UbuntuNet Alliance
for Research and Education Networking

UbuntuNet CONNECT 2014

NRENs Cloud Infrastructure Framework (NRENs-CLIF): Case Study of SADC Region

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Introduction

- NRENs-CLIF : NRENs-CLIF Cloud Infrastructure Framework
- Conceived to build a Cloud computing infrastructure framework suitable for the SADC NRENs

Motivation -Strength

- Existing functional NRENs in the SADC region
- Structures of the existing NRENs
- Resources, technologies, etc

Objective(s)

- NRENs-CLIF assess the prevailing status of SADC NRENs, non-Cloud based technology
- Further determine best possible framework of transforming current infrastructure into cloud model

Statement of the Problem

- Appealing features of Cloud Computing have been driving its integration into ICT component of Education sector
- In view of the above, NRENs in developed nations are adopting Cloud Computing
- Thorsteinsson et. Al., (2010), cloud-based solutions can be very effective collaboration learning
- Katz (2009), many NRENs in developed countries are joining cloud-based services to stay organised and connected
- Developed world opted for Cloud Computing because of its flexibility to pay-as-you-go and on demand scalable model

Statement of the Problem (contd.)

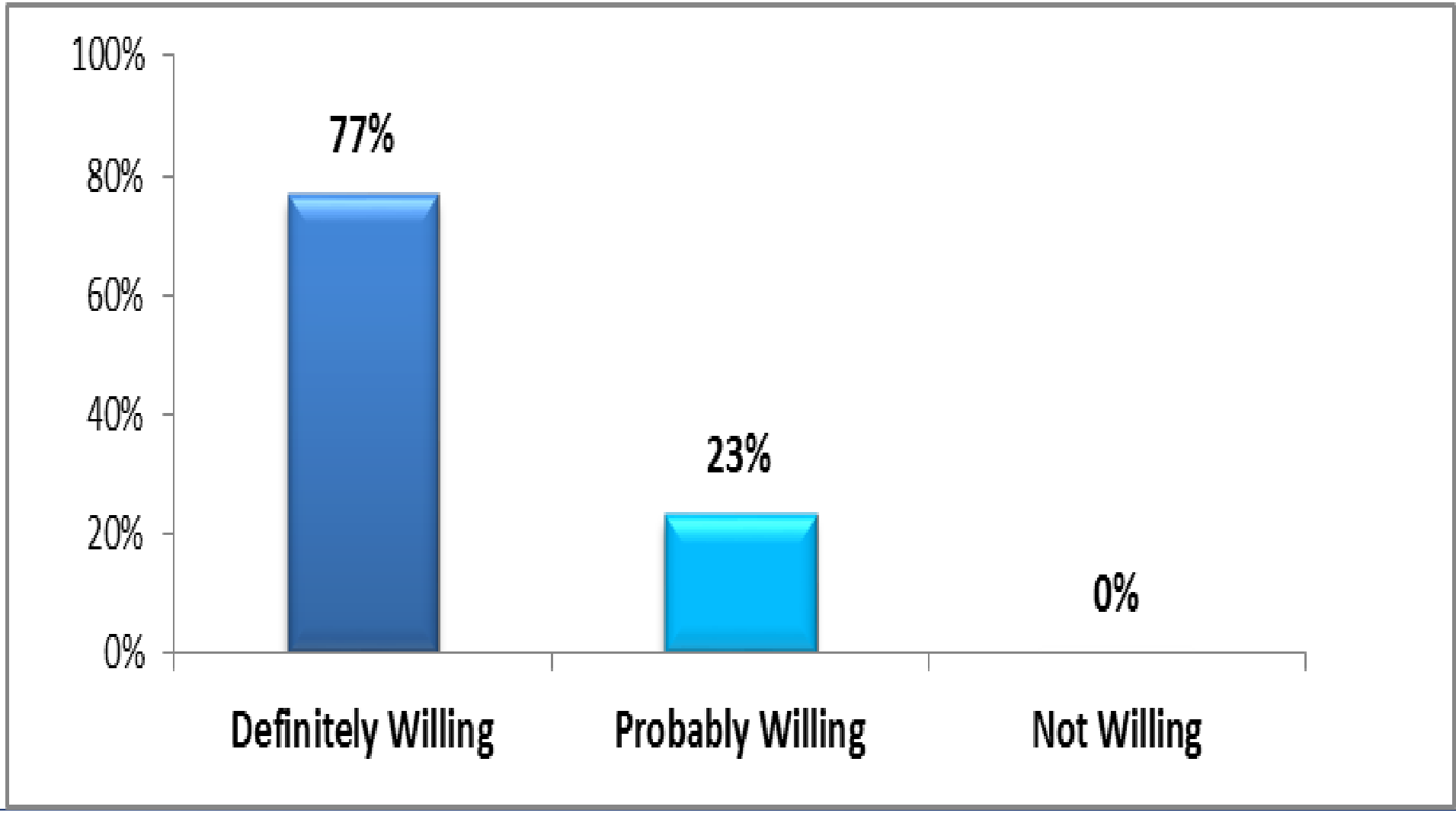
- Require dedicated research on Cloud Computing in the SADC region
- In view of the above, this work introduces NRENs-CLIF which would build an Inter-Cloud infrastructure system that would envision the transitions of every NREN into Cloud
- The study aim to address the following Research Questions:
  1. How can the SADC NRENs resources be utilised to establish Cloud infrastructure and connectivity to facilitate research collaboration?
  2. What are the resources that can be used to establish institutional Cloud infrastructure in the SADC NRENs?

