



Ghana Government Enterprise Architecture Implementation Guide

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 report is a key deliverable that will guide the MDAs through the Enterprise Architecture implementation process. The Implementation Guide is developed to aid Ministries Departments Agencies (MDAs) through the Enterprise Architecture (EA) definition process. It is intended to be a guide, and not prescriptive in nature. Each activity, task, and work product documented in the guide should be considered for inclusion in the EA implementation plan. However, the time devoted to each one should be carefully weighed against the project objectives and drivers. MDAs should use their judgment and experience when considering specific activities, tasks and work products to be included in the project implementation plan.

The primary users of the Implementation Guide are the MDAs Enterprise Architects and ICT Directors. Other ICT staff may also find the guide a useful reference as they participate in EA implementation. The scope of the Implementation Guide includes an examination of the MDA's business strategy, develops each domain of the EA, and delivers an implementation plan supported by programme project management and governance.

2. The EA Implementation Methodology

The Ghana Government Enterprise Architecture (GGEA) implementation planning report recommends a strategy that ensures that there is smooth transformation of the MDAs through the various transition steps. The report recommends a strategy to build shared service infrastructures and core components through competency centres in leveraged delivery model and then deploy them to MDAs. The MDAs are expected to formulate their EA based on the following 5 stage methodology:

- ☐ Initiate Project;
- ☐ Current Business and ICT Environment Assessment;
- ☐ Formulate Enterprise Architecture;
- ☐ Define Governance Model;
- ☐ Define Implementation Plan.

2.1 INITIATE PROJECT

The Project Initiation activities are structured to prepare the MDA for the definition of their EA and the Project Initiation activities are the pre-project start activities. The stage is about gathering all the relevant information so the current environment is understood by the MDA prior to the start of the project. If external consultants are involved in the project, the MDAs are expected to prepare a project scope statement (i.e., Statement of Work) to ensure clear understanding of the project activities and schedule of events can be confirmed. MDAs are expected to hold a formal kick off meeting to provide all stakeholders with a clear understanding of the project expectations and deliverables. The following activities are to be performed during Project Initiation stage:



2.1.1 Identify Data Requirements and Assess GGEA

Based on the business objectives of the MDA, the EA team must review the GGEA to identify all the architecture principles, constraints and structures for the different architecture perspectives (business, services/applications, data and technical) that will be needed by the MDA. The MDA must also take into consideration previous planning or assessment work completed by the MDA or consultants on their behalf. The MDA must assess the quality and completeness of available information. Any required items which are not available will have to be created, possibly by the consulting team. Thus, the project scope, project schedule, and Statement of Work should reflect this additional effort necessary.

Inputs to this process include:

- ☐ The central government authority (GICTeD), MDA project sponsor's (e.g. Chief Director, Director General, and CEO) confirmation of stakeholders, objectives, scope and deliverables.
- ☐ MDA must establish business context and IT environment:
 - MDA's mission and vision statements;
 - MDA's business strategic plans;
 - Current and planned business initiatives;
 - Organization charts and responsibility matrix;
 - MDA's control mechanisms for initiatives and projects, for example strictly hierarchical or flat and informal.
- ☐ MDA's business environment
 - MDA's services description;
 - Customer (citizen) base;
 - Business process maps;
- ☐ ICT environment
 - MDA's IT strategic plans;
 - Application portfolio – inventory of business applications including application and software package name, version, ownership and responsibility, business process and function, lifespan, operational mode – batch versus online, number of users, operating system requirements, database, interfaces – data or interfaces with other applications, and growth projections;
 - Technology portfolio (Infrastructure) – current portfolio inventory of hardware platform and vendor, operating system and version, maintenance window, database engine, equipment age – technical limitations, platform utilisation (CPU, Memory, other), platform scalability, expandability, network operating system, enterprise network, support staff and service level agreements;
 - ICT architectures, including information architectures, application architectures, infrastructure architectures (network diagram), and security architectures;



- ICT organisation charts and responsibility matrix;
- ICT policies or standards;
- Costs associated with maintaining applications and infrastructure (IT expenditures) or total cost of ownership (TCO) if available;
- Internal and external audit findings and comments;
- Current and planned IT initiatives;
- Tactical and strategic vendors and partners.

