Outline

• SZTAKI Cloud project
• Infrastructure
  • architecture
  • hardware
  • software
• Results
• Experiences
• Statistics
SZTAKI Cloud Project
**SZTAKI Cloud**

- **Goals:**
  - Building a private IaaS for SZTAKI that makes its e-infrastructure more modern and economical.
  - Do researches that make SZTAKI cloud easy to use and more reliable.

- **Visions:**
  - Fully separate software (services) from the physical hardware.
  - More transparent way to maintain the SZTAKI services.
  - Central support for hardware procurement for reasonable infrastructure.
  - If a user needs more resources, it should be available within moments (in a fully automated way).
SZTAKI Cloud

- **Duration:** 2 years (started 01/04/2012)
- **Partners:**
  - **DSD** - Department of Distributed Systems  
    http://dsd.sztaki.hu/
  - **ILAB** - Informatics Laboratory  
    http://www.sztaki.hu/infolab/
  - **HBIT** - Department of Network Security and Internet Technologies  
    http://www.sztaki.hu/department/HBIT
  - **LPDS** - Laboratory of Parallel and Distributed Systems  
    http://www.lpds.sztaki.hu/
Preludes of the project

• Before the cloud era, developers and software testers requested VMs from the infrastructure team ...

• Need for an infrastructure that is:
  • highly reliable,
  • dynamic,
  • flexible,
  • and easy to use by developers and users.

• LPDS cloud since ~summer of 2011

• Some data:

<table>
<thead>
<tr>
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<th>04/06/2012</th>
<th>27/06/2013</th>
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<td>registered images</td>
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Research and development topics

• Elasticity and automatic scaling
• Data-intensive cloud
• Reliability security improvements
Infrastructure
Hardware elements

• **Front-end Server** (2X) - DELL PowerEdge R415
  - AMD Opteron 4280 Processor (2.8GHz, 8C); 16GB RAM; (2X) 600GB SAS 15k 3.5" HD Hot Plug;

• **Node Server** (7X) – DELL PowerEdge R815
  - (4x) AMD Opteron 6272 (2.1GHz, **16C**); **256GB Memory**, (6X) 1TB Near-Line SAS; 7.2k 2.5" HD Hot Plug
Hardware elements

- **Storage server (2X)**
  - DELL MD3600i - (12X) *3TB* NL SAS 6Gbps 7.2k 3.5" HD;
  - PowerEdge R510 - Intel Xeon E5620, (2X) 4C, 2.40GHz, 24GB; (12X) *3TB*, NL SAS 6Gbps, 3.5-in, 7.2K HD

- **Switch (2X)** - PowerConnect 6248, *48 Ports*, Managed Switch
Software elements

- OpenNebula 3.8.3 (version 4.0.1 coming soon)
- CentOS 6.4 (Operating System)
- Puppet – for managing configuration files
- TFTP+NFS-root+UNION FS – for keeping the software stack coherent and for making the physical infrastructure scalable
- AAI based authentication
- iSCSI – for providing SAN
- CEPH – (in progress) for providing S3-like storage interface and distributed storage
Quota

• Multitenancy -> the cloud use shared resources.
• Fair share -> quota for every department
• Departments = groups in OpenNebula
• Current values/groups:
  o 45 VM or CPU cores,
  o 92GB Mem,
  o 2TB persistent storage.
• The values can be easily adopted to the characteristic of the usage.
Results
Current Results

• Beta state. (Available for SZTAKI employees)
• Production services provided by the cloud (e.g. SZTAKI Szótár, gLite resources)
• Several bugfixes and improvements for OpenNeula
  • Rewritten iSCSI storage driver script
  • AAI auth. module
  • AoE storage driver
  • NFS-root based cloud nodes
  • Coming soon - Hungarian OpenNebula User Group
Experiences

• Foresight is valuable – What kind of workload should it serve?
  o Network – isolated/need public IPs?
  o Storage – local/SAN/Distributed? (local -> HADOOP, SAN -> general (e.g WEB servers))
  o CPU / MEM rate (e.g 1core->4GB mem)
  o CPU/Storage rate (general usage/big data?)

• Involve network and security departments from the beginning – Harmonize the AUP (Acceptable use policy)

• Avoid to lock in a version - If you have own developments for a cloud tool then you should put it back into the main branch
SZTAKI Cloud website

Available: http://cloud.sztaki.hu

All-in-one:
- OpenNebula Front-end entry point
- Documents
- Events
Statistics

Demo – Online statistics

http://cloud.sztaki.hu/monitoring
Questions?

Thank you for the attention!