



Ghana Government Enterprise Architecture Implementation Plan

ABBREVIATIONS

Term	Definition
GGEA	Ghana Government Enterprise Architecture
EA	Enterprise Architecture
MDA	Ministries Departments and Agencies
GICTeD	Ghana ICT Directorate
GoG	Government of Ghana
CIO	Chief Innovation Officer
QAC	Quality Assurance Committee
RFP	Request for Proposal
CMM	Capability Maturity Model



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1. Introduction

This implementation planning report is one of the key deliverables of the GGEA project and it serves as the road map of the required steps to transition the MDAs' IT from their current state to the strategic state and the additional business value that transformation can deliver.

The purpose of the report is to define the concrete steps to be taken by the Government of Ghana (GoG) through GICTeD to implement the recommendations provided in GGEA report. The report defines the implementation strategy, which describes the overall approach to the transformation activity. It uses the recommended governance principles, the future Enterprise Architecture and gap analysis as input to formulate the plan. The strategy will guide the development of all initiatives recommended. The ultimate goal of the implementation strategy is to make the changes necessary to the MDA ICT environments to fulfil their egovernment objectives while causing the least amount of disruption to business operations.

2. The Transition Strategy

The implementation strategy for the MDAs will depend on the unique MDA's situation and its readiness for change. In fact, the detailed implementation activities may vary between MDAs but the strategy provides a broad framework for the implementation of the GGEA. During implementation the following aspects will be considered:

- ☐ The MDA's culture – the transition and transformation strategies should be designed to work well within the culture. They should not contradict behavioural norms and ideals. They should reflect processes that people readily understand and embrace.
- ☐ Other changes occurring in the organisation – there is a need to consider how much change is occurring in the MDA, the people involved in the changes and the thresholds for accepting change.

MDAs will develop their transition strategies, which will describe their plans for migrating from their baseline architectures to the target architecture. The transition strategy will define projects, programmes, and timelines/milestones and is the foundation for modernisation and transformation activities for the MDAs.

The transition strategy is based on multi-year realisation of the Enterprise Architecture. This could be expanded or contracted as government's needs dictate, but the overall strategy and direction remains the same. The philosophy used to best realise progress to that goal is composed of a series of three actions:

- ☐ Replace old hardware and software with systems that conform to the enterprise IT architecture standards. However, some core systems may be too expensive or complex to redevelop and may need to be left in place. This may result in accepting some inefficiencies in operation;



- ❑ Freeze investments in obsolete and incompatible capabilities;
- ❑ Require all new systems and services to adopt the Enterprise Architecture and eGovernment Interoperability Framework (eGIF) standards unless business reasons dictate otherwise.

Over time, the GGEA will be adapted and extended to address new needs and to include new technology. For instance, the architecture should be able to include relevant systems standards as they become stable and proven. However, decisions concerning new technologies should be made within the framework of the architecture as a master blueprint, instead of a constant reaction to a multi-technology muddle.

An implementation workshop is required urgently to gain concurrence to the transition and implementation strategies. The workshop will enable GICTeD and other stakeholders to develop, validate and incorporate feedback into the strategies.

3. Government Priorities

The implementation of the GGEA must be aligned to the delivery of key government programmes identified by the Ministry of Communications in the eGovernment Strategy report. The programmes are referred to as the ICT4AD Priorities areas, which are provided in the list below.

1. Accelerated Human Resource development;
2. Promoting ICTs in Education – The Deployment and Exploitation of ICTs in Education;
3. Facilitating Government Administration and Service Delivery – Promoting Electronic Government and Governance;
4. Facilitating the Development of the Private Sector (Portal, Content & Knowledge Mgt, Revenue Collection);
5. Developing an Export-Oriented ICT Products and Services Industry;
6. Modernisation of Agriculture and the Development of an Agro-Business Industry;
7. Developing a Globally Competitive Value-Added Services Sector - A Regional Business Service and ICT Hub;
8. Deployment and Spread of ICTs in the Community;
9. Promotion of National Health;
10. Rapid ICT and Enabling Physical Infrastructure Development;
11. Legal, Regulatory, and Institutional Framework Provisions;



12. Research and Development, Scientific and Industrial Research Capacity Development;
13. Promoting Foreign and Local Direct Investment Drive in ICT;
14. Facilitating National Security and Law and Order.