2.1.2 Establish Teams and Schedule

As part of the Project Initiation phase the MDA must determine the resources and experience required to meet the project objectives and produce the deliverables. The MDA must develop a detailed work plan and schedule identifying resources and times needed. The Statement of Work must be updated with resource and skill requirements.

The following resources will be put together for the project:

- ☐ Project Manager;
- ☐ Enterprise Architect;
- ☐ Architects;
- ☐ Business Analysts.

The number of resources will depend on the size of the MDA.

The MDA EA team will identify key stakeholders for interviews, meetings, and, if needed, workshops. While a detailed schedule of interviews, meetings, and workshops need not be created at this point, the MDA EA project manager will indicate the types of people required at the interviews and meetings. If the key personnel will not be available due to other business obligations, vacations, and so on, then the Project Manager may need to delay the start of the project to ensure efficient execution of the project. Lack of personnel availability early in the project is often the biggest cause of delays and project inefficiencies.

2.1.3 Develop Project Plan and Quality Plan

The Project Manager must develop a detailed schedule/project plan and a quality plan. The project plan should include a project schedule with sufficient detail to define the work activities in terms of days required to accomplish each task, and it should reflect the interdependencies of the activities. The quality plan addresses activities to ensure that the project deliverables meet or exceed MDA's expectations.

2.1.4 Conduct Kick-Off Meeting

The MDA must have clear expectations of the project, including the deliverables and the participation of key stakeholders to ensure no delays. The EA Project Initiation has the following objectives:

- ☐ To introduce the project to the stakeholders;
- ☐ To agree on a detailed work plan and schedule;



- ☐ To agree on scope, deliverables, roles, MDA resource availability, responsibilities, risks, and risk mitigation strategies.

The kick off meeting must be scheduled with agreement of the key stakeholders who should attend and participate in the kick-off meeting. During this meeting, the key MDA users and ICT staff discuss the MDA's business direction as it applies to the scope of the project. The MDA project manager must establish and confirm expectations regarding the project, including achieving agreement on these items:

- ☐ Scope, approach, and schedule;
- ☐ EA deliverables;
- ☐ Roles and responsibilities of the team members;
- ☐ Assignment of specific team members;
- ☐ Project communication;
- ☐ Frequency and format for status review meetings;
- ☐ Scheduling of interviews for the next tasks;
- ☐ Potential project risks and mitigation strategies;
- ☐ Project administration.

2.2 ASSESS CURRENT BUSINESS AND ICT ENVIRONMENT

The stage is about reviewing all the information gathered during the interviews, meetings and workshops to understand and document the MDA's current business situation and future direction. This information will provide insight into the circumstances within which EA will be defined and future state ICT services will be delivered. Decisions on the future EA and transformation initiatives must be consistent with the business direction and align to it.

2.2.1 Document Business Objectives and Critical Success Factors

The EA team must review documents and interview results to understand the business environment within which the MDA operates, including government legislations. The team must answer the following questions: What do we want to accomplish? How can we achieve our vision? What are the priorities? How can we take advantage of our strengths and minimise our weaknesses? What are the key areas of focus and importance to the organization?

The team must also:

- ☐ Identify performance measures for the objectives of the MDA. For example the Citizens Charter;
- ☐ The Critical Success Factors;
- ☐ Identify initial transformation opportunities;
- ☐ Look for strengths, weaknesses, opportunities and threats;
- ☐ Determine how ICT is or is not integrated with the business units it supports;
- ☐ Assess the current ICT organisation structure against business needs to identify gaps;



- ☐ Assess the current governance structure against business needs to identify gaps.
- ☐ Research and summarise benchmarks, best practices, and emerging technologies that are relevant to the MDA's environment and offer insight for potential business and ICT improvement. Use industry benchmarks and best practices to support recommended solutions. Emerging technologies and paradigm within the industry will be used to develop the future state architecture.

