Ministry of Innovation and Technology

Ethiopia Digital Foundation Project

Project No.: P171034

Summary Report on the Knowledge Sharing Workshop on Modern Data Center

June 23, 2022

Addis Ababa, Ethiopia

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1. Background

The Federal Democratic Republic of Ethiopia, Ministry of Finance (MoF), has received financing from the World Bank toward the cost of the Ethiopia Digital Foundations Project. The Digital Foundations project will be financed through an SDR 138.9 million (US$200 million equivalent) IDA credit that will involve a range of stakeholders through five components having as leading implementing partners the Ethiopian Communication Authority (ECA), Ethiopian Education and Research Network (EthERNet), the Ministry of Peace, the Ministry of Finance, and the Ministry of Innovation and Technology (MInT) as the main coordinating and beneficiary institution.

The project is intended to lay the building blocks to develop Ethiopia's digital economy through support to the policy and regulatory environment, improving infrastructure and quality of broadband connectivity and supporting the digitalization of services, and promoting digital entrepreneurship. The project development objective is "to improve Ethiopia's competitiveness in the digital age through increased inclusiveness and affordability of digital services and through digital job creation".

The aim of this workshop is to expand the knowledge and understanding of the global trends of how countries around the world are approaching the development of the National Data Centre Infrastructure. This will be done through overview of global trends as well as provide more details on a select few country cases and how other governments managed to address data hosting needs, in collaboration with partners.

International expertise will be speaking on approaches to develop Modern Data Center infrastructure which include green DC, Cloud DC, etc. to participants from MInT, beneficiaries from Ethiopia Digital Foundation, MDAs. Participants will be project managers and professionals in the area of Data Center and ICT Infrastructure.

The workshop was a hybrid type. Participants from MInT and MDAs met at the Ministry's Main Hall and the international expertise and some participants are connected virtually.

2. Objectives of the Workshop

The main objective of the half days experience sharing program was to:

➢ Share ideas about what the Ministry of Innovation and Technology has planned to build National Data Center and explain the status of the preparation,

➢ Share best practices from other countries in the process of establishing national Data Centers,

➢ Share practical experiences on establishing and managing the Data Centers at national level.

3. Participants of the Workshop

A total of 51 participants from 11 ministries (Ministry of Innovation Technology, Ministry of Agriculture, Ministry of Foreign Affairs, Ministry of Justice, Ministry of Transport, Ministry of Revenue, Ministry of Culture and Sport, Ministry of Agricultural Authority, Ministry of Industry and Ethiopian Communication Authority) and the World Bank staff, partners from Uganda, presenters from USA and Moldova attended the workshop where 21 participants (41%) were female.

The table below shows the gender aggregated data of the workshop participants.

Gender	No of Participants	Percentage
Male	30	59%
Female	21	41%
Total	**51**	**100%**

4. Speakers Profile

Two international speakers, John Savageau and Vlad Manoil shared their reach experience in the area. Yonas Hailu, Director for Government ICT Network Development and Administration Directorate, MInT explained the Ethiopian scenario in the Data Center area.

4.1. John Savageau

John is a senior consultant with the World Bank, UN Development Program (UNDP), and US Trade & Development Agency (USTDA) sponsored projects. His most effort is directed at developing national ICT strategy, infrastructure, enterprise architecture, and integration of government information systems. Recent projects include support for the World Bank and USTDA missions in Kazakhstan, Kyrgyzstan, Tonga, Romania, Brazil, Egypt, Benin, Indonesia, the Philippines, DC Government, Municipality of Istanbul, City of Cape Town, The Solomon Islands, and Azerbaijan.

He also prepared business plans and strategies for eGovernment projects in Kyrgyzstan, Tonga, Brazil, Moldova, Indonesia, and the Philippines. This included recommendations and designs for government data center consolidation and cloud computing. He was more devoted in developing service-oriented cloud computing infrastructures for both private industry and governments, and increased focus on risk, disaster management, continuity of operations models, and IT Governance.

