The United Republic of Tanzania

President's Office Public Service Management and Good Governance

e-Government Authority

# e-Government Technology Roadmap

# PREFACE

The 4th Industrial revolution which mainly feature Information and Communication Technology has transformed the way businesses are conducted, communication is achieved and services are provided. These changes are attributed to innovation and rapid technological transformation which affects all walks of lives.

The Government of Tanzania has embarked in various initiative to tap into this growing domain. In realizing the potential provided by 4th Industrial revolution, the Government has developed e-Government Strategy which among other things aim to increase use of ICT and provide sustainable environment of service delivery through application of ICT. This strategy is based on seven (7) pillars which are; Connected Government; Institutional Collaboration and Coordination; E-Government Services; E-Government Research and Innovations; E-Government Cyber-Security Ecosystem; e-Government Human Capital Development; and E-Government Policies, Legal and Institutional Framework.

For effective and successful delivery of the set targets in the e-Government Strategy, technology plays an important role as a drive-force. This unbeknown force to many provides the fundamentals and techniques to achieve the set e-government strategic goal. Technology itself being a varsity sea of knowledge and application, has a tendency of changing rapidly and advancing so fast. Hence, it is imperative as a Government to provide a technological blueprint that guides public institution in acquiring, applying and developing various technologies that are available to assist towards successfully implementation of e-Government Strategy.

This Technological Roadmap aims to safely yet harmoniously set a clear path towards acquiring, development, implementation, retirement and management of existing, upcoming and emerging technologies. The roadmap also provides a glimpse on near and far future technologies that the government intend to acquire, develop, use and retire in its provision of satisfactory, efficient, cost-effective and effective services.

Dr. Mussa M. Kissaka

**BOARD CHAIRPERSON**

## Acronyms

| Abbreviation | Explanation |
|---|---|
| AMHS | Aeronautical Message Handling System |
| AMIS | Airport Management Information System |
| API | Application Programming Interface |
| CAS | NACTE Central Admission System |
| CBMS | Central Budget Management System |
| DBMS | Database Management System |
| D-FUNDS MIS | Donor Fund Management Information System |
| DR | Disaster Recovery |
| e-GA | e-Government Authority |
| eGSOC | e-GA Security Operation Center |
| eOSS | Electronic One Stop Solution |
| ERMS | Enterprise Resource Service Management Suite |
| EPZA | Export Processing Zone Authority |
| FAAS | Foreign Awards Assessment System |
| GAMIS | Government Asset Management Information Systems |
| G2B | Government to Business |
| G2C | Government to Citizen |
| G2E | Government to Employee |
| G2G | Government to Government |
| GDC | Government Data Center |
| GePG | Government Electronic Payment Gateway |
| GISP | Government ICT Service Portal |
| GMS | Government Mailing System |
| GOTHOMIS | Government Hospital Management Information System |
| GovESB | Government Enterprise Service Bus |
| GovNet | Government Network |
| HCMIS | Human Capital Management Information System |
| HTML | Hypertext Markup Language |
| ICT | Information and Communications Technology |
| IPv6 | Internet Protocol Version 6 |
| ITAS | Integrated Tax Administration System |

| Abbreviation | Explanation |
|---|---|
| LGAs | Local Government Authorities |
| LGRCIS | Local Government Revenue Collection Information System |
| MAIS | Meteorogical Aviation Information System |
| MDAs | Ministries, Departments and Authorities |
| mGOV | Government Mobile Platform |
| MMIS | Marine Meteorological Information System |
| MPLS | Multiprotocol Label Switching |
| MUSE | Mfumo wa Ulipaji Serikalini |
| MVM-MIS | Motor Vehicle Maintenance Management Information System |
| NAPS | National Addressing and Postcode System |
| NAS | Network Attached Storage |
| NAVS | NACTEVET Award Verification System |
| NHIF | National Health Insurance Fund |
| NPS | National Payments System |
| NIDA | National Identification Authority |
| OLAMS | Online Loan Application Management System |
| ORS | Online Registration System |
| OTS | Online TIN Service |
| PKI | Public Key Infrastructure |
| PMS | Programme Management System |
| POLIS | Parliamentary Online System |
| PReMS | Secondary Schools Record Manager |
| SAN | Storage Area Network |
| SD-WAN | software-defined wide area network |
| SURLIS | SUMATRA Road License Information System |
| TANCIS | Tanzania Customs Integrated System |
| TANePS | Tanzania National e-Procurement System |
| TeSWS | Tanzania Electronic Single Window System |
| VPLS | virtual private LAN service |
| UIMS | Universities Information Management System |

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# 1. INTRODUCTION

## 1.1 Overview

e-Government Authority also known as "e-GA" is a public institution established in 2019 under the e-Government Act No. 10 of 2019. The Authority is mandated to coordinate, oversee and promote e-Government initiatives and enforce e-Government related policies, laws, regulations, standards and guidelines in Public Institutions. The Act, among other functions endows e-GA to provide guidance and e-Government initiatives to public institutions.

Pursuant to Section 26 (1) (a) of the e-Government Act, Regulation 22 of the e-Government General Regulations, 2020 and the e-Government Strategy 2022, the Authority has developed the Technology Roadmap for the Government.

## 1.2 Purpose

The purpose of this document is to provide a clear path for development, implementation and management of Government's technology resources This roadmap provides a clear timeline for implementing e-Government Technology goals and milestones for tracking progress. The ultimate goal is to align Government's technology investments with business objectives and ensure that our ICT technology is integrated into our overall e-Government strategy.

## 1.3 Rationale

The technology roadmap depicts a future based on the government's shared vision and provides a technological framework for making that future a reality. The e-Government technology roadmap aims to identify e-Government requirements for future competitiveness and establish avenues for developing required technologies and skills. In addition, it assists the government in identifying and mitigating potential risks and uncertainties associated with technology development.

### 1.4 Scope

This document outlines the specific technology initiatives and projects that the Government will undertake over the next five years to support the e-Government Strategy. The roadmap will cover a broad range of technology areas, including hardware, software, networking and security. The scope of this roadmap is limited to Government's technology needs and will be used by all Public Institutions during the implementation of e-Government initiatives.

