



# Fundamental policy principles and guidelines for an effective migration to the cloud

**ITU / ALECSO High Level Meeting on Cloud Computing for  
Education (Tunis-Tunisia, 30-31 Oct. 2018)**

**Guidelines to improve the use of Cloud  
Computing Technology in Education in  
Arab Countries**

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**Final Report**

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# Report outline

- Executive Summary
- State of the Arts in Cloud Adoption and Cloud Technologies
- State of ICT and cloud computing in education in the Arab World (Survey)
- Cloud adoption: Policy guidelines for each stakeholder's profile Ministry, University, Educational institution
- Cloud migration: Implementation and guidelines (Technical aspects)

# Cloud adoption: Policy guidelines

# Policy recommendations

- Result of intensive exchanges and debates between the experts of the project team
- Based on findings related to cloud adoption in the world and particularly in educational institutions
- Refer to the state of infrastructure and ICT development in the Arab world
- Take into account
  - the rate of cloud adoption or intentions and preferences
  - Take into account recommendations of 1<sup>st</sup> expert meeting
- **Four key policies**
  - Structured according to major stakeholder's profiles: ministerial departments, universities and educational institutions.

# Key policy one: high quality network

- *A prerequisite:*

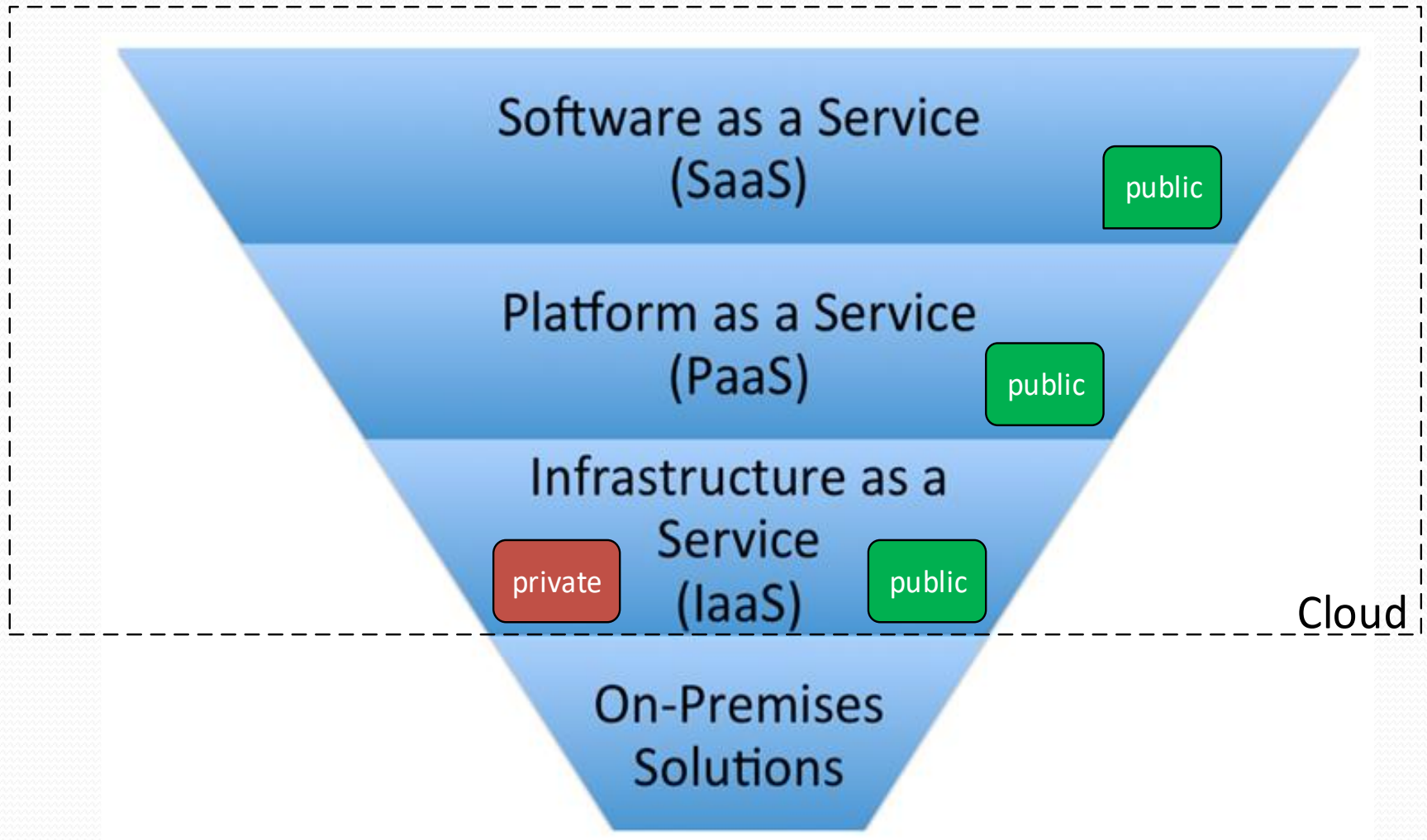
*Give to investment in a high quality network (intranet+access to Internet) the highest priority*

