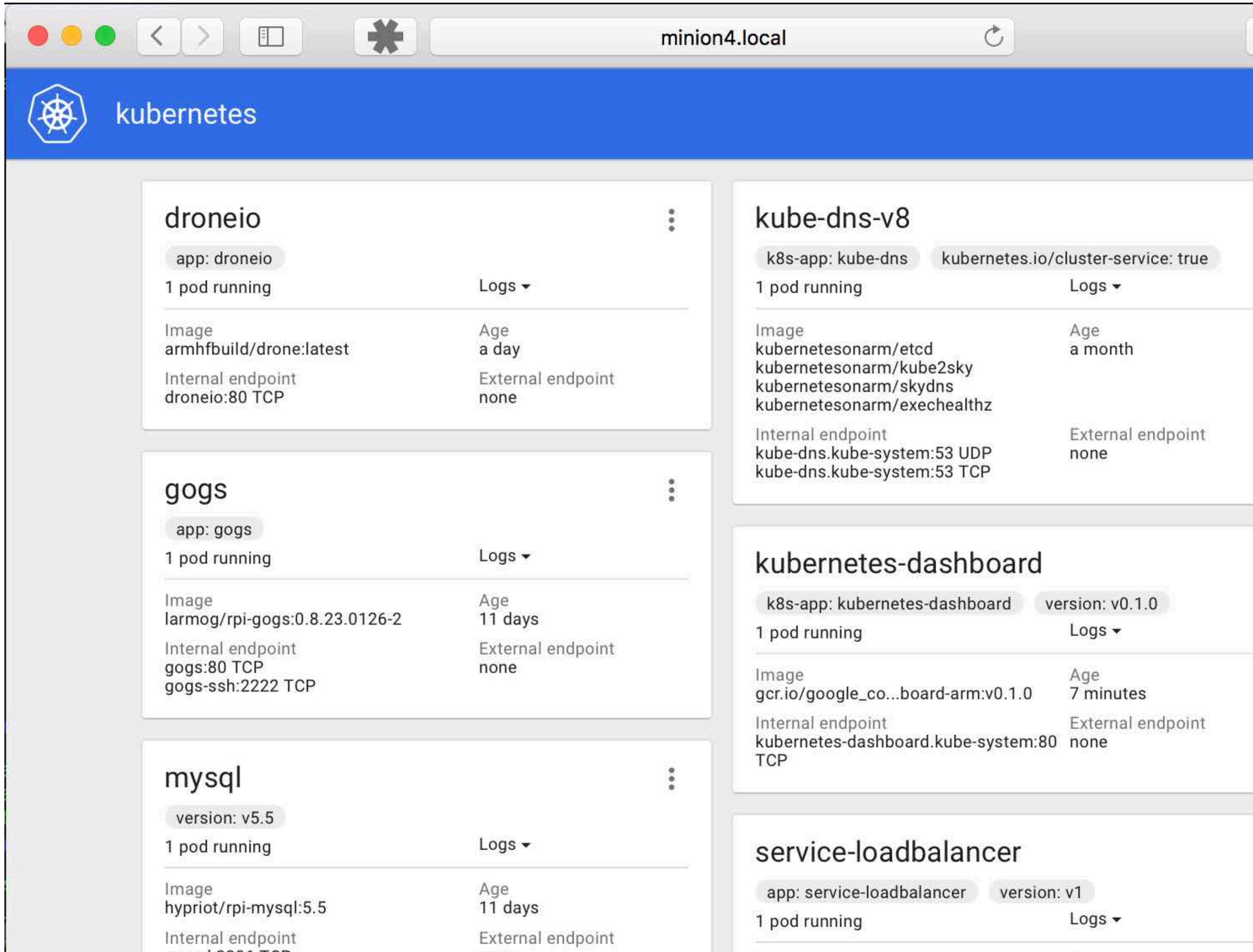
- Image: Immutable file that is essentially a snapshot of a container.
- Container: lightweight and portable encapsulations of an environment in which to run applications, Process running in a restricted mode.
- Turn image into container: Docker engine takes image, add read-write file system on top, initializes settings (ports, container name, ID and resource limits)
- What is the advantage of using containers?

Container management

- Deploy, manage and run application components
- Providers: Bluemix, google cloud, Amazon web service
- Several infrastructure compute technologies: Docker containers, OpenStack virtual machines, Cloud Foundry apps.
- Monitoring of the environment

EST Activity 4: Kubernetes Dashboard

- Contribution to a Dashboard for Kubernetes Container Management.



droneio

app: droneio

1 pod running — Logs ▾

Image
armhfbuild/drone:latest

Age
a day

Internal endpoint
droneio:80 TCP

External endpoint
none

gogs

app: gogs

1 pod running — Logs ▾

Image
larmog/rpi-gogs:0.8.23.0126-2

Age
11 days

Internal endpoint
gogs:80 TCP
gogs-ssh:2222 TCP

External endpoint
none

mysql

version: v5.5

1 pod running — Logs ▾

Image
hypriot/rpi-mysql:5.5

Age
11 days

Internal endpoint

External endpoint

kube-dns-v8

k8s-app: kube-dns — kubernetes.io/cluster-service: true

1 pod running — Logs ▾

Image
kubernetesonarm/etcd
kubernetesonarm/kube2sky
kubernetesonarm/skydns
kubernetesonarm/exechealthz