Statement of the Problem (contd.)

3. What Cloud Service Architecture is suitable for interconnection of NRENs in SADC region?
4. What are the challenges faced by SADC NRENs with regards to establishing institutional Cloud services

Statement of the Problem (contd.)

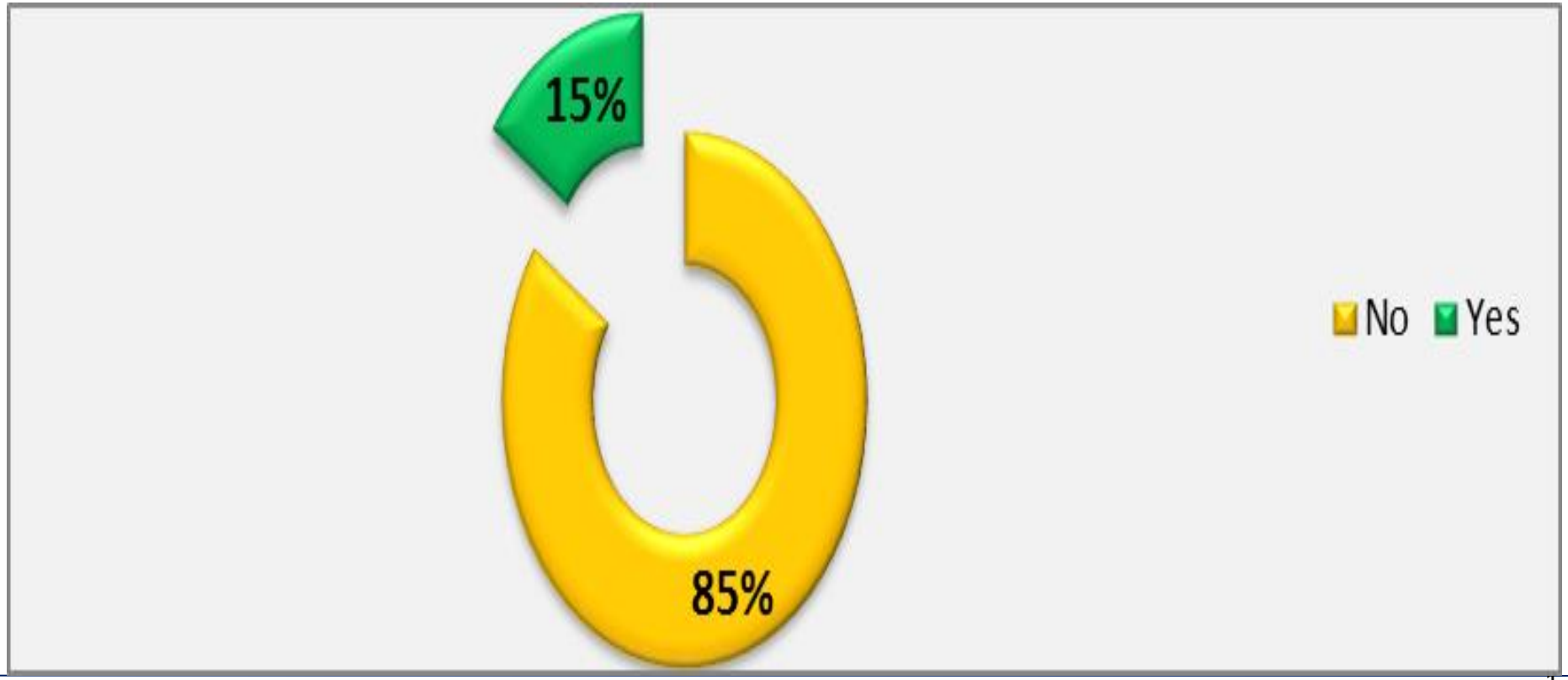
- Study: willingness of NRENs to deploy Cloud technologies:



Study – Challenges Adopting Cloud Computing

Study revealed that:

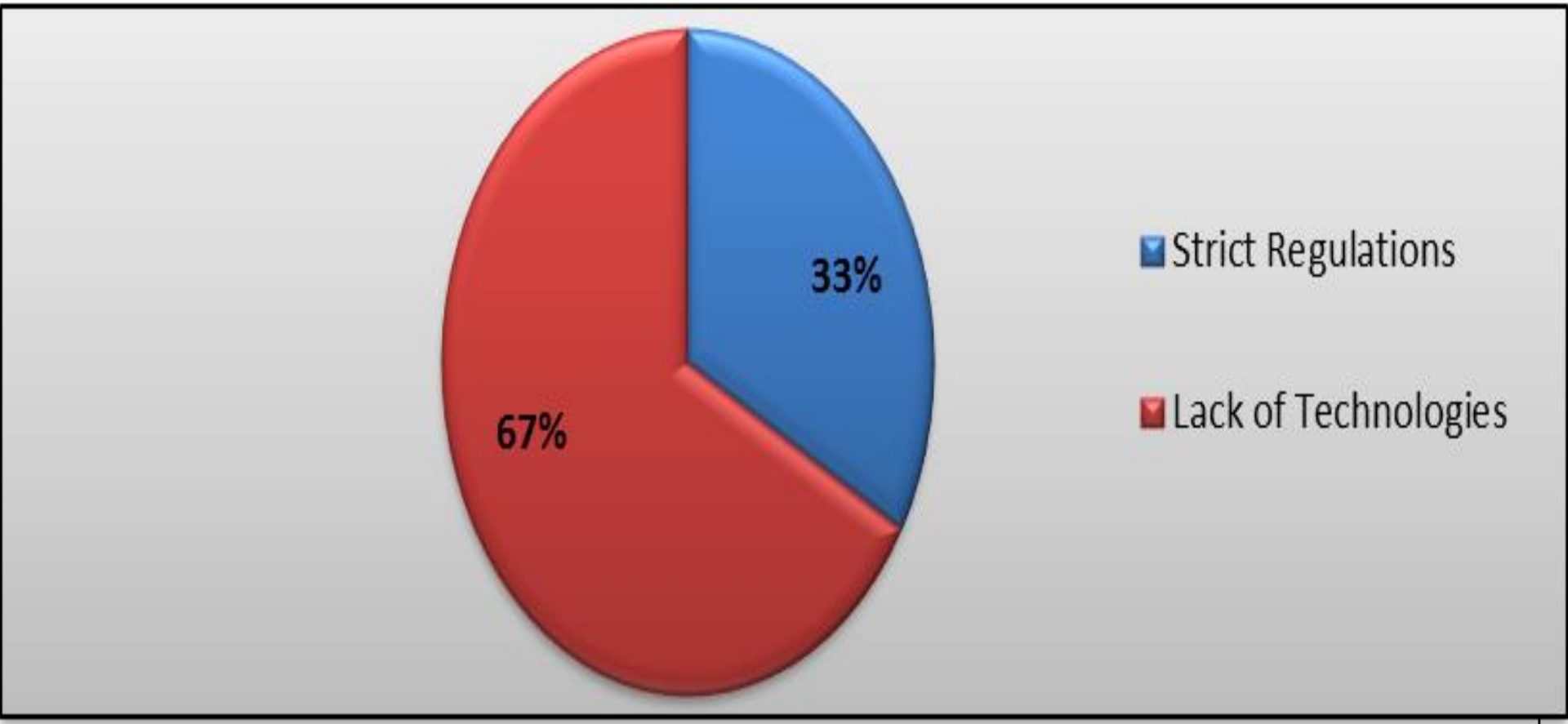
- only 15% responded that their organisations implemented cloud technology
- about 85% NRENs not implemented Cloud technology



