

CSC/FUNET organized Datacenter IaaS workshop 11.-12.9.2014 in Helsinki as part of the GÉANT Campus Best Practice task.

## **Day 1, Session I**

Jari Miettinen, CBP Task Leader opened the event. The first session had a theme "Green Datacenter Technologies". Jukka-Pekka Partanen from CSC introduced the CSC Kajaani datacenter. Very low PUE value is reached with free air cooling in Kajaani climate. In addition, reliable feed of electricity is available at a reasonable price (hydropower). Modular structure brings expandability. See video tour: <http://youtu.be/ASVtutOBVZA> There is also a HPC data center that has 90 % water cooling.

"Does an efficient datacenter guarantee high quality data services?" No, but it can make them superior due to competitive cost structure, flexibility to expand and robustness in operation.

Romarc David from University of Strasbourg gave a presentation about improving the energy efficiency of existing datacenters. He showed many practical hints that you can deploy today. Airflow control is the most important thing to plan and care about in a DC. Cover plates and panels are inexpensive but efficient. Power usage and temperature is easy to measure using managed PDUs and SNMP for example.

Tuure Vartiainen from Tampere University of Technology told how a new machine room was built and taken in use. A compromise between energy consumption and disk failure rate was to adjust cold aisle temperature to 27 degrees. The cooling system was tweaked and significant reduction of power consumption was achieved compared to default settings. PUE value will improve as more equipment is installed.

## **Session II**

Session II was about Cloud Service Provisioning. Slavko Gajin from University of Belgrade introduced the GN3plus SA7T1 Support to Clouds, Cloud Strategy. Cloud Assessment Survey showed that only 15 % of NRENs have a cloud strategy. Possible approaches to NRENs are cloud brokerage, cloud provider, community cloud, peering with commercial cloud providers or do nothing. Clouds are already here, time for NRENs to act is now starting with building a strategy (strategic analysis). Don't start with the deployment model, start with the users needs.

George Kargiotakis from GRNET told about Cloud services that GRNET provides. Installation and provisioning is highly automated including monitoring and configuration management. Different kind of solutions are offered for different needs: Okeanos and ViMa. Users always ask for maximum amount of resources even if they don't need it. Regulating resource usage is challenging. Abuse requests must be dealt with.

Filip Hubik from Masaryk University in Brno had a presentation with title Provisioning Cloud Services to Academic Users in the Czech Republic. Two production clouds are available: MetaCloud and FedCloud, that both use OpenNebula. Virtualization platforms KVM and Xen are in use. HA is needed and implemented.

## **Session III**

Session III took the view to Joint Procurement, costs and agreements. First, Kimmo Pettinen from Laurea University of Applied Sciences shared experience on Cost of outsourced datacenter services. Laurea has currently two service providers: one for infrastructure services and other for frame

network together with their own IT-organization. Competitive tendering is done every 3-5-years, latest in 2012. Hardware is the biggest part of IT costs at Laurea (24%). Online help is maintained by students and it's also a part of the studies. The decision to outsource is a strategic decision. Changing service provider is tricky, but virtualisation helps.

Robert Ferret from RENATER showed that the carbon footprint of ICT depends on more than just electricity. There is no Green IT and also virtual machines consume real power. 3/4 of all energy currently is fossil worldwide. Natural resources will run out due to human usage, silver and gold will be the first. There is no choice, renewable energy is needed. Also turn off any unused equipment. Do all services need UPS? Measuring is key in understanding what should be changed. See the European Code of Conduct for Data Centres Energy Efficiency.

Pekka Palin from CSC told how CSC uses Box service that was procured with a Nordic joint tender. NORDUnet has a framework agreement, CSC has an agreement with Box and universities make agreement with CSC. Billing is based on the number of user accounts. Lesson learnt during the process is that making an agreement with an American company takes a lot of time. Fortunately it was possible to make the agreement under Finnish law. You should always be prepared to surprises.