Age
a month

Internal endpoint
kube-dns.kube-system:53 UDP
kube-dns.kube-system:53 TCP

External endpoint
none

kubernetes-dashboard

k8s-app: kubernetes-dashboard — version: v0.1.0

1 pod running — Logs ▾

Image
gcr.io/google_co...board-arm:v0.1.0

Age
7 minutes

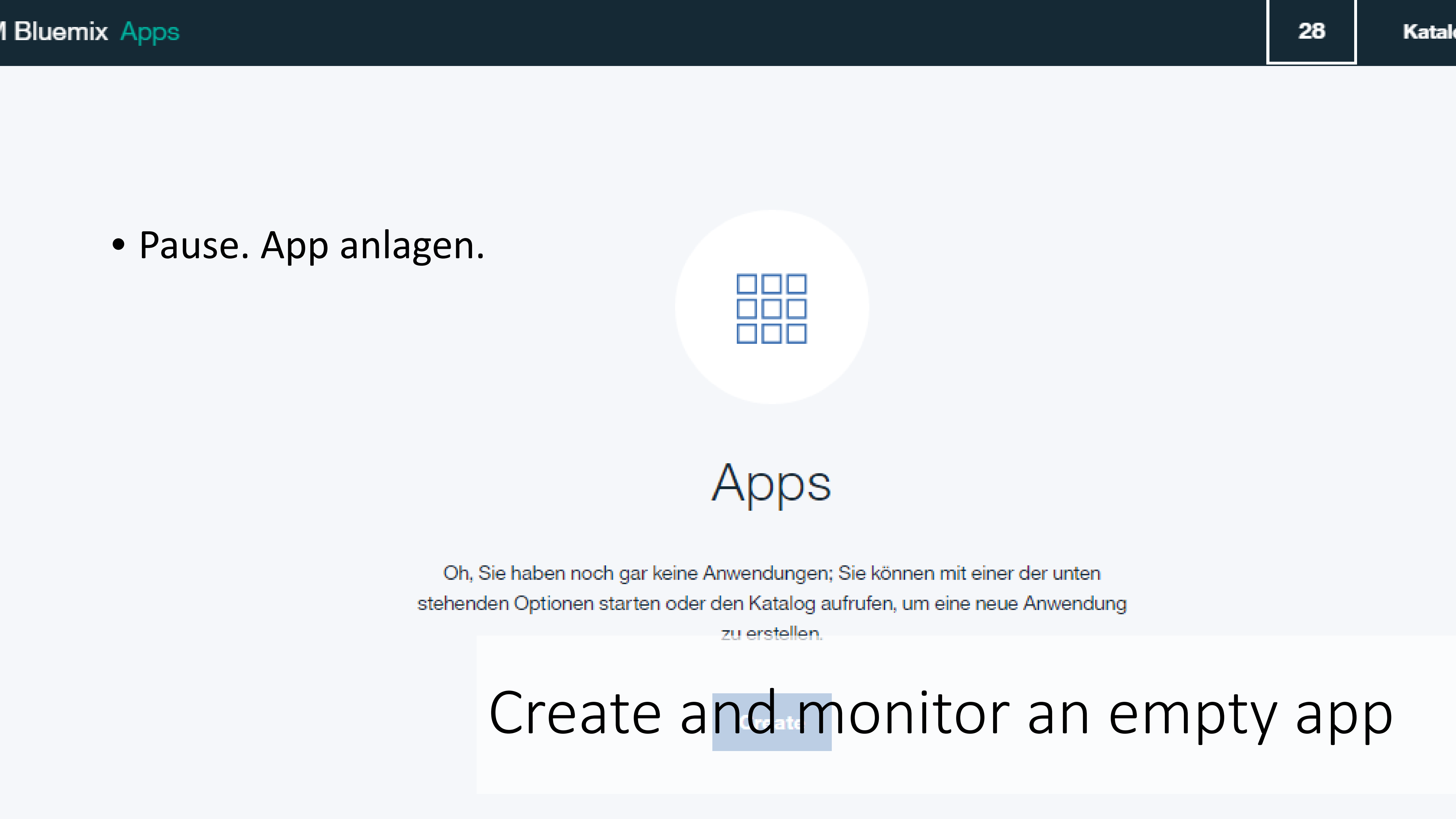
Internal endpoint
kubernetes-dashboard.kube-system:80 TCP