## 2. e-GOVERNMENT TECHNOLOGY ROADMAP

### 2.1 e-Government Objectives and Strategies

The e-Government Technology roadmap has been developed in alignment with the e-Government Strategy 2022 - 2027. Table 1 below presents the e-Government Objectives and Strategies:

| *S/No* | Objectives | Strategies |
|---|---|---|
| 1. | Connected Government for the efficient delivery of public services strengthened | i. Consolidate GovNet infrastructure<br>ii. Improve GovNet infrastructure<br>iii. Expand Coverage of GovNet to all LGA and MDAs facilities/service delivery points.<br>iv. Enhance and optimize GDC services and its replications on DR. |
| 2. | Inter-institutional collaboration and coordination in public services strengthened | i. Improve inter-institutional business processes<br>ii. Strengthen Data Sharing and Exchange Platform<br>iii. Enhance system integration and interoperability<br>iv. Enhance Government and Sectoral Portal<br>v. Enhance public services digitalization |
| 3. | E-Services delivery enhanced and sustained | i. Promote access high quality e-Services across multiple delivery channels<br>ii. Promote inter-institutional collaboration in the delivery of e-Services<br>iii. Facilitate e-Services availability<br>iv. Facilitate e-Services accessibility to diversified groups |

| S/No | Objectives | Strategies |
|---|---|---|
| 4. | e-Government Research, Innovations and Development enhanced | i. Promote locally developed e-Government innovations<br>ii. Promote the adoption of emerging and environmentally friendly e-Government technologies<br>iii. Promote collaboration with stakeholder in e-Government Research, Innovations and Development |
| 5. | e-Government Cyber-security Ecosystem improved | i. Strengthen e-Government cyber-security infrastructure<br>ii. Enhance Cyber-security technical capabilities and awareness.<br>iii. Improve security of e-service transactions |
| 6. | E-Government Human Capital Capacity Strengthened | i. Promote e-Government human capital knowledge and skillset<br>ii. Facilitate e-Government capacity building<br>iii. Improve Government ICT cadre welfare |
| 7. | E-Government Management Frameworks strengthened | i. Enhance e-Government policy framework.<br>ii. Strengthening e-Government legislative environment<br>iii. Improve e-Government Institutional framework |

***Table 1: The e-Government Objectives and Strategies***

## 2.2 Current Situation

e-Government is about delivering quality services to the public through Information and Communication Technologies. It involves using ICT to support processes within the Government as well as for the delivery of services to beneficiaries, such as citizens, businesses and other organization in all sectors. The current technology situation is as stipulated below.

### 2.2.1 Connected Government for the efficient delivery of public services

Initiatives for the efficient delivery of public services, were enabled through an e-Government support infrastructure and applications as categorized below;

**A: Hard Infrastructure**

This includes enabling infrastructures that facilitate unification of Government services such as Government Network (GovNet) and Government Data Centres. A total of 265 MDAs and LGAs were connected on dedicated government communication network.

Establishment and operationalization of the government owned Data Centre (GDC) which serves as the primary delivery hub for Government service including provision of Cloud Computing, Containerization platform, Server virtualization, Server co-location, Disaster recovering sites, Storage and other operations.

**B: Soft Infrastructure**

Establishment of shared soft infrastructure such as;

i. Government Mobile Platform (mGov) was established to provides a shared mobile channel for service delivery including SMS notification, USSD and mobile Apps.
ii. Government Electronic Payment Gateway (GePG) was established to provide a one stop payment gateway for government service.
iii. National Identification Platform was established to provide integrity on personnel information.

**C: Supporting Software Application**

Government relied on the following classifications of support software;

i. Proprietary Operating Systems such as Windows OS;
ii. Proprietary office applications such as Ms Office;
iii. Open-Source Operating Systems such as Linux and Ubuntu; and
iv. Use of Open-Source Office software such as WPS

### 2.2.2 Inter Institutional Collaboration and Coordination

With respect to integration and interoperability, the following initiatives have been implemented;

i. Establishment of Government Data Sharing and Exchange Platform known as Government Enterprise Service Bus (GovESB) where public institutions have rendered usage of the platform to exchange information between them.

ii. Formulation of Criteria for Data Sharing and Exchange through Government Enterprise Service Bus (GovESB).

### 2.2.3 E-Service delivery enhanced and sustained

#### 2.2.3.1 e-Services

The Government has done many ICT Initiatives to ensure that public services are delivered efficiently. Initiatives are based on sectorial categories and Business processes as described in appendix 1.

#### 2.2.3.2 e-Government Research, Innovations and Development

Through various research conducted on technology trends, the e-Government application development was performed in adherence to the following;

i. Use of enterprise framework for application development such as Spring boot, Angular, Django and Laravel.

ii. The use of front-end development languages such as JavaScript and HTMLetc.

iii. Using AJAX, a web development technique for creating interactive web applications.

iv. Deploying of web services using API

v. Implementation of web caching techniques to improve the performance of the web application.

vi. Mobile application development for Android and IOS using JAVA, kotlin swift and flutter.

vii. Deploying or using approved Government SMS Gateway, for interchange messages with other systems such as Internet email (Capable of supporting POP3, IMAP4, SMTP (with or without SSL)), the web etc.

viii. The use of Continuous Integration, Continuous Delivery and Continuous Deployment (CI/CD) methodology.

ix. The use of software code versioning and repository systems such as Jenkins, Git and Junit. Designing Applications using a modular and component-based approach for reusability

x. Development of Configurable/parameterized applications rather than code-driven applications.

### 2.2.4 Cyber Security

With respect to Cyber Security, the following initiatives have been implemented;

xi. Establishment of Government Cyber Security Strategy, 2022

xii. Establishment of e-Government Security Operation Center (eGSOC) for Protection, Monitoring and Evaluation of Critical Government Infrastructure.

xiii. Increase Cyber Security technical capabilities and awareness across the Government through conducting awareness and training.

xiv. Performance of Security Assessment whereby until March 2023, a number of 457 systems were assessed and 48 ICT Security Advisories issued.

## 2.3 The Roadmap

The e-Government Technology Roadmap has been developed to align with the e-Government Strategy 2022, and it outlines important focus areas that enhance the technology niche.

### 2.3.1 Connected Government for the efficient Delivery of Public Service strengthened

The concept of connected Government means, Public Institutions transform themselves into a unified or connected entities where critical business processes are fully and seamlessly integrated to provide efficient, complex and personalized services. It allows customers (G2G, G2C, G2B, G2E, C2G, B2G and E2G) to enjoy Single Window services under One-Roof. It also focuses on continually improving process performance through incremental and innovative process and technological improvements.

**A: Hard Infrastructure**

The enabling services/product for a connected government includes GovNET and Government Data centers as presented in the Figure 1: Technology Towards Connected Government. The technologies that shall facilitate the achievement of this objective include;

a) Medium of exchange shall include Fibre, Radio, Microwave and Copper as
b) Protocol (IP) address standard shall be IPV6 to enabling more connected devices and security;
c) Networking Technology for traffic routing shall be the simultaneously use of Multiprotocol Label Switching (MPLS) and software-defined wide area network (SD-WAN);
d) Method of software delivery and licensing shall be using cloud computing (Software-as-a-Service [SaaS], Platform-as-a-Service [PaaS], Infrastructure-as-a-Service [IaaS]);
e) Method of data storage shall be the use of NAS and SAN as storage to enable easy service deployment as shown in the below diagram.