## **Day 2, Session IV**

The second day started with theme Security. Josef Spillner from Technical University of Dresden had a presentation with title Safe File Storage and Databases. Everybody is talking about big data, but maybe it's better to first think about how to store small data safe. For cloud storage, new visualisation methods are needed to display weights and other properties. NubiSave Cloud Storage Controller software prototype answers many concerns with distributed storage including support for streaming and batching, profiles and search functions.

Rogier Spoor from SURFnet introduced SURFdrive which is an Owncloud sync & share service. Commercial cloud storage services have many open questions regarding security. SURFdrive is a solution that offers the same level of userfriendliness as commercial services in accordance with the Legal Framework for Cloud Services in Higher Education and the highest privacy and security requirements. The service should be more attractive than commercial cloud services. Encryption of the data still has some challenges.

Tuomas Tonteri from elfCLOUD presented a cloud service located in Finland with title "Credibly secure cloud storage". Finland is a good country to store data. The service is client based and there is no web gui. With elfCLOUD service the data is encrypted locally before transfer and keys are stored at the client. Editing conflicts can be avoided with this solution and firewalls are not a problem as the client always initiates the connection. User authentication is done on the customer/client side.

Christian Sprjac from PowerFolder told about PowerFolder Sync and share software, that is the market leader in education and research in Germany. Supported features include federated login, intuitive client local file transfer (peer to peer). Linux and Windows are supported. Also free PowerFolder Server edition is available.

## **Session V, theme: Network**

Martin Pustka from VSB-Technical University of Ostrava told about the Services and DC infrastructure of VSB-Technical university. Fault tolerant DC network design allows savings in HW maintenance SLAs. No vendor lock-in, any part of the network can be replaced with a similar

component from any vendor. Nobody wants a physical server even if available.

Denis Matousek from Invea talked about Hardware Acceleration for High-density Datacenter Monitoring. Real-time detection and mitigation of network attacks requires traffic analysis at wire-speed. Using FPGAs allows to use the same hardware for multiple applications. The same card can be used for example as 2x40G or 8x10G ethernet. Solution is cost efficient and flexible and easy to integrate with tools like tcpdump, Wireshark, Snort and FlowMon with high performance.

Jani Myyry from CSC presented Multi-domain connectivity services BoD and MDVPN that are piloted in GN3plus SA3 T1 Bandwidth-on-Demand and SA3 T3 MDVPN. BoD is a dynamic point-to-point L2VPN service which is currently available in 9 European NRENS. MDVPN offers both L2VPN and routed L3VPN services and is available in 16 European NRENS. These services are useful for connecting datacenters, cloud services, and users making it possible to bypass network performance bottlenecks like firewalls.

## **Session VI, Lightning talks**

Miloš Kukoleča from AMRES started the Lightning talks session with a presentation about AMRES Virtualization solution. Citric XenServer is well suited for small low cost deployments. Since the virtualization platform doesn't offer integrated backup, shell scripts are needed, which is not optimal. Proxmox is an opensource virtualisation platform which is very stable and worth checking out.

Sigmund Augdal from Uninett presented a Self service platform for virtual Machines. Microsoft System Center was chosen to replace old VMWare. Templates for different OSs are built daily so that VM:s are ready to use right away. Each VM has it's own Private VLAN and users are able to configure the firewall for their own VM. Self service portal is used for administration. From the experiences gathered in this project it was concluded that UNINETT will buy virtual services not provide them.

Kalle Happonen from CSC introduced the Pouta cloud service. The goal is to provide the benefits of a cloud with the performance of HPC. OpenStack is used in this service on HPC hardware.

Jorma Paananen from CSC told about the IDA Storage service for research data. The purpose of the service is to facilitate availability and re-use of research data. Service has three user interfaces, Liferay based webUI, network directory using webdav and command line UI using iRODS.

Ari Lukkarinen from CSC presented the EUDAT project that aims at standardized storage services for European research communities. The project builds on trust between players. It has been recognised that it takes an effort to keep research data usable and readable. The current project is about to finish. CSC has applied for new funding.

Jari Miettinen summarised the themes of the workshop and listed areas of future work.

Statistics: 39 participants and 8 countries. Remote maximum 17 participants (day 1) 14 participants (day 2).