# Key Policy 2

## *Always public cloud first*

- use of public cloud as the first choice wherever possible and hence enabling educational institutions **fast access to advanced IT and catching up with international practice**
- Always SaaS first and Use Pubic PaaS/IaaS instead of local infrastructures
- Existing on-premise applications that (i) have critical constraints or (ii) wouldn't benefit from public or private clouds or (iii) can't be **cloudified** should continue operating on-premises

# Public/private cloud Services





# Main guidelines for the implementation of key policy 2

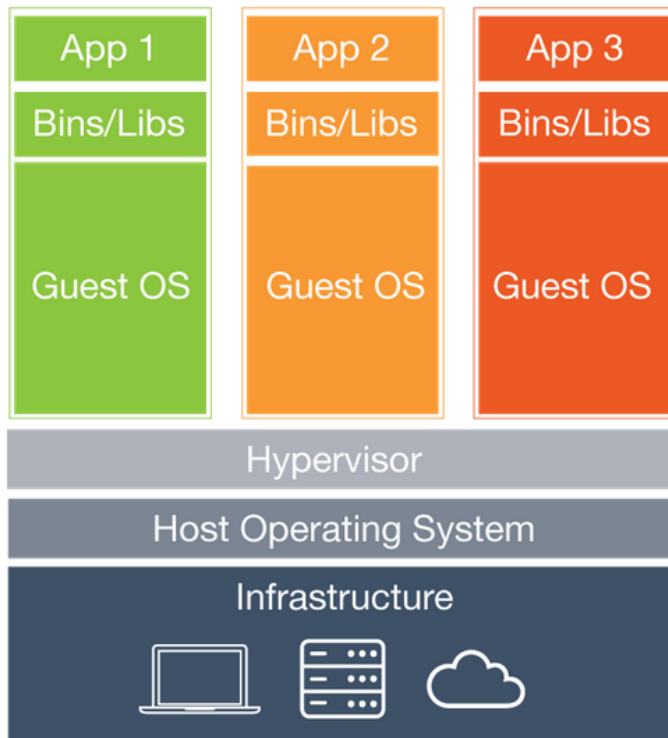
- Ministries in charge of higher education and research
  - should negotiate contracts' frameworks with the key global and local cloud providers
  - Engage in **ambitious partnerships** with those players (such as Google, Microsoft, Amazon, etc.) in order to make the use of cloud in education part of a larger framework of cooperation, promotion of innovation and adoption of **cutting-edge IT solutions** throughout the country.
  - Put in place **communication** strategies contributing to a mindset shift about pervasiveness of cloud solutions. Those strategies should foster the adoption of the “**public cloud first**” approach and catalyze the **everything-as-a-service** paradigm shift.

# Key policy 3

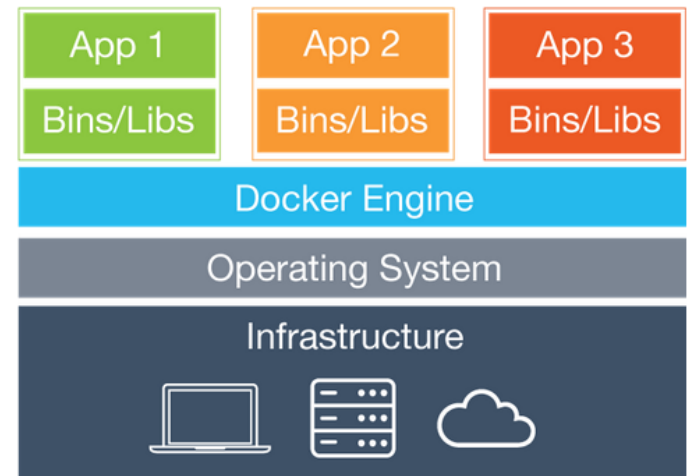
*“Cloudify” the existing local infrastructures and applications at institutional level*

- To **speed up cloud migration**, intermediate solutions may be adopted to improve the management of the existing IT infrastructure without disrupting the operation of the applications used by educational institutions. 2 options :
  - Use **containers** for applications deployment
  - Use a mature **open source cloud toolkit** (OpenStack, OpenNebula)

# Containers



Virtual Machines



Containers

# Main guidelines for the implementation of key policy 3

- **for ministries in charge of higher education and research**
  - Put in place a program for pilot projects **to show case the cloudification** using containers and cloud toolkits of typical institutions' infrastructures. publish and disseminate results, know-how and lessons learned.
- **for Universities/ higher education institutions**
  - Universities/higher education institutions IT departments should **train** their members on technologies such as containers, virtualization technologies and clouds toolkits.
  - Pilot projects must be put in place to help making **informed decisions** about the specific container orchestration technology and cloud toolkit that would best fit the needs of the institution.