**B: Support Software Application**

More emphasize on the support software shall be towards;

a) Open-Source Operating Systems such as Linux and Ubuntu; and
b) Use of Open-Source Office software such as WPS

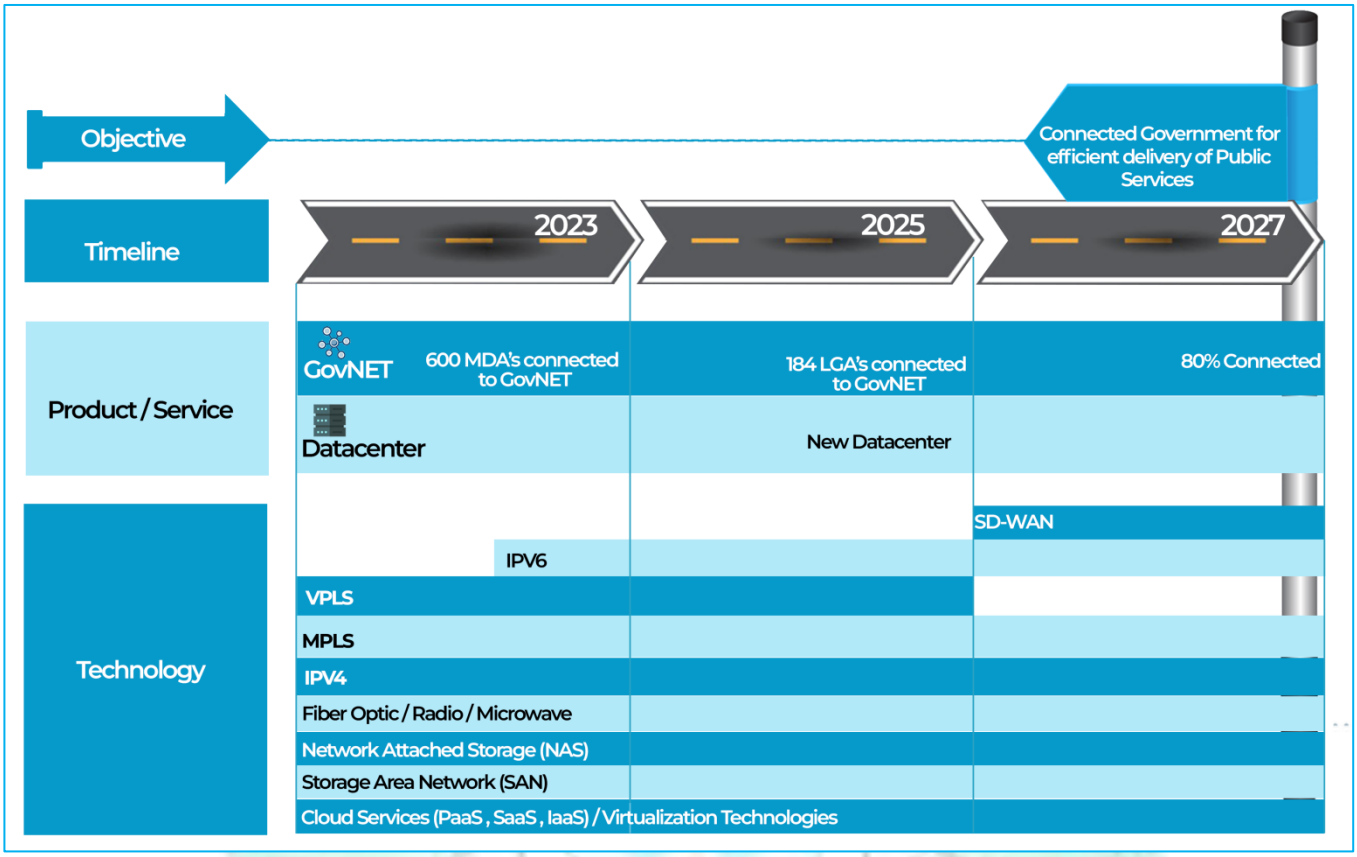


**Figure 1: Connected Government Technology Roadmap**

### 2.3.2 Inter-institutional Collaboration and Coordination in Public Service Strengthened

Collaboration between Government MDAs and LGAs in the digital age is essential for promoting mutually supportive actions across all sectors in order to deliver e-services efficiently and effectively.

The e-Government Act of 2019 requires all government systems to exchange data electronically through the Data Sharing Exchange Platform. This enables inter-institutional collaboration via system integration to reduce duplication of effort and facilitate the delivery of public services. This is crucial for lowering operational costs and improving the quality and dependability of e-services offered to citizens. Figure 2 below presents the technology roadmap towards Inter-Institutional Collaboration and

Coordination. The government employs the following technologies to accomplish inter-institutional collaboration and coordination: -

a) Government Enterprise Service Bus (GovESB) is a platform that allows Government institutions to exchange electronic data between communication systems.
b) Web technologies are created using Java and PHP on the AngularJS framework.
c) Integration of web technologies necessitates Application Programming Interface (API) technologies such as JSON and XML.
d) For a more modular, loosely coupled approach, applications are broken down into small and independent components that can perform discrete services.
e) To accomplish this, micro-service technologies like dockers and Kubernetes are utilized.
f) Data exchanged is managed and stored in a variety of Database Management Systems, including Postgres, MySQL, Apache, Cassandra DB, and Apache Couch DB.
g) The use of big data technologies, such as Hadoop, NoSQL, and Apache Spark, for big data management.
h) Government Service Directory (GSD) employs identical technologies.
i) The roadmap suggests expanding the use of Cloud Computing technologies. Cloud computing provides sufficient and cost-effective processing, computation, and storage capacities to government institutions to efficiently and effectively provide public e-services.
j) The roadmap proposes adopting technologies such as Content Delivery Networks, Anycast, Virtualization, Containerization, Load Balancing, Auto-scaling, Serverless Computing, Identity and Access Management, and Infrastructure as a Code.
k) Additionally, these technologies may necessitate the expansion of the Government Cloud to other carrier-neutral data centres.