4.2. Vlad Manoil

Vlad is an International Digital Transformation Consultant for the past 10 years and currently working as Senior Digital Government Consultant at the World Bank responsible to support the Digital Development and Gov-Tech projects design and implementation in various countries (e.g. Serbia, Mozambique, Rwanda, Malawi, Uzbekistan, Kyrgyz Republic, Tajikistan); support to World Bank Group's Identification for Development (ID4D) in advancing implementation of digital identity for various countries (Uganda, Rwanda, Mozambique, Tunisia, Madagascar, Uzbekistan, Tajikistan, Kyrgyzstan) and the provide advisory services (RAS) to various countries (Bulgaria, Russian Federation, Kazakhstan).

He worked as Deputy Director at e-Governance Agency Moldova leading the public service modernization program, including but not limited to World Bank-funded project Modernization of Government Services Project. He also worked as Chief re-engineering officer, and Senior e-Services Manager at e-Governance Agency Moldova.

4.3. Yonas Hailu

Yonas is a senior Network and Security Engineer with years of experience from over six years in network and security engineering especially on routing, switching and IT Security discipline. He has extensive experience in MPLS architecture and heterogeneous Enterprise network environment, including Cisco, Fortinet, Huawei and ZTE developed through many professional certifications.

He worked as Data Center Administration and Infrastructure Development Manager and Project Manager and IT Security Specialist in the then Ministry of Communication and Information Technology mainly involved in Managing National Data Center and National Network Infrastructure including WoredaNet Load balance and Virtualization project just to list some.

4.4. Wilson Byekwaso and Richard Mugwanya

Wilson and Richard participated as discussants sharing their experience from Uganda and representing National Information Technology Agency (NITA) Uganda. Both participated and responsible for the development of national data center infrastructure in Uganda. Wilson is manager for the Data Center and is a system administer both at NITA-Uganda.

The National Information Technology Authority-Uganda (NITA-U) is an autonomous statutory body established under the NITA-U Act 2009, to coordinate and regulate Information Technology services in Uganda. NITA-U is under the general supervision of the Ministry of ICT and National Guidance with the vision statement "Lives transformed through e-services delivery".

5. Presented Topics

In this workshop, the following major topics were discussed in brief, followed by question and answers sessions.

5.1. Welcome of the Participants

The workshop has started by welcoming the speakers, participants that are attending face-to-face and connected virtually. The PIU Director of the Ethiopia Digital Foundation Project welcomes the participants by highlighting the major objective of the organized workshop.

5.2. Highlight of the Workshop

The highlight of the workshop is explained by the representative of the World Bank, Senior Digital Development specialist, Mrs. Luda Bujoreanu. She explained how the workshop is planned and with what specific objectives and also introduced the international speakers with their experiences and the rate involvement in the subject areas.

5.3. Overview of the International Best Practices

In this section of the presentation, global trends in developing Data Center infrastructure, including in collaboration with the private sector are explained. Country highlights from the USA, Canada, Singapore, and South Africa is explained.

John Savageau, Data center expert, from California has touched up on many areas which include the Evolution of Compute Technology, the reason for Leveraging the Private Sector, Benefits of Moving to Cloud Computing, The Risk of Shadow IT, Government Roles in Hybrid Clouds and Public Clouds, and the Cloud Accreditation Process. The following points were among the major areas of descriptions and concepts during the presentations.

Evolution of Computer Technology from the 1960's to the recent period based on the design, scale, target user and user experience., ERA of computer (1960& 1970's). (1980's and 1990's) Era of IT ERA of from 2000 the user was briefly discussed.

The reason for leveraging the private sector was also discussed by comparing the outsourced cloud computing cost and operations components for Infrastructure Operated by CSP – OPEX Model with the Data center cost and operation components for Government-Owned and Operated – CAPEX Heavy, in terms of construction, IT equipment, support equipment, operations, info systems.

Major Benefits of Moving to Cloud Computing were described and listed as: the Move to IS Platform standardization, Simplify Procurement and Resource Management, Standardized security controls, Facilitates data sharing and information systems process integration, Common integration utilities (e.g., service buss, APIs). It also supports integration of Decision Support Systems, Development of Data Warehouses, Development of Data Marts, Multi-

stream Data Analytics, Common applications across Government, Easier adoption of emerging technologies, Improved Disaster Management and Continuity of Operations.