External endpoint
none

service-loadbalancer

app: service-loadbalancer — version: v1

1 pod running — Logs ▾

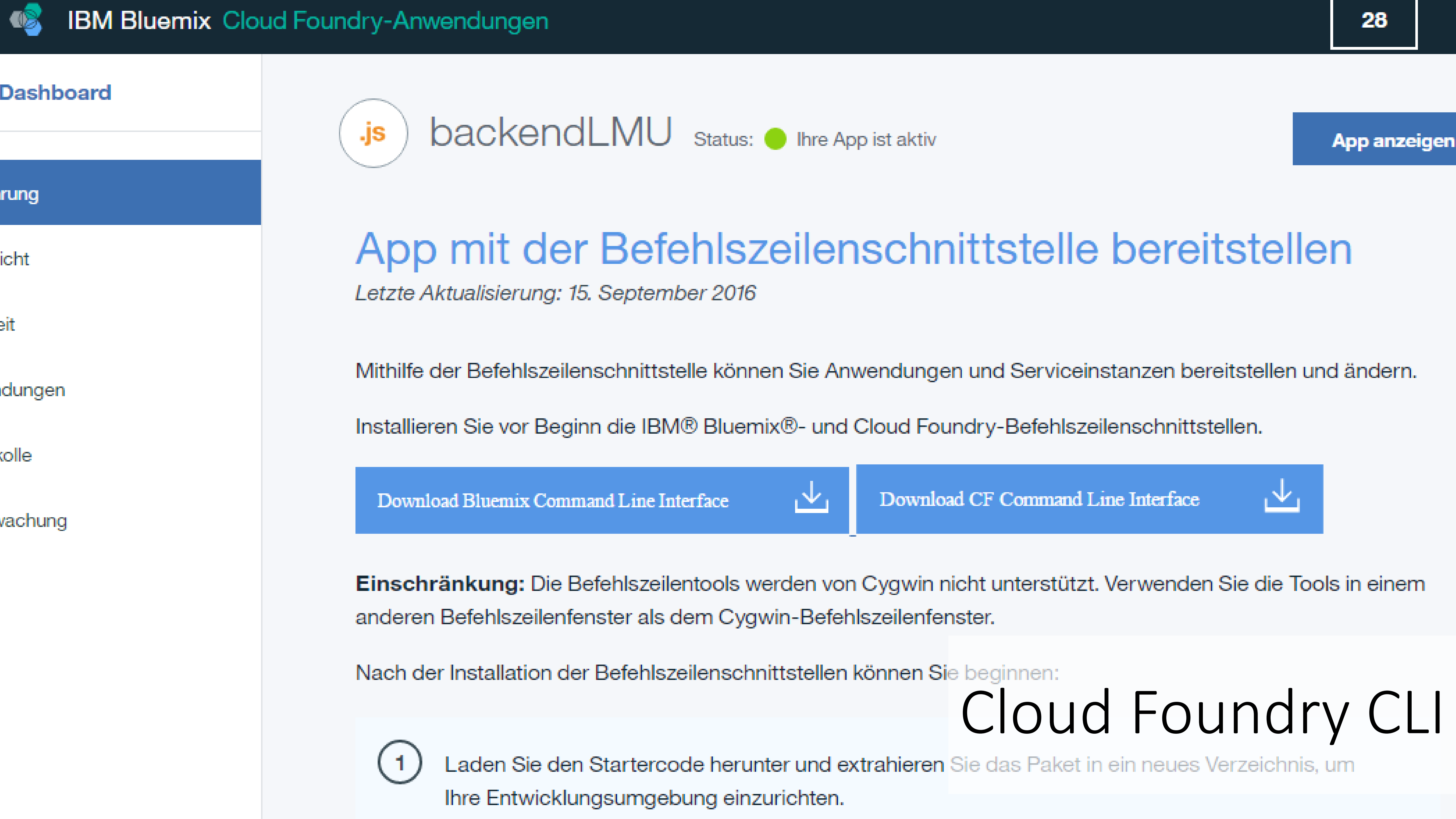


- Pause. App anlagen.

Apps

Oh, Sie haben noch gar keine Anwendungen; Sie können mit einer der unten stehenden Optionen starten oder den Katalog aufrufen, um eine neue Anwendung zu erstellen.

Create and monitor an empty app


IBM Bluemix Cloud Foundry-Anwendungen
Dashboard
rung
icht
eit
dungen
kolle
wachung
.js
App anzeigen
Download Bluemix Command Line Interface
Download CF Command Line Interface

backendLMU Status: ● Ihre App ist aktiv

App mit der Befehlszeilenschnittstelle bereitstellen

Letzte Aktualisierung: 15. September 2016

Mithilfe der Befehlszeilenschnittstelle können Sie Anwendungen und Serviceinstanzen bereitstellen und ändern.

Installieren Sie vor Beginn die IBM® Bluemix®- und Cloud Foundry-Befehlszeilenschnittstellen.

Einschränkung: Die Befehlszeilentools werden von Cygwin nicht unterstützt. Verwenden Sie die Tools in einem anderen Befehlszeilenfenster als dem Cygwin-Befehlszeilenfenster.

Nach der Installation der Befehlszeilenschnittstellen können Sie beginnen:

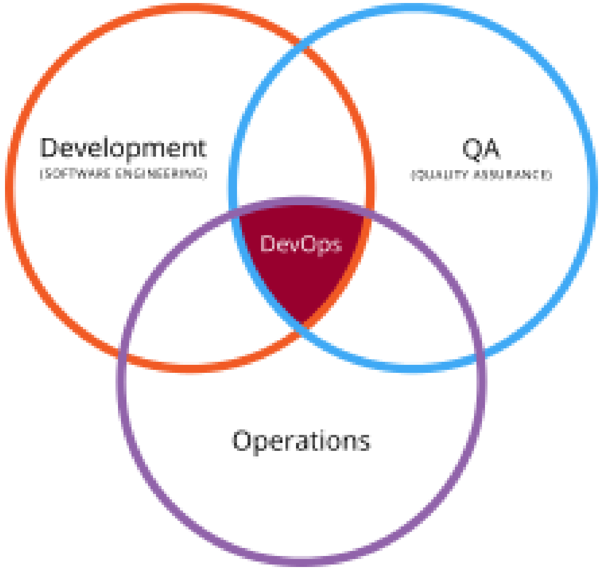
1 Laden Sie den Startercode herunter und extrahieren Sie das Paket in ein neues Verzeichnis, um Ihre Entwicklungsumgebung einzurichten.

Cloud Foundry CLI

Part 3: What is DevOps

DevOps

- Intersection between development, QA and operations
  - Coding and deployment in isolation, error prone.
- A culture
- Requires a different way of team collaboration
- With the goal
  - of delivering Software in a certain timespan
  - of making Software products more robust
- Requires various tools and team-routines