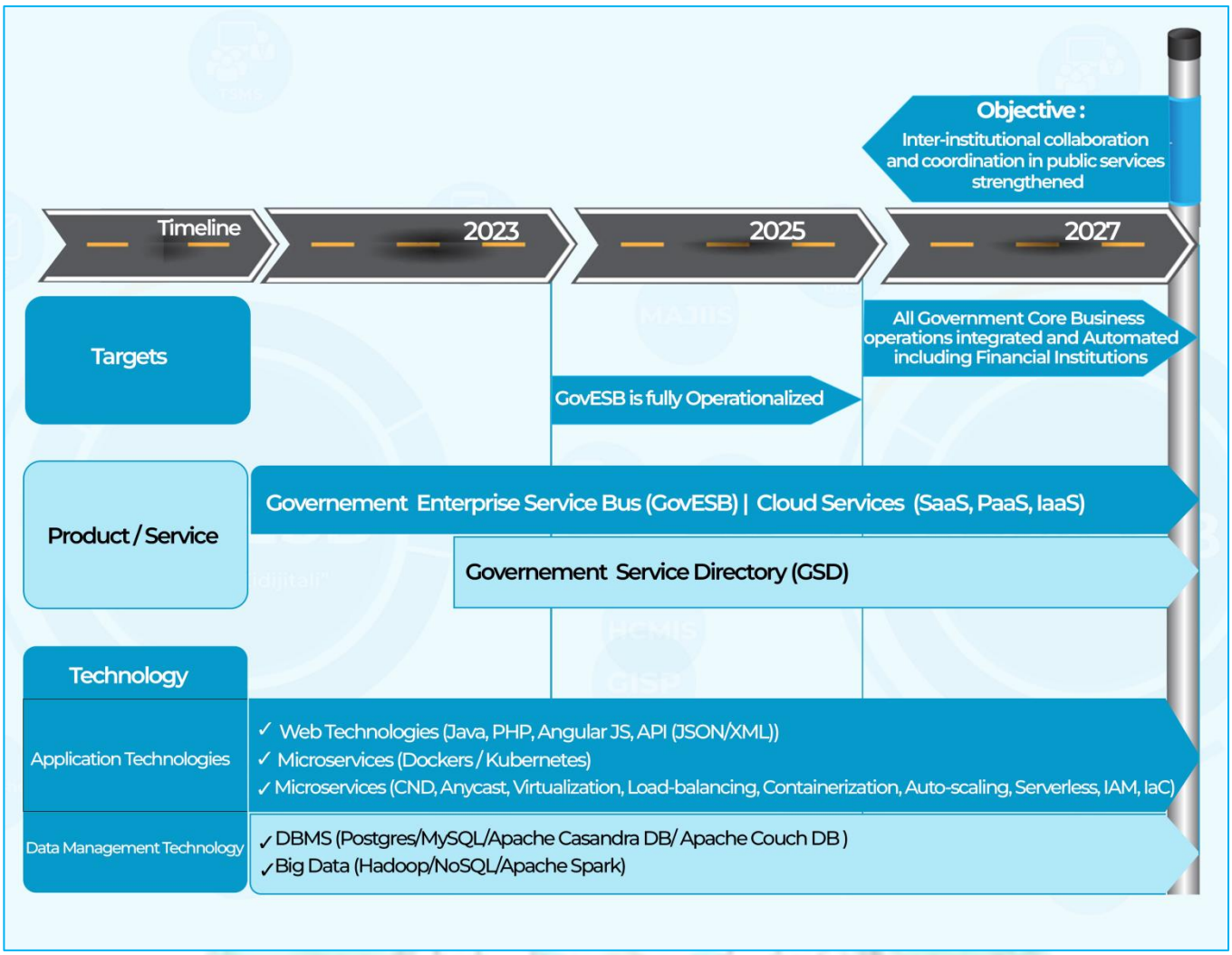


**Figure 2: Inter-Institutional Collaboration and Coordination Technology Roadmap**

### 2.3.3 e-Service Delivery Enhanced and Sustained

The enabling services/product for e-Services and Soft Infrastructure include Mobile Applications, Mobile App Store, Single Window Applications and Sectorial Portals. Figure 3 below presents the technology roadmap towards e-services and soft infrastructure.

The Application technologies that shall facilitate the achievement of this objective include:

a) Java, PHP, Python, JS, API (Json, XML for Web Technologies;
b) Android (Java/Kotlin), IOS (Swift) and Flutter for Mobile Platform.
c) In addition, Technologies for Data Management include DBMS (Postgres/ MySQL, /Apache) and Data warehouse (OLAP).

The following diagram summarizes the enabling technologies to ensure sustainable e-services.

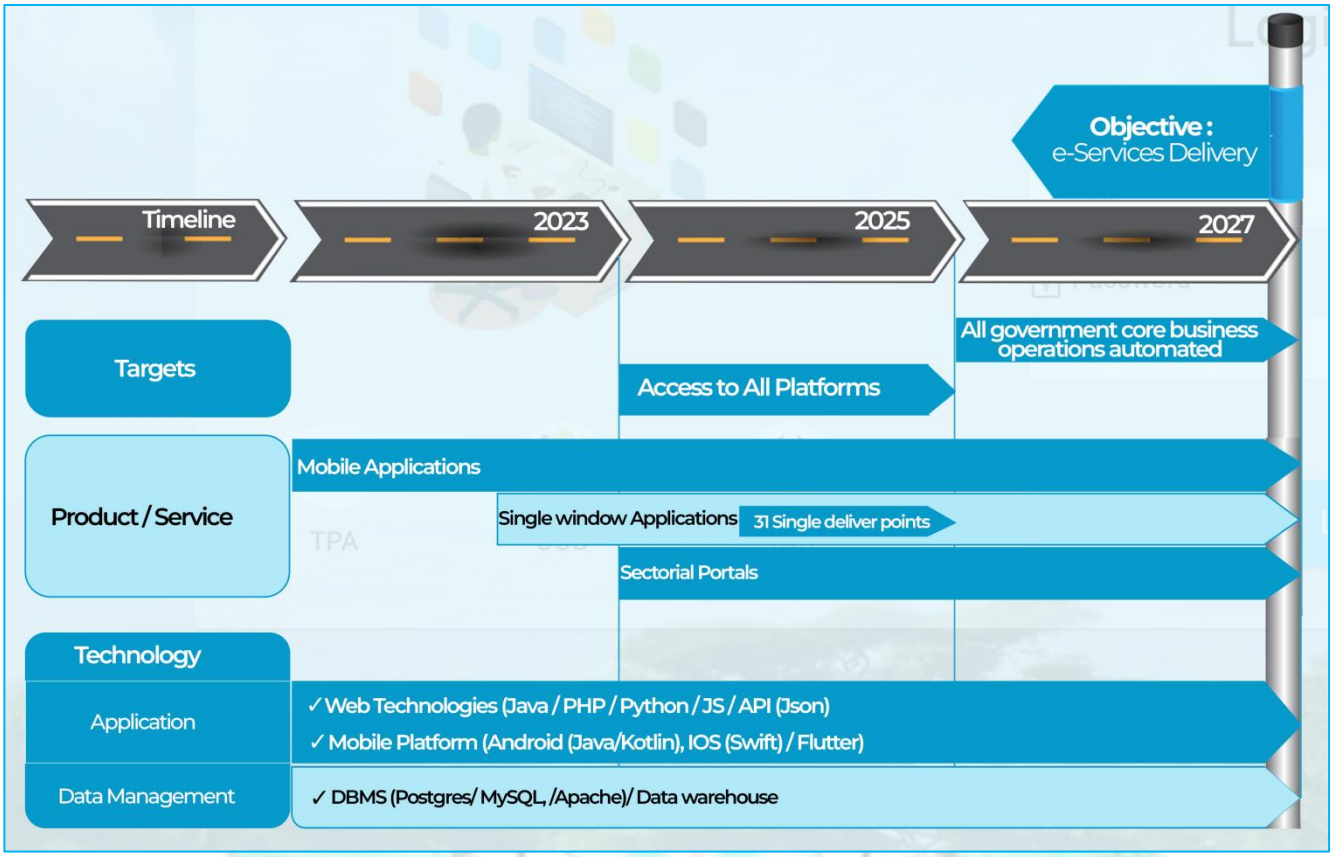


**Figure 3: e-Services and Soft Infrastructure Technology Roadmap**

### 2.3.4 E-Government Research, Innovations and Development Enhanced

Research, Innovation and Development on e-Government solutions are utmost important for delivery of eGovernment vision of a connected, coordinated and integrated Government. The Government needs to cope with the rapid technological development by adopting emerging technologies in a timely manner. Research leads to discoveries and innovations to find more effective and efficient utilization of technology and produce new home-grown solutions.

