Arab Republic of Egypt
Ministry of Communications
and Information Technology

The Egyptian Government Cloud (EG-Cloud) Strategy

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Executive Summary

Cloud Computing has emerged as a step change in the economics and sustainability of Information and Communication Technologies (ICT). It is globally considered as one of the utmost innovative models for developing and utilizing computing resources. The underlying technology is rather simple, but the business model is truly attractive. The model presents a shift away from computing as a purchased product, to computing as a delivered service. Users no longer need to seek and invest large funds for buying capital equipment. The model allows enterprises, especially SMEs, to access powerful resources that they cannot afford. Even larger organizations can now access as much power, storage, and bandwidth whenever they need them without hitting resource limitations or having to oversize their installations. The opportunities of using powerful computing resources on demand via the network are a potential driver for the growth of nations economy.

Governments all over the world have started to deploy the cloud computing model and reap the benefits of the transformation. Despite the variation in the implementation model from one country to another, clear positive impact has been confirmed from both the financial and performance perspectives.

Understanding both the promise and risks of this new paradigm, the Egyptian Ministry of Communications and Information Technology (MCIT) has decided to develop a thoughtful Egypt Government Cloud (EG-Cloud) strategy to support and promote the utilization of the cloud computing in the government. A task force has been formed, representing all the relevant stakeholders from the government, private sector, academia, NGOs and others.

A complete situation analysis has been undertaken in order to identify the most appropriate strategic directions and initiatives. A roadmap for implementing the EG-Cloud strategy has been proposed along three main strategic directions: developing the eco system, developing the governance model, and rolling out the EG-Cloud.

A pilot implementation was deemed crucial at this stage, not only to develop capacity and knowledge, but also to assist the government entities to gradually accept and migrate to the cloud model. This acceptance is a mandatory ingredient of a successful nationwide deployment.

This document reveals anticipated challenges; it illustrates how the government can overcome those challenges, creating and maintaining certain key success factors.

1. Introduction

Cloud computing is a different facet of ICT that is transforming the way IT is consumed, managed, and procured. Just as the Internet has led to the creation of new business models twenty years ago, cloud computing is beginning to disrupt and reshape entire industries in unforeseen ways. The economics of IT have changed. Consequently, the new market for cloud computing software, systems, and services has been on a growth path for the past few years. It has exceeded$130B worldwide in 2013, growing from around $110B in 2012.

Growth is fastest in developing nations; where the model is most attractive for cashstrapped SMEs and governments trying to rapidly expand the deployment of more transparent and convenient e-services to their increasingly ICT-savvy citizens.

MCIT announced its national ICT strategy targeting a key vision of achieving a digital economy –through the use of ICT—in order to provide prosperity, freedom and social equity for all. The vision identified three basic strategic objectives – illustrated in figure- 1: establishing the Digital Society; developing the Egyptian ICT Industry; and establishing Egypt as a Digital Hub. The Cloud Computing strategy comes under the basic infrastructure pillar to support the overall implementation of the strategy.

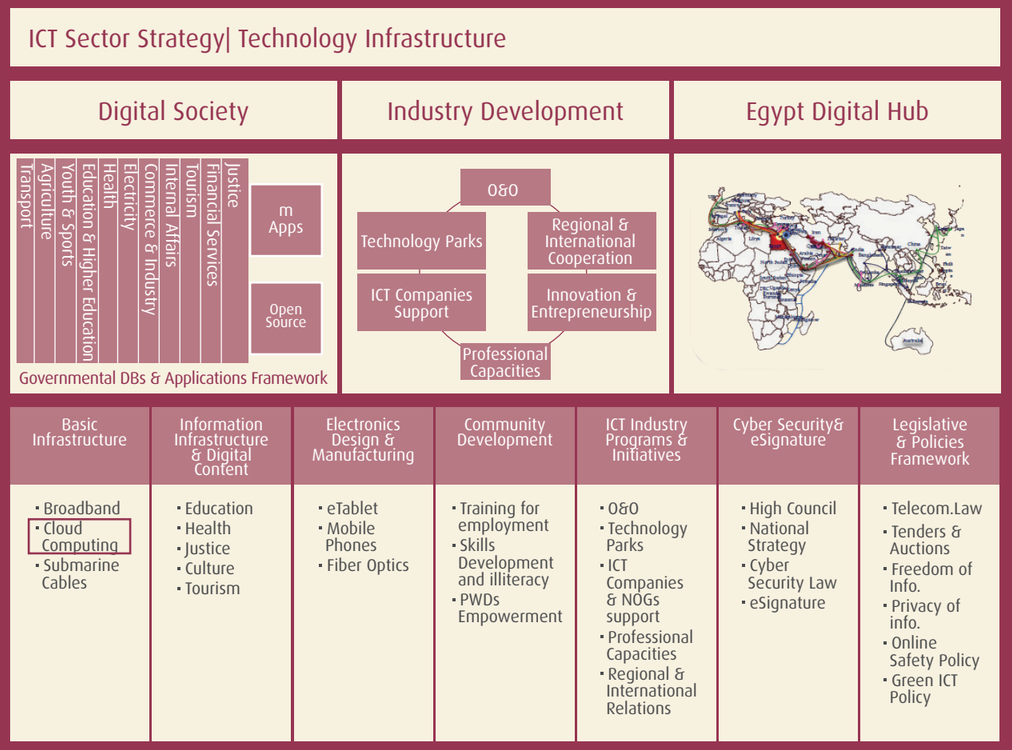

Figure 1- MCIT Key Strategic Initiatives

1.1 Why Governments Need Cloud Strategy?

The public sector's ICT infrastructure has grown over several decades to meet the increasing demand for the automation of government processes, storage and management of government data, and provision of some online services to citizens. This has resulted in increasingly costly infrastructure proliferation, which has hindered the government's ability to upgrade it, optimize its usage across government entities, and scale it up to address the expanding needs at the national level. The cloud computing model provides an opportunity for the Egyptian government to deliver efficient, costeffective public services. Cloud computing is creating a paradigm shift by delivering hosted services through the internet with recognized cost benefits and business innovation. While the private sector is building on cloud computing's numerous benefits, government organizations have also aggressively begun to capitalize on them. Accordingly, the government of Egypt sees the cloud computing technology and practices as an opportunity to improve service performance. It intends to achieve this through eliminating redundancy, increasing agility, and providing information and communication technology services as a utility.