2.2.2 Analyse Business Process Needs

The team must review documents, conduct interviews with business managers, and analyse the results. They must also determine the current business environment, the core and supporting business processes, and the information and automation needs of the business processes. This includes the following:

- ☐ Organisational charts;
- ☐ Current and planned business initiatives, their time frames, the initiative stakeholders, and how these initiatives will affect this project, and who the stakeholders are;
- ☐ Business function/process model;
- ☐ Logical location model (geographical locations map);

2.2.3 Develop Business Models

The team must:

- ☐ Analyse the information reviewed and the information gathered in interviews;
- ☐ Use the GGEA Framework reference architectures to frame the collection, organisation and assessment of the MDA's business architecture;
- ☐ Develop the Business Function Process Model;
- ☐ Identify the major functions performed by the MDA and which are essential to delivering value to citizens. The functions may or may not be aligned with the business organisational structure;
- ☐ Decompose (break down) the functions into business processes. Processes should be stated as an action (i.e., be stated with a verb);
- ☐ Develop Use Cases for the business process;
- ☐ Identify the core and supporting business processes;
- ☐ Analyse key operating metrics.

2.2.4 Understand Current ICT Environment

The team must review documents, conduct interviews with key ICT personnel (including consultants, if applicable), and analyse results. Understand the current ICT environment. Later in the project, the gaps between the current ICT environment and what is needed to support the proposed future business environment will drive the need for initiatives as part of the transformation strategy.



The output from the ICT environment analysis will include:

- ☐ Assessment of current enterprise architecture;
- ☐ Functional versus technical quality assessment of applications and infrastructure;
- ☐ Assessment of current information architecture;
- ☐ Data access methods or layer;
- ☐ Assessment of current application architecture;
- ☐ Identify application portfolio – Inventory of business applications including application and software package name, ownership and responsibility, business function, lifespan, operational mode – batch versus online, number of users, operating system requirements, database, and interfaces – data or interfaces with other applications, and growth projections.
- ☐ Map applications to business processes:
 - Mapping will identify which process owns a specific application and which processes use it;
 - While there may be many users for an application, there should only be one owner;
 - The mapping can be used to quickly identify redundant, duplicate or overlapping applications or applications with no users;
 - The mapping will also illustrate the process impacts of eliminating or modifying an application.
- ☐ Assessment of technical architecture
 - Identify the technology used in the ICT environment in all technology “towers” (e.g., network, platform, storage);
 - Identify logical locations which help determine the design, implementation, deployment, and management of those of ICT resource throughout the enterprise. The resultant view provides input into the distribution of applications as well as the information and infrastructure requirements for the definition of those architectures;
 - Document the impact of the infrastructure on each business-critical application.
 - These results could be presented as a dashboard (functional vs. technical quality assessment of applications and infrastructure example) with the following dimensions:
 - Application management;
 - Desktop services;
 - Hosting;
 - Storage;
 - Network;



- Facilities.
- Additionally, a more in-depth assessment of the following aspects of applications management which also affect availability is usually appropriate:
 - Disaster recovery and business continuity;
 - Service levels;
 - Management tools.
- Assessment of current security architecture.
 - Security policies addressing areas such as network intrusion, firewall configuration, anti-virus tools and strategies, and remote access capabilities.

2.2.5 Develop Current Assessment Report

The EA team must produce a Current Assessment Report to confirm that the team accurately understands the current business direction, business and ICT environment, business satisfaction with ICT services. It will also confirm the mutual understanding of the next steps, especially with respect to future business requirements.

2.3 FORMULATE FUTURE ENTERPRISE ARCHITECTURE

The EA team must define the future EA that is strategically aligned to the MDA's business direction. The team must develop a future Enterprise Architectures leveraging: the GGEA framework, using the different architecture reference models. The GGEA broadly supports the use event-driven and service-oriented architectures. These architectures facilitate enterprise ICT systems with the following characteristics:

- Centralised data management;
- Simplified end-to-end business processes;
- Highly scalable, secure network;
- Application renewal capabilities;
- Enabling integration platform;
- ICT programme and process management capabilities.

The architectures developed here are intended to be at the conceptual level, i.e., they identify the components within each domain and how the components work together.

The team must perform a gap analysis between the current ICT environment and the future enterprise architecture (as dictated by the GGEA framework) to identify alternate courses of action to improve the environment to support business objectives. The team must also perform a mapping between the existing ICT landscape and industry-leading models and architectures.

2.3.1 Define Architecture Principles

The EA team must use information discovered when interviewing key stakeholders regarding the MDA's view of the role of the ICT function to determine basic philosophies, tenets, and



precepts that should be applied to the enterprise architecture. They must establish the strategic architecting window and document these views in terms of architecture principles that will apply across all architecture domains.