The emerging technologies that shall facilitate the achievement of this objective include:

a) Artificial Intelligence: refers to the development of computer systems that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation
b) Cloud Computing: the delivery of computing services—such as storage, processing power, and applications—over the internet, allowing users to access and use resources without the need for extensive local infrastructure
c) Internet Of Things (IOT): A network of interconnected devices that can communicate and share data, enabling them to work together seamlessly; it involves embedding sensors, software, and other technologies into physical objects to collect and exchange data
d) Big Data and Data Mining: Massive volume of structured and unstructured data analysed this data to discover patterns, correlations, and insights that can inform decision-making and business strategies
e) Blockchain: decentralized and distributed ledger technology that securely records and verifies transactions across multiple computers, ensuring transparency, security, and immutability, commonly associated with crypto-currencies like Bitcoin.
f) Augmented Reality and Virtual Reality: enhances real-world environments by overlaying digital information or objects mostly used in various fields, including gaming, education, healthcare, and training

Figure 4 below presents roadmap of employment and research of emerging technologies.

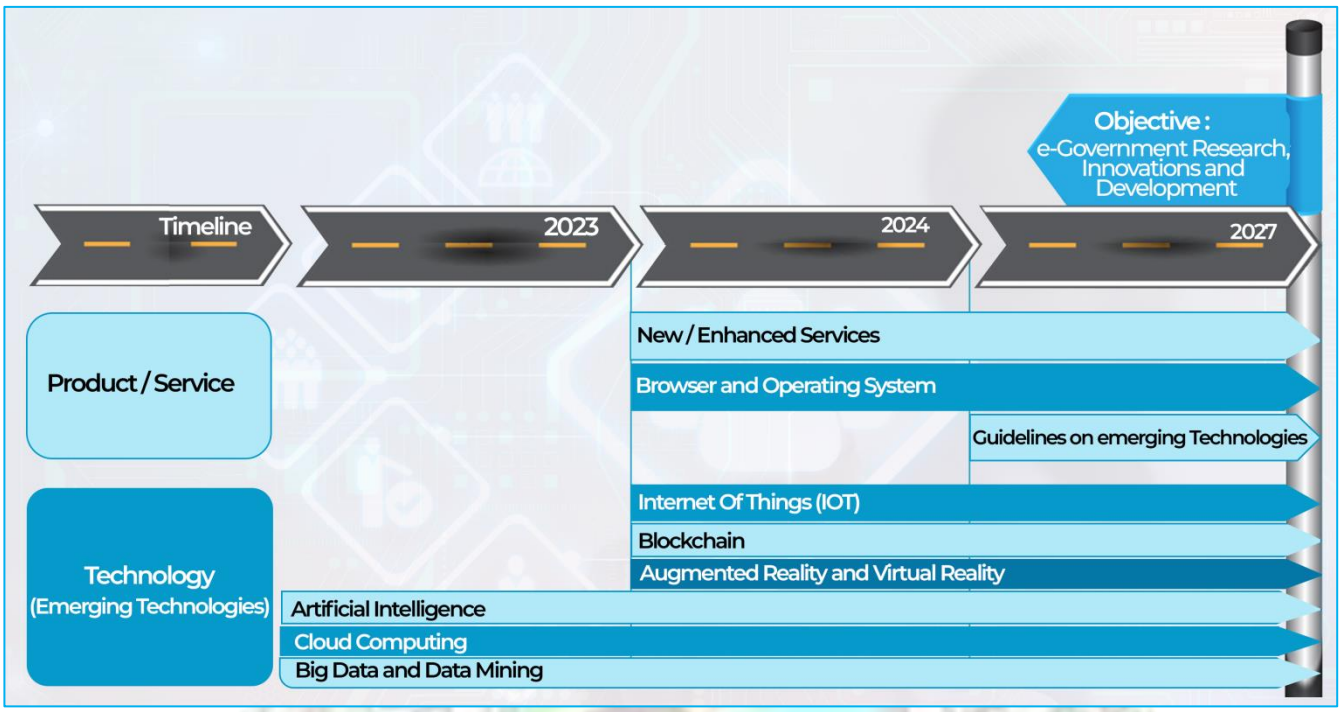


**Figure 4: e-Government Research, Innovations and Development Technology Roadmap**

### 2.3.5 e-Government Cyber-Security Ecosystem, Improved

Internet-connected digital technologies and service platforms are always susceptible to infiltration by cyber criminals, which could result in unacceptable socioeconomic losses. These hazards necessitate that the government implement measures, controls, and procedures to ensure the confidentiality, integrity, and availability of information in ICT systems. The road map below depicts the technologies that will mitigate cyber security threats and risks. Figure 5 below presents the road map of the eGSOC by improving monitoring, security advisory and security awareness using:

a) Public Key Infrastructure (PKI) provides a framework for secure communication and authentication over a computer network.
b) Digital Signature for securing government infrastructure and information.
c) OpenDNSsec to allow verification of DNS information and ensure all Government domains are signed.
d) Security Analytics technology for analyzing security levels and threats.

e) Security Information and Event Management (SIEM), a comprehensive approach to managing an organization's security by combining information management and security event management.

f) Intrusion Prevention and Detection Systems (IPS/IDS), are both security technologies designed to protect computer networks from unauthorized access, attacks, and security breaches.

g) Endpoint Detection and Response (EDR), focuses on detecting and mitigating threats on individual computing devices (endpoints) within a network.

h) Threat Intelligence Platforms (TIP), A solution that aggregates, correlates, and analyzes threat intelligence data from various sources to provide actionable insights for cybersecurity teams.

i) Security Orchestration- refers to the coordination and automation of various security processes and tasks within an organization.

j) Automation, and Response (SOAR), a comprehensive approach to cybersecurity that integrates orchestration and automation into incident response processes.

k) Data Loss Prevention (DLP). a set of strategies and tools designed to prevent unauthorized access, use, or transmission of sensitive information or data.

l) Cryptograph Technology uses mathematical algorithms to transform data into a format that is unreadable without the appropriate decryption key. It plays a crucial role in ensuring the confidentiality, integrity, and authenticity of information in various applications, including secure communication, digital signatures, secure transactions, and data protection.

m) PKI technologies like OpenSSL, EJBCA, XiPKI, JKS and encryption technologies like SSL, TLS, MIME, Code signing, Kerberos and Two-factor authentication (2FA) will ensure protection of data and information transmitted in the Government network and information stored in its related systems.