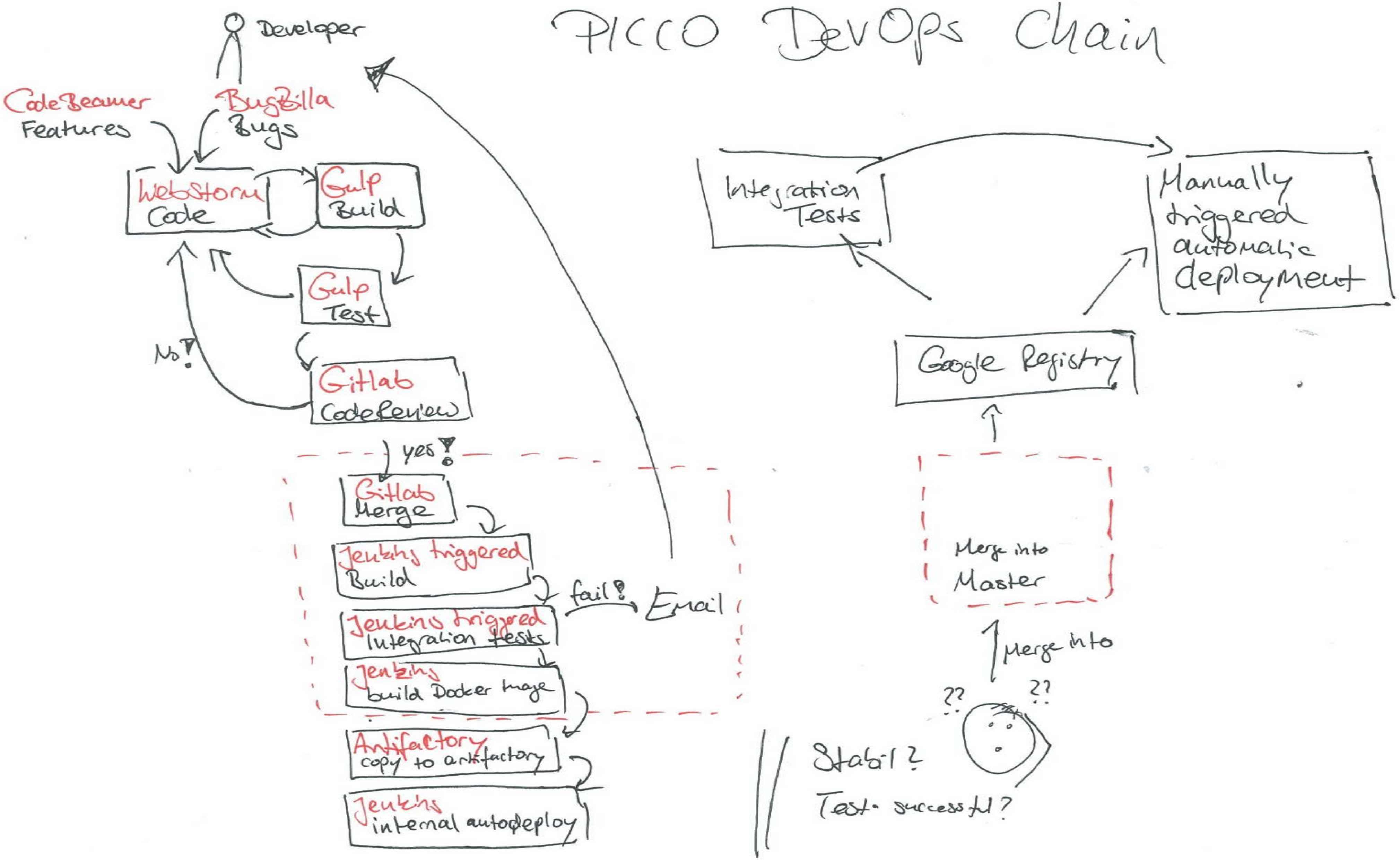
https://en.wikipedia.org/wiki/DevOps

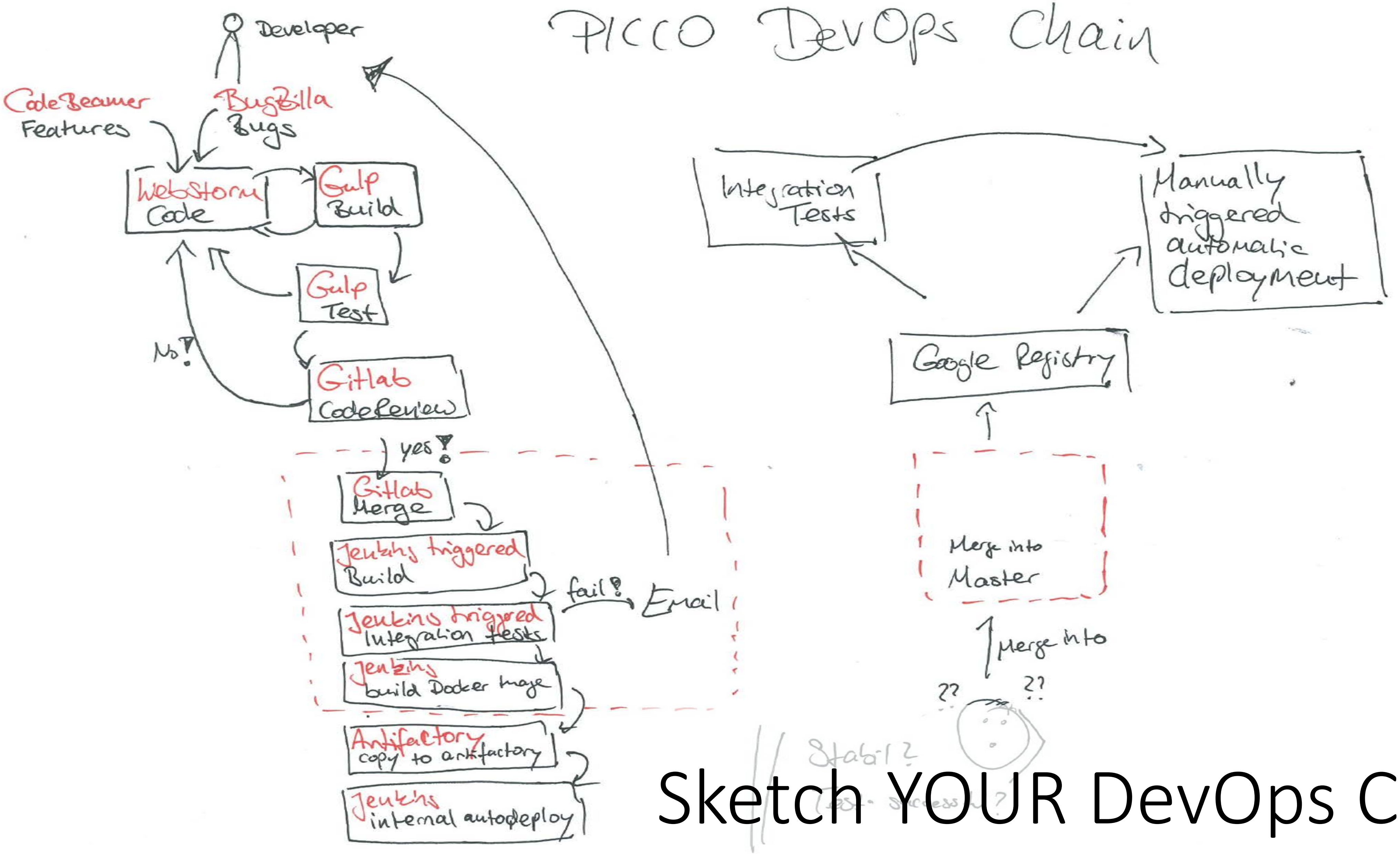
What is the average time between deployments at Amazon?