Adopting the Egyptian Government Cloud (EG-Cloud) strategy has strong economic and developmental benefits, which became apparent in the case of both developing and developed countries. Such benefits include reduced costs, organizational agility, and government transformation. Gartner report –published in Dec, 2012 - stated that "Governments worldwide continue pursuing cloud computing strategies, and their focus ranges from developing or mandating cloud services to allowing agencies to buy or consume commercial cloud services". Since then, countries like India, Australia, the UK, and the US have launched and announced their strategies for cloud computing deployment in the government sector. IDC published an article in Jul 2013 mentioning that the U.S. Federal government spending on private cloud will be $1.7 billion vs. just $118.3 million on public cloud in 2014. Government organizations are redefining their businesses to deliver improved citizen services. According to the U.S. Federal Cloud Computing Strategy, published on the Whitehouse website in Feb. 2011, stated that the U.S. government instituted the Cloud-First policy to accelerate the pace of cloud adoption.

Forrester Research (March 2014) announced that India's government cloud infrastructure, Meghraj, went live recently. The government cloud offers infrastructure-, platform-, storage-, and software-as-a-service for the Indian public sector. Forrester believes that India's g-cloud holds significant potential for the central government to increase its agility, efficiency, and collaboration. Over the next decade, the Indian Government's g-cloud approach will drive major changes in the types of services it delivers — not just to citizens but also to employees. and businesses. In particular,

The government will reap the following benefits from its initiative: rolling out services faster and gaining desired benefits, optimizing the use of infrastructure while reducing management overhead, and reducing bureaucracy and bringing transparency.

The UK strategy announced for the Government cloud summarized the benefits of deploying the model. For the government, the benefits will be many more common commodity solutions; flexibility and freedom; ready and easy to use; low cost competitive marketplace

An overview of MCIT strategy highlights for Cloud Computing is illustrated in figure 2.

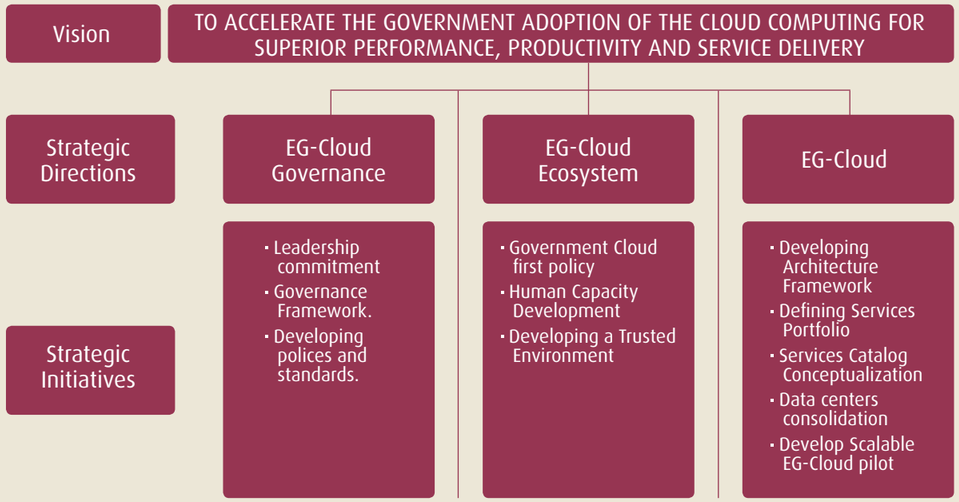

Figure 2- EG-Cloud Strategy Highlights

The EG-Cloud strategy holds a great potential to improve the efficiency and performance of the government. It enables the delivery of optimum value by increasing operational efficiency and responding faster to integral needs. The proposed cloud model supports governmental agencies grappling with the need to provide highly rapid reliable, innovative services despite resource constraints.

1.2 Government Existing Challenges

The current ICT environment in the government sector is facing a number of distinct challenges that can be solved by adopting a cloud computing paradigm.

1.2.1 Duplication of Resources

The ICT system deployed in most of the Egyptian governmental entities have been developed to meet their individual needs with limited consideration for sharing resources with other entities. This approach has led in many instances to excess capacity and duplication of resources. In addition, no centralized coordination of ICT projects, applications and procurement exits among different entities. This has also led to the waste of efforts, investments and time.

1.2.2 Budgetary Limitations and ICT Procurement

Government entities have limited financial resources especially when IT deployments are considered. This has stimulated the need for an innovative approach in implementing ICT projects. Currently the procurement and delivery of ICT in the public sector is a complicated process that typically takes over twelve months for large ICT systems. The cost of this procurement cycle for both the government and its suppliers is significant. A more agile method of procurement and delivery is required to enhance the performance and overall productivity.