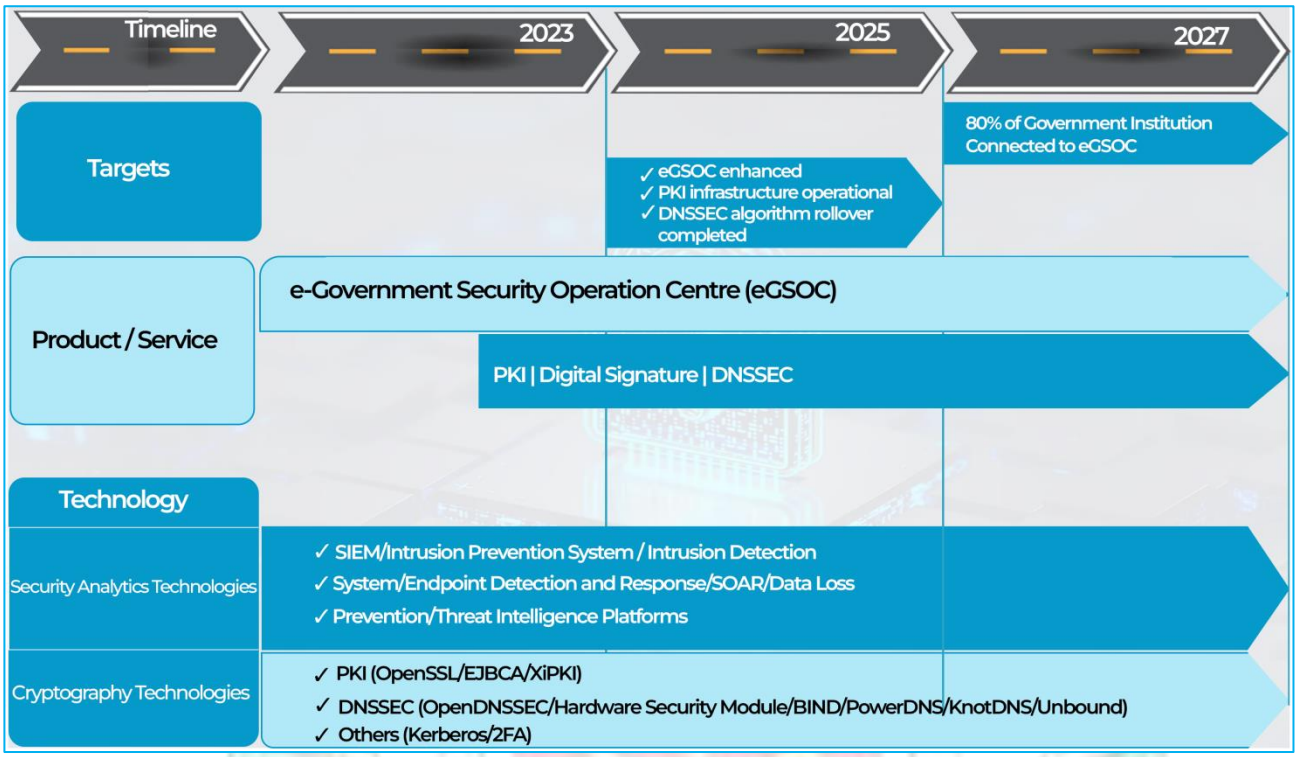


**Figure 5: Cyber Security Ecosystem Technology Roadmap**

### 2.3.6 e-Government Human Capital Capacity Strengthened

The availability of skilled and professional workforce with good capacity for learning is essential and one of the key factors in determining the success or failure of e-Government. e-Government Human Capital Development initiatives are intended to increase stock of knowledge and skills for Government employees as presented in the Figure 6 below. The enabling technologies in facilitating e-Government Human Capital Development will include: -

a) e-Learning Platforms: Web-based applications or software that provide a virtual learning environment for individuals or organizations

b) e-Learning Technologies: Tools and systems designed to facilitate online education and training such as Learning Management Systems (LMS), Virtual Learning Environments (VLE), Web Conferencing, and Mobile Learning (m-Learning)

