

# **Web Services: Pilot for PaaS Web Application Hosting**

Web application hosting made easy

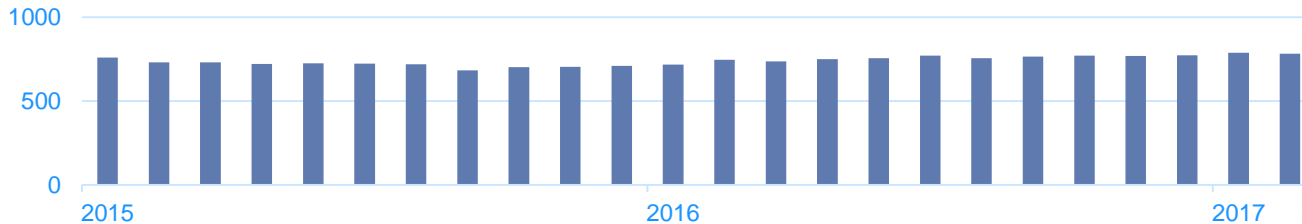
**Alex Lossent  
IT-CDA-WF**

# Context

- **Long-standing challenge for Central Web Hosting**



- Could only offer a limited selection of libraries and web frameworks
- Leading to many “stand-alone” web servers for Web Applications



External firewall:  
web servers  
(from Security team)

- **Containers popularity on the rise**

- Cf. CERN Cloud Service Update



kubernetes

- **“Platform-as-a-Service” approach for some new services**

- E.g. Continuous Integration with Jenkins



Jenkins

- **Web Hosting and Version Control Systems now in same OU**

- Opportunities to better integrate web hosting and tools for developers



# Containers for Web Hosting

- **Next-generation web hosting technology**



- Openshift container orchestration platform
- A distribution of Kubernetes optimized for web application hosting

- **In production since H1 2016**

- Continuous Integration with Jenkins (June 2016)
- Web Applications for internal use in IT-CDA
- New services



- **And used extensively to prototype possible future services**

- Saving time compared to deploying VMs



# Opening the platform to public use

- **Goal: reduce the need for dedicated web servers**
  - Consolidate on central Web Services infrastructure
- **Platform as a Service for custom web applications**
  - **Fast deployment** of custom Web Applications based on a range of programming languages
  - With **full control** on framework version, libraries etc.
  - **GitLab integration** with support for various environments (staging...)
  - **Automation of deployments** and rollbacks
- **Deploy 3<sup>rd</sup> party web applications**
  - Using off-the-shelf or custom Docker images



# How it works

- Create project from Web Services

The screenshot displays the OpenShift console interface for a project named 'test-openshift2'. The top navigation bar includes a home icon, the project name, and a red circle highlighting the 'Add to project' button. The left sidebar contains navigation options: Overview, Applications, Builds, Resources, Storage, and Monitoring. The main content area shows the URL 'https://test-openshift2.web.cern.ch' and two service cards. The first card, 'cern-ss0-proxy', shows 81.7 MiB Memory, 0 Millicores CPU, 0.1 KiB/s Network, and 1 pod. The second card, 'http-headers', shows 34.2 MiB Memory, 0 Millicores CPU, 0 KiB/s Network, and 2 pods. Both cards include a 'Group Service' button and a message: 'No grouped services. No services are grouped with [service name]. Add a service to group them together.' A 'Create Route' link is visible next to the 'HTTP HEADERS' section header. Informational banners at the top of each service card state: 'cern-ss0-proxy has containers without health checks, which ensure your application is running correctly. Add health checks' and 'http-headers has containers without health checks, which ensure your application is running correctly. Add health checks'.

# How it works: application templates



Project test-openshift1 ▼ Add to project

▼ <https://test-openshift1.web.cern.ch> and 1 other route

**Jenkins**  alossent | [log out](#) ENABLE AUTO REFRESH

- New Item
- People
- Build History
- Manage Jenkins
- My Views
- Credentials

**Build Queue** —

No builds in the queue.

**Build Executor Status** —

## Welcome to Jenkins!

For documentation on how to use Jenkins at CERN, see [cern.ch/jenkinsdocs](http://cern.ch/jenkinsdocs), as well as [wiki.jenkins-ci.org](http://wiki.jenkins-ci.org).

