Web Services:
Pilot for PaaS Web Application Hosting

Web application hosting made easy

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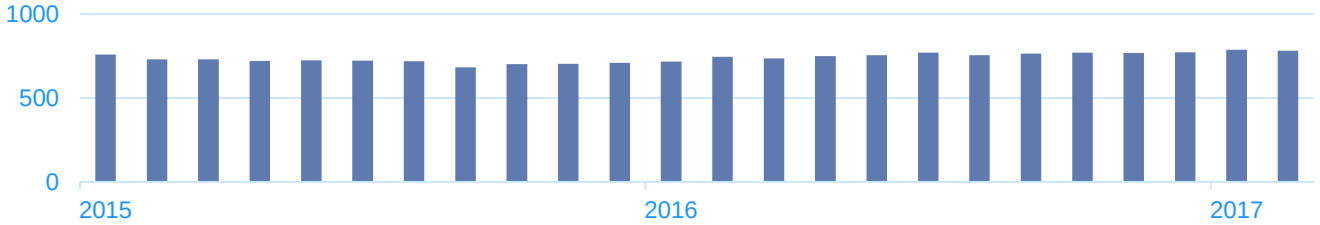
Context

- **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
- **“Platform-as-a-Service” approach for some new services**
  - E.g. Continuous Integration with 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