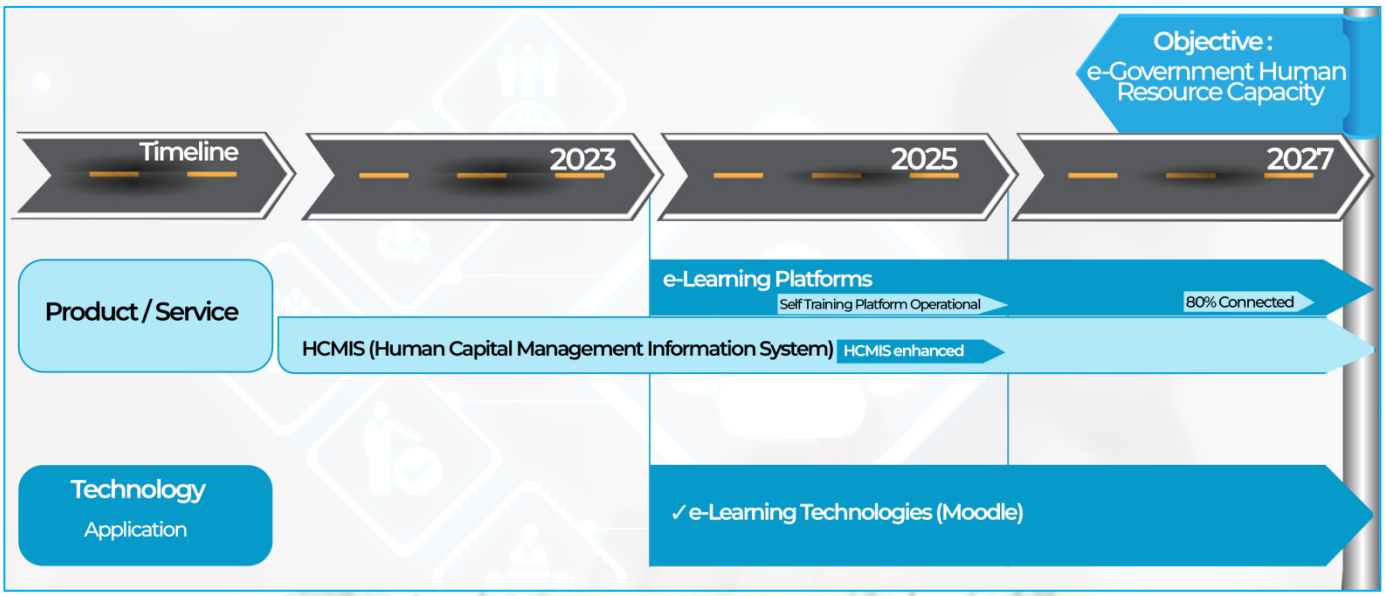


**Figure 6: Human Capital Development Technology Roadmap**

## 2.4 Consolidated Technology Roadmap

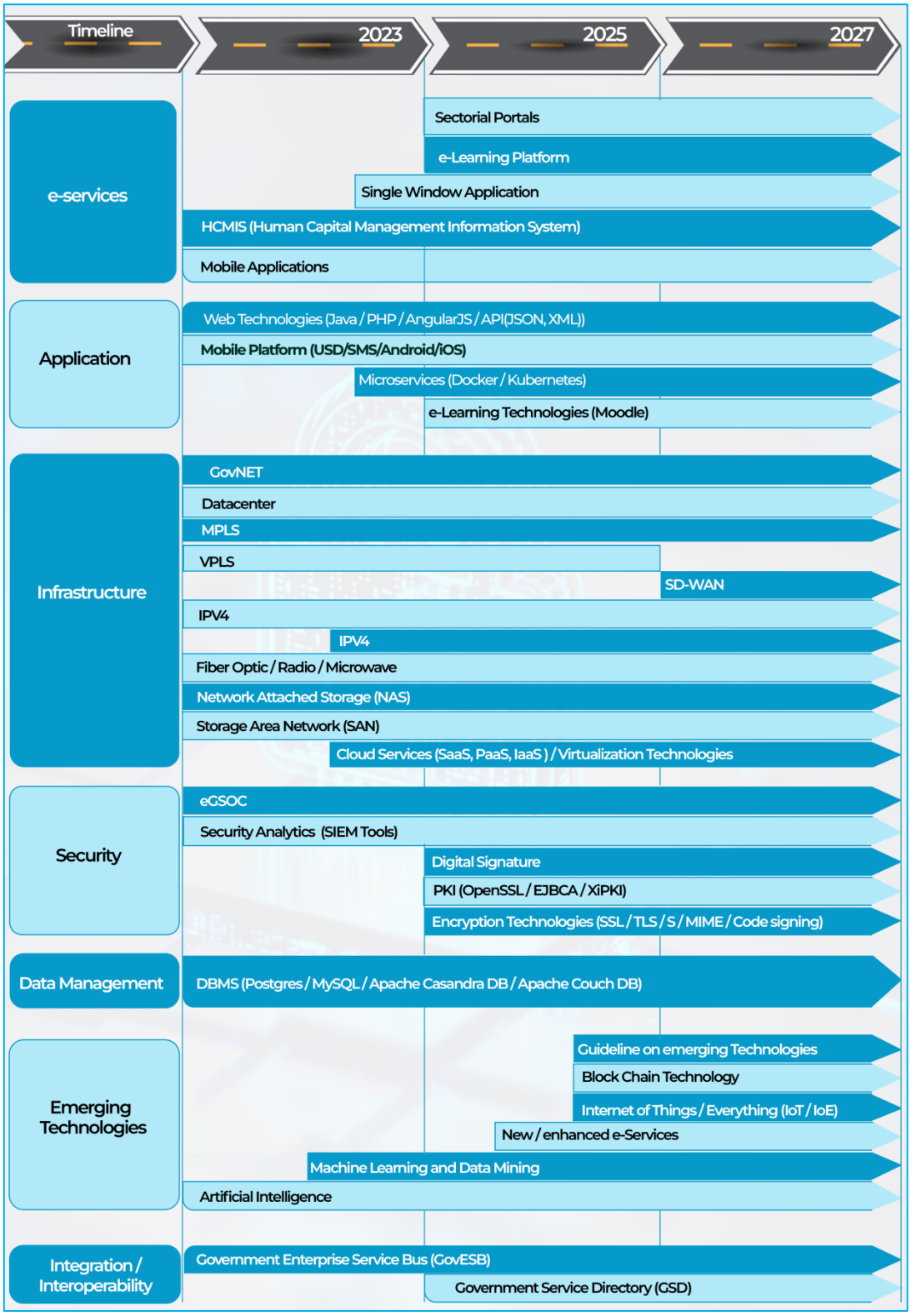


**Figure 7: Consolidated Technology Roadmap**

## 2.5 Critical Success factors and Risks

### 2.5.1 Critical Success factors

| S/N | | CRITICAL SUCCESS FACTORS | REQUIREMENTS |
|---|---|---|---|
| 1. | **Infrastructure** | Reliable network and Communication Infrastructure | - Sufficient bandwidth<br>- Security assurance.<br>- Shared Infrastructure to sustain e-services.<br>- Availability of GovNET to all Public Institution.<br>- Usage of Public Private Partnership |
| | | Lower cost of software ownership | - Use of Open-Source Software.<br>- Use of Shared solutions<br>- Usage of shared government Data Centers |
| 2. | **Application** | Reliable, accessible and secure development, testing, training and deployment environment | - Highly maintainable and testable applications<br>- Loosely coupled applications<br>- Upgraded systems |

| S/N | | CRITICAL SUCCESS FACTORS | REQUIREMENTS |
|---|---|---|---|
| | | | - High standard of software development.<br>- Independently deployable applications. |
| 3. | **Business/Services** | Improved, reliable and accessible Government Services | - Business Process Improvement (Re-engineering).<br>- Service Automation.<br>- Self Service capabilities.<br>- Interoperable solutions. |
| 4. | **Integration and Interoperability** | Presence of Government Enterprise Service Bus (ESB) | - No systems duplication<br>- Maintained Data Dictionaries<br>- Solution usability and accessibility<br>- Systems integration<br>- **Usage of latest technology** |
| 5. | **Security** | Secure, reliable and trusted systems and Infrastructures. | - Monitoring of Government Systems and Network Infrastructure.<br>- Timely Analysis and Response to Cyber Security Incidents. |

| S/N | | CRITICAL SUCCESS FACTORS | REQUIREMENTS |
|---|---|---|---|
| | | Government Public Key Infrastructure (GPKI). | - Dedicated protection of Government Systems and Infrastructures. |

### 2.5.2 Risks

Despite the availability of above initiative and solutions to foster for a quick and resilient path towards achieving the envisioned technologies, some risks if not properly handled may hinder or delay the success of this roadmap. Some of the risks and their mitigation and identifies below.

| S/N | | RISK | IMPACT | MITIGATION |
|---|---|---|---|---|
| 1. | **Infrastructure** | Technological failure | Medium to High | i. Business Continuity Plan.<br>ii. Disaster recovery plan.<br>iii. **Approve more budgets**<br>iv. **Build Resilient infrastructures** |

| S/N | | RISK | IMPACT | MITIGATION |
|---|---|---|---|---|
| 2. | **Application** | Insufficient Coding | High | i. Proper user acceptance testing<br>ii. Enforce proper coding standard and procedures<br>iii. Proper error handling.<br>iv. Input data validation.<br>v. Provide proper training |
| 3. | **Business/**<br>**Services** | poor quality services | Medium | i. Dedicated and trained human resource<br>ii. Sufficient budget allocation on business/services<br>iii. Develop and operationalize quality assurance guideline |

| S/N | | RISK | IMPACT | MITIGATION |
|---|---|---|---|---|
| | | | | iv. Business Process Improvement<br>v. Business Processes Automation |
| 4. | **Integration and Interoperability** | - Data format mismatch<br>- Incompatible Technologies | Medium | i. Strictly adhering to Data Sharing Criteria for Data Sharing<br>ii. Develop Institutional Data Dictionary<br>iii. Adherence to Technical Standards and Guidelines<br>iv. Upgrade to modern technologies<br>v. Promote usage of shared solutions |

| S/N | | RISK | IMPACT | MITIGATION |
|---|---|---|---|---|
| 5. | **Security** | - Sensitive Data Exposure<br>- Inadequate security implementation<br>- Rapid technological change | High | i. Regular provision of security awareness training<br>ii. Proper implementation of all security aspects such as Data encryption, patching, proper configuration etc.<br>iii. Regular security vulnerability assessment<br>iv. Regular review of security standards and guidelines |