A [SSH key pair](#) was generated automatically for this Jenkins instance. The public key is:

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDNU3obiEfiNZLDAfILPQXlnwOaApMsWY6UTs7LmE+gEuw95FkSCg8ZVlwEdD2Q23WI29dFnbJK82bxULppnSfDTKNS4oJQUdUQuz0C
```

[edit description](#)

S	W	Name ↓	Last Success	Last Failure	Last Duration
●	☀	<a href="#">longrunning30</a>	3 mo 7 days - #1	N/A	30 min
●	☀	<a href="#">longrunning5</a>	2 mo 22 days - #13	N/A	5 min 2 sec
●	☀	<a href="#">OpenShift Sample</a>	N/A	N/A	N/A
●	☀	<a href="#">simplejob</a>	2 mo 16 days - #3	N/A	3.3 sec
●	☀	<a href="#">test-cmshcal</a>	N/A	N/A	N/A
●	☀	<a href="#">test-hcal</a>	2 mo 15 days - #9	2 mo 16 days - #2	2 min 11 sec

Icon: [S](#) [M](#) [L](#)

[Legend](#) [RSS for all](#) [RSS for failures](#) [RSS for just latest builds](#)

# How it works: custom web application

Project openshift-app-manager-dev ▼ Add to project ? alossent ▼


WEBSERVICES APP MANAGER <https://openshift-app-manager-dev.web.cern.ch>

- Build webservices-app-manager, #299 ✔ Complete 2 minutes ago [View Log](#) ✕
- Build webservices-app-manager, #284 ✔ Complete 2 months ago [View Log](#) ✕

**i** webservices-app-manager has containers without health checks, which ensure your application is running correctly. [Add health checks](#) ✕

**🔗** webservices-app-manager


Deployment webservices-app-manager  
Rolling deployment in progress... [Cancel](#)




No grouped services.  
No services are grouped with webservices-app-manager.

Deployment sso-registration-manager – 9 days ago #230  
openshift-app-manager-dev/webservices-app-manager [b561863](#)

- 0 MiB Memory
- 0 Millicores CPU
- 0 KiB/s Network




Deployment volume-provisioner  
Rolling deployment in progress... [Cancel](#)

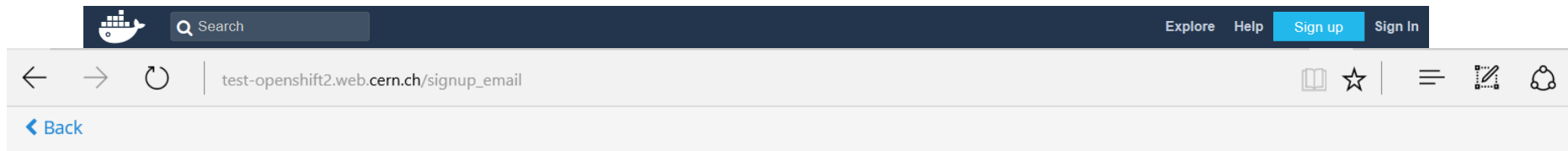


Deployment volume-reclaimer – a few seconds ago #83  
openshift-app-manager-dev/webservices-app-manager [ea44778](#)

- 0 MiB Memory



# How it works: off-the-shelf Docker image



## Mattermost

All team communication in one place,  
searchable and accessible anywhere

Let's create your account

Already have an account? [Click here to sign in.](#)

**What's your email address?**

Valid email required for sign-up

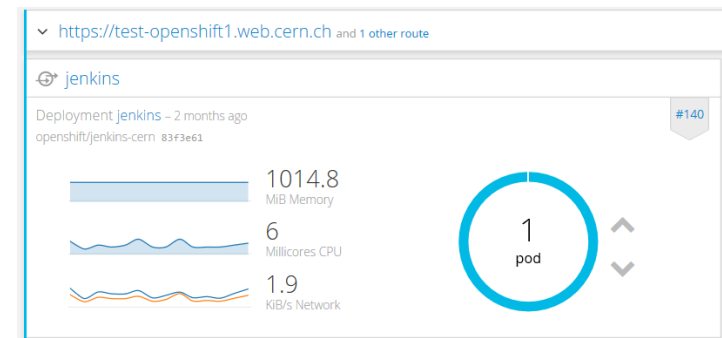
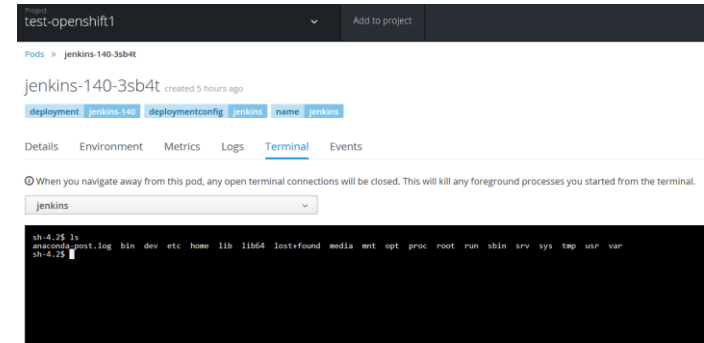
**Choose your username**

Username must begin with a letter, and contain between 3 to 22 lowercase characters made up of numbers, letters, and the symbols '.', '-' and '\_'



# Features highlights

- **Free HA: scale app in one click**
- **Shell access**
- **Container metrics and status**
- **Data persistence**
  - NFS volumes (IT-ST filer service)
  - DBoD for databases
  - EOS/CVMFS support (from Cloud team)
- **Docker images are portable**
  - Build once, Deploy anywhere!
  - Prototype before deployment to VMs, Magnum...
- **Same lifecycle as all central web sites**



# Limitations

- **Resources (CPU, memory) are constrained by quota**
  - Focus on web apps with typical resource requirements <1VM
  - For significant amount of resources, consider Openstack/Magnum