Study : Cloud Services

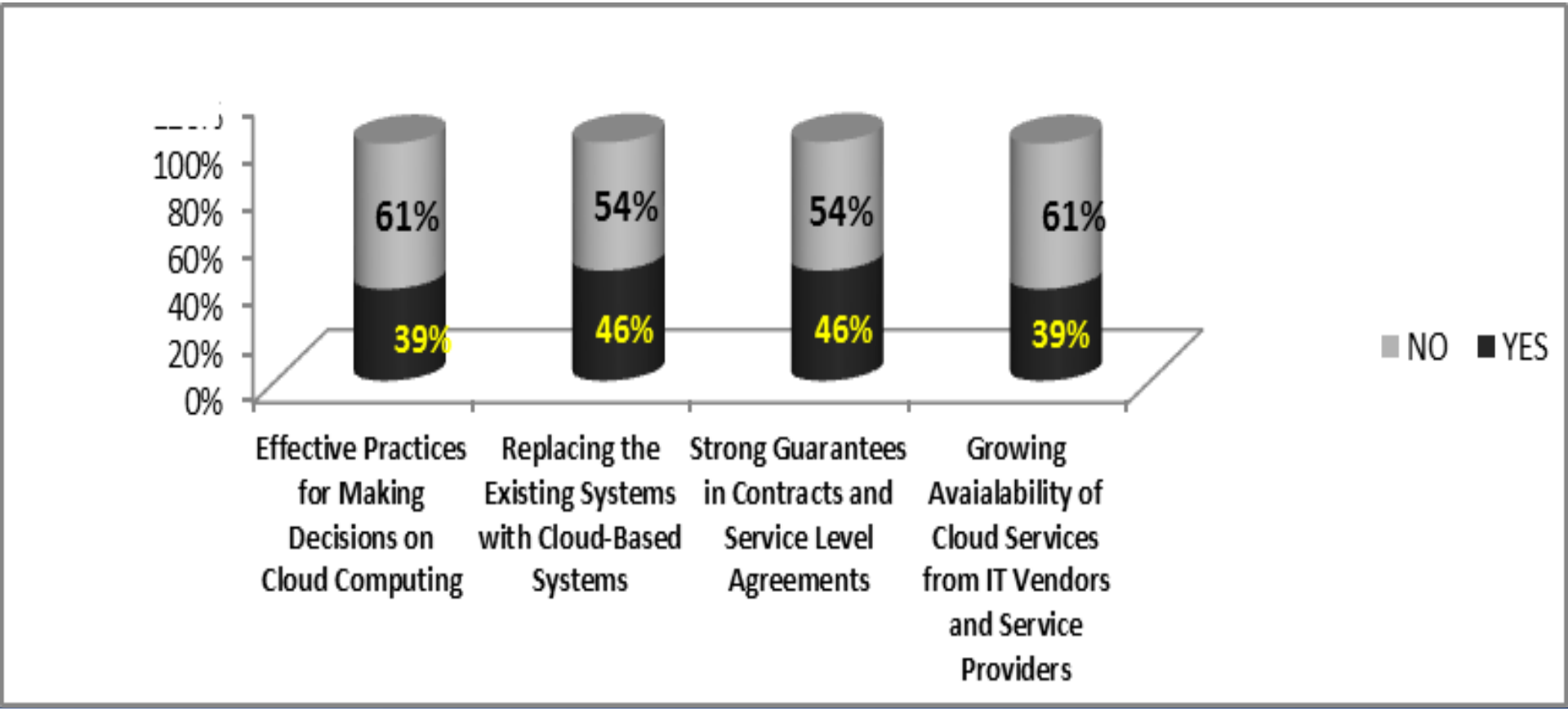
Study: reasons for having not adopted Cloud services in NRENs institutions