The GGEA implementation must enable the delivery of services and community information for citizens, business and local partnerships through a connected national infrastructure. The GGEA must also promote healthy communities; support the economic vitality of district assemblies and other programmes national such as Community Based Poverty Reduction Project (CPRP) and Agricultural Services Sub-Sector Investment Programme (AgSSIP).



4. Implementation Strategy

A strategic vision is useless if it is unattainable. The implementation strategy must ensure the steps towards the vision are feasible, low in risk and meet government objectives. Our analysis of the scope and requirements has proved that a phased implementation of the programme is the only viable approach as the risks associated with a single massive implementation are significantly greater. Thus we are recommending the adoption of a piloting strategy that will enable the GoG to test the effectiveness of the new processes and technologies, prior to rollout. It will also allow the MDAs to build the knowledge and skills necessary for implementing the various solutions, greatly enhancing the speed and ease of the roll-out.

We recommend a shared services strategy that will consolidate the delivery of both application development and infrastructure hosting services for the MDAs reducing rework and ensure consistency in delivery of the necessary technologies. The strategy involves developing common application services that could be rolled out to the MDAs with minimum level of customisation and configuration to enable speed of delivery.

The strategy recommends the following:

- ☐ A phased MDA implementation model;
- ☐ A centralised Programme Office to oversee the delivery of projects;
- ☐ Shared application services developed and supported by competency centres to rollout solutions to MDAs;
- ☐ Shared infrastructure for network connectivity and data centre hosting services.

4.1 SHARED INFRASTRUCTURE SERVICES

The implementation of the GGEA is based on building shared infrastructure and application capabilities to be used by the MDAs to speed up the implementation and reduce the risk of creating unnecessary levels of complexity. As illustrated in figure 1 below we recommend a phased approach that will ensure that first waves of shared infrastructure services are implemented to enable the MDAs to use centralised services.

