Title: Cloud Based Learning Framework for Academia

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Background:

- Cloud technology in academia is to manage effectively the technological needs of universities:
  - providing of virtual resources for students and faculties,
  - online learning system,
  - storage of data and computing and so on.
- Academia systems have *variety of data and also need many isolated network* for education services among universities
- Most institutions *need to share teaching and learning materials and also make research collaboration*
Targets:

- The cloud computing infrastructure is solutions that can adequately fulfill these requirements:
  - To offer online learning and this framework addresses the services and development of cloud for helping the students, faculties, researchers and administrators of the university to better utilize their infrastructure.
  - To ensure the right people are accessing the right areas on campus using the blockchain technology to provide students with anytime/anywhere collaborative learning environment with a high level of security.
  - To be a plan for disaster recovery such as against earthquake, tsunami disaster and a heavy flood for cloud based learning environment using live migration mechanism between two private cloud infrastructures.
Proposed Method: Cloud based Learning Framework with Disaster Recovery Plan

- Cloud Computing
- SDN Concepts
- Blockchain Technology in Cloud Framework
- Live Migration Mechanism
Proposed Method: Cloud based Learning Framework with Disaster Recovery Plan

Wireless users

External/Core Network

VPN

External/Core Network

Academic Cloud Services

Live Migration

Cloud Controller

Physical servers from tenant 1

SDN based switch

Disaster

Private Cloud A

Live Migration

Physical servers from tenant 2

SDN based switch

Private Cloud B

Cloud Controller

Physical servers from tenant 1

SDN based switch

Physical servers from tenant 2
Proposed Method: Cloud based Learning Framework with Disaster Recovery Plan

❖ This framework specifies the *virtualization* technology in order to use the resources more effectively.

❖ In this academic cloud can store educational records including transcripts, diploma, or personal students/teachers records, examination results, teaching material and so on.

❖ In order to get the high level of security for accessing the right people on right area *blockchain technology* is considered.

❖ It has been also a plan for disaster recovery for cloud based learning environment using *live migration mechanism* between two private cloud infrastructures.

❖ The proposed architecture is based on cloud computing and SDN concepts.
Proposed Method: Cloud based Learning Framework with Disaster Recovery Plan

❖ **For Disaster Recovery Plan**

❖ Own private cloud fabric has *several node machines* to get enough *fabric’s redundancy*.

❖ The computing resources and the data store resources are provided via VMs, and the resources are changed adaptively by the request from the administrators.

❖ The VM *can migrate between other private cloud fabrics*, and it is able to continue to keep running.

❖ A *live migration function* needs a *shared file* system to process the *VM’s live-migration*. 
The Cisco SDN architecture can be considered for SDN concept such as APIC-EM.

- Advantage of this model is the use of open-source software so implementation costs for this solution are significantly reduced.

- Nowadays, many universities collaborate with teaching and e-learning system, research activities and so on.

- Latest technology, Cisco Connected Mobile Experiences (CMX) is used which use WiFi and location analytics technology.

Impact: Understanding Digital Network Architecture in Education
Impact: How benefit cloud blockchain Technology bring to Education

❖ *Blockchain* systems frequently involve the use of cloud computing platforms.

❖ A *permissioned blockchain* is used for restricting/controlling the access of the stored record such as transcripts, diploma, or personal students/teachers records, teaching materials/courses, examination results and so on.

❖ It may also include maintaining the identity of each blockchain participant on the network.

❖ Such blockchain control the participants’ transactions and define their roles in which each participant can access to the blockchain.

❖ It is used for *restricting access to academic credentials and limit it to the intended participants only.*
Impact: Offering Disaster recovery plan using the cloud Framework

❖ Each private cloud fabric has *private cloud controller* which constructed *live-migration function*.

❖ *VPN connection* makes connection between both private cloud fabrics.

❖ As a result, both private cloud fabrics are organized same cluster logically.

❖ Open Flow switch is used for *making optimum path dynamically between several private cloud fabrics*.

❖ The cloud controller has functions, there are *catching earthquake alert notification* via cell-phone carrier using smartphone function.

❖ Then, cloud controller *makes live-migration command* for target node machine, and sending command to the target node machine.

❖ The service running on *private cloud A is migrated to private cloud B*. 
Output/Outcome

- The cloud based academia framework is presented for providing richer learning experiences *gaining real-time, actionable insight into student performance with high security*

- This framework is *also helpful for disaster recovery between two private cloud infrastructures.*
Conclusion:

❖ All recent research and developments, *cloud-computing technology* is still evolving.

❖ In the same way, education system is also promoted by use of technology, in such a way that information is distributed and knowledge is shared between students, researchers and faculties.

❖ Cloud Computing Technology has emerged as a meaningful technology by providing infrastructure and software solutions for the ICT needs of University via internet.

❖ So, *the cloud computing infrastructure is a solution* that can adequate fulfill for sharing teaching and learning materials and also research collaboration.

❖ In order to provide network programmability *SDN concepts must be used too* in proposed framework.

❖ Additionally, *the blockchain technology* is considered for *high security and integrity*, building a collaborative atmosphere for all parties including students, faculty members, and authorities.

❖ Moreover, this framework has also been *a plan for disaster recovery* for cloud based learning environment *using live migration* mechanism between two private cloud infrastructures.
Thank You So Much For Your Kind Attention