- About 63% pointed out, lack of technology
- While 33% raised concerns on strict(ed) regulations



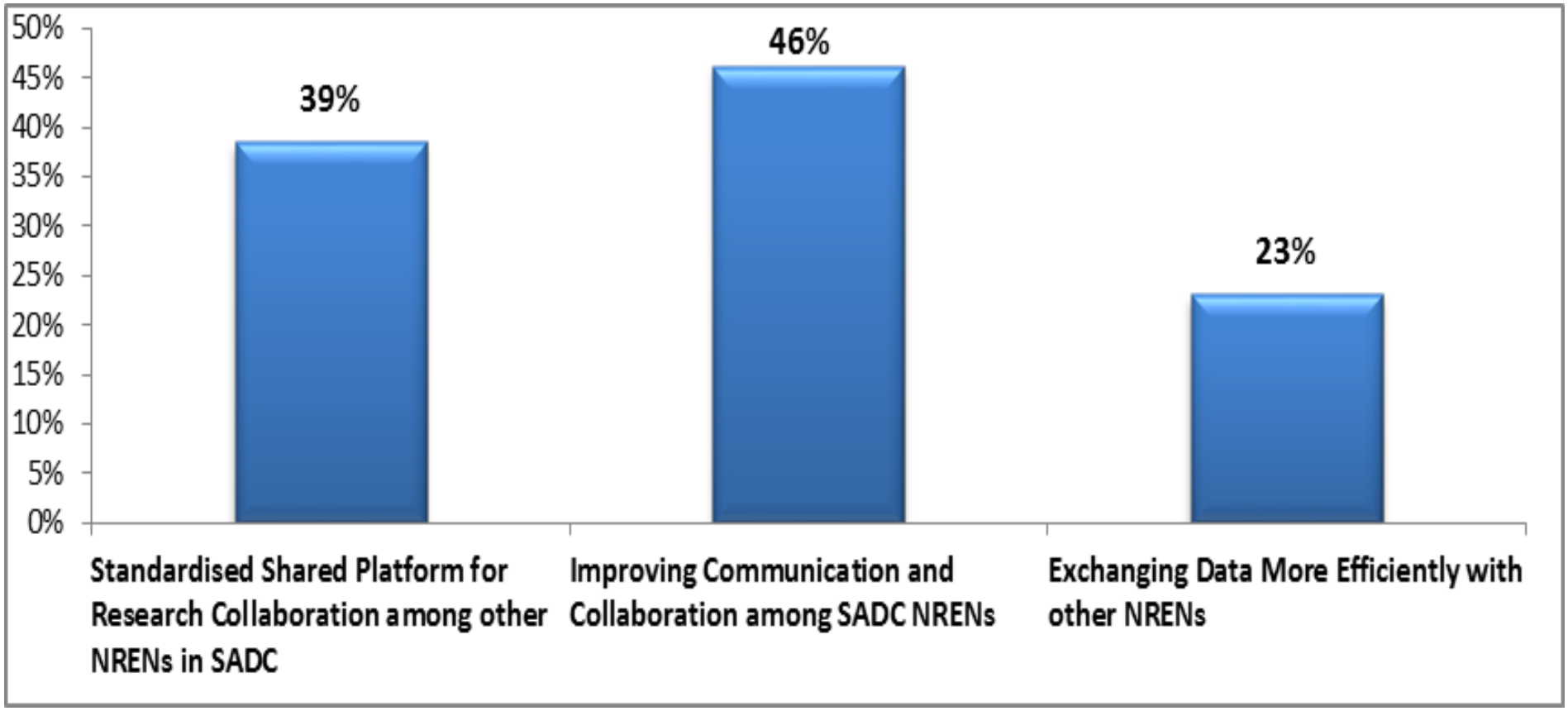
Factors to be Considered on Adopting Cloud Technology

- Stronger executive support – cloud initiatives
- Upgrading to Cloud services
- Strong/firm guarantees – contracts
- Availability of Cloud services