In developing the architecture principles the categories to consider include:

- ☐ Architecture horizon;
- ☐ Technology homogeneity;
- ☐ Strategic value;
- ☐ Cost effectiveness;
- ☐ Serviceability/manageability;
- ☐ Scalability/flexibility;
- ☐ Usability, and
- ☐ Maintainability.

The team must ensure the Architecture Guiding Principles established can be applied consistently across all architectural domains – business, data, application, infrastructure, security and enterprise ICT management. The principles must be reviewed against the GGEA framework principles for consistency.

2.3.2 Define Future Business Architecture Reference Model (BARM)

Using information gathered or created during previous activities, develop the future business architecture and present them to stakeholders via interviews or workshops.

A Business Architecture Reference Model (BARM) reflects an enterprise view of what the MDA must do today as well as in the future to accomplish particular business requirements. The BARM defines the business organisation structure, functions, business process architectures, work scenarios, and the operating environment within which they all exist. It is the business context and business architecture that will provide the rationale for the remainder of the future enterprise architecture domains development.

The BARM provides an operational overview of the MDA business functions and their supporting processes. The BARM will be used for understanding and assessing the business processes to effectively identify how information technology can enable an enterprise to meet its business objectives.

The elements that comprise the Business Architecture include:

- ☐ Business drivers;
- ☐ Business Enterprise Model;
- ☐ Business Function Process Model;
- ☐ Logical Location Model(s);
- ☐ Process workflow scenarios and Use Cases.

2.3.3 Define Future Data Architecture Reference Model (DARM)



The Data Architecture Reference Model (DARM) represents what information must be delivered to individuals across the MDA to help them effectively execute business processes and make informed decisions. The information architecture contains:

- ☐ The information and data management framework and precepts;
- ☐ The models for the integrated information, application, and systems management architectures;
- ☐ The Ghana Government XML Schema;
- ☐ The technology components view, and
- ☐ The information-applications software portfolio that address business intelligence scenarios.

The DARM provides the business intelligence structure for providing employees with the ability to analyse the performance of the MDA and its capability to achieve the business goals, objectives, critical success factors, and performance metrics. The DARM is the cornerstone of an organisation's ability to effectively manage information. This capability is critical to the discovery and exploration of information related to the critical factors and trends of a business and its industry.

The elements that comprise the DARM include:

- ☐ Define Enterprise Information & Data Management Framework - The definition of MDA's DARM includes several views that describe the information needs and uses, its owners and users and management, the forms the information is stored in and the information sources. The information and data management framework establishes decision-making principles, precepts, and standards for the identification and use of information as a business resource. Also part of the framework is understanding the informational needs of the operational (tactical) side and the informational (strategic) side;
- ☐ Data Model, which includes the Entity/Relationship model. The team must identify all key data entities used by the MDA and their relationships;
- ☐ Define Business Intelligence Scenarios - As a result of the overall strategic business plan and its supporting business architecture, DARM is required for providing business intelligence on both the internal and external business environment. For example this architecture should enable the MDA to explore forecasts, and what-if information;
- ☐ Define Data Warehouse Framework - Based on the databases that are required to enable business intelligence within the MDA, an enterprise information and data technology data warehouse framework is formulated that identifies all the business transactions that are occurring within the MDA from both internal and external sources. In addition the architecture identifies all of the pertinent high-level management and operations reports. This framework is oriented around the transaction and information components required to develop a data warehouse capability and enabling business intelligence within a corporation.



2.3.4 Define Services/Application Architecture Reference Model (SARM)

The SARM serves to support business process execution and bring information and data to the process. The SARM defines the application software portfolio and integration relationships. Application inputs and outputs are identified as well as the application component view for deployment. Guiding principles, standards, and design characteristics support the acquisition as well as development of applications.

The SARM provides a logical portfolio of applications for supporting the various business processes of an enterprise. The application portfolio is designed to illustrate the optimum distribution of applications and components across multiple business functions, processes, sites and platforms for enabling business workflow scenarios that will insure efficient and effective business operations.

The elements that comprise the Application Architecture include:

- ☐ Integrated Application / Information / Systems Management Architecture (Value Stream Enablement Views);
- ☐ Application Portfolio Architecture – Component View;
- ☐ Enterprise Application Software Portfolio Integration Matrix.