1.2.3 Silos and Lack of Integration

The Egyptian government has launched the Digital Society initiative, which intends to "Build an ICT ecosystem to ensure the availability of quality e-services to everyone, everywhere, based on a unified digital identification, while guaranteeing the security and privacy of data". Achieving this vision clearly mandates much more focus on the adoption of an integrated system view, which would currently be hindered by the presence of silos and the lack of interoperability among the various government systems.

1.2.4 Government Data Security

Government systems commonly demand a secure operation environment and tight processes that ensure data privacy. Unfortunately, these are weak points in a number of systems deployed today. Cloud computing offers some interesting avenues for providing such controls but it is important to fully acknowledge –and address–the risks associated with it, from the end-user as well as the service provider perspectives.

1.3 Cloud Computing Expected Challenges

The implementation of Cloud Computing in the government's context is expected to face three main challenging hurdles:

1.3.1 Connectivity Efficiency

The cloud computing efficiency is very dependent on the Internet connectivity and performance. Internet service loss may interrupt cloud supported services. Furthermore, business continuity and disaster recovery plans must be well considered and planned for.

1.3.2 Culture Change Reluctance

The bureaucratic culture is usually rigid and change resistant. One of the most stimulating challenges of cloud computing is the adjustment of the current culture to accept and adopt this new model and to develop and apply appropriate policies and procedures that drive positive change.

1.3.3 Shortage of Qualified Resources

A direct result of transition to the cloud environment is the demand for qualified resources with different skills set. The government departments are generally understaffed in ICT, presenting an opportunity for requirements' identification. A welldefined capacity building exercise needs to be carried out across the government to ensure the projects do not suffer due to lack of skilled resources.

2. Methodology and Framework

The EG-Cloud strategy is envisioned to improve the overall government performance. By adopting cloud computing, the government will increasingly be able to easily exploit and share ICT products and services. Accordingly, H.E the Minister of CIT formed a committee to formulate the EG-Cloud Strategy.

2.1 Methodology

The committee has benefited from the presence and contribution of a diverse group of experts. Members included representatives from MCIT, affiliates, government agencies, academia, civil society, private sector and industry experts. The committee has exerted considerable effort in laying down the foundations of the strategy, conducting discussion sessions, and presenting different views. The team has worked on reaching consensus to produce the current version of the document, which reconciles different interests in view of the national interest of Egypt and its promising ICT sector. The private sector and multinationals in particular, played an important role in conducting multiple workshops to ensure a technical and a business know-how transfer.

This knowledge helped to crystallize technical concerns and devise required plans and capacities.

This section outlines the methodology followed to bring this strategy to life, including the need for a governance authority, strategic directions, and the high-level implementation roadmap. The document highlights how the EG-Cloud will be developed to support the government ICT requirements and develop mandatory human capacity and local market supply to meet the government's strategic approach to cloud sourcing.

The EG-Cloud strategy is part of the MCIT overall strategy and the strategic business plan initiatives to ensure conceptual and executive alignment.

2.2 Conceptual Framework

The EG-Cloud committee perceives the high-level architecture of the cloud computing developed by the National Institute of Standards and Technology (NIST) as the most relevant and appropriate architecture to adopt. NIST perceives cloud computing as an evolving paradigm; their definition characterizes important aspects and is intended to serve as a means for broad comparisons of cloud services and deployment strategies, and provide a baseline for discussion from what cloud computing is to how best use cloud computing. The service and deployment models defined are not intended to prescribe any particular method of deployment, service delivery or business operation.

Throughout this strategy, the NIST generic high-level architecture - shown in figure 3- is used as a common basis in order to facilitate the understanding of the requirements, uses, characteristics and standards of the cloud computing.

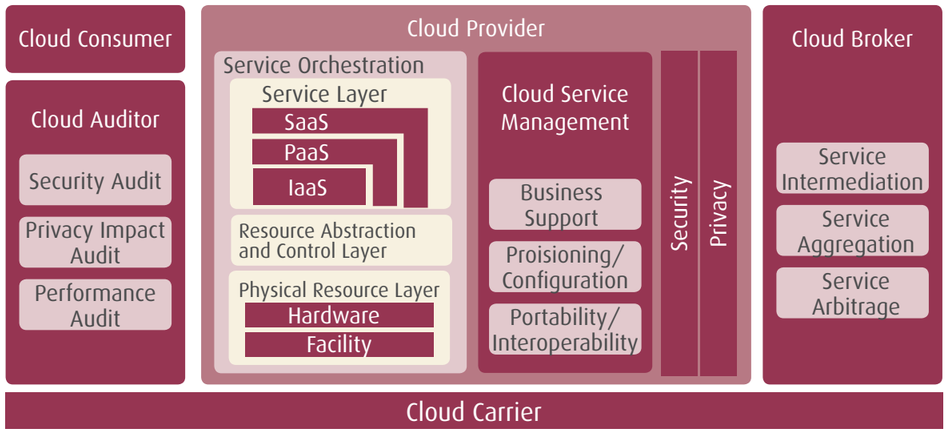

Figure 3- NIST Cloud Computing Architecture

2.3 Cloud Full Journey

The figure shown below illustrates the four-stage process of the Cloud journey, and the EG-Cloud committee was mainly assigned to execute stage one and two. This strategy document is considered the primary deliverable of both stages.

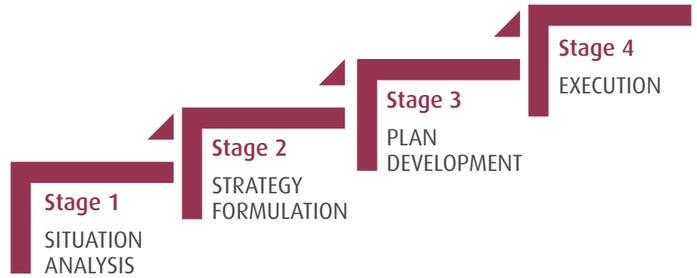

Figure 4- Cloud Full Journey

2.3.1 Stage One: Situational Analysis

The main goal of this stage is to assess the external and internal environments, the current situation of the Egyptian ICT sector concerning the adoption of the cloud technology, and the broader global environment relative to the adoption of the strategy. The procedure followed in this stage is illustrated in figure 5.