Continuous Delivery (CD)

- Software engineering approach
- Software product in short development cycles
- Software can be reliably released at any time
- Build, test and release software faster and more frequent
  - “when you integrate your code more frequently, the possibility of having a misunderstanding that might lead to a build-breaking problem became less common.” (Kyle Brown, CTO at IBM)
  - Instead of a stressful ‘big bang’ release, frequent and small releases.

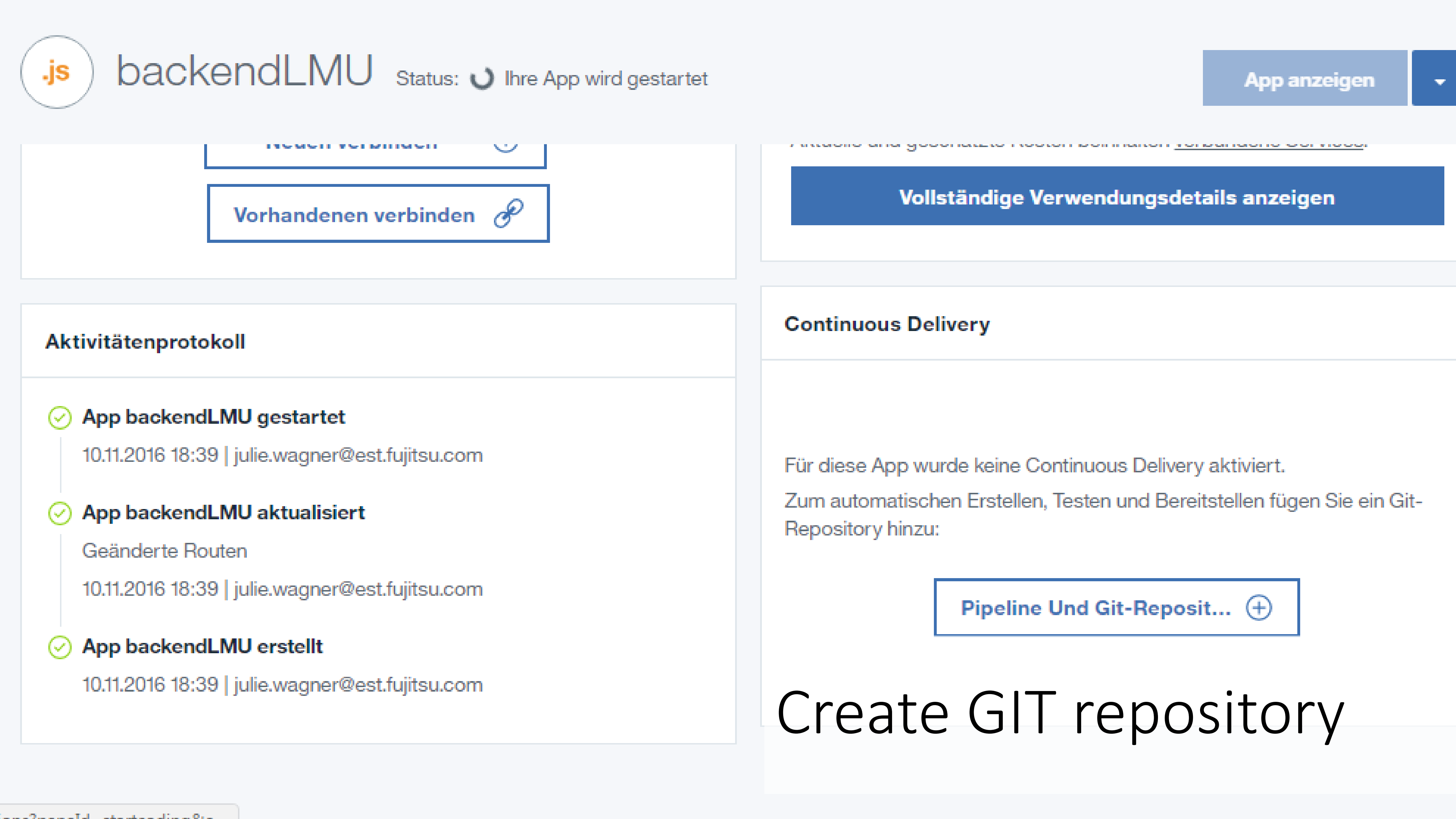
PICCO DevOps Chain





Sketch YOUR DevOps Chain

Part 4: Deployment



backendLMU Status: Ihre App wird gestartet

Aktuelle und geschätzte Kosten beinhalten verbundene Services.