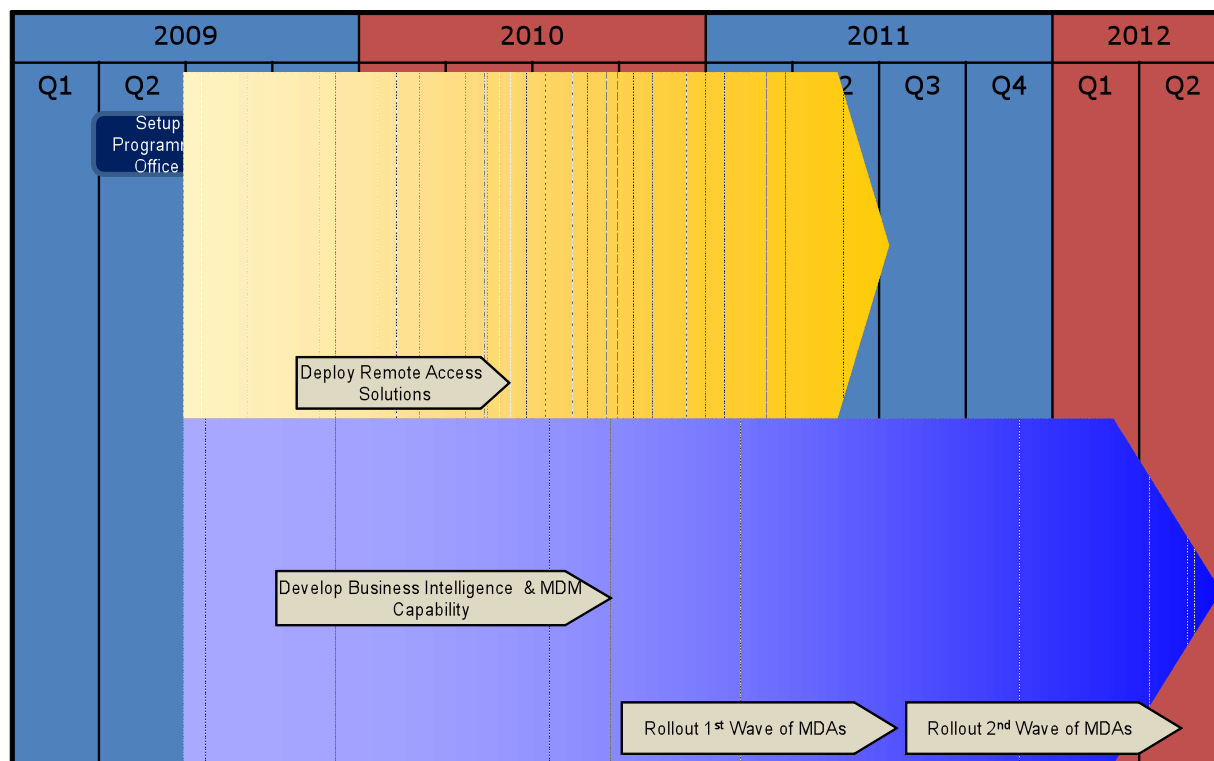


Figure 1: General Implementation Approach

The first wave assumes the implementation of shared infrastructure services to be built by the GoG. This includes the Wide Area Network infrastructure (GovNet) that will connect all the MDAs enabling them to exchange data effectively. This is an important deliverable on the part of the government as a precursor to the rollout of shared services. We recommend that the GovNet deployment is given a major 'push' to ensure that shared services implementations could proceed as planned.

Other shared infrastructure services to be deployed are:

- ☐ Shared Data Centres - currently the MDA Data Centres have basic environmental facilities and technologies. It is therefore recommended that centralised government Data Centres are built to host the shared applications. As recommended in the GGEA report two large Data Centres with industry-aligned facilities offering higher availability targets are required. This could either be an in-house-maintained facility or provided as a managed service by a third-party supplier with the capability to provide higher availability levels.
- ☐ Government Secure Intranet and Email – infrastructure is required to enable secure collaboration across the public sector as well as access to the shared and MDA specific applications.
- ☐ Remote Access – infrastructure is also required to enable public servants log in to access systems from remote locations.



4.2 SHARED ERP SERVICES

Shared services are the enabler of change, offering the GoG the means to achieve several goals such as efficiency improvements and the transformation of government and the wider public sector into a more focused, citizen-centric entity. Shared services has now been adopted by vast majority of large private sector companies and governments because they have been proven to save money, provide better Human Resource, Finance and other back-office services to employees and managers, and lay solid foundations for a variety of other cultural transformations. Shared services deployed across central and local government offer the opportunity to make major savings on support services and to redeploy those financial and human resources to front line, citizen-facing services.

One of the key recommendations from the GGEA is the deployment of an Enterprise Resource Planning (ERP) shared service. GoG must build an ERP competency centre to build solutions for the Enterprise Management services. This will include technical staff along with business analysts who will be well versed with the selected ERP software and business processes. The ERP competency centre will also complete vendor certification, enabling the organisation to compare the operation with best in class competency centres. ERP implementation is a highly complex and costly exercise and so building a competency centre will enable GoG to reduce implementation risks and consolidate support for Human Resource, Supply Chain Management, Asset/Facility Management, Finance, etc under one roof.

Core functions of the ERP competency centre include:

- ☐ Resource alignment to support sites;
- ☐ Single point of contact and minor enhancement;
- ☐ SLA metrics reporting and 2nd level support;
- ☐ Release and change management;
- ☐ Business and technical design;
- ☐ New developments, major upgrades and enhancements;
- ☐ Regulatory changes and tuning;
- ☐ Vendor liaison, bug fixes and root cause analysis.

4.3 COMPOSITE APPLICATION SERVICES PLATFORM

Every MDA will have to develop a core set of technologies to meet their architecture requirements and most of these technologies are considered to be standard across the MDAs. There is therefore a need to develop composite applications based the standard core technologies recommended in the GGEA report. Each MDA will then be required to deploy the standard applications services alongside the MDA specific applications. This will require some specialisation in Web Portal development, detailed integration know how of a specific system, cross system know-how (technology and data), advanced/new technologies XML-Schema and transformations and the use of best-practice integration approaches.

We are recommending the implementation of a Composite Applications Services Platform (CASP), which will leverage various mechanisms (for example content management, user interface formatting and display, and data aggregation) to bring together the appropriate



information and existing systems to serve the goals of the MDAs. For example, when attempting to grow citizen mindshare and knowledge, the government Portal system can bring together the proper information tailored to the type of user that the MDA would like to target. The components of personalisation, multi-device type access, a presentation rendering mechanism, and a business rules engine are combined with the ability to search and index content (of various types and formats) and management of content via a workflow process to provide both content aggregation and a collaborative environment.