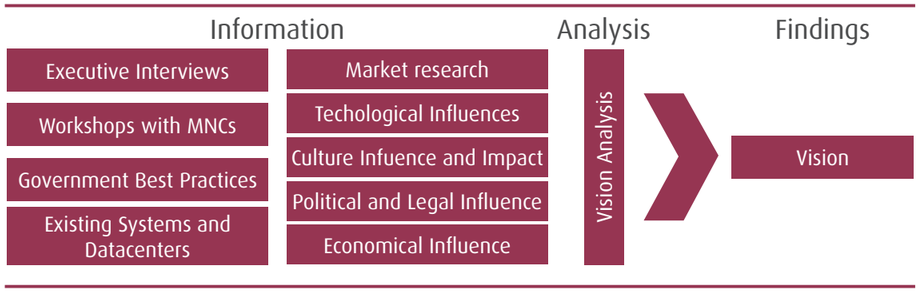

Figure 5 - Situation Analysis Flow Diagram

2.3.2 Stage Two: Strategy Formulation

The main output of this stage is the definition of a clear vision and mission to guide all partners through the cloud journey, the conceptual cloud architecture for the government of Egypt, and the governance model required to govern the implementation of the EG-Cloud. The procedure followed in this stage is illustrated in figure 6.

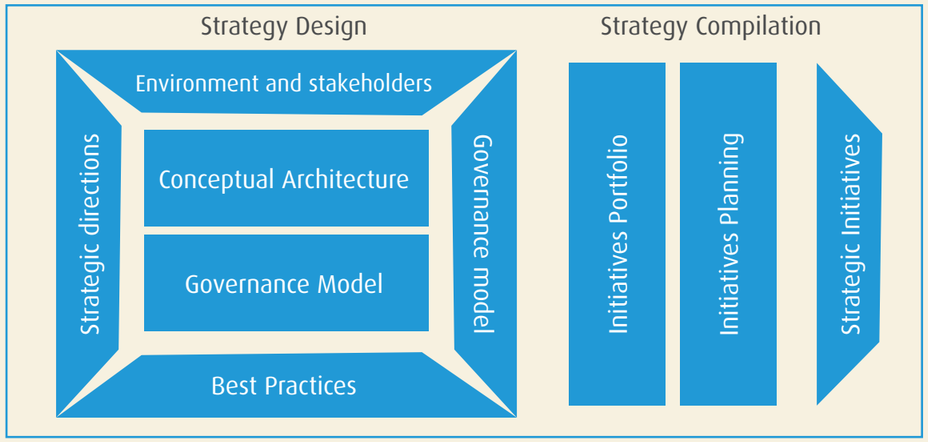

Figure 6- Strategy Formulation Flow Diagram

3. Situation Analysis

In 2014, traditional client server architecture model for ICT project implementation was replaced by a more centralized one using web technologies. The trend of hosting among multiple ISPs was adopted in to reduce management overhead and shorten the infrastructure procurement cycle. Since 2011, MCIT has been considering the Cloud Computing model; and in 2013, a decision was made to build and deploy a government cloud as a proof of concept. Moreover, while formulating a comprehensive strategic study for the EG- Cloud, governance and implementation became a priority.

To strategically plan and assess the situation, the SWOT analysis was conducted. The following section lists the results of the SWOT Analysis, namely:

- **The Internal Environment:** Strengths and Weaknesses
- **The External Environment:** Opportunities and Threats

3.1 The Internal Environment: Strengths and Weakness

3.1.1Strengths

S1 . Existing infrastructure with low asset utilization
S2. The existence of a strong ICT sector
S3 . High volume demand in the government sector for IT systems
S4 . Availability of human resources, knowledge, experience in the ICT sector
S5 . Geographical outreach to facilitate operation

3.1.2 Weaknesses

w1 . High finance requirements
w2 . Fragmented demand led to duplicated systems
w3 . Relative weak development of cloud technologies
w4 . High turnover for technical expertise
w5 . Complicated business process and procurement cycle
w6 . No governance model, and no data classification or categorization for government entities
w7 . Lack of data security
w8 . Data Centers working in silos
w9 . No ecosystem available for governing providers
w10 . Lack of technical skills

3.2 The External Environment: Opportunities and Threats

3.2.1 Opportunities

01 . New model for acquiring IT projects
02 . Launching of the Broadband Strategy
03 . Strong telecommunication industry sector
04 . Expanded IT services across the government
05 . Users pay per use, reducing requirement for capital investment
06 . Optimization of resources' utilization with a transfer to the Cloud
07 . High awareness of the green agenda and new approaches to reduce the carbon footprint
08 . Global trend to shift focus from asset ownership to service management

3.2.2 Threats

T1 . Rapid change in technology
T2 . Government data security concerns
T3 . Legal changes required to adapt the new model of procurement
T4 . Economic and political conditions
T5 . Culture behavior, acceptance and digital divide
T6 . Increasing e-Crime
T7 . Lack of Finance to develop the full scale vision
T8 . Government data at risk (security – Privacy, etc.)