- **PaaS approach:**
  - We provide the infrastructure and reference container images
  - No support for application development/deployment itself
    - Standard technology with lots of resources online
- **Security: keeping web apps up to date remains entirely the owner's responsibility**
  - We maintain infrastructure components (TLS termination...)
  - Red Hat maintains a number of reference images (Python, Java etc.)
    - By default, apps using reference images are rebuilt on image update



# Outlook

- **February 2017: production use for Java application hosting**



MW On Demand

- **Pilot phase for other languages and 3<sup>rd</sup> party applications**
  - Knowledge Base being built
  - A few features still being worked on
    - E.g. log integration with Web Services
  - Pilot users needed to help refine policy and identify areas needing improvement

# Java Middleware on Demand: migration to PaaS Web Application

- **Why?**
  - Functionality overlap
  - Minimize in-house development
  - Consolidate on PaaS Web App central hosting by CERN Web Services
  - Openshift maintained by Red Hat
- **No automatic migration**
- **Procedure in Knowledge Base article (by IT-DB)**
  - <https://cern.service-now.com/service-portal/article.do?n=KB0004488>
- **Migration will happen during 2017**
  - <https://cern.service-now.com/service-portal/view-outage.do?n=OTG0035296>

# Java Middleware on Demand migration: milestones

- **February:**
  - No new web sites: remove link from webservices.cern.ch
  - Documentation on how to deploy a Java Web application
  - Notifications and meeting with user community about this migration
- **April:**
  - MWOD **TEST** sites will be stopped
  - Site content (.war, .jar, options, keystores...) will be archived
- **March – September:**
  - IT-DB-IMS will follow up migration process with the users
- **October:**
  - MWOD **PROD** sites will be stopped
  - Site content (.war, .jar, options, keystores...) will be archived

# Resources

- **Service Level Description**

- <http://information-technology.web.cern.ch/services/PaaS-Web-App>

- **Getting started**

- <https://cern.service-now.com/service-portal/article.do?n=KB0004358>

- **Openshift Developer guide**

- [https://docs.openshift.org/latest/dev\\_guide/](https://docs.openshift.org/latest/dev_guide/)

- **Java Middleware on Demand migration**

- <https://cern.service-now.com/service-portal/view-outage.do?n=OTG0035296>
- <https://cern.service-now.com/service-portal/article.do?n=KB0004488>

# Summary

- **Next-generation web hosting based on containers**
  - Enabling central Web Services to host a much wider range of web applications
  - Saving time and effort
    - Standard, portable technologies
    - Automation of application deployment
    - Integration with developer tools
  - Used internally in IT-CDA to provide a growing number of services
- **Now available to host user applications**
  - Beginning with Java web applications

# Questions?

IT Technical Users Meeting  
Web site: <http://cern.ch/ITUM>