



National Strategic Implementation plan for using Cloud Computing in Education in Arab Countries



January 2018

Objective : guide project teams from Arab countries in the elaboration of their own vision and national strategy for mass adoption of cloud computing in higher education.

- The development of a vision and strategy for migration to the cloud requires a **structured approach** that takes into account different facets of cloud computing and the context in which Higher Education Applications' migration will be implemented.
- To meet such requirements, a **general model** of the Digital University (DU) as well as a **contextualization approach and tools** for designing and implementing the cloud migration strategy have been developed.

These tools are designed so that the main actors within the ministries and / or universities can, through **discussion** and **dialogue**, not only reduce / add elements composing these tools, but also review and update their degree of importance in acting on the weights.

This process is initiated by the contextualization of the tools that allow an **exchange based on the argumentation of the actors**. As a result, the process and the tools that underpin it bring views together and foster the emergence of a **shared vision and a consensus around goals**, their priorities, and the means to achieve them.

This creates the right conditions for the acceptance, commitment, and involvement of the actors

General Digital University Model

Digital University Vision and Strategy

Improve experience

Establish Brand

Control Costs

Increase Revenues

Deliver best outcomes

Promote Academic Values

Strategy Planning Service

Strategic intelligence and analysis Service

Strategy Monitoring, KPIs, Dashboards Service

Digital Campus Management

Rationalize Operations

Rationalize energy consumption

Promote sustainable & eco-friendly models

Improve communication and collaboration

Enable remote working

Collect Data, manage data

Use data and analytics to improve efficiency

Improve Staff experience, capacity building and productivity

Improve security

Students Management Systems

Staff and faculty Management Systems

Library Services

ICT Support Services

Energy Monitoring & Control

Assets management System

Security & Access Control

Video & Information systems

Attendance Systems

Location-based services

Building Control & Management

Digital Teaching & Learning

Increase number and quality of admissions

Improve retention

Improve employability rates

Measure, monitor and improve academic performance

Improve access to certifications and success rates

Improve Pedagogical methods and techniques

Collect data and leverage analytics to improve the learning experience and efficiency

Improve Curriculum attractiveness and relevance

Adapt to Lifelong learning trends

Outreach to distant learners

Improve Communicatin and collaboration

Leverage on existing Open Education Resources

Virtual Learning Environment Moodle, Open Edx, ..

MOOC Platform Moodle, Open Edx, ..

Assessment Management System

Learning analytics Systems

Virtual Laboratories

Virtual IDE/Workbench

Video conferencing/ broadcasting of courses

Digital Research

Improve productivity

Improve Research communication and Collaboration

Increase Grants applications number and success rate

Improve number and volume of external collaborations and contracts (Industry, organizations)

Promote and facilitate Spin-Offs creation

Optimize IP management

Increase Uptake / Promote Technology Transfer

Virtual Research Environments

Research Data management systems and governance

Research support and consultancy services

Compute Services, Clouds, HPC Clusters, SuperComputers

Ecosystem links

Deliver and anchor skilled graduates into their local economy

Drive economic prosperity

Promote civic engagement

Support local authorities and communities

Stimulate stakeholders engagement, collaboration & sponsorship of the University activities

Engage & contribute to local networks & clusters

Collect and analyze data on graduates employment and careers

Involve stakeholders in strategies elaboration

Improve Communicatin and collaboration

• Stakeholders management, dissemination and communication systems

Careers services

Unified Communications Emails, Web Conferencing and Collaboration

Video Conferencing

Video Capture & Storage

Social Media Tools

Information Sharing Tools

University Portal

Storage services

Collaborative Office Suites

Communication & Collaboration Services

IT Service Delivery Platform, End-to-end infrastructure

Wired and Wireless Network

IoT Network

Secure Remote Access

Identity Federation

Data Center / Private Cloud

Brokers

Community Cloud

Public Clouds

Customized Digital University Model

Digital University Vision and Strategy

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Rationalize energy consumption

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Improve communication and collaboration

Enable remote working

Improve Staff experience, capacity building and productivity

Collect Data, manage data

Use data and analytics to improve efficiency

Students Management Systems

Staff and faculty Management Systems

Library Services

ICT Support Services

Energy Monitoring & Control (Pilot)

Assets management System

Security & Access Control

Building Control & Management

Digital Teaching & Learning

Increase number and quality of admissions

Improve Pedagogical methods and techniques

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What IT applications contribute most to achieving the selected objectives?