Aktivitätenprotokoll

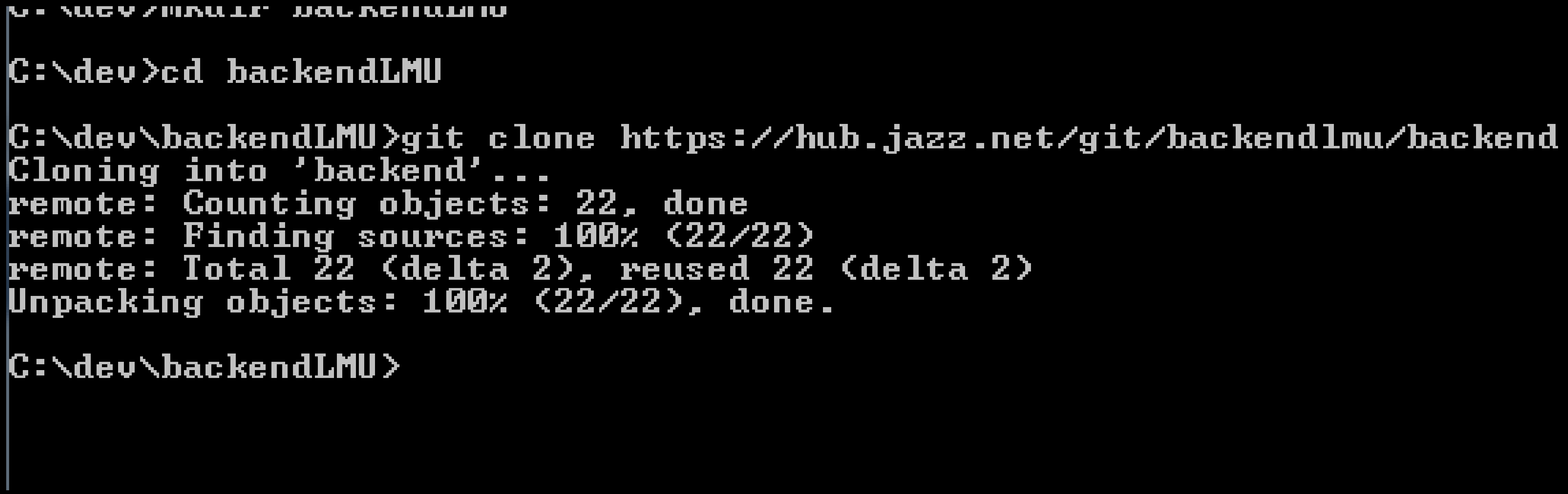
- ✓ **App backendLMU gestartet**
  10.11.2016 18:39 | julie.wagner@est.fujitsu.com
- ✓ **App backendLMU aktualisiert**
  Geänderte Routen
  10.11.2016 18:39 | julie.wagner@est.fujitsu.com
- ✓ **App backendLMU erstellt**
  10.11.2016 18:39 | julie.wagner@est.fujitsu.com

Continuous Delivery

Für diese App wurde keine Continuous Delivery aktiviert.

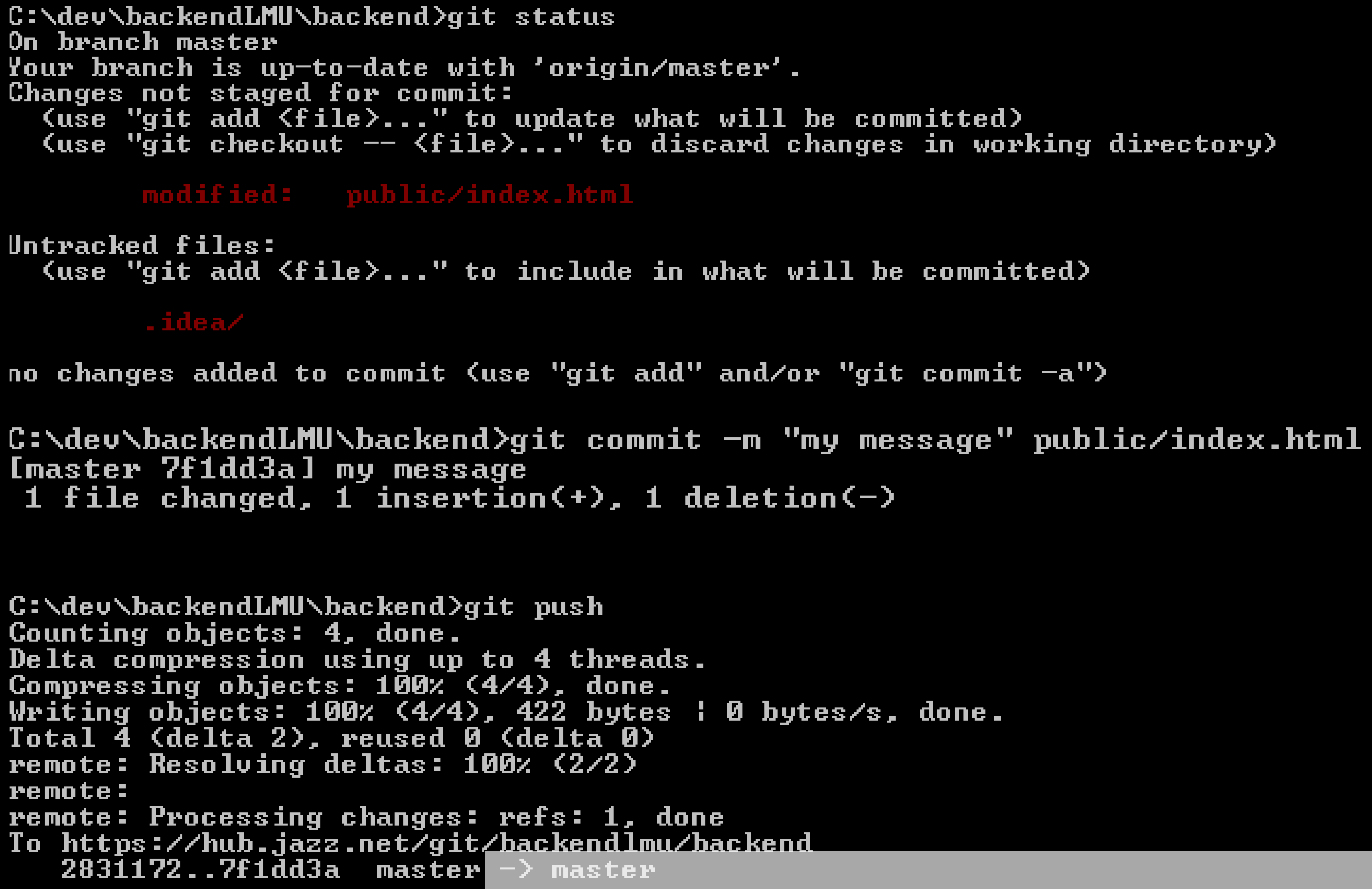
Zum automatischen Erstellen, Testen und Bereitstellen fügen Sie ein Git-Repository hinzu:

Create GIT repository



```
C:\dev>mkdir backendLMU

C:\dev>cd backendLMU

C:\dev\backendLMU>git clone https://hub.jazz.net/git/backendlmu/backend
Cloning into 'backend'...
remote: Counting objects: 22, done
remote: Finding sources: 100% (22/22)
remote: Total 22 (delta 2), reused 22 (delta 2)
Unpacking objects: 100% (22/22), done.

C:\dev\backendLMU>
```

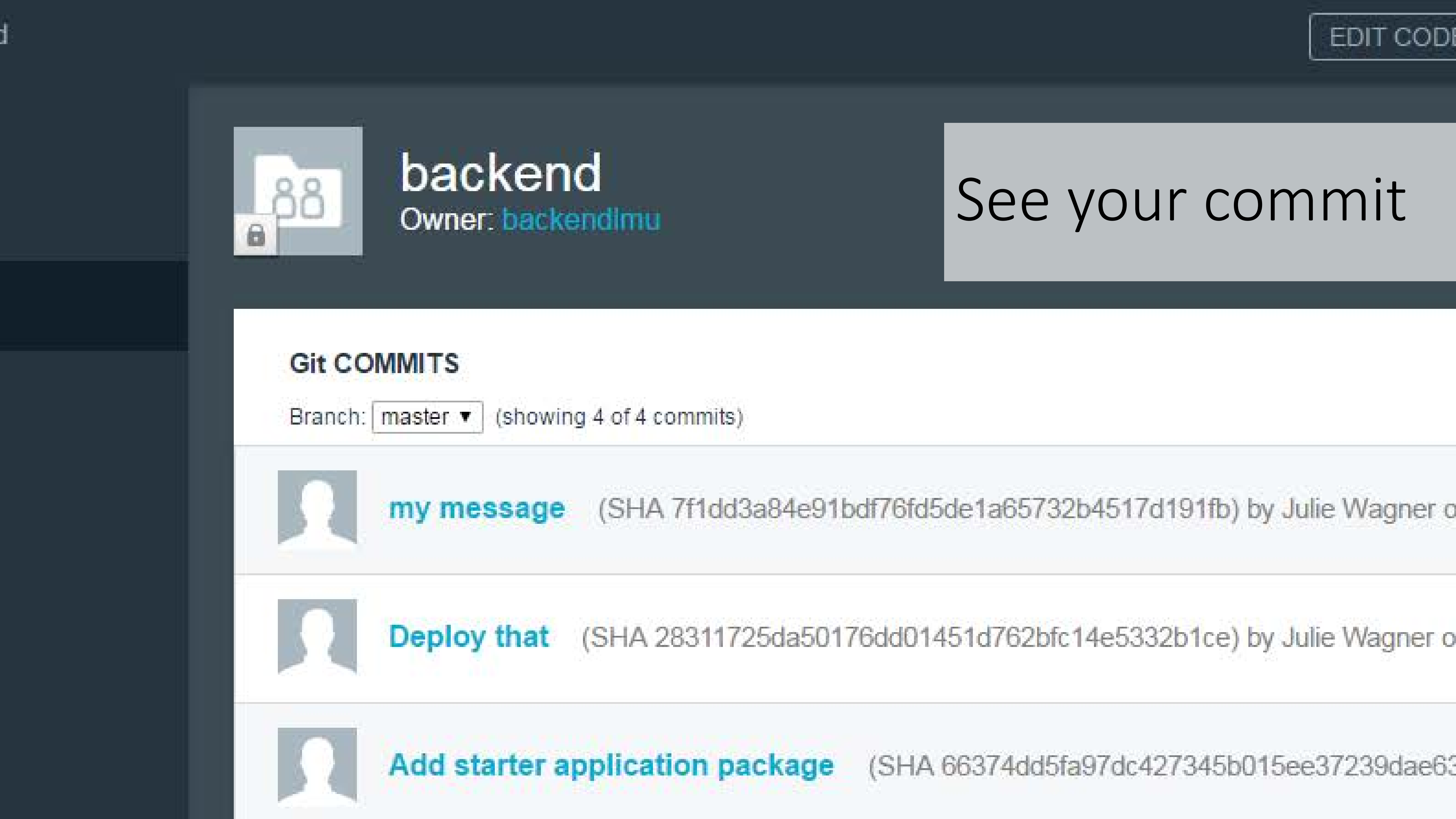
Clone GIT repository



```
C:\dev\backendLMU\backend>git status
On branch master
Your branch is up-to-date with 'origin/master'.
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   public/index.html

Untracked files:
  (use "git add <file>..." to include in what will be committed)

        .idea/

no changes added to commit (use "git add" and/or "git commit -a")

C:\dev\backendLMU\backend>git commit -m "my message" public/index.html
[master 7f1dd3a] my message
 1 file changed, 1 insertion(+), 1 deletion(-)



C:\dev\backendLMU\backend>git push
Counting objects: 4, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 422 bytes | 0 bytes/s, done.
Total 4 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2)
remote:
remote: Processing changes: refs: 1, done
To https://hub.jazz.net/git/backendlmu/backend
   2831172..7f1dd3a  master -> master
```