Table 1 displays the strategic actions stemming from the situation analysis exercise

Strategic Combinations	Strategic Actions
SO Strategies Capitalize on strengths to seize opportunities	■ Establish the EG- Cloud to maximize the use of existing IT assets (S1,S5, S7,01,06,07) ■ Develop EG-Cloud ecosystem ■ Establish Framework for delivering efficient government services (S2,S5,03,02) ■ Initiate Human Capacity development program (S6,S3,08) ■ Establish the Governance body (S4,S2,04,07) ■ Enable Green ICT eco-Friendly systems (S1,S2,07,08)
WO Strategies Minimize weaknesses to seize opportunities	■ Establish the Governance body (W7,W8,W6,W10,01,02,03,04) ■ Establish Data Center Consolidation program to reduce the overall cost, and energy consumption (W1,W3,W9,01,02,03,06,08) ■ Initiate training and incentives programs for IT staff (W5,W11,08,01)
ST Strategies Capitalize on strengths to mitigate threats	■ Promote investment with large scale of existing technology and solution providers (S2,S3,T1,T8) ■ Develop a trusted environment (S2,S3,S7,T2,T6,T1,T8) ■ Conduct government awareness program to update employees of all issues (S5,S6,T5) ■ Establish a government program to develop local industry and increase competitiveness (S2,S3,T1) ■ Involve Industry experts to ensure periodic state of art technical know-how (S2,T1)
WT Strategies Minimize weaknesses to mitigate threats	■ Develop new model - Pay for use (W1,W2,T1) ■ Establish the Governance Body (W2,W8,T2,T3, T6) ■ Involve National security council (W8,T2,T6,T8) ■ Develop Culture awareness campaign (W5,T5)

Table 1 - SWOT Analysis

4. Strategic Directions

There is an increasing interest in outlining a conducive environment for the EG-Cloud. Performing a thorough review of cloud computing strategies in a number of developed and developing countries, the following strategic directions were agreed to:

- Establish a governance body that holds responsibility for setting the standards and regulations
- Establish an enabling eco system, as a mandate to develop the trust environment and ensure availing vital resources
- Start the transformation of governmental applications with a scalable pilot project to prove the concept

According to these principles and the rich discussions and experiences shared among committee members, the strategic directions listed in figure 8 were recommended.

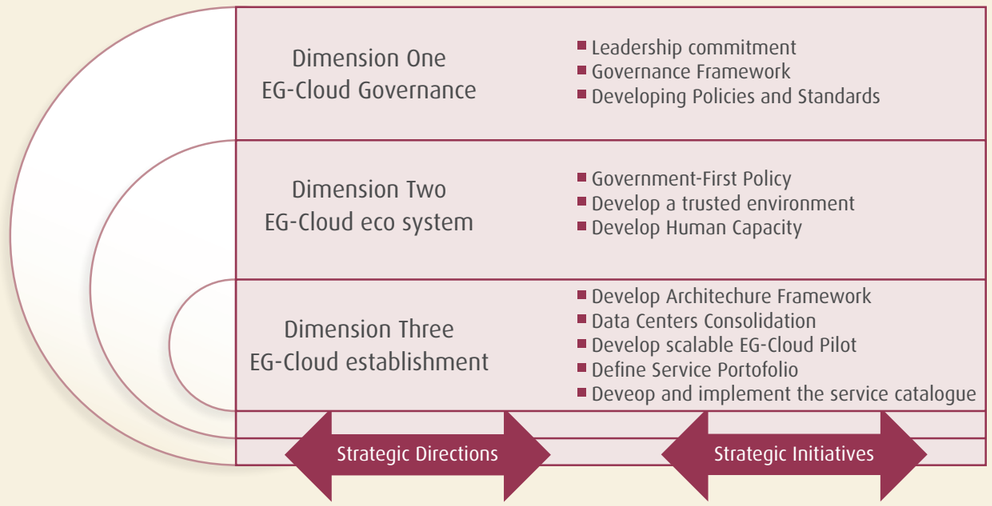

Figure 7- EG-Cloud Strategic Directions

4.1 Strategic Dimension 1: EG-Cloud Governance

4.1.1 The Need for a Governance Authority

Cloud governance is a critical challenge. The process gets more complicated as public and private cloud deployments become increasingly important. Accordingly, the number of applications in the cloud is increasing, the scale gets more complicated, and the number of people involved in managing and operating those applications is growing.

Most of the challenges anticipated in section one are expected to arise while deploying, operating, and managing the government cloud. Those challenges originate mainly from the lack of existence of a centralized regulating body. These lead to the need for establishing a governance authority, which will take the responsibility for setting the standards, regulations and principles required to develop, deploy and manage the EG-Cloud.

Security

Within the governmental context, security challenges should be accurately handled. Challenges would vary from confidentiality of information and intellectual property to inappropriate access to private and confidential information. Appropriate privacy and security measures should be developed, deployed and monitored regularly by the governance body.

Uncertainty

An important aspect stemming from the dynamic nature of the cloud computing practices is the uncertainty of the data location. Where does the data actually reside at a given point in time? The question raises concerns related to data ownership, data accessibility, data privacy and data security. The decision regarding storage and transmission of data may therefore be based on several variables, such as application sensitivity, data classification and other relevant privacy and security related considerations including the regulatory and legal frameworks of the hosting jurisdiction. Such policies and standards should be regulated by an unbiased body.

Competition

As cloud offerings gain maturity, service providers are becoming more competitive. They are expected to differentiate and compete regarding their provided offerings. Reducing prices, realization of return on investments, and leveraging economies of scale will be definitely their planned competitive edge. Differentiation could still be based on quality, providing better availability, improved security or enhanced ability to manage services. The practices and procedures of service providers need to be governed and regulated to nurture and not destroy the industry.

Moreover, there are other critical aspects that should be governed: the relationship among the stakeholders, the business models and practices, and the standards of implementation (RFPs, SLAs, etc.)