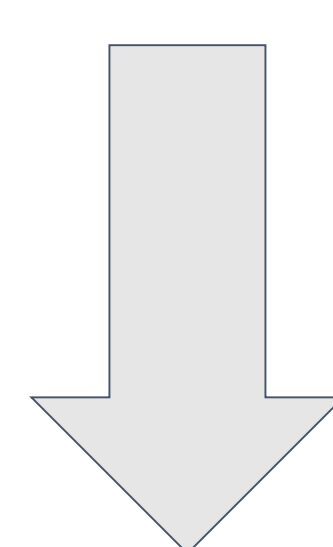
<http://bit.ly/bahrain-oapp>

Three-layered decision making model

Ministry-driven strategy

Ministry Objectives and Applications

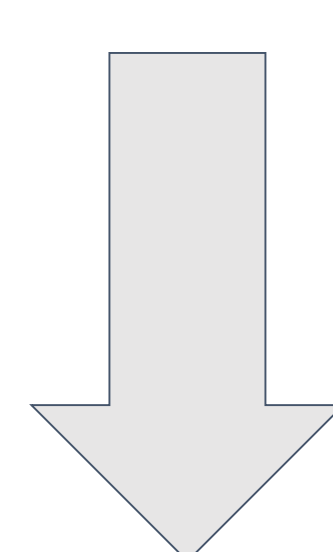
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- Digital Research: { DU3-OBJ1 } { DU3-APP1, DU3-APP2 }
- Ecosystem digital links: { DU4-OBJ1, DU4-OBJ2 } { DU4-APP1 }



University strictly follows Ministry strategy

University Objectives and Applications derived from Ministry Objectives and Applications

- Digital Campus Management: { DU1-OBJ1, DU1-OBJ2, DU1-OBJ3 } { DU1-APP1, DU1-APP2 }
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Institution strictly follows University strategy

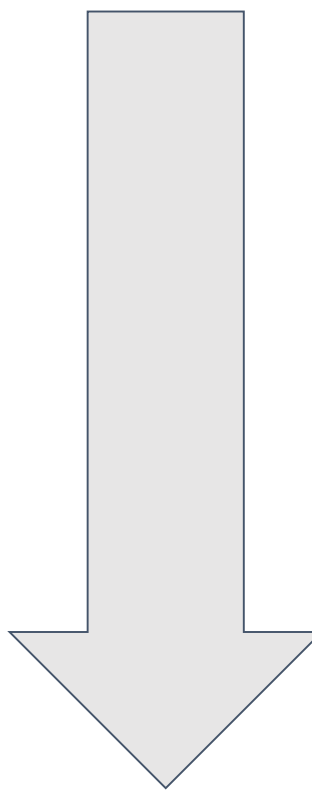
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Ministry enforces subset of common objectives and applications
University defines subset of specific objectives and applications

Ministry Objectives and Applications

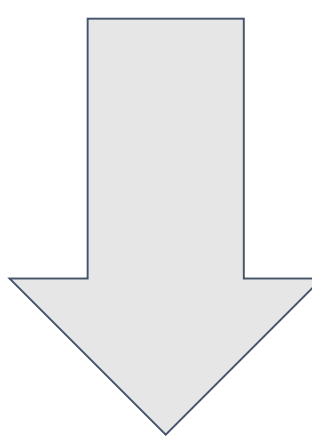
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University follows Ministry strategy and defines its own strategy adapted to its specific context.

University Objectives and Applications derived from Ministry Objectives and Applications and adds specific new objectives and applications

- Digital Campus Management: { DU1-OBJ1, DU1-OBJ2, **DU1-OBJ3** } { DU1-APP1, **DU1-APP2** }
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Institution strictly follows University strategy

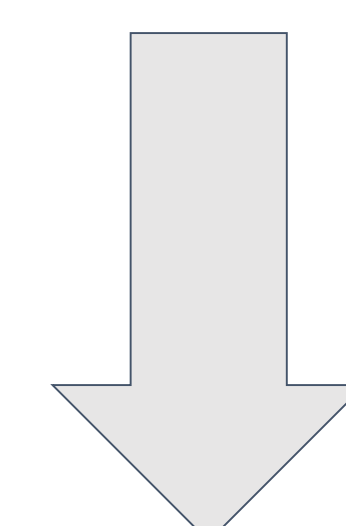
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Ministry enforces subset of common objectives and applications
University defines common subset of specific objectives and applications
Institution defines extra subset of specific objectives and applications