Change, commit and push your code

See your commit



backend
Owner: backendlmu

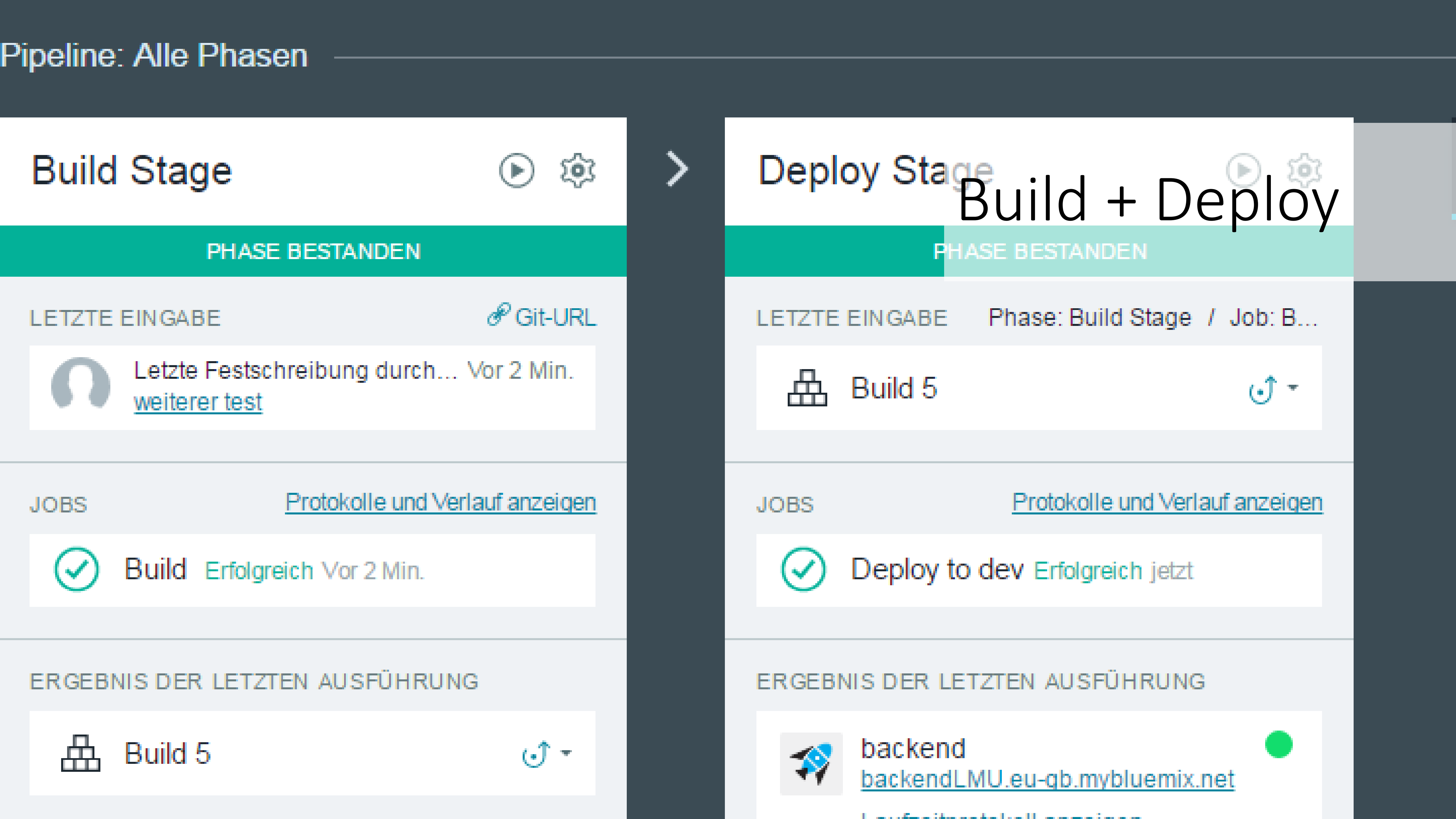
Git COMMITS

Branch: master ▾ (showing 4 of 4 commits)

my message (SHA 7f1dd3a84e91bdf76fd5de1a65732b4517d191fb) by Julie Wagner o

Deploy that (SHA 28311725da50176dd01451d762bfc14e5332b1ce) by Julie Wagner o

Add starter application package (SHA 66374dd5fa97dc427345b015ee37239dae63



Build + Deploy

Pipeline: Alle Phasen

Build Stage

PHASE BESTANDEN

LETZTE EINGABE — Git-URL

Letzte Festschreibung durch… Vor 2 Min.
weiterer test

JOBS — Protokolle und Verlauf anzeigen

✓ Build Erfolgreich Vor 2 Min.

ERGEBNIS DER LETZTEN AUSFÜHRUNG

Build 5

Deploy Stage

PHASE BESTANDEN

LETZTE EINGABE — Phase: Build Stage / Job: B…

Build 5

JOBS — Protokolle und Verlauf anzeigen

✓ Deploy to dev Erfolgreich jetzt

ERGEBNIS DER LETZTEN AUSFÜHRUNG

backend ●
backendLMU.eu-gb.mybluemix.net

What else?

Organize your Software Development

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