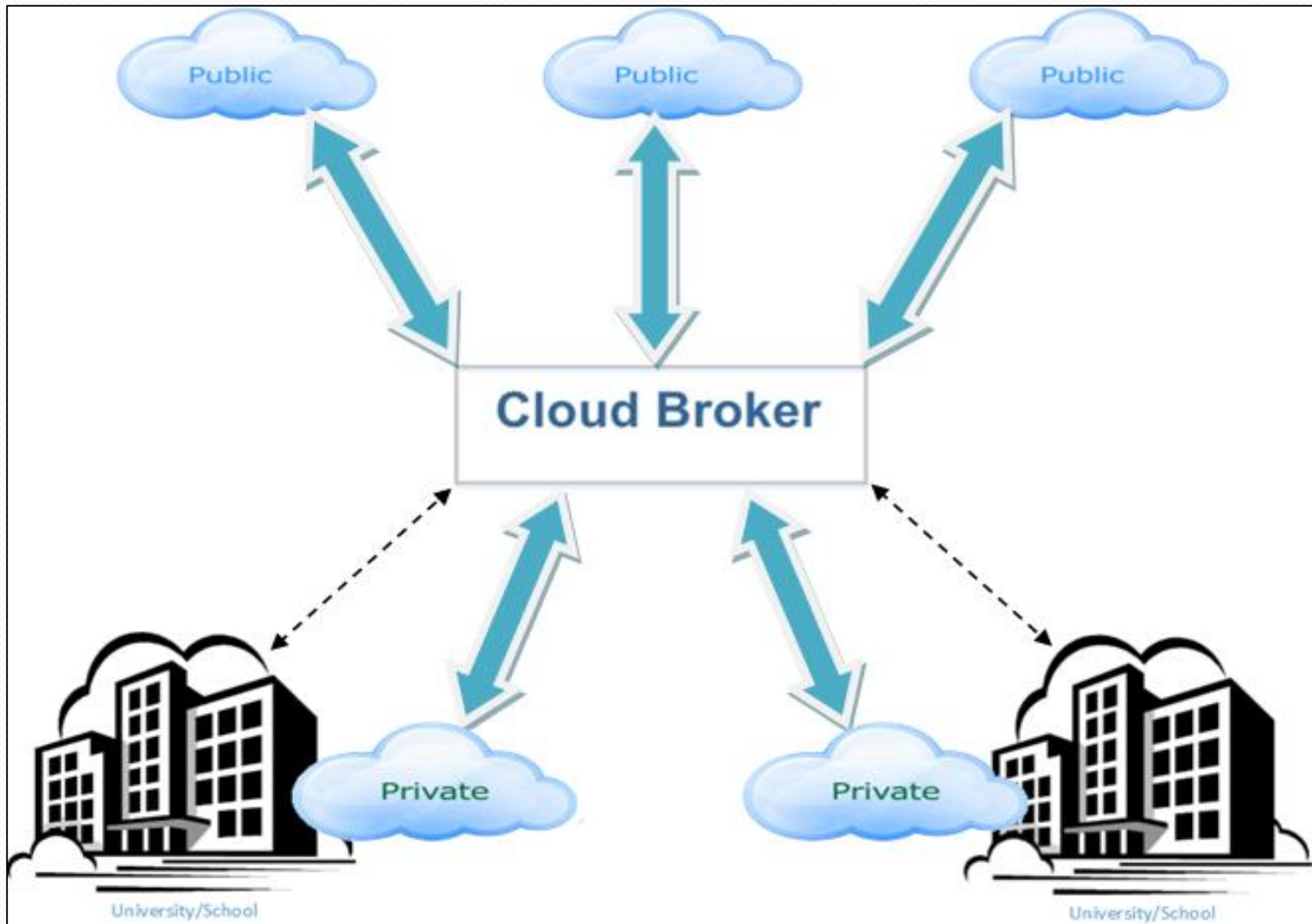
# Key policy 4

- The migration to the cloud requires a change in IT governance models and practices, offers to be made available to users must meet two main requirements: *ease of use and flexibility.*

## *Adopt a cloud friendly governance model for IT*

- Hence it is advisable to:
  - **Redefine** the role of the IT department to become a **service** and support provider without limiting the scope of initiatives that users may want to take
  - Create an **entity at national**, regional or institutional level that deals with **brokerage** and procurement in a centralized way

# Cloud Broker



# Cloud Service Entity

- Operate the **cloud broker** and the self-service portal
- Negotiate the SLAs & general terms and conditions with Network providers and **global/national public clouds** providers. Terms must be **compatible** with legal frameworks
- **Expose** to individual **users** and member **institutions** terms and conditions that engage their individual responsibility in case of a non-authorized/legally reprehensible behavior.
- **Negotiate** software **licenses** on behalf of a group of institutions
- Make it possible for users from a **group of institutions** to interact/collaborate/share cloud resources, applications or services they acquire/access through the intermediate entity
- Take **responsibility** for a federated/consistent **data** strategy and data management plan.
- Act as a single **point of information** for IT/data **security** and **privacy** policies/rules