The Risk of Shadow IT: Critical business applications existing outside of IT control frameworks may not be visible to IT control, information security or vendor-management functions and may therefore create risk that has not been measured. Shadow IT can have the following business impacts: Security of data stored by third-party vendors may not be compliant with national security and privacy standards, Fines, lawsuits and legal fees may result from noncompliance and/or loss of confidential or private information, Lack of knowledge of shadow IT solutions could cause loss of time and productivity, Complicated IT architecture may increase the risk of business disruptions or loss of integration, Costs may increase and other complications may arise in relation to services by third-party development vendors, Creation of non-single source of truth data, inability to share and integrate data or information systems processes.

Government Roles in Hybrid Clouds and Public Clouds was mentioned as an accreditation agency, a Cloud Broker and Government Adopts a Hybrid Cloud Approach. The Cloud Broker is also defined as an entity that manages the use, performance, and delivery of cloud services and negotiates relationships between Cloud Providers and Cloud Consumers.

International case studies from US, Canada, South Africa and Singapore were also briefly discussed regarding Cloud accreditation and Security Process for CSPs.

5.4. Lessons from Moldova

In this section, the best lessons learned from Moldova with regard to establishing a national Data Center from a container-based datacenter solution to hybrid government cloud.

Vlad Manoil, formerly with the e-Government Agency under PMO of Moldova and currently a World Bank consultant has highlighted on issues related to the Moldova Strategic Program for e-Governance, the platform for Moldova Government, MCloud® – government cloud, e-Service infrastructure, implementation Timeline and MCloud® administration. The process of Handover, MCloud® Governance MODEL, MCloud® LEGAL framework and adoption of government cloud was also related issues discussed at the event

The private Cloud, Government hybrid cloud and its concerns, Hybrid cloud prerequisites, Data classification was also discussed.

Summary of the key points were:

- Governments will always have sensitive data which they would like to have exclusive full control. Therefore, they do need reliable IT infrastructures deployed on the ground.
- Government will always want to optimize costs for running IT, therefore they need to think about sharing and reuse of resources. That's a private cloud.
- There will always be a large amount of less sensitive data which can easily and securely be hosted somewhere else, i.e., in a public cloud.
- Hybrid cloud is a good balance combining private and public clouds. Some prerequisites must be considered. Proper data classification model is one of them.

6. Discussion:

In this half-day workshop, several questions were raised by the participants and the presenters responded to each of the questions. Some of the questions raised by participants attending the workshop face-to-face and virtually are:

- The issue shadow IT is indicated in the presentation. In this regard, what measures must be taken to overcome the issue of shadow IT. How are the other countries' experiences in making the systems secure and sustainable?
- Cloud infrastructure models that can be applicable for the country like Ethiopia. With the uniqueness the country has. Private cloud versus public cloud and hybrid cloud solutions for specific country. Any experience that has a private cloud that serves national demand in practice.
- Retaining Data Center professionals is a challenge everywhere and the same must have happened to Moldova as well. Can you share the Moldova's experience how to mitigate the same?
- The participation of the private sector (using private cloud) in securing the data center's sustainability and the use of the Software that is used in the data center. What type of scenario and approach is applied in this regard?

Sufficient responses from the speakers on the issue raised were communicated well. In addition to the speakers, the colleagues from Uganda have also shared their experiences in the establishment and running of Data Center.

7. Major Achievements of the workshop

The workshop was very participatory, and the participants have got lessons from the experiences of major sample countries' journey with respect to cloud based data center. It is also believed that the Ministry of Innovation and Technology has got an input to decide on the choice of technology, the corresponding challenges and the way forward for the newly planned national data center.