In support of the overall strategic business plan and its supporting business architecture, an enabling application portfolio and architecture is required for performing business operations. The application architecture identifies the logical applications required for optimising business operations and the logical locations of those enabling applications.

The SARM consists of a portfolio of applications that automate business processes. The SARM addresses the combination of functional software applications that must be integrated to enable the business process in the BARM. The integrated application portfolio should empower the information-based employees within the MDA to manage the day-to-day operations of the enterprise, and allow management and business analysts to concentrate on analysing and operating the business.

The MDA's SARM will be characterised by:

- ☐ The required application components;
- ☐ A component view for relating the application architectural components to their corresponding logical and physical locations and organisational structures;
- ☐ Integration requirements for applications.

2.3.5 Define Technical Architecture Reference Model (TARM)

A Technical Architecture Reference Model (TARM) enables access to information and provides support for the execution of activities. This architecture contains the standards and policies or “building codes” for infrastructure construction. The architecture also contains the logical location software deployment schemas as well as a characterisation of the infrastructure environment to provide the base line for the target environment. It also provides identification and views of the future component layouts with ICT platform operating requirements and characteristics that will provide the basis for engineering blueprints and deployment.



The enterprise technology infrastructure architecture provides the technology structure to support the information, application, and enterprise ICT systems management architectures. The infrastructure architecture describes the underlying systems and associated platforms to integrate the business intelligence and business application portfolios into an enterprise information system.

The elements that comprise the Infrastructure Architecture include:

- ☐ Standards, Policies, and Governance;
- ☐ Logical Location Software Deployment Schemas;
- ☐ Operating and Systems Requirements and Characteristics;
- ☐ Technology Infrastructure Architecture – Consolidated Component View (with Linkages to Lower Level Technical Component Architectures).

In support of the information and application architectures an underlying technical infrastructure architecture must be defined. The infrastructure architecture addresses the systems and networking structures that support the application portfolios that enable the value streams and workflow scenarios outlined in the business architecture. The infrastructure framework allows common and consistent operating environments to be established.

The TARM identifies and graphically depicts the underlying networking structures and associated platforms, operating systems, and protocols that enable the information, application and systems-management systems.

The TARM is characterised by:

- ☐ Highlighting in the MDA's enterprise infrastructure view the required system components for enabling the value streams and ensuring effective and efficient performance of these systems;
- ☐ Establishing a common operating environment that will standardise operating practices throughout the enterprise and allow for ease-of-use and ease-of-training of end users;
- ☐ Using the e-Government Interoperability Framework standards and policies as a guide to developing the technical infrastructure.

2.3.6 Define Security Architecture

An information security architecture describes the way security measures fit together in the context of the EA to meet the security objectives of the MDA. The Security Architecture Framework provides best practice guidance for the development of an (information) security architecture. The framework provides a consistent approach to breaking up the security design task into different topics and will guide architects in establishing security objectives, devising security solutions and selecting an appropriate mix of security measures.

The elements that comprise the Security Architecture include:

- ☐ Information Security View
 - ☐ Authorisation of access to and control of users and other valid entities accessing the information;



- Dealing with incidents, problems and contingencies in case the information suffers loss of confidentiality, integrity, availability, accountability;
- Identifying and dealing with vulnerabilities of and threats to data
- Transmitting in a trusted manner;
- Creating and reviewing appropriate audit trails and logs;
- Determining sensitivity and criticality of the data/information, i.e. its classification;
- Application Security View
 - Identification and Authentication of users and other valid entities accessing the application;
 - Authorisation of access to and control of users and other valid entities accessing the applications;
 - Dealing with incidents, problems and contingencies in case the application suffers loss of confidentiality, integrity, availability, accountability;
 - Identifying and dealing with vulnerabilities of and threats to the application;
 - Ensuring communication with the application is trusted;
 - Management of the application throughout its lifecycle.
- Technology Infrastructure View
 - Identification and Authentication of users and other valid entities accessing the infrastructure;
 - Authorisation of access to and control of users and other valid entities accessing the infrastructure;
 - Dealing with incidents, problems, and contingencies in case the infrastructure suffers loss of confidentiality, integrity, availability, accountability;
 - Ensuring communications with and within the infrastructure are trusted;
 - Management of the infrastructure throughout its lifecycle.
- Information Security Administration, Management and Training View
 - Managing Users and their Credentials;
 - Managing Keys/Codes/etc;
 - Managing Authorization and Access Control and Domains;
 - Managing Business Continuity, Disaster Recover and Major Incidents;
 - Managing Threats and Vulnerabilities and Risks;
 - Managing Event and Problem Response and Resolution;
 - Managing Audit Compliance and Assurance;
 - Managing Security Awareness and Security Training Programmes;



- Managing change.