4.4 BUSINESS INTELLIGENCE

We are recommending the implementation of a Business Intelligence Competency Centre to develop analytics and management information reporting for the MDAs. The Business Intelligence Competency Centre can help promote and provide delivery enablement through a consistent set of Business Intelligence skills, standards, technologies and best practices. It will also enable repeatable successful Business Intelligence deployment across the MDAs.

- ☐ Guide and train users in Business Intelligence self service tools;
- ☐ Performing ad hoc or complex analysis;
- ☐ Design and maintain standard Business Intelligence architecture;
- ☐ Data Warehouse development and maintenance;
- ☐ ETL functions development and data provisioning;
- ☐ Develop and maintain data marts and metadata ;
- ☐ 2nd level support and liaison with technical services;
- ☐ Ensure consistency in analytics approach and Business Intelligence tools;
- ☐ Connect sites with similar Business Intelligence needs and problems.

4.5 APPLICATION & DATA INTEGRATION

Managing data exchange between core systems is considered to be one of the key challenges for GoG. An Application Integration competency centre must therefore be set up to help MDAs in their applications and data integration efforts. It will be a single point of contact for the sites to use one service responsible for applications integration. The Application Integration Competency Centre will provide general purpose integration services for internal (Application to Application) and external (Business to Business) application integration. The competency centre must have a set of integration technologies that will support leading standards and protocols including; HTTP/S, FTP, SMTP, JDBC, Web Services with SOAP processors and a WSDL editor, XML and XSLT-based wizard and engine for transformation.

Core functions of the Application Integration Competency Centre will include:

- ☐ Business to Business integration including EDI services (if required);
- ☐ Enterprise Application Integration services;
- ☐ Business Process Management (BPM) support;
- ☐ Integration middleware support;
- ☐ Metadata management;
- ☐ SOA implementation and governance;
- ☐ Web services;
- ☐ Integration project management;
- ☐ Release management and change control.