## 3. IMPLEMENTATION, REVIEW AND ENFORCEMENT

This document shall:

3.1. Effective upon being reviewed by e-GA Board of Directors and signed by the Board chairman on its first page.

3.2. Subjected to review at least once every three years or whenever necessary changes are needed.

3.3. Consistently complied with, any exceptions to its application must duly be authorized by the Board chairman.

## 4. RELATED DOCUMENTS

4.1. e-Government Act, 2019

4.2. e-Government General Regulations, 2020

4.3. e-Government Infrastructure Architecture Standards and Technical Guidelines (eGA/EXT/IRA/002).

4.4. Tanzania e-Government Strategy 2022

4.5. e-Government Guideline 2017

4.6. Government Cybersecurity Strategy 2022

## 5. DOCUMENT CONTROL

| Version | Name | Comment | Date |
|---|---|---|---|
| Ver. 1.0 | e-Government Technology Roadmap | Creation of Document | February 2024 |

**Appendix 1:** Examples of Sectorial e-services initiatives

| No. | Sector | e-Services |
|---|---|---|
| 1. | Public Service Management and Good Governance | i. Human Capital Management Information System (HCMIS);<br>ii. Government ICT Service Portal (GISP);<br>iii. e-Mrejesho;<br>iv. e-Office System;<br>v. Enterprise Resource Service Management Suite (ERMS);<br>vi. Government Mailing System (GMS);<br>vii. Trusted Digital Repository;<br>viii. Recruitment Portal;<br>ix. Ethics Management Information System;<br>x. Government official travelling permit;<br>xi. Corruption complaints;<br>xii. Government Performance Reporting Dashboard;<br>xiii. e-Mikutano<br>xiv. Incident Reporting System; and<br>xv. Parliamentary Online System (POLIS). |
| 2. | Health, Education and Social Services | i. Online Work Permit System; |

| No. | Sector | e-Services |
|---|---|---|
| | | ii. Workers' Compensation Self-service;<br>iii. NHIF Service Portal;<br>iv. Central Admission System;<br>v. Public Service Social Security Fund system and Loan Management System (LMS).<br>vi. Online Loan Application Management System (OLAMS)<br>vii. Universities Information Management System (UIMS)<br>viii. Programme Management System (PMS)<br>ix. Foreign Awards Assessment System (FAAS)<br>x. Secondary Schools Record Manager (PReMS)<br>xi. Examination Results<br>xii. NACTEVET Award Verification System (NAVS)<br>xiii. NACTE Central Admission System (CAS) |
| **3.** | Financial Services | i. Central Budget Management System (CBMS);<br>ii. Government Asset Management Information Systems (GAMIS); |

| No. | Sector | e-Services |
|---|---|---|
| | | iii. "Mfumo wa Ulipaji Serikalini (MUSE)";<br>iv. Donor Fund Management Information System (D-FUNDS MIS);<br>v. Treasury Registrar Management Information system;<br>vi. Tanzania Customs Integrated System (TANCIS);<br>Integrated Tax Administration System (ITAX);<br>viii. Revenue Gateway system;<br>ix. Central Motor Vehicle Registration System;<br>x. Tanzania Electronic Single Window System (TeSWS);<br>xi. Machinga Registration System;<br>xii. Online TIN Service (OTS);<br>xiii. National Payments System (NPS);<br>xiv. Salary Slip Portal.<br>xv. Government e-Payment System (GePG)<br>xvi. Tausi Taxpayer Portal |
| **4.** | Regional Administration and Local Government Authorities | i. School Information Management System; |

| No. | Sector | e-Services |
|---|---|---|
| | | ii. Government of Tanzania Health Operations Management Information System (GOTHOMIS);<br>iii. Local Government Revenue Collection Information System (LGRCIS);<br>iv. Online Teachers Application Systems;<br>v. Facility Financial Accounting and Reporting System;<br>vi. District Road Maintenance System, Planning; and<br>vii. Planning and Reporting System (PlanRep). |
| **5.** | Land and Tourism Services | i. Integrated Land Management Information System;<br>ii. Government Real Estate Management System;<br>iii. MNRT Portal; and<br>iv. Safari Portal. |
| **6.** | Industry, Trade and Investment Services | i. Online Registration System (ORS);<br>ii. Electronic One Stop Solution (eOSS); and<br>iii. Business Licensing Portal. |
| **7.** | Works and Transport and Communications Services | i. Road Toll System, Road Accident Information System (RAIS); |

| No. | Sector | e-Services |
|---|---|---|
| | | ii. Shipping Business Information System;<br>iii. Tanzania Electronic Single Window System (TeSWS);<br>iv. Airport Management Information System (AMIS);<br>v. Traffic Information Data Base System;<br>vi. National Addressing and Postcode System (NAPS);<br>vii. Train e-ticketing and Cargo Management System;<br>viii. Meteorological Aviation Information System (MAIS);<br>ix. Marine Meteorological Information System (MMIS);<br>x. Aeronautical Message Handling System (AMHS);<br>xi. Special Load Permit System; and<br>xii. Motor Vehicle Maintenance Management Information System (MVM-MIS). |
| **8.** | Agriculture, Livestock and Fisheries | i. Farmers Registration System;<br>ii. Agricultural Trade Management Information System;<br>iii. e-Extension Services and Marketing; |

| No. | Sector | e-Services |
|---|---|---|
| | | iv. National Agricultural Management Information System;<br>v. Agriculture Products Licensing and Plant Health Management Information System;<br>vi. Fisheries Management System;<br>vii. Tanzania National Livestock Identification;<br>viii. Traceability System (TANLITS); and<br>ix. Water Point Mapping System for Rural Water Supply Services. |
| **9.** | Information, Culture, Arts and Sports Services | i. Wananchi Portal;<br>ii. Gaming Licensing;<br>iii. Inspection and Compliance Application System. |
| **10.** | Home Affairs, Foreign Affairs and Legal Services | i. e-immigration;<br>ii. National Identification system;<br>iii. Traffic offence verification system;<br>iv. Lost Property Report system (Property loss registration);<br>v. Birth Registration System; and |
| **11.** | Minerals, Energy and Water Services | i. Mining Cadastral Portal; |

| No. | Sector | e-Services |
|---|---|---|
| | | ii. Geological and Mineral Information System; National Energy management information system;<br>iii. LUKU Vending system;<br>iv. Water Point Mapping System for Rural Water Supply Services; and<br>v. MAJI Information System. |

## HEADQUARTERS

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