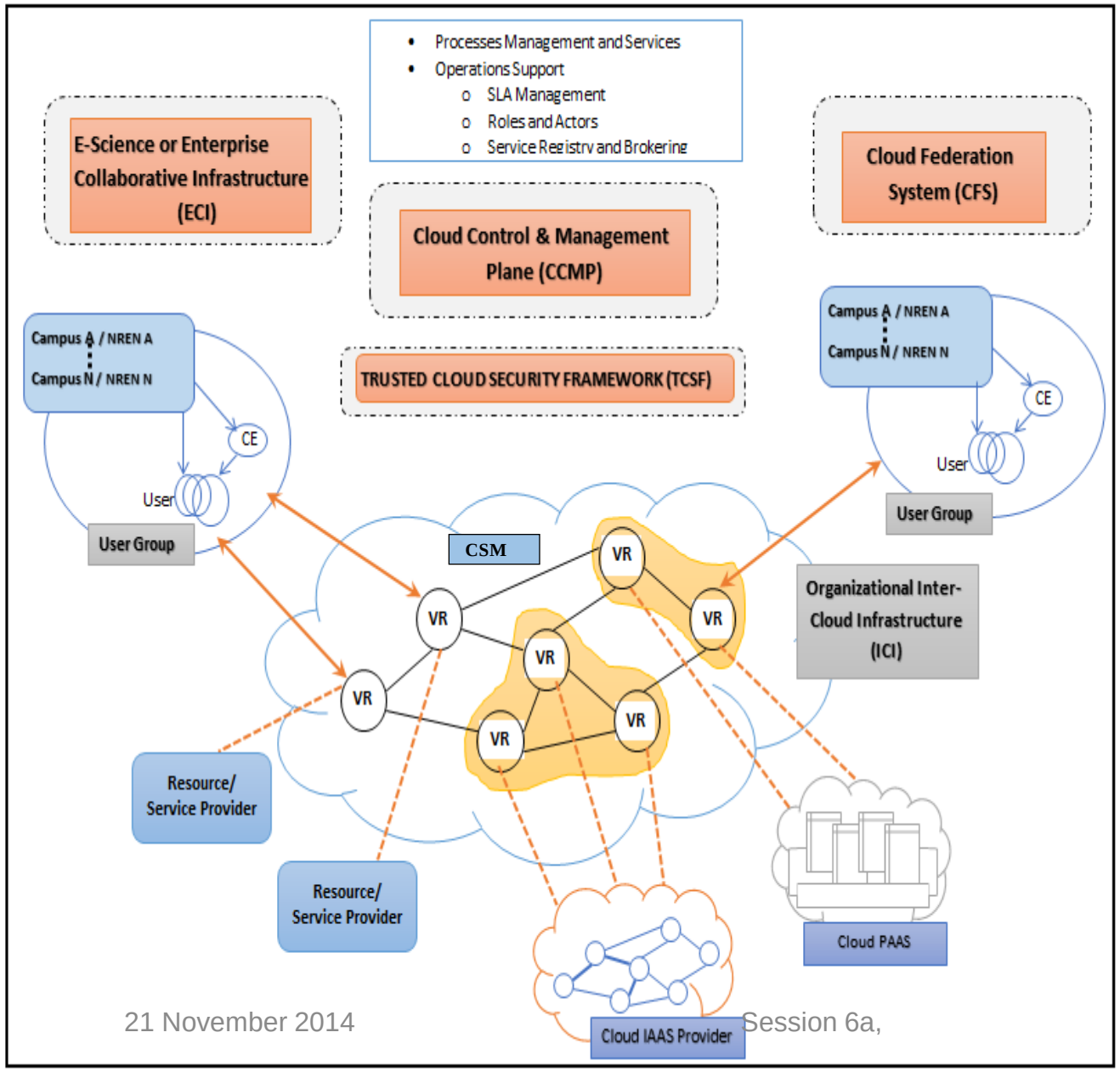


Benefits of Cloud Services in NRENs Members

- Standardised shared platform
- Effective collaboration among SADC NRENs
- Effective data exchange among SADC and NRENs beyond



