One Click deployment on the Cloud

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Schedule

- Introduction

- Building the “Vento” Cloud

- Configuring one Vento Instance
  - Starting the cloudRAID application once

- One Click deployment

- Status and Conclusion
Cloud computing

- Big topic in industry
- EclipseCon Europe 2012
  - 25-30 talks with topic „tool“
  - 14 talks with topic „cloud“

User devices / Clients

User Interfaces / Machine Interfaces

Software as a Service (SaaS)

Platform as a Service (PaaS)

Infrastructure as a Service (IaaS)

Let the clouds make your life easier

Last year we recognized that our processes were far too complex

So we put them into the cloud

http://geekandpoke.typepad.com/a/6a00d8341d3df53ef01156f3f1664970b-800wi

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Kornmayer / Bausch / Holtermann
Any Cloud Problems?

• Users’ biggest concerns
  – Are my data safe?
    • Who else can look inside my data?
  – Are my data and applications always available?
    • Can I work any time?
  – How easily can I migrate systems?
    • Can I jump from cloud to cloud?
g-Eclipse

- Eclipse Technology Project (funded by EC in FP7)
  www.eclipse.org/geclipse

- Intuitive and easy access for
  - Cloud users

- Extensible framework including a Grid model for seamless integration of Grid/Cloud resources

- Supports different Cloud providers
  - Amazon Web Service (AWS)
  - Eucalyptus (Open Source) under development
    - Azure (first test with data)
    - OpenNebula, OpenStack, ... ??

- Can run in headless mode as API
Clouds using g-Eclipse

Private Cloud Resources (on premise)

Public Cloud Resources (Provider B)

Public Cloud Resources (Provider C)

g-Eclipse
Demo 1 – Access to Cloud

0. In order to see this text, you must create an AWS Project and then mount this bucket to open this file.
1. Start 4 instances at AWS with the ebs image!
2. Then create a EUCAL Project in order to interact with EUCALypus
3. I can not run the application on eucalyptus, because I did not have the time to configure the EME like I did in the AWS.

But show that it works exactly the same way as it is working for AWS.
4. Go back to AWS. Define the webpages to crawl for
   And start the webpages to crawl by selecting all of them and click on start web crawler
5. Access the webpages with the tool and search for two separate examples
6. Connect the different searches to one page with the SHL4 tool integration
7. Check that now the search works over all sites.
8. Then start to install the HAP software by login in to one machine and by executing the following commands:

```
$ telnet localhost 8081
$ provInstall http://download.eclipse.org/econ2010/cloud/pl/provIax
$ provInstall tu.eclipse.econ2010.search.sap.feature.group 1.0.0.0.200803141500
```
Eclipse/OSGi and the Cloud

• From Tooling to OSGi Runtime

![Diagram showing the evolution of the Eclipse ecosystem from embedded, mobile, and desktop to server and cloud environments. The timeline progresses from 2001 to today, with a dotted line indicating the future cloud.]
Vento - Cloud runtime with OSGi

• Requirements
  – independent from a specific Cloud infrastructure provider
  – provisioning framework

  – Applications
    • i.e. new (OSGi) Application
    • i.e. Legacy Application

• Implementation with OSGi
  – „Interoperability on the Platform level“
Deploy an OSGi application

Which application?

What about a service that increases availability and privacy in the Cloud!

The service/application must be an OSGi installable unit!
The CloudRAID Application

• Basic idea:
  – RAID 5 distributes data on various hard disks
    • increases availability and privacy
  – cloudRAID distributes data to various Cloud storage providers
    • increases data-availability and data-privacy in the Cloud

• Current implementation
  – OSGi bundles for modularity
  – RAID 5 algorithm implemented in C
    • Performance via JNI
    • Part of the OSGi Bundle
  – provides RESTful API for communication with clients
  – extensible architecture
    • for new Cloud storage providers
    • implementations for AWS S3, Dropbox, Ubuntu One, SugarSync, …
  – Secure
    • Encryption of files and passwords (salted)
  – Apache 2 licensed
The CloudRAID Application

Public Cloud Storage Service (Provider A)

Public Cloud Storage Service (Provider B)

Public Cloud Storage Service (Provider C)

file metadata
Demo 2

• Installing the CloudRAID application
• Starting the CloudRAID Client
• Connecting to the service
  – uploading files
  – downloading files
Next Question please?

• Can we deploy an **OSGi application** on our **local** workstation (within Eclipse) **and** on the **Cloud** (within Vento) just by **one click**?

  – **One Stop Cloud Shop!**
The Cloud ScienStore Scenario

1. Read Application MetaData from ScienStore
2. Contact all Cloud Instances and add Repositories
   - (REST via HTTP)
3. Initiate the Provisioning
   1. On the g-Eclipse Workbench (REST via HTTP)
   2. On all Cloud Instances (REST via HTTP)
ScienStore schema (0.1)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<scienstore location="http://79.125.127.88/scienstore"
    name="Inventos Scienstore">
    <science-domain name="Astroparticle Physics">
        <subdomain name="GammaRay Astronomy">
            <experiment name="MAGIC Telescope">
                ...
            </experiment>
        </subdomain>
    </science-domain>
    <science-domain name="Computer Science">
        <subdomain name="OSGi Applications">
            <experiment name="Examples">
                <cloud-applications name="Pi-Simulation">
                    img="http://79.125.127.88/scienstore/img/pisim.png">
                    <client-software>
                        <iu>org.vento.example.simulation.pi.feature.client.feature.group</iu>
                    </client-software>
                    <cloud-software>
                        <iu>org.vento.example.simulation.pi.feature.cloud.feature.group</iu>
                    </cloud-software>
                </cloud-application>
            </experiment>
        </subdomain>
    </science-domain>
</scienstore>
```
Demo - The Application

- **MC Pi Simulation**
  - randomize $X, Y$ from $[0,1]$
  - Count all in green
  - Count all
  - $\pi = 4 \times \text{green/all}$

- **Run on many nodes**
  - Like all Monte Carlo Sim.

![Diagram showing AWS, SQS, and Workstation services with arrows indicating data flow.](image)
Demo 3

• Use the ScienStore View
• Install one Application
  – PI Simulation
• Hope that the network is stable!
• After Cloud provisioning use the application!
Summary

- A provider independent Cloud runtime is needed with support for Cloud management

- g-Eclipse provides reliable, provider independent platform
  - g-Eclipse provides such a platform
  - Cloud Application can be integrated on Client side

- Combining g-Eclipse with Eclipse p2 technologies enables the simple provisioning/deployment of Cloud OSGi Applications

- The CloudRAID system (built on OSGi) provides increase privacy and availability for Cloud Storage systems

- The OneClick Deployment on many nodes in the Cloud was demonstrated with a simple application

- In the future the deployment in OSGi Clouds will be as easy as the deployment of smart phone applications
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• Geek&Poke for their great cartoon
  – Published under license
Resources

• g-Eclipse: www.eclipse.org/geclipse

• CloudRAID: https://github.com/Markush2010

• Vento Runtime will be available soon!
Outlook

• Legacy adapter layer
  – Work is ongoing to enable
    • Corsika Simulation
    • CTA simulation

• Provisioning on linux
  – Studies on p2 to integrate „linux deployment“ methods (apt-get install, …) are planned

• General improvements
  – Finalizing the ScienStore XML structure
  – Improving the ScienStore plugin