Cloud bursting for Earth Science Applications and Services

Hybrid Cloud Strategy for Terradue’s Cloud Platform Users

Cesare Rossi
EGI Conference 2015, Lisbon – 21 May 2015
Terradue Our Company

- Founded 2006 in Italy
- Earth Science start-up
- Head Office in Rome - IT, 12 team members
  - Branch office in Oxford – UK

Provide computational science for researchers to study the earth system
Ocean ecosystem
Land Use
Atmosphere Analysis
Platform as a Service
Platform as a Service (PaaS)

- Hadoop Sandboxes on Private Cloud
- Build Applications
- Community Hubs on Private Cloud
- Define OneFlow services
- Elastic Catalogues
- S3 data nodes
- Templates (hybrid)
- Producer Decks (hybrid)
- Deploy Cloud Appliance clusters on Public Clouds
Terradue PaaS Operator

![Graph showing the increase in users over time from 1/13 to 12/14. The x-axis represents months from 01/13 to 12/14, and the y-axis represents the number of users from 0 to 120.]
Operations & Support
User Cloud Management

Virtual Machines

- **Melodies Platform Services WP7 Sandbox - IST**
  - Running
  - x1 - 2GB
  - CentOS 6.6 Sandbox v.20141112
  - 10.15.27.25 -
  - hcaumont
  - 5 Dec 2014

- **Melodies Platform Services WP7 Sandbox - CSIC**
  - Running
  - x1 - 2GB
  - CentOS 6.6 Sandbox v.20141112
  - 10.15.27.24 -
  - hcaumont
  - 5 Dec 2014

- **Melodies Platform Services WP6 VM**
  - Running
  - x1 - 2GB
  - CentOS 6.6 Sandbox v.20141112
  - 10.15.27.23 -
  - hcaumont
  - 2 Nov 2014

- **Melodies Platform Services WP2 Sandbox - Silk**
  - Running
  - x0.5 - 4GB
  - undefined
  - 10.15.27.18 -
  - hcaumont
  - 2 Oct 2014

- **Melodies Platform Services WP7 VM**
  - Running
  - x1 - 2GB
  - CentOS 6.5 Baseline
  - 10.15.27.22 -
  - hcaumont
  - 4 Sep 2014

- **Melodies Platform Services WP7 Sandbox**
  - Running
  - x1 - 2GB
  - undefined
  - 10.15.27.21 -
  - hcaumont
  - 1 Jul 2014

EGI Conference 2015
Ubud - Bali
User Cloud Management

Virtual Machines  dcs-gmatsar-ifg

- **RUNNING**
  - x1 - 8GB
  - CentOS 6.6 Sandbox 100G
  - 10.16.10.51 -
  - 5 May
  - gepadmin
User Cloud Management

- Explorer Plan
- Scaler Plan
- Premium Plan

- Settings
- Quotas

- Change Language
- Change Password

- Add SSH Key

- Update View
Create Service

- riak cluster

- node

Cardinality

Change cardinality

1

VMs
Operations Infrastructure management

- Configuration Management
  - Consistency
  - Integrity
  - Code Paradigm

- System Monitoring
  - Operational readiness
  - Services recovery notifications
Operations Network & Access

- Dynamic DNS management
  • Hostname allocation
- Network Isolation & Security
  • OpenvSwitch, VLANs
- Network access
  • OpenVPN Access Server
- User profile certification
  • LDAP + X.509 auth
ESA Exploitation Platform integration with EGI
## Environments

### Common Environment

<table>
<thead>
<tr>
<th>Hostname</th>
<th>User</th>
<th>State</th>
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<tbody>
<tr>
<td>10.15.25.14</td>
<td>slavender</td>
<td>active</td>
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### Evaluation Environment

<table>
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<th>User</th>
<th>State</th>
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</thead>
<tbody>
<tr>
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<td>slavender</td>
<td>active</td>
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### Private Environments

<table>
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<th>Hostname</th>
<th>User</th>
<th>State</th>
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</thead>
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<tr>
<td>Not available</td>
<td>Fabrice.Brito</td>
<td>not created</td>
</tr>
</tbody>
</table>
The EGI support can help the sustainability beyond the life of the projects

Supporting the TEP on Geo-Hazards

- Compute resources: 60 VMs with 2 cores at least and a variable amount of RAM (from 4 to 32 GB), 120 GB storage
- Permanent storage: 40 TB for 6 months
The EGI support can help the sustainability beyond the life of the projects

Supporting the TEP on Hydrology

- Compute resources: 60 VMs with 2 cores at least and a variable amount of RAM (from 4 to 32 GB), 120 GB storage
- Permanent storage: 40 TB for 6 months
Infrastructure components
Cloud Bursting driver

OpenNebula

cloud-bursting4one driver

jclouds

cloudstack

rOCCI
Terradue Laboratories
Processing operations support for partners

CMRE’s Hybrid Cloud provisioning approach during GEOSS AIP-7

Source: GEO XI Plenary, Novembre 2014
Terradue Ecosystem

OpenNebula
Next steps

- Integration of the rOCCI client for OpenNebula
  - It will be developed under the generic cloud-bursting4one umbrella, in the southbound interface
  - It should address the EGI security management based on X.509 certificate and proxy mechanism

- Setup of a execution testbed by registering Terradue's Hadoop Sandboxes into the EGI appdb and launching them through the OpenNebula controller, using OneFlow services

- Management of the EGI security at Platform level
  - It implies the management of the users proxy certificates (creation, renewal, deletion)
Terradue Join us

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