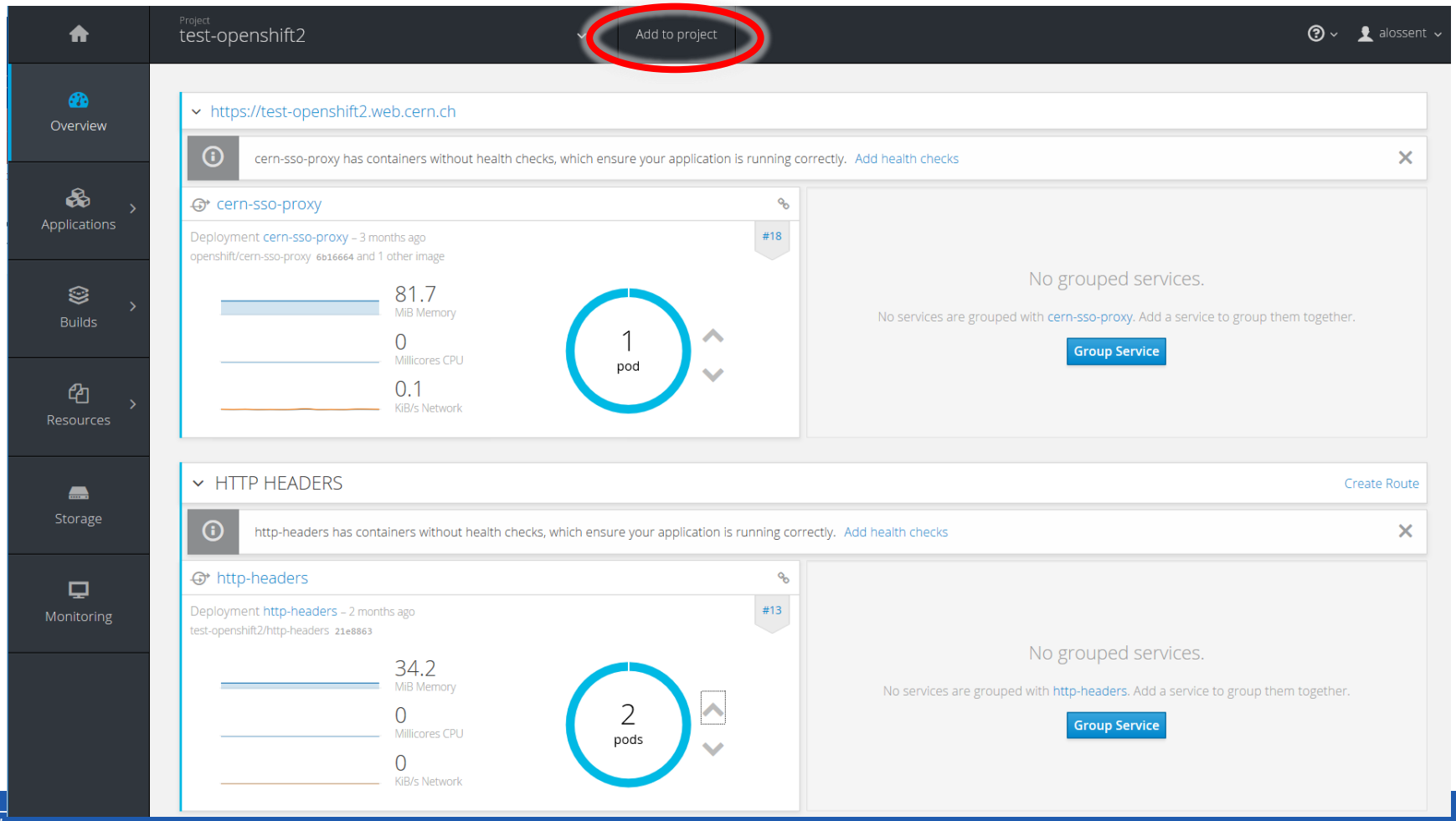
Opening the platform to public use

- **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

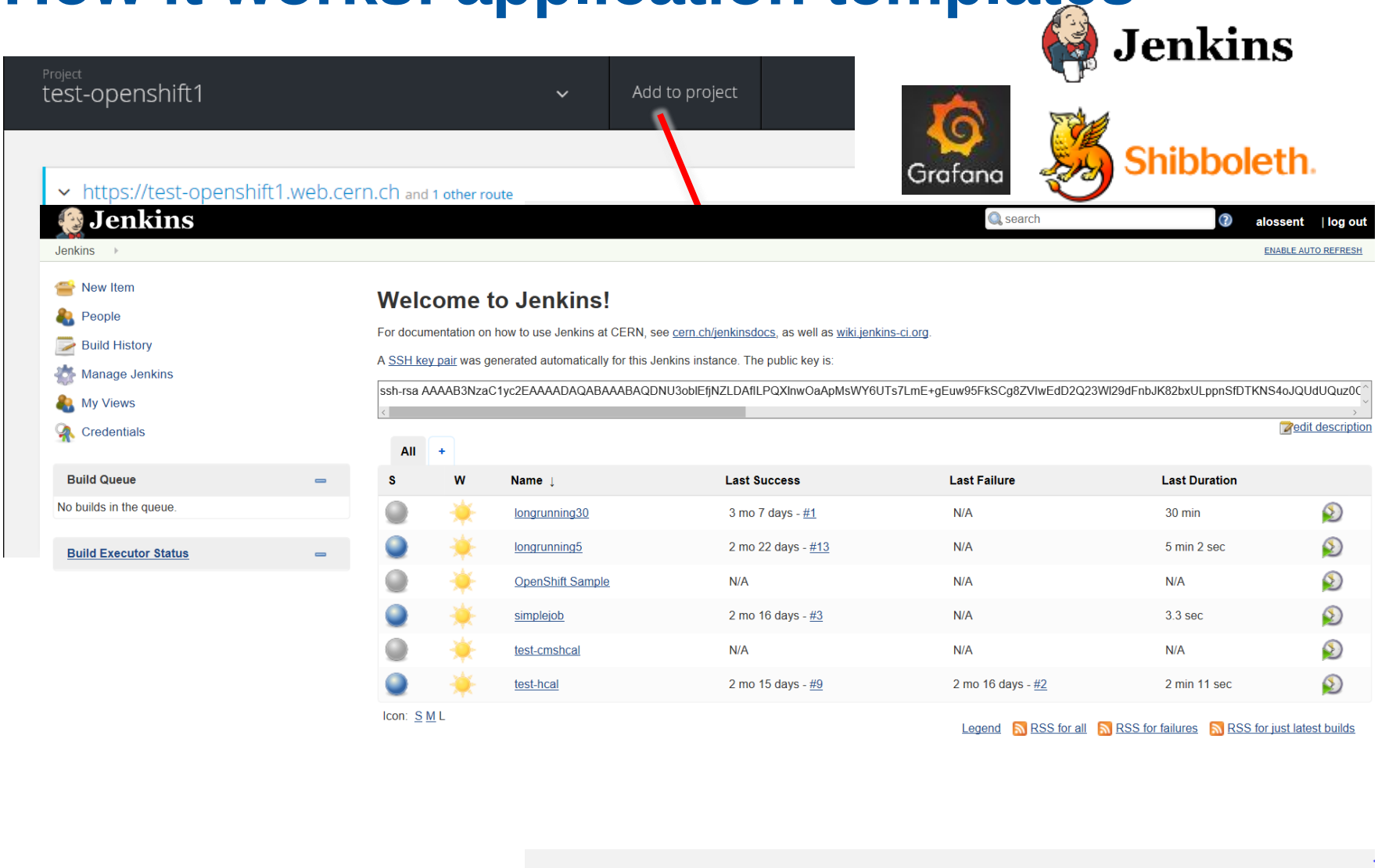
  - With **full control** on framework version, libraries etc.
  - **GitLab integration** with support for various environments (staging…)
  - **Automation of deployments** and rollbacks
- **Deploy 3rd party web applications**
  - Using off-the-shelf or custom Docker images