2.3.7 Assess Current Projects and Analyse Gaps

The team must evaluate projects and initiatives currently underway or planned in the near term to determine how they will fit into or support the future environment. They must analyse the gap between the current business and IT environment and the future business and IT environment to determine the changes required.

2.3.8 Assess MDA's Readiness for Change

The EA team must assess the impact of the change on the organisation and the readiness of the organisation to accept and embrace the transformation, making it successful. Understand the impact of the transformation (positive and negative) at an individual stakeholder level and within their sphere of control and influence of control.

2.3.9 Develop Future Enterprise Architecture Report

The team must package the EA work into a future Enterprise Architecture Report. Present the report to the senior managers and the Central Government's ICT authority (e.g. GICTeD) and the key stakeholders for validation. The results will confirm that the project team accurately understands the target ICT environment that needs to be in place to support the business objectives.

Depending on the presentation audience it may be necessary to develop slightly different versions of the deliverable. It is advisable to prepare a full detailed report along with two versions for executives: (1) sponsor level with enough background and detail to accommodate full understanding and (2) executive level which summarises the background and findings into highlights and key messages.

2.4 DEFINE ENTERPRISE GOVERNANCE MODEL

In order for ICT to return value to the organisation, it must be aligned with the organisation's business goals. To ensure this alignment, a governance model, which includes an enterprise governance structure, governance processes, and measurements to prioritise and direct transformation as well as reinforce and promote alignment on a continuous basis, must be established. The Governance Model defines the principles, structures, and processes which management uses to make and implement transformation decisions.

The team must determine how decisions on architecture revisions and new initiatives will be made. They team must identify individual and committee roles, and develop processes and procedures for the governance teams.

The team must also develop the enterprise governance structure in parallel with the formulation of the Future Enterprise Architecture.

2.4.1 Develop Governance Principles

The team must use the information and insight gained in the key stakeholder meetings to develop the Governance Principles. The principles are simple statements which describe the



organisation's beliefs on how it should fund, create, deploy and use information technology products and services.

Principles should raise issues that might be contentious; alternative viewpoints should be able to be rationally argued. A principle that is simply a platitude is not useful for subsequent decision-making. Principles focus attention on areas of general management insight such as: ownership, strategic intent, selection criteria and common tradeoffs.

2.4.2 Define Governance Structures

The team must define the structures in which management makes and implements its transformation decisions. Governance structures define the distinction between parties, with input rights from those with decision rights, across a range of specific domains to create an accountability framework that encourages the desired behaviour and use of ICT. The governance structure must strike a balance between distributing input rights across the enterprise or line-of-business representatives with the decision rights needed to provide cost-effective ICT services.

The governance structure may consist of one or more decision-making bodies. It will contain at least an enterprise architecture (compliance) board and may contain one or more review and change control boards.

The team must validate existing information about the MDA's current governance model against a recommendation for how governance should be done in the future.

2.4.3 Define Enterprise Governance Processes

The team must elaborate and develop detail for the high-level processes for Governance Charter. This must be built on best practice processes and adapted to satisfy specific MDA needs. The team must establish a consistent enterprise governance process that effectively supports all aspects of the transformation function – investments, technology, strategy, and processes.

The governance processes to be developed include:

- ☐ Strategic planning – The process of developing an ICT strategy for the organisation. It enables the organisation to transform to a desired future state where its investments in ICT are strategically aligned with the business, and it enables the business to meet its goals and objectives. This entails developing an enterprise architecture. The planning horizon is typically three to five years.
- ☐ Operational planning – The process of developing a plan that defines the programmes and projects required to implement the strategy and transform the organisation to its desired future state, as defined by the enterprise architectures. The planning horizon for operational planning is typically one to two years.
- ☐ Budget planning – The process of developing the budget that accompanies operational planning. Budget planning defines the financial boundaries for the programs and projects required to implement the strategy. The planning horizon typically matches the operational planning horizon of one to two years.
- ☐ Transformation investment and innovation planning – The process of planning specific elements of the transformation strategy that are considered investments or innovations. These are typically the larger programmes that are driven by a specific business change



or specific ICT change for an organization. Each one of the investments or innovations would require specific planning as if the effort would be a project for the organisation.