4.1.2 The Governance Authority

The governance authority plays a major role in regulating and managing the whole process of development , deployment, and operation procedures of the EG-Cloud. The governance authority activities are classified into three distinct roles; Regulator, Developer, and Operational.

4.1.3 The Authority Structure

The EG-Cloud strategy committee has reached a consensus on the following structure - illustrated in figure 10, which shows the basic structural components necessary to accomplish the role of the Authority.

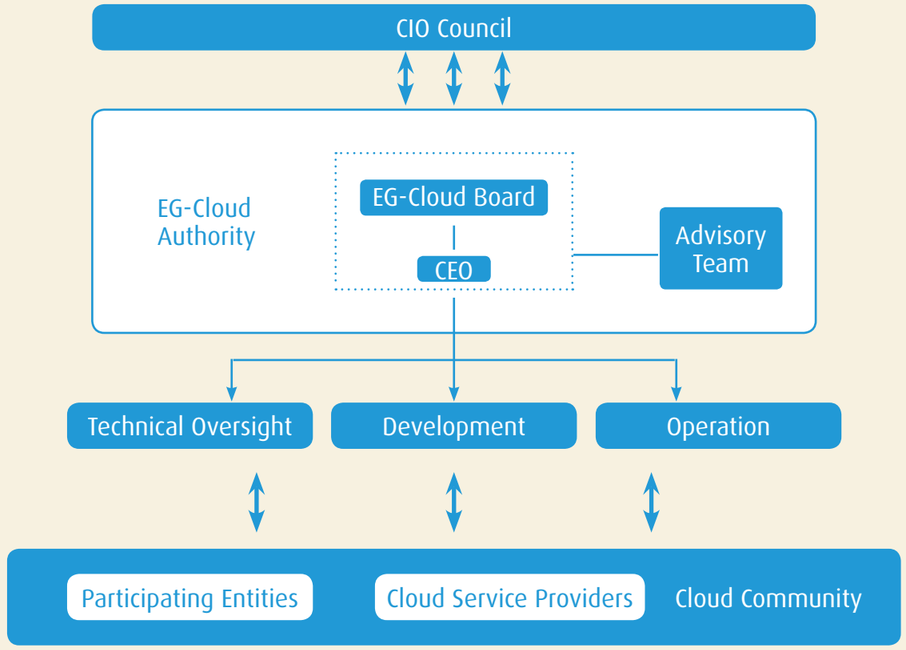

Figure 8- The EG-Cloud Governance Structural Model

The EG-Cloud Governance Authority consists of the following units:

- EG-Cloud Board (+CEO)
- Advisory Unit
- Operation Entity
- Development
- Technical Oversight

- **Technical Oversight unit:**

This unit is responsible for:

- Setting the standards, regulations, policies, and principles to be followed by the cloud community (providers and beneficiaries)
- Designing and maintaining an architectural framework that all proposed solutions must be based upon
- Assuring that all solutions are complying with the framework and the standards
- Ensuring the security and privacy of the government services and government data
- Setting the policies regarding those data related processes (exchange, classification, security and privacy)

- **Development unit:**

This unit is responsible for:

- The design and development of the cloud services
- The procurement of the solution, including contract negotiation procedures and artifacts (RFPs, SLAs, etc.)
- The maintenance and support procedures
- The procedural relationship among the participating entities, on both contractual and executive levels

- **Operation unit:**

This unit will be responsible for:

- Solution deployment procedures and implementation
- The scaling up/down processes
- First level of support
- Operational management: systems availability, performance monitoring and tuning, security, etc.

- **EG-Cloud Board**

The board is responsible for the decision making process of the governance authority. The board will work with the CEO of the Authority. The CEO holds the responsibility for managing the three units: technical unit, operation unit, and the development unit.

- **Advisory Unit** is intended to provide expert opinions and conduct investigative analyses in support of the decision making process of the EG-Cloud Board and CEO. The members are expert cloud computing practitioners. The mandate of the advisory council is to provide recommendations and endorsements concerning all governance procedures and decisions, and also to highlight issues and concerns that may drag risks or cause threats.

4.2 Strategic Dimension 2: EG-Cloud Ecosystem

The Cloud ecosystem is a term used to describe the overall environment which consists of dependent and independent components working in collaboration to enable the EG-Cloud services. The Cloud—unlike previous technology shifts—is not a mere collection of technologies, but a transformational concept that requires the ecosystem to be developed accordingly. A rich ecosystem is vital to the successful implementation of the EG-Cloud strategy.

The Cloud ecosystem includes the main strategic initiatives listed below:

1. Government Cloud-First policy initiative
2. Human Capacity Building initiative
3. Trusted Environment (Policies and Legislation) initiative

4.2.1 Government Cloud-First Policy Initiative

Description

This initiative is to ensure that governmental bodies see the cloud model as their first option in IT procurement and implementation. This means that when considering procurement of new IT products/services, these organizations consider and assess potential cloud solutions as priority. If any entity decides that the cloud is not their best option, they have to require an approval to implement a non-cloud solution from the governance authority.

Outcome

- The publishing of the Cloud-First Policy
- Government awareness of the cloud model benefits

4.2.2 Human Capacity Building Initiative

Description

This strategic initiative is designed to support the adoption and development of the EG-Cloud, and among all sectors by providing qualified skilled professionals, and enhancing the skill set available in the market today. Three main key players should be involved here: Government, Academia, and the Private sector.