Proposed NRENs-CLIF Framework for SADC NRENs



Main Architectural Components

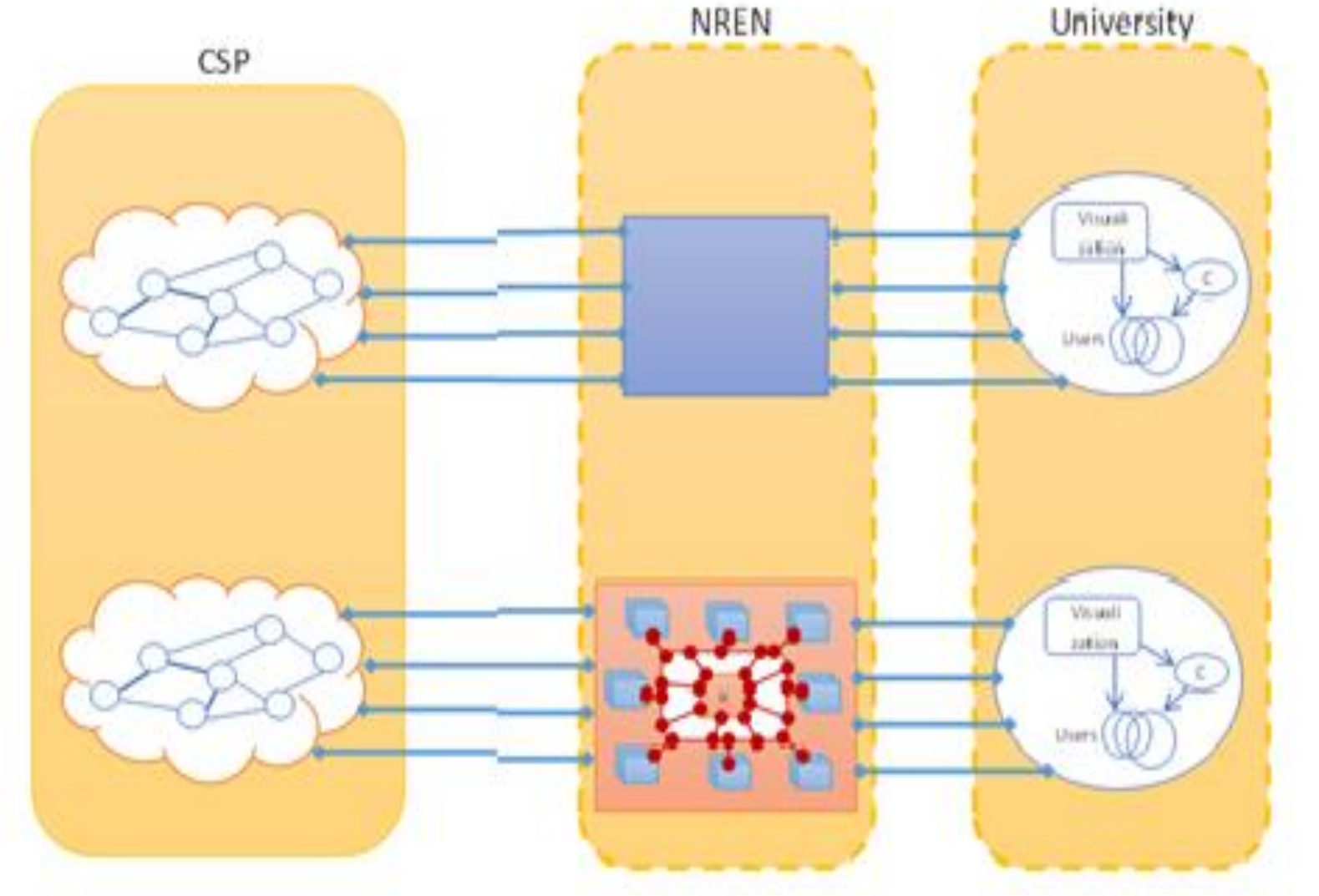
- Cloud Services Model (CSM)
- Cloud Control and Management Plane (CCMP)
- Trusted Cloud Security Framework (TCSF)
- Cloud Federation System (CFS)