4.6 MDA IMPLEMENTATION MODEL

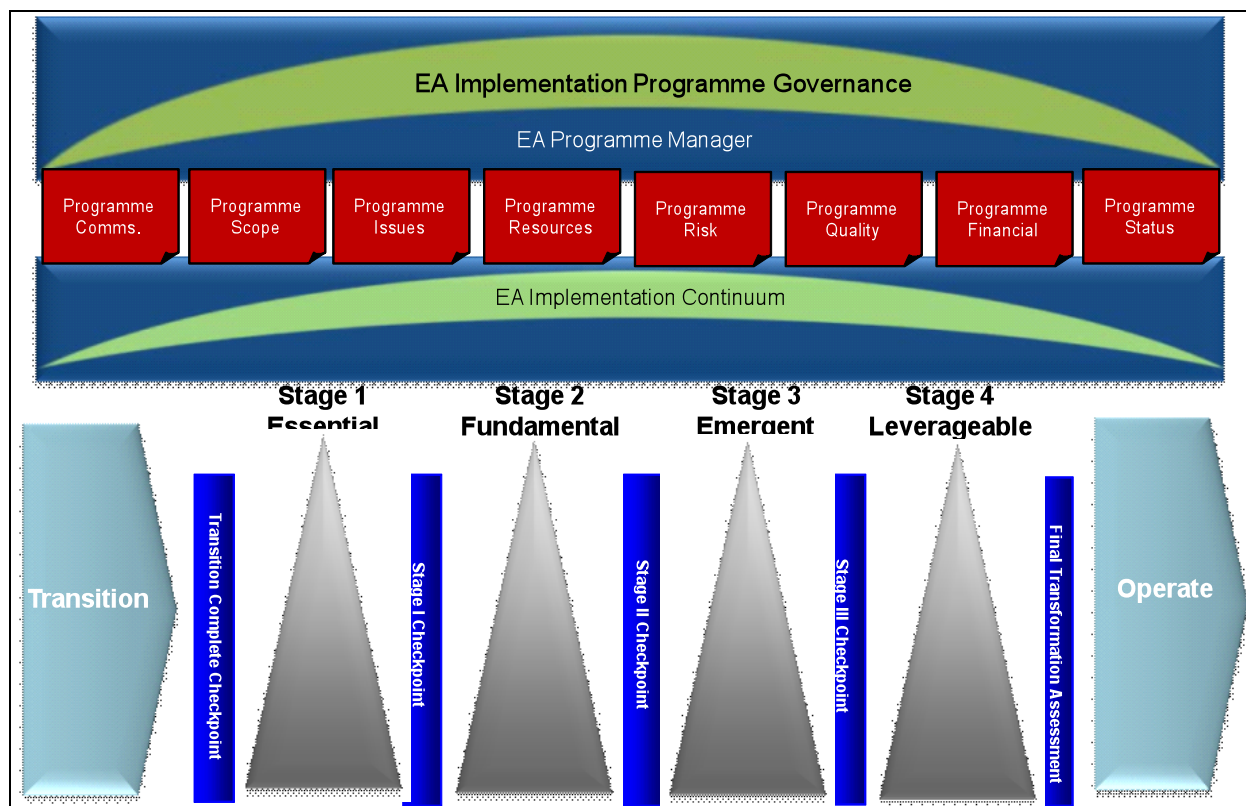


Figure 2: MDA Application Delivery Model

To ensure that there is smooth transformation of the MDAs through the implementation of the GGEA the strategy is to build the core components through competency centres in leveraged delivery model and then deploy them to MDA according to GoG priorities for the MDAs. The MDAs will then receive solutions in a predictable and cost effective manner. The delivery model depicted in figure 2 above provides a logical, step by step approach to implementing the EA solutions for the MDAs. It takes MDAs through a capability maturity process as the technologies are implemented. The different stages of the model are:

- ☐ **Stage 1 – Essential** (0 – 6 months) – this stage involves adoption of the EA by the MDA and definition of applications, data and infrastructure requirements for implementation. This stage also involves the implementation of the critical processes and structures necessary to position the MDA within the leveraged applications delivery structure.
- ☐ **Stage 2 – Fundamental** (6 – 12 months) – this stage involves establishing basic operating requirements and transitioning services to the government data centre and the customisation of application services for the MDA.
- ☐ **Stage 3 – Emergent** (12 – 24 months) – involves the deployment of the necessary technologies for the MDA and evolving organisational processes.



- ☐ **Stage 4 – Leverageable** (24 months +) - competent in data centre disciplines, methods, processes and positioned as leveraged delivery services across multiple MDAs.

The implementation strategy has been designed to provide the necessary flexibility to enable the GoG implement the GGEA to meet defined government priorities. The model also provides a consistent transformation roadmap for the MDAs, which is important for the successful implementation of the GGEA.

5. Programme Management

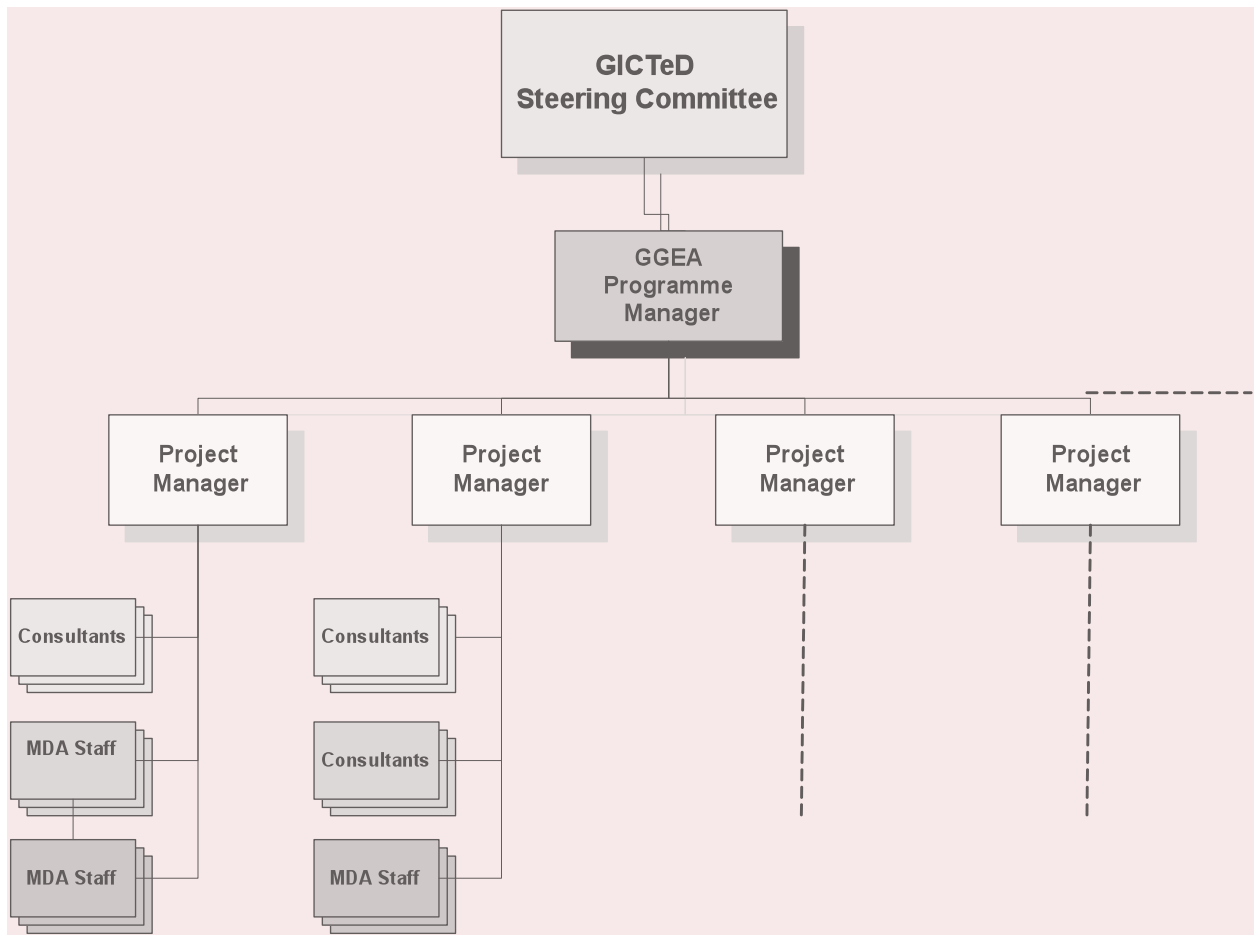
Due to the complexity of managing the GGEA implementation across government GICTeD must implement a Programme Management Office (PMO) to support the various projects. The PMO team must be made up of at least two full-time project office administrators, and led by an experienced project manager. The programme office will provide:

- ☐ An integrated set of project management standards and procedures;
- ☐ A focal point for the development teams;
- ☐ Agreed ways of dealing with administrative and project management procedures to provide consistency and better control across the two projects and work teams;
- ☐ An understanding of the dependencies between the projects, as they relate to work products and deliverables;
- ☐ Experienced staff to assist project staff in effectively applying tools and methodology.

5.1 PROGRAMME STRUCTURE

An industry best practice programme management methodology is required to provide a set of logical processes to manage the various implementation projects of all types and sizes in a structured and standardised manner. The methodology must be very flexible and be able to use existing tools or techniques currently used by GICTeD. The programme structure will be based on the following:

- ☐ Steering Committee (composition to be determined);
- ☐ Programme Manager;
- ☐ Project Managers;
- ☐ Development Teams (Consultants and MDA staff).



.Figure 3: Programme Structure

5.2 RISK FACTORS

The main risks associated with such a big programme are related to labour and equipment cost increases and delivery delays. There is always the danger to under estimate the amount of effort required to implement the recommendations. These factors could dramatically reduce the potential benefit of the investment required for the transformation.

Although it is not possible to identify everything that could possibly go wrong, it's important to take into account the likelihood of changing business requirements and the impact of the programme. Some of these factors could be outside the control of the programme itself, but they could have an impact on the overall decision to implement the activities in the programme.

The following factors must be considered during the implementation to minimise risks to the business:

- ☐ The availability of resources for the major projects;
- ☐ Prioritisation of transformation projects against business as usual processes;
- ☐ Any rapid change in business activity during transformation period;
- ☐ The migration of infrastructure components must be planned carefully to avoid disruption to services.



5.3 IMPLEMENTATION PLAN

The high level plan in figure 4 below is structured to provide maximum benefit to GoG by prioritising projects such as the shared services, which are necessary for the successful implementation of GGEA. The plan is a multi- year programme that will enable a comprehensive transformation of MDAs but the actual elapsed time will depend on the availability of funds for the MDAs and technical resources.

The plan has been structured to enable the GoG build the necessary shared infrastructures up front, and then use a pilot MDA to test and prove the technologies prior to MDA-wide rollout. It also enables multiple MDAs to be implemented simultaneously to speed up the GGEA implementation process. Each MDA is expected to go through the implementation maturity stages defined in section 3.6, but the duration of the stages for the MDAs will vary depending on the current state and transition strategy adopted by the MDA.