How it works

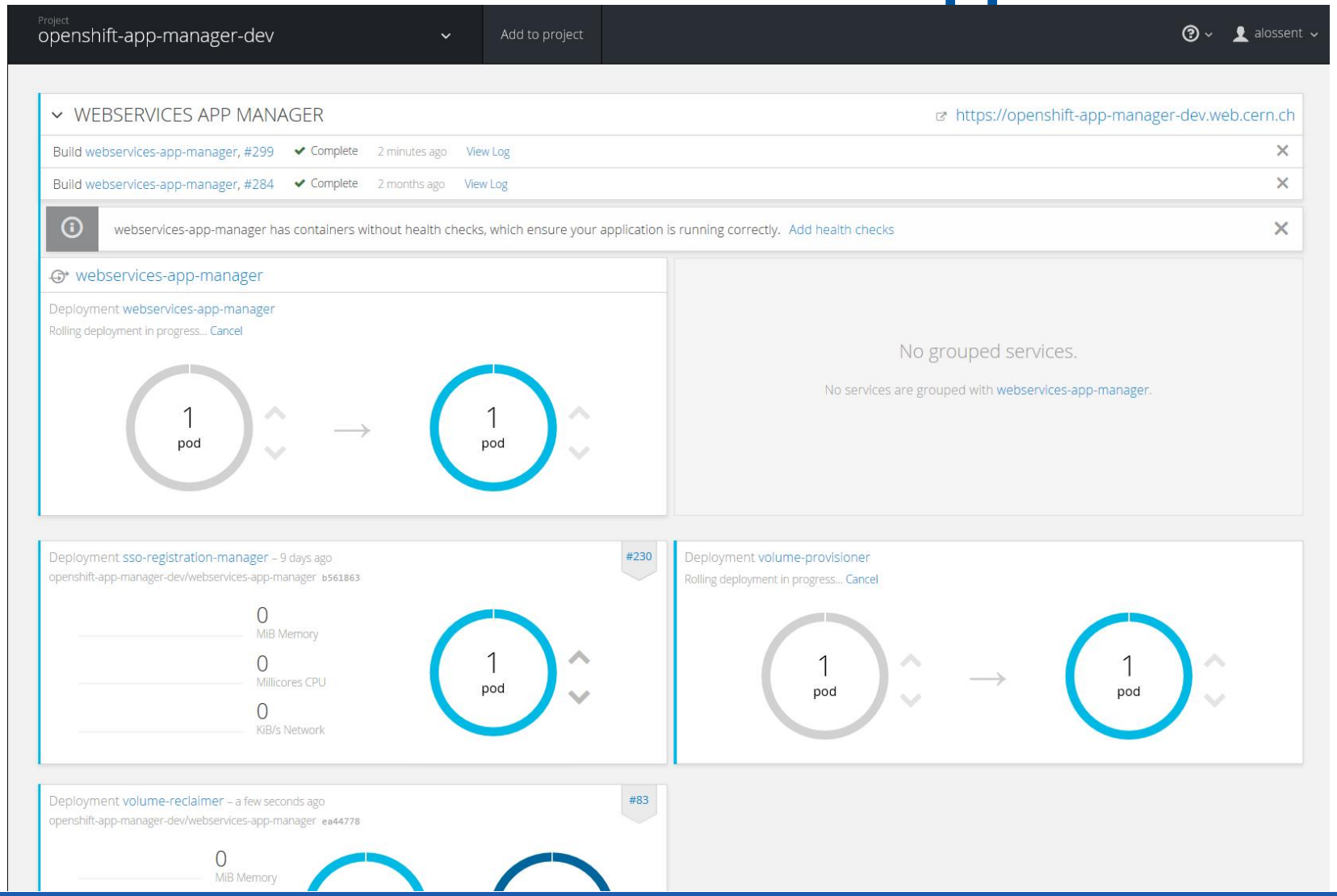
- **Create project from Web Services**



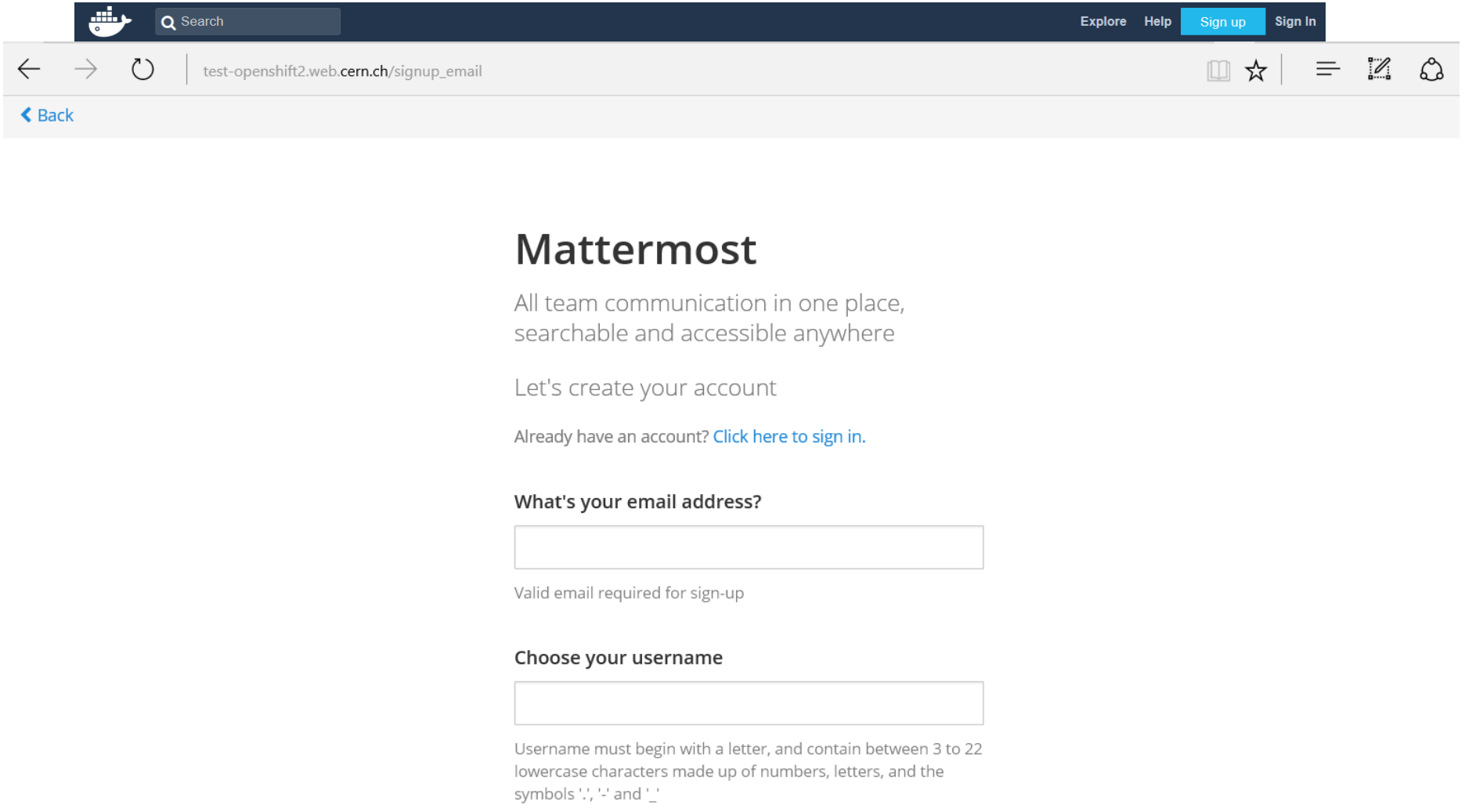
How it works: application templates



How it works: custom web application

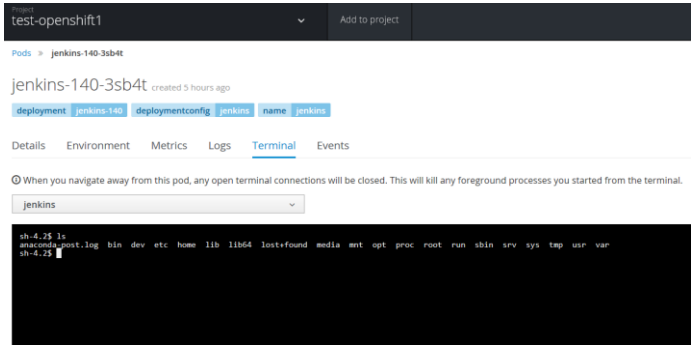


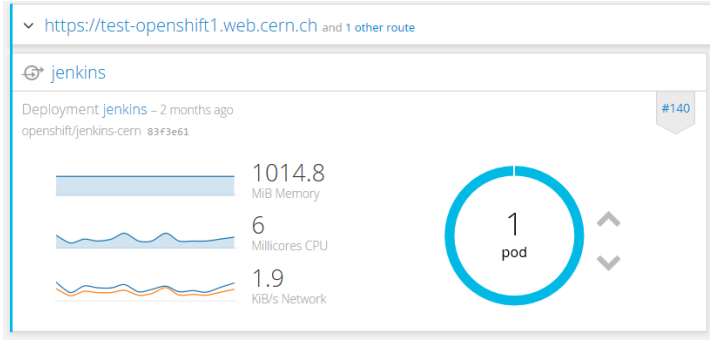
How it works: off-the-shelf Docker image



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

- **<u>Pilot phase</u> for other languages and 3rd 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/
- **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