Understanding Cloud Services for Member Institutions

The higher education and research community (i.e., students, faculty, researchers and staff) takes Cloud Services for granted. In fact, most members of the community have a Google mail or Yahoo e-mail address (vc@gmail.com or steve@yahoo.com) and are vaguely aware that their e-mails are stored somewhere in the Internet or in the **cloud**. Moreover, most KENET member universities have already moved their student e-mails to Google by taking advantage of FREE **Google Apps for Education** Services. It means that the e-mail is stored in Google servers that are outside of Kenya.

Microsoft Office applications are now also available in the **cloud** as Office 365 (i.e., in Microsoft servers in data centers outside your campus and often outside Kenya). The cloud version of Microsoft Office 365 is actually available for FREE to university students with each user having 1 TB of storage in the cloud (1 TB = 1,024 Mbytes). The applications are accessible from up to five devices per student (i.e., desktop, laptop, tablet, smartphones etc.) from anywhere as long as the user has Internet access. Institutions can also subscribe to Office 365 that is installed in the devices and allows storage on local machines in offices or labs so that they can work even without Internet access

Some member institutions are already running cloud-based ERPs and Learning Management Systems (LMS) like Blackboard that host the content in servers outside the campus or even outside Kenya. Such institutions simply require high-speed Internet from their campuses to access the servers.

Closer to home, KENET hosts the websites of about 70 member institutions and provides storage or virtual private servers to members on demand. The virtual private servers (VPS), also called **virtual machines** or VMs, are also used to host some institutional e-learning or learning management systems, provide backup storage or disaster recovery sites. The servers and storage are all available in KENET data centers. This makes it possible for a university to run its entire ERP or LMS service using virtual private servers leased from KENET. All these are called **community cloud services** because they are provided by an organization that is a consortium of only member institutions or a community organization like KENET.

The KENET cloud is an example of a **community cloud** because it is available only to member institutions unlike the **public cloud** available to any organization in the world for FREE or for a consideration and often offered by commercial companies such as Google, Microsoft or Amazon (these are the large ones). It is also possible for a large multiple-campus university to setup a **private cloud** at a data center located at one of the campuses.

Cloud services are therefore defined as *ICT services delivered over the Internet. Cloud services are often delivered using IT resources that are outside a campus* and that are often leased from a cloud services provider such as KENET (community owned cloud) or commercial public cloud providers such as Google or Microsoft.

Global or community cloud services reduce capital investments of member institutions in servers, storage, and the associated data center or server room infrastructure. Member

institutions just need to invest in end-user computers and campus networks, including wireless or WiFi network and can lease any storage or servers required on a monthly basis from Cloud services operators (OPEX rather than CAPEX). It also reduces the systems administration costs of the member institutions; institutions need fewer back-end engineers or systems administrators. This is the trend all over the world – most higher education institutions in developing countries are moving their ICT systems to the cloud, often the Global cloud. Amazon and Microsoft are the leaders in this area

However, the data and applications still belong to the institutions and they need to take full responsibility for administration and security. This is often negotiated in Service Level Agreements (SLAs).

There are **five** things you therefore need to know about cloud infrastructure and services:

1. **What is the motivation for Cloud services adoption by member institutions**? The main motivation is reliability, reduced CAPEX in ICT infrastructures and data centers, and availability of broadband Internet for on-campus and off-campus users. For example, providing e-mail with adequate storage to a student population of even 5,000 students can represent a big CAPEX for a university but this FREE with Google Apps for Education.

2. **Who is providing cloud services to member institutions?** Cloud services are being provided by Global public cloud providers (e.g., Google, Microsoft, or Amazon Web services), local public cloud providers, and KENET as a community cloud provider. Most of the global public cloud infrastructures are hosted in data centers outside Kenya or Africa. The KENET community cloud infrastructure is hosted in community data centers in Kenyan universities. Hosting cloud infrastructures in data centers in Europe or the US affects the performance of some applications (e.g., video or voice services) that are sensitive to delay caused by data travelling 10,000 KM or that need to move large volumes of data over the Internet because of the additional communications costs.

3. **Which member institutions need KENET community cloud services?** All member institutions that need to move their ERPs, Websites, Learning Management Systems or **Disaster Recovery sites** to the cloud would benefit from KENET community cloud services. Many member institutions do not yet reliable have fully-fledged tier 3 data centers with adequate cloud resources such as servers, storage, cloud software platforms, cloud applications policies, and the high-end ICT staff to manage cloud services. Member institutions also seem to **trust** the KENET community cloud more than the public cloud for mission-critical applications and/or services such as disaster recovery sites or ERPs because they know the physical location of the KENET data centers.

4. **What is readiness of Member institutions for critical cloud services such as ERPs and LMSes**? Member institutions require a reliable and high speed communications link to cloud services provider data center(s). Most member institutions already have a high-speed link to KENET data center and are ready. In addition, all member institutions require well-documented cloud services policy, strategy and Service Level Agreements. This might require the services of specialized Cloud Services ICT consultants at high costs (e.g., Ernest & Young, PWC, KPMG etc). *KENET has the necessary independent high-*

end ICT talent to provide member institutions with cloud advisory services including development of a suitable SLA with third-party providers of Cloud services.

5. **What is the state of cloud adoption for Higher education and research institutions in Europe and the US**? Higher education institutions in Europe and the US are currently deploying cloud services with the support of regional or national research and education networks. While in Europe and the US, NRENs are mainly brokers for cloud services **provided at scale**, KENET provides the cloud services using its own community cloud infrastructure. This might change in the future.

Prepared by

Meoli Kashorda

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References:

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