- Cost management – The activities associated with controlling costs or driving out inefficiencies in the cost structure of the organisation and operations. These activities are typically associated directly to the budget planning and forecasting activities of either the business or ICT management teams. Once again, individual initiatives are typically derived and would require specific planning as if the effort would be considered a project in the eyes of the ICT department.
- Resource planning – The activities associated with scheduling all resources for development, operation, and maintenance during a specific time horizon. Resources would include both human and physical resources. Once again, relevant processes or activities include strategic planning, operational planning, budget planning, investment and innovation planning, and cost management.
- Enterprise architecture maintenance process – The process to update the enterprise architecture and associated assets and keep them current.
- Enterprise architecture compliance process – The process to determine whether a project or initiative is consistent with the enterprise architecture; that is, it has fulfilled and conforms to the requirements of the enterprise architecture.
- ICT policy management – The process concerned with the basis for decisions about acquiring and applying various technologies. In support of such decisions, the ICT policy identifies key technologies and describes how those technologies are advancing and how they are being applied to support business needs. The ICT policy also establishes guidelines or specifications to support selecting and integrating those technologies throughout the enterprise. Those guidelines normally point to industry standards but may also specify tools or products as necessary.
- Programme management – The management of resources, budget, timeline, schedule, deliverables, and milestones of a particular project. Effective project management entails appropriate resource allocation and management, quality assurance and performance measurement tools, and procedures for risk management. Use of project management processes and tools improves project performance by helping to deliver a project on time, within cost, and to required functionality.
- Contract and vendor management – The process of setting the strategic long- and short-term view of the organization's relationship with ICT product and service suppliers. In addition, it includes how to manage external supplier relationships and create new supplier relationships.
- Service level management – The process of ensuring that SLAs and underpinning operational level agreements (OLAs) are met and that any adverse impact on service quality is kept to a minimum. Included as part of this process is monitoring and reporting on SLAs and assessing the impact of changes upon service quality and SLAs, both when changes are proposed and after they have been implemented.



2.5 DEFINE EA IMPLEMENTATION PLAN

The EA implementation plan is also the MDA transformation plan, which is the final deliverable that serves as the road map of the required steps to transform the MDA's environment to the future EA.

The implementation plan may include various sections or documents that describe the steps recommended for transforming the MDA's ICT from its current state to the strategic state and the additional business value that transformation can deliver. The team must customise the documents to represent the transformation plan to specifically address the unique needs and circumstances of the MDA.

2.5.1 Create Solution Scenarios & Business Cases

Using information gathered or created during previous activities the team must identify alternative solution scenarios. The ultimate objective of each scenario is to align the MDA's use of technology with business goals and direction, while providing a framework from which technical capabilities can efficiently and effectively adapt to the changing business requirements of tomorrow.

The team must develop a high-level business case for each scenario considering costs to implement and anticipated benefits. The business case allows you to evaluate the scenarios by their relative value, as determined by their contribution to critical business and technology objectives and their estimated return on investment. Present the alternatives and business cases to the stakeholders during working sessions.

2.5.2 Prioritise & Select Solutions

The team must develop prioritisation criteria that will be used to evaluate and prioritise each solution scenario. They must select one or more scenarios that will help effectively move the MDA's current environment to the defined future environment.

2.5.3 Develop Initiatives & Refine Business Cases

The team must group the selected solution(s) into transformation initiatives. Initiatives are developed to address the transformation needed in each area of the enterprise architecture: business, data, applications, technical and security. Team must refine the business case of each initiative to include documentation of business value, benefits, estimated costs, estimated effort, and major steps. Each initiative supports one or more business objectives and multiple technology success factors. Project plans for the initiatives are then created.