Supporting Architectural Components

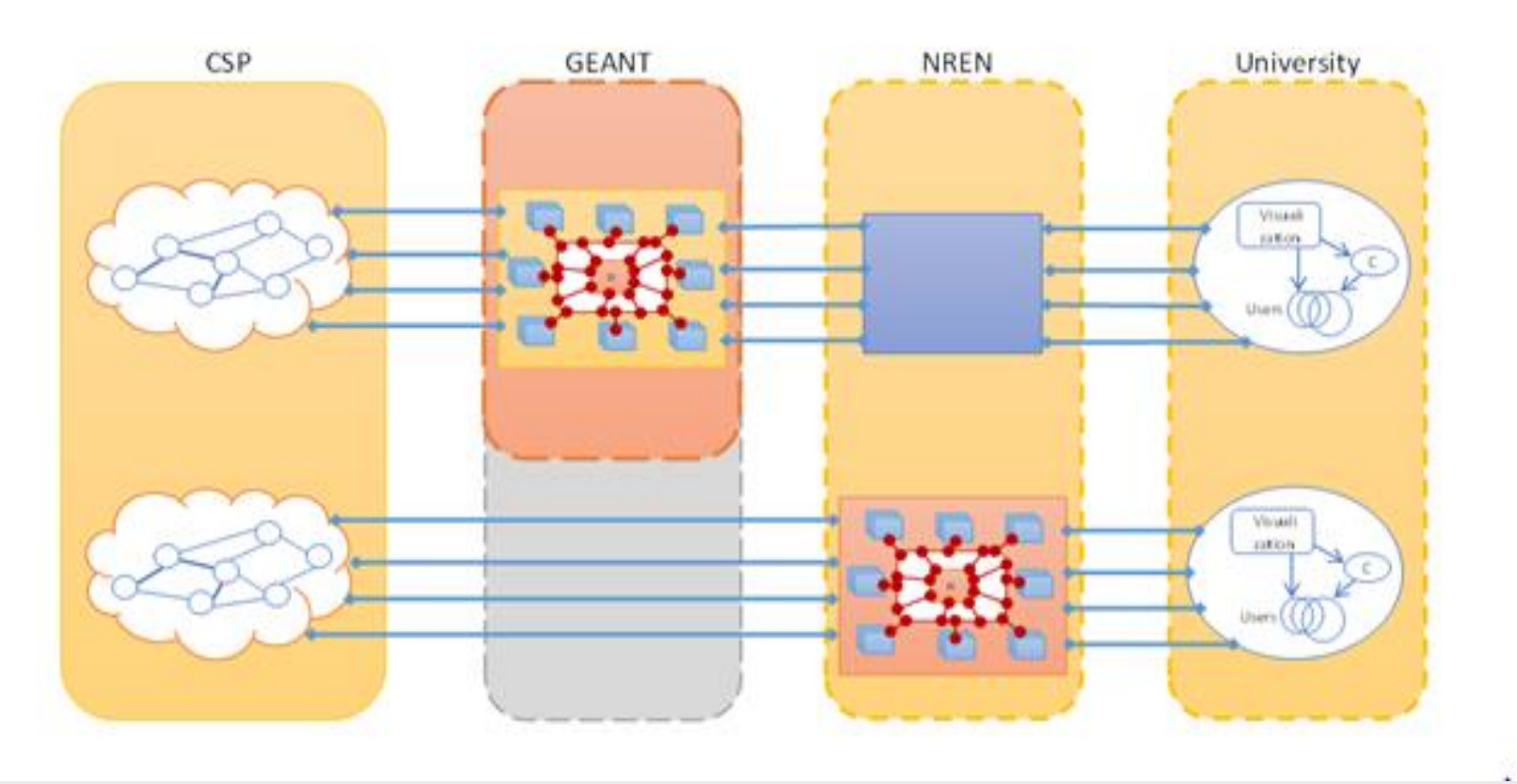
- E-Science or Enterprise Collaborative Infrastructure (ECI)
- Virtual Resources (VRs)
- Inter Cloud Infrastructure (ICI)
- Resource/Service provider
- Campus Network
- Cloud IaaS/PaaS provider

Summary

NRENs-CLIF Topology



Recommendations



Single NRENs-CLIFF IX on NREN or GEANT: Hierarchical Topology

Conclusion

- Cross border issues
- Legal issues
- Interoperability issues

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Thank You