Ministry Objectives and Applications

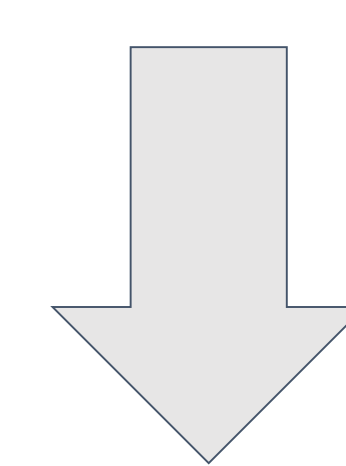
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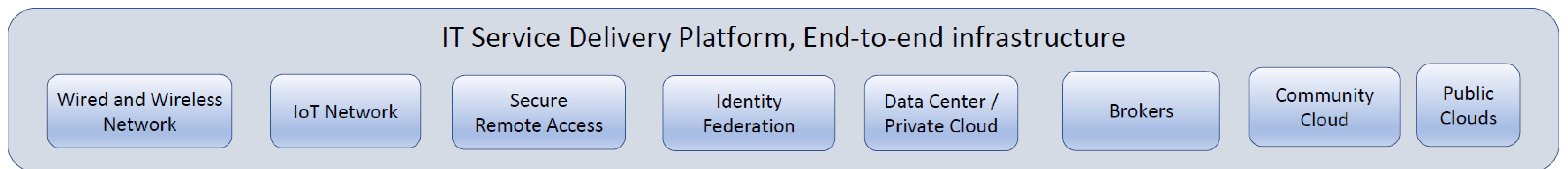


Institution follows University strategy and defines its own extra strategy adapted to its specific context

Institution Objectives and Applications derived from University Objectives and Applications

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Contextualized IT Service Delivery Platform layer



Contextualized SWOT Analysis

- The four dimensions of SWOT are defined as follows:
- **Strengths** : characteristics of the project that give it an advantage to achieve
- objectives
- **Weaknesses** : characteristics of the project that place it at a disadvantage for achieving
- objectives
- **Opportunities** : elements in the environment that the project could exploit to its
- advantage
- **Threats** : elements in the environment that could cause trouble for the project

• <http://bit.ly/bahrain-swot>

SWOT ANALYSIS



Contextualized vision for IT governance

Critical factors and migrability level identification

<http://bit.ly/bahrain-factors>

Building migration & Implementation strategies

Translate objectives into operational plans and programs by choosing the cloud style, type and provider, and by defining sub-objectives, activities, sub-activities to be implemented and by identifying the resources to be allocated and the teams to be deployed.

<http://bit.ly/bahrain-migration>

Typical migration scenarios

Scenario 1, Migration to a private cloud with OpenStack

Its objective is to deploy a legacy Students Management System on an OpenStack-based private cloud

Scenario 2, Migrating Moodle to AWS

Its Objective is to deploy a Virtual Learning Environment / LMS based on Moodle on Amazon's public cloud

Scenario 3, Migrating Research Computing Services to the cloud using a cloud broker, AWS, Azure and Google Cloud Platform (GCP)

Its objective is to deploy a Cloud broker and a collaboration portal to access compute and storage capabilities for research on AWS, Azure, GCP and Open Nebula-based research cloud in order to provide each researcher and each PhD student with a managed /monitored personal public cloud account

Typical migration scenarios

Scenario4, Migrating SharePoint-based portal to Azure 365

Its objective is to **deploy** a Stakeholders management, dissemination and communication portal/CMS based on Microsoft SharePoint on Azure.

Scenario 5, Migrating communication and collaboration services to G Suite for education

Its objective is the use G Suite for education for communication (GMAIL, HANGOUTS)

Collaboration (G Docs) Courses management (G Classroom) and cloud computing/big data education.

The migration of universities to the cloud is not limited to its technological dimension. It involves a set of actors including decision makers, beneficiaries and teams involved in the implementation of change.

The latter is to be interpreted as a **dynamic process of material and immaterial transformations**, including the **culture** of the university.

This process is part of a **proactive** strategy of permanent renewal with regards to technological evolutions and modes of work and collaboration.

The success in migrating to the cloud in Higher Education is conditioned by the adoption of a **participatory approach** that puts emphasis on the development of the university's capacity to change and adapt. It is essential to conduct and steer change in a way that enables the **greatest autonomy** of the different actors while respecting key **guidelines** and preserving core strategic objectives.