2.5.4 Develop Implementation Schedule

The final deliverable of the project is the EA implementation plan. The team must use a standard Project Management tool (e.g. Microsoft Project) to develop a high-level view of the sequence and timing of transformation initiatives and develop a project schedule. A transformation or implementation schedule provides a high-level ordering and timing of initiatives according to their priority, adjusted as necessary to accommodate dependencies among the initiatives and availability of resources.

This supports resource planning and other long-range enterprise planning.

The team must determine the sequence of the initiatives based on the following considerations:



- Ability to demonstrate business value while seeking to reduce complexity, risk, and time frame to deliver;
- Timing of demonstrable business value and outcome;
- Outcome of the previously undertaken priority ranking;
- Cost-benefit analysis and risks associated with the initiatives;
- Interdependencies of initiatives, including the availability of an ICT infrastructure to support the initiatives;
- As noted with initiatives, the transformation plan can include non-ICT initiatives such as business process reengineering, organisational change, and change management to support execution of the transformation strategy.
- Identify critical path to determine which of the initiatives is on the critical path.
- Group initiatives into appropriate releases or waves for implementation in the same time period. Applying the prioritisation criteria to the initiatives will aid in clustering the initiatives by priority & business value.
- Rather than just sequencing individual initiatives, you may create the transformation schedule by grouping the initiatives by their type of focus or the business and technology objectives they support. This may help to identify clusters of initiatives that can be implemented in a single time period. Using this approach, group the clusters based on their general characteristics rather than individual initiatives. Schedule individual initiatives within each cluster as the timing for the cluster approaches. For example, one way is to divide the initiatives into short-, mid-, or long-term to take into account the interrelationships of the initiatives and the direction of the MDA:
 - Short-term initiatives might include projects that stabilise the existing environment and alleviate existing trouble spots, provide a significant amount of short-term payback, and lay the foundation for subsequent initiatives.
 - Mid-term initiatives might include projects that significantly improve quality, strengthen customer relationships, and build the infrastructure or lay the foundation for future projects.
 - Long-term initiatives might include projects that focus on building the capabilities to position the MDA.

3. Programme Management

Due to the complexity of managing the EA implementation the MDA team 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;

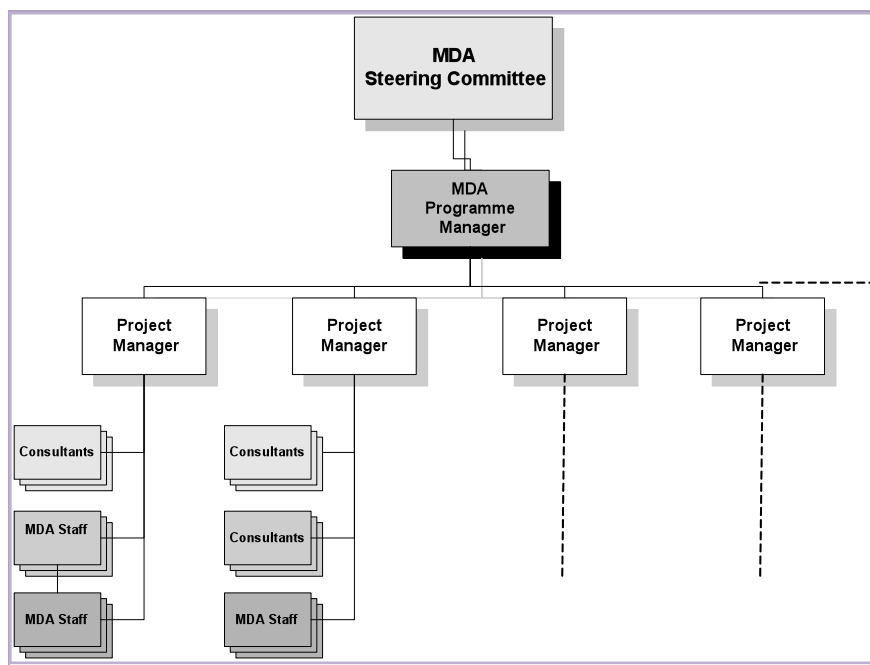


- ☐ Agreed ways of dealing with administrative and project management procedures to provide consistency and better control across the two projects and work teams;
- ☐ An understanding of the dependencies between the projects, as they relate to work products and deliverables;
- ☐ Experienced staff to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

3.1 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 the MDA. 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 1: Programme Structure

4. 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.