Outcome

- Develop professional business and technology experts

4.2.3 Developing a Trusted Environment Initiative

Description

This initiative establishes a trusted environment to ensure compliance with the standards and policies, and to provide cloud security and data protection, especially in a dynamic and multi-tenant environments. The proposed data protection framework aims to protect government entities through regulation of the collection, use, disclosure, transfer and security of their data. It is recommended to introduce a broad-based data protection law that is required for government entities to use data for legitimate and reasonable purposes.

A multi-faceted security framework that addresses issues ranging from technology to policies could help provide greater clarification on the level of risk exposure. It also provides greater visibility into the security provisions of various cloud service providers.The concerns behind cloud security range from lack of understanding to unavailability of clear guidelines and standards.

Outcomes

- Data Protection Framework and Policy
- Cloud Security Framework and Policy
- Methodology for Cloud Risk Assessment

4.3 Strategic Dimension 3: EG-Cloud Deployment

The focus of this dimension is to build a set of essential initiatives for designing and deploying the EG-Cloud. The government will identify and provide requirements for common services as SaaS/PaaS offerings through the EG-Cloud (such as e-mail services, productivity tools, customer relationship management, web content management...etc.), as well as sectorial services (such as health, justice, education, etc.).

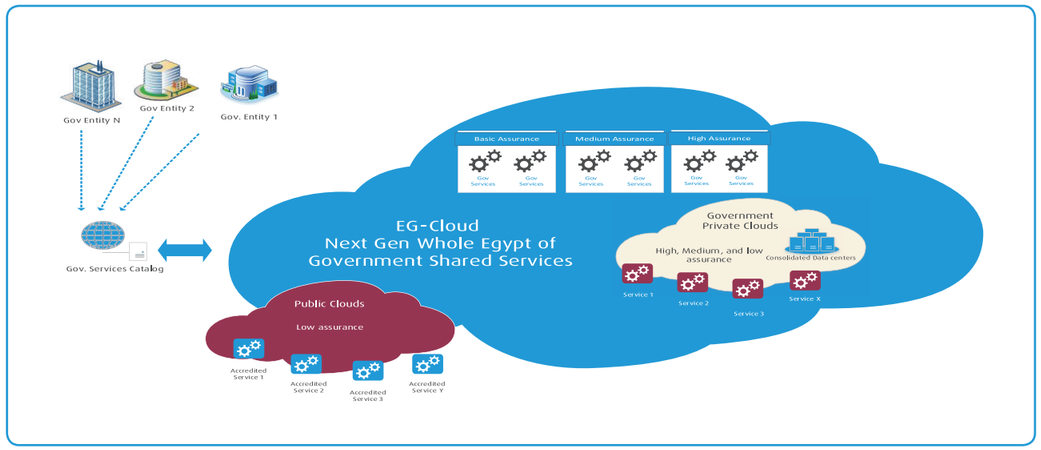

Figure 9- EG-Cloud Conceptual Architecture

The EG-Cloud includes multivendor cloud technology, with geo-redundancy. It consists of two basic deployment models:

- Government Private Clouds

  The cloud is owned by the government, it provides a cloud infrastructure for governmental entities and it will basically cover the high, medium, and low assurance zones of services covering security and availability.

- Public Clouds

  Leverage the commercially available public cloud offerings to benefit from lower cost of computing resources. These can be used only for low assurance services.

It is important to mention that government private clouds' operation may be outsourced to different service providers while maintaining government's ownership.

4.3.1 Developing the Architecture Framework Initiative

Description

The EG-Cloud will be built in compliance with the cloud governance recommendations, having the capabilities for future expansion. Expansion could be either through adding additional physical resources or through integration with other cloud services. The EG-Cloud will incorporate the facilities that enable management and monitoring of its provided services and users. The EG-Cloud architecture will accommodate technologies and products from different suppliers in order to avoid supplier(s) lock-in.

Outcomes

The EG-Cloud

Enterprise architecture, components, interoperability, and expansion policies

Provisioning rules

The EG-Cloud implementation plan that includes:

Tender document

Evaluation methodology

Procedures and manuals

4.3.2 Data Centers Consolidation Initiative

Description

Data center consolidation initiative aims to reduce the overall cost of data center operations and energy consumption, which would be achieved through enabling cloud computing model. This initiative will enhance the utilization of existing resources.

Outcomes

- Policies that support datacenter consolidation
- A capable infrastructure for the adoption of consolidated datacenter
- Cloud Integration with MCIT's infrastructure initiatives (Digital hub, Broadband, Open Source, etc.)

4.3.3 Scalable EG-Cloud Pilot Initiative

Description

This strategic initiative establishes the seed for building and deploying the EG-Cloud. MCIT will be responsible for funding the pilot in its starting phase, targeting the implementation of a pilot project and acquiring practical experience.

Emphasis will be on the following:

- Readiness of the ICT sector to deploy solutions, and provide maintenance/support
- Actual need assessment of the government administrative body
- Assessment of the market segment (government segment demand + overall supply)
- Identification of the capacity building requirements
- Refinement of the service parameters (pricing and availability)

The pilot project implementation is based on :

- Service provision through more than one cloud and company (multi-vendor) integrated under one management
- A broad service portfolio that includes IAAS, PAAS, and SAAS

Outcomes

- A Government Cloud Computing center (hardware, software, applications and services) operating in coordination with several governmental entities
- Providing ten common services and at least two sector applications over a period of three years

4.3.4 Defining Services Portfolio Initiative

Description

Clouds are basically built to provide a better service delivery model. The set of services that cover the whole government needs is vast, varying in nature, and unbound. Therefore, EG-Cloud services have to be properly listed, comprehensively described, clearly categorized and being defined according to standards.

These services should also cope with the level of complexity of government utilization. They can be acquired in many different ways: licensed, purchased, developed...etc. Government users will have also several ways to procure the EG-Cloud services: direct, bundled, with or without infrastructure and platform, etc.