8. Annex I. Workshop Schedule

	DATA CENTER INFRASTRUCTURE IN ETHIOPIA Date: Thursday, June 23, 2022 Time: 10:00 AM – 12:00PM (Local time)		
Time	**Session**	**Speaker**	**Venue**
9:00-10:00 AM	**Reception**	MInT/PIU	MInT Main Hall
10:00-10:10	**Welcome**	Dr. Abiyot/Yonas/Dr. Mesfin	The workshop will be a hybrid type. Participants will be meeting at the MInT's Main Hall; and international expertise will be delivering the speech virtually
10:10-10:20	**Highlight of the workshop**	Luda Bujoreanu, Senior Digital Development specialist, WB	
10:20 -10:45	**Importance of National Data Center**	Yonas, MInT	
10:45 -11:15	**Overview of the Best Practices**: Global trends in developing Data Center infrastructure, including in collaboration with the private sector. Country highlights will include from the USA, Canada, Singapore and South Africa.	John Savageau, Data center expert, California	
11:20 AM -11:50 PM	**Lessons from Moldova: from a container-based datacenter solution to hybrid government cloud**	Vlad Manoil, formerly with the e-Government Agency under PMO of Moldova. Currently WB consultant	
112 - 1:00 PM	Q&A session: Brainstorming on the business option for data center development in Ethiopia	MInT, WB, Speakers	

Discussants: Representatives from NITA-Uganda, responsible for the development of national data center infrastructure:
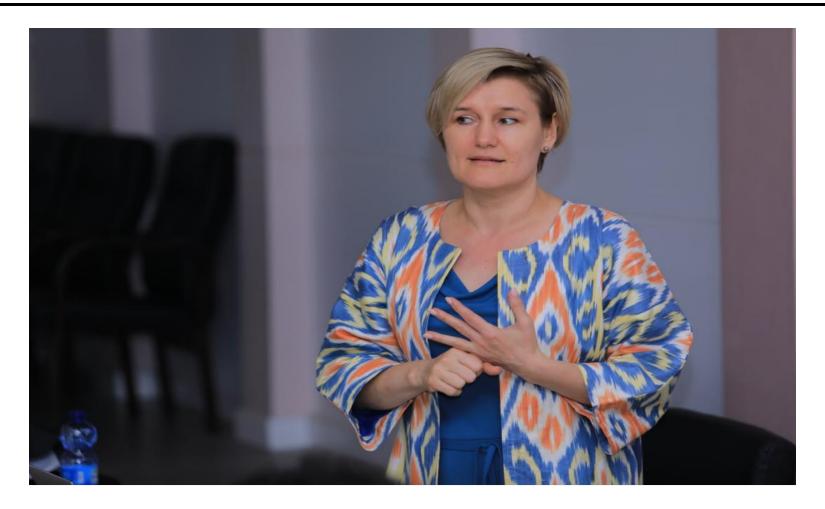Mr. Wilson Byekwaso, VCP-CMA®, CISSP ® Manager – Data Center   Mr. Richard Mugwanya, PMP® Systems Administrator

9. Annex II. Picture of Some of the Participants

10.ANNEX III. List of Participants of the Workshop

MINISTRY OF INNOVATION AND TECHINOLOGY
ETHIOPIAN DIGITAL FOUNDATION PROJECT
PROJECT WORKSHOP FOR BUILDING MODERN DATACENTER   Date 23/06/2022

S.No	Participants Name	Organization Name	Position	Telephone	E-Mail	Signiture
1	Tewodaj Adane	MINT	Infrastructure Security Expert	0911056457	Tewodaj.adane@mint.gov.et	
2	Wondwossen Teshome	M/I&T	team leader	0911612031	wondwossen.teshome@mint.gov.et	
3	Kindil Gir-acheu	MINT	Monitoring & evaluation	0943119315	kindil.Girachew@mint.gov.et	
4	Yealem3wid Tesfaye	MINT	IT Security	0911873138	Yealem3wid.tesfaye@mint	
5	Alemseltay Wlel	MINT/EDFP	Environment Scientist	0912032241	alemwesh@gmail.com	
6	Hailu Fevera	MINT/EDFP	FM Specialist	0911615071	fey_haia@yahoo.com	
7	Abiy Tessema	MINT/PIU	M&E Specialist	0911715923	abiy.tessema@mint.gov.et	
8	Natnael Dereze	MOA	Sinior Manager	0510150160	natnael@digitalgreen.org	
9	Meseret Negatu	MINT	Director	0920606300	meseret.negatu@mint.gov.et	
10	Haregewoin Habtamu	MINT	Team Leader	0911638994	haregewoin.habtamu@mint.gov.et	
11	Tariku Gerba	MINT	IT Security Expert	0911793136	tariku.gerba@mint.gov.et	
12	Tirunar Walelign	MINT	System Analyst	09138607	tirunar.walelign@mint.gov.et	
13	Mdlalign Shiferaw	MFA	S-Network Admin	0911 3174	mollalign251@gmail.com	
14	Nishu se Hlmaria	Ministry of Justice	Team Leader	0913346935	nhailemarian@gmail.com	
15	Bezuayehu Birke	Mint/NDC	System Admin	0911149562	bezuayehu.Birke@mint.gov.et	
16	Senait Lakew	" /EDFP	Admin Assistant	0922599353	senait.lakew@mint.gov.et	
17	Luda. Bujoreanu	World Bank	Senior program officer	—	lbujoreanu@worldbank.org	
18	Tim Kelly	"	CO-TTL	—	tkelly@worldbank.org	
19	Victor	"	CO-TTL	—		
20	Iaonia Nasi	"	Consultant	—	Inasi@worldbank.org	
21	Dr. Mostin Belew	MINT	Director	0911791662	mostin.belew@mint.gov.et	
22	Yonas Hailu	MINT	General Director	0913158333	yonas.hailu@mint.gov.et	

MINISTRY OF INNOVATION AND TECHNOLOGY
ETHIOPIAN DIGITAL FOUNDATION PROJECT
PROJECT WORKSHOP FOR BUILDING MODERN DATACENTER   Date 23/06/2022

S.No	Participants Name	Organization Name	Position	Telephone	E-Mail	Signiture
1	Yirgalem Simeneh	Ministry of Transport	Network Admin	0910137205	y.yrga01@gmail.com	
2	Hanan Adane	Ministry of Revenue	DC & Sys Adm	0911630460	hannaye2012@gmail	
3	Amias Getnet	MINT	Senior web developer	0913139235	amiasgenes@mint	
4	Daniel Fisha	ministry of Innovation	software programmer	900870108	fishadaniel@gmail	
5	Merawi kibru	Ethiopian Agricultural Authority	ICT Director	0912602100	merawi@eaa-power	
6	Yehualashet Lessen	Ethiopian Communication Authority	principal ICT Expert	0923292739	yehubet@gmail.com	
7	Firehiwot Tulu	Ethiopian communication Authority	IT Director	0911303813	firenchJos@gmail.com	
8	Saron Mergu	MInT	System assure IT security	0985180110	saronmergu	
9	Miftah Jemal	MInT	Team Lead of	0917728667	miftah.jemal@mint.gov.et	
10	Habtamu Bakelu	MInT	ICT Professional	0917122079	habtamu.bl@gmail	
11	Martha Haddis	MInT	ICT Security	0911621192	martha.haddis@mint.gov.et	
12	Kebebush Agzu	MINT	ICT security	0911971035	kebebush.utt@comm.gov.et	
13	Getahun Hailu	Minstry of Trade	database Team	0911833061	getahailu@yahoo.com	
14	Eyob Mulugeta	Ministry of Industry	Network Admin.	0911106553	emugeta60@gmail.com	
15	Bisrat Tregaye	MINT	ICT Infrastructure	0911824556	bistrag@gmail.com	
16	Surafel Asru	MINT	App Software Developer	0922281070	surafaclsin@mint	
17	Roman Legesse	MINT	IT Security	0911274630	roman.legesse@gmail.com	
18	Meklit Teshome	MInT	System Analyst	0911353424	meklit.teshome@mint.gov.et	
19	Mesfin Shiferaw	MINT	System Analyst	0913669876	mesfinshiferaw5@gmail.com	
20	Ephrem Belew	MInT-DTP	Sr. Tech-supp	0931508931	ephrem.belew@mint.gov.et	
21	Lobuse Girma	MINT-DTP	Auto Vedo sister	0911519960	lobusira@mint.gov	
22	Helina Alemu	MINT	Network Admin	0922-747285	helina.alemu@mint	