Outcomes

- Analysis of the needs of the government entities
- List of target services and the prioritization scheme
- List of accredited suppliers
- Budget evaluation for acquiring cloud solutions

4.3.5 Develop and Implement the Services Catalogue Initiative

Description

The EG-Cloud services catalog is the actual market place where government entities can search for, locate, compare, evaluate and select the services they need. Auditing organizations will be able to carry out any necessary procurement audits upon notification. There will be a list of accredited suppliers, who will be authorized to publish the necessary information relevant to their services. Suppliers can also update this information and use the catalogue to advertise their services. The services catalog will be under MCIT administration and will provide information to the government entities, such as new announced services, case studies, new procurements, and procurement regulations.

Outcomes

- The Services Catalog procedures, and functional requirements (user interface, content, dialogs, and search criteria)
- The Service Catalogue operation and management procedures

5. High-Level Implementation Roadmap

The implementation roadmap is based on a five-year plan, The roadmap below represents expected outcomes at each phase of the strategy. Activities will be implemented in a parrallel apporach.

Short Term (0- 2) Years	Medium Term (2-3) Years	Long Term (3-5) Years
Strategic Direction 1. EG-Cloud Governance		
Establishment of governance model structure	Certifying qualified Public Service providers (10 service providers) inside the Country	Certifying qualified Service providers
Establishment of cloud information community	Establishing Digital Data Privacy Law	
Development of a cloud framework	Establishing certification program and regulations for Public Service Providers outside the country	
Establishment of data classification regulations	Elaborating the frame agreements (FAs) with the accredited suppliers	
Establishment of data security standards		
Strategic Direction 2. Cloud Ecosystem		
Government Cloud first-policy		
Establishment of cloud first policy	Establishing Policy for Legacy system transformation and migration	Public Sector ICT departments complete transition to new Cloud model for new and legacy system
Policy awareness workshops	Developing Case Studies and regulation for common services	
Establishment of cloud awarding program		
Developing a trusted environment		
Establishment of cloud risk assessment methodology		
Technical reference documents on guidelines		
Cloud security framework and policy		
Data protection framework and policy		
Establishment of best practices for cloud standards		
Capacity Building Development		
Awareness campaigns and workshops for public & private sector	Building new curriculum for information technology and software engineering schools for undergraduates	
Establishment of cloud training program for governmental entities	Establishing "Innovative culture using cloud computing" competition program	
Establishment of cloud training program for SMEs		
Establishment of cloud training program for post graduates		
Establishment of research & training lab (Tech. Providers, Universities and Training institutions)		
Strategic Direction 3. Establish EG-Cloud		
EG-Cloud Architecture		
Development of enterprise cloud Architecture	Procurement of Government Applications Store	Enabling vendors to add their services on the G-Store
Analyzing the architecture alternatives		
Establishment of EG-Cloud procurement framework		
Datacenters Consolidation		
initiation of a consolidation program for public sector owned data centers	Consolidation and closure of more data centers across Public Sector	Completing data center consolidation
Consolidation and closure of 3 data centers across public sector		
EG-Cloud Pilot		
Establishment of EG-Cloud pilot program		
Procurement of first EG-Cloud services		
Procurement of new infrastructure and data center facility services for ICT services		
Selection of the first cloud adopters		
Defining Services Portfolio		
Definition of service catalog and prioritization of matrix	Enabling Governmental Entities to use the new provided services (at 30% of ministries and 50% governorates)	Adding the rest of services of the catalog to the G-Store
Publishing of first prioritized services for government entities	Publishing a Market Place for first cloud services	Enabling Governmental Entities to use the new provided services
Enabling of governmental entities to use the new provided services (at least 5 ministries and 5 governorates)	Adding services of the catalog to the G-Store	Adopting EG-Cloud across remaining governmental entities
Development of services costing matrix and case studies of services usage		Adopting EG-Cloud across remaining governmental entities

Table 2- High Level Implementation Plan

6. Critical Success Factors

This section includes critical success factors, for the implementation of the whole strategy. These factors include challenges and sustainability that are vital to the overall success. The following four dynamics were drafted to highlight the most critical factors to achieve and implement the strategy.

6.1 Leadership

Strong political leadership of the government is critical to establish political mechanisms and to realize collaboration among ministries that share interests and agendas. This factor is also required to give powerful directions for sufficient resource allocation, authority, and result reporting. Adopting new technologies in government entities that directly interact with citizens require wise leadership that balances potential benefits and associated risks. The leadership is also required through the design phase to solve any conflicts or interoperability issues.

6.2 Transformation

Modifying Egyptian current laws to declare the cloud governance should follow a strong leadership in order to overcome interoperability issues, and to have holistic view of the whole system's development. Otherwise, Government Cloud Computing in the Government sector may lead to non-conformed results or side effects.

6.3 People

Involvement, awareness and commitment of people through this transformation is essential for basic and future development, as well as achieving customer satisfaction. Local Service providers are required to provide customization to available ready-made solutions to fulfill the existing demand.

6.4 Governance

The existence of a governance body is essential to regulate and govern the procedures and processes among all stakeholders. As comprehensively explained in section 4.1.1 , the cloud governance is essential for the transformation to maintain control over increasingly complicated and integrated systems, services and human resources environments. Furthermore, it turned to be a fact that organizations are worried about moving more applications to the cloud due to their concerns and uncertainty of the cloud governance. Governmental organizations are more vulnerable due to their special nature of private data in process, public services offerings, and political influence in either success or failure. The governance of EG-Cloud is an essential step to ensure its sustainable success.