



*Government Information Technology Officer's Council of South Africa*

# **Government-Wide Enterprise Architecture (GWEA) Framework Implementation Guide**

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## FOREWORD

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**Chairman: GITO Council**

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# 1 INTRODUCTION

## 1.1 BACKGROUND

Strategic management of Information, Information Systems and Information & Communication Technology of the South African Government are regulated in accordance with the Public Service Act and Regulations, the State Information Technology Agency Act and Regulations, and governed by relevant governing bodies to give effect thereto.

According to the Public Service Regulation<sup>1</sup> each executive authority of a department shall develop plans: (a) a *strategic plan* that comprises the department's core objectives, its core and support activities, its functions and structures, the goals, the programmes for attaining those goals; and specify *information systems* by which to monitor the progress against plan; and (b) an *information plan* that supports the strategic plan, an *information infrastructure plan*, and an *operational plan* that comply with the interoperability and security standards of Electronic Government<sup>2</sup>.

The Office of Government Chief Information Officer (OGCIO), the Government Information Technology Officers Council (GITOC) and the State IT Agency (SITA) constitutes the collective governing body of Information & Communication Technology (ICT), which are charged with the responsibility to govern Government-Wide ICT plans and programmes in pursuance of the outcomes, principles and means of the ICT House of Values<sup>3</sup> (as depicted in *Figure 1: ICT House of values*).

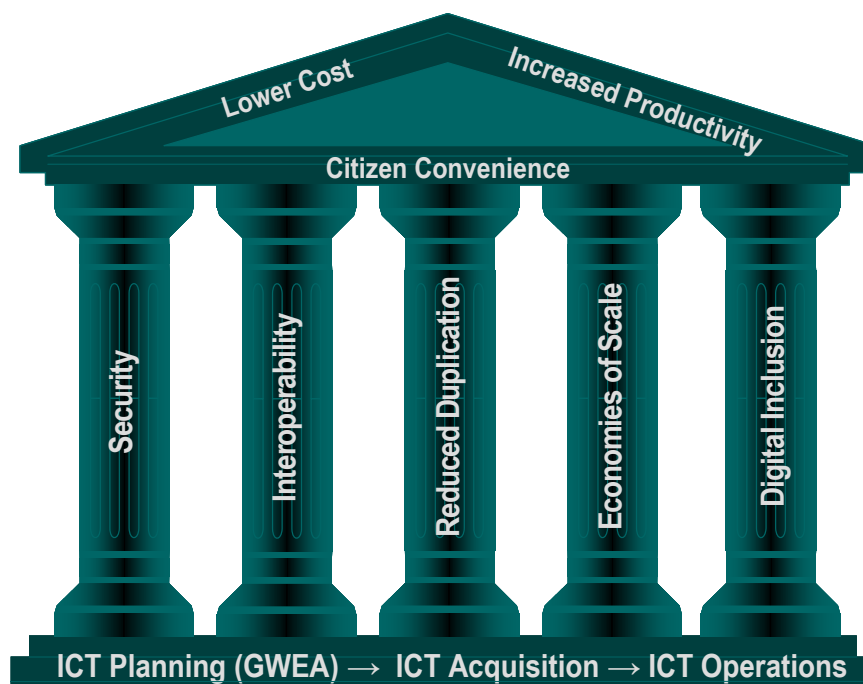


Figure 1: ICT House of values

<sup>1</sup> Public Service Regulations 2001 (as amended 20 March 2009), Chapter 1, Part III, Section B & E

<sup>2</sup> Public Service Regulations 2001 (as amended 20 March 2009), Chapter 5

<sup>3</sup> South African E-Government Policy Rev G.1.0 [DPSA, 25 July 2005]

Heads of departments – in particular the departmental information management executive – have in response to conform to above regulations, initiated on a number of ICT planning programmes. These programmes used a variety of frameworks and methods to develop ICT plans, which resulted in inconsistency across government and agencies and are often not aligned with the Government ICT House of values.

To address this inconsistency and misalignment of ICT plans, the GITOC Standing Committee on Architecture (SCARC) developed the South African Government Wide Enterprise Architecture (GWEA) Framework as a minimum standard to be used across all government departments and agencies. The GWEA Framework is intended to supersede the prevailing Enterprise Architecture and ICT planning frameworks and methods in use in government. The correlation between the GWEA Framework and the “Master System Planning (MSP)” framework – the most prevalent framework in government – is outlined in Appendix D).

Although the GWEA Framework, which is strongly aligned with the Open Group Architecture Framework (TOGAF) Version 9, prescribes a method and defines the minimum components of an ICT Plan, it does not provide sufficient guidelines on how to implement it in Government.

## 1.2 PURPOSE

The purpose of this implementation guide is twofold: firstly to provides guidance to Government CIO/GITO and Enterprise Architecture practitioners to establish and manage an EA Capability, and secondly it provides guidance to the EA Capability to use the Government Wide Enterprise Architecture (GWEA) Framework as means to develop an Enterprise Architecture Plan for a department/agency or programme of Government.

The GWEA Framework is generic and can be applied in all spheres and levels of government, and is valuable to produce department/agency Enterprise Architecture Plan (also referred to as ICT Plan or ICT Roadmap) that is fully aligned with the department/agency business plan, whilst observing the objectives and principles of the South African e-Government as defined in the ICT House of Values.

An Enterprise Architecture Plan is essential to (a) achieve the department/agency performance objectives through optimal enabling of its business processes within an efficient ICT environment; and (b) to evolve existing information systems, acquiring new information systems and renewing ICT products that will optimise the value to the business.

This guide can be used by any department or agency, regardless of the EA capability maturity. Departments/Agencies should use this guide to tailor or establish their EA capability to meet the minimum requirements as contemplated in the GWEA Framework.

## 1.3 SCOPE

The scope of this guide pertains to guidelines on how to implement the GWEA Framework in government. It defines the government-wide EA principles, provide guidance on how an EA capability co-exist with other relevant management and engineering capabilities, provides reference models to inform the scope of work and responsibility of an EA development

programme; and provides templates and guidelines for the development of EA products (deliverables) that can be tailored to suite the needs of a department/agency.

This implementation guide is based on The Open Group Architecture Framework version 9 (TOGAF-9) as tailored by the GWEA Framework. It is therefore essential to use the TOGAF-9 documentation as supplementary reference material to this guide.

## 1.4 APPLICABILITY

The GWEA Framework implementation guide is applicable to any organisation that executes an Enterprise Architecture Planning programme for or on behalf of a department/agency of the Government of South Africa.

To Executive Management (i.e. Accounting Officers, Chief Information Officers and Government IT Officers) it provides guidance to motivate and obtain key stakeholder commitment and investment to establish an effective EA capability.

To Enterprise Architects, employed or contracted by a government department/agency, it provides guidance to develop the EA products/deliverables that form the fundamental building blocks of an Enterprise Architecture Plan.

To Architecture Governing Bodies (both intra- and inter-departmental), it provides guidance to direct, coordinate, validate and monitor the performance and conformance of Enterprise Architecture Plans and Enterprise Architecture Implementations within and across departments/agencies.

To Auditing and Assessment bodies, it provides guidance to assess whether department/agency Enterprise Architecture Plans comply with relevant legislation, policies and standards.

Because Enterprise Architecture touches on many disciplines, the following functions and organisations will find this guide informative: government planners and corporate performance management, human resource development and training, organisational structure development, investors and fiscal review boards, business process management, project/programme management, risk management, system engineering (including solution architects, application architects, data architects, technology/infrastructure architects and security engineers), procurement and suppliers, and ICT Operations management.



## 2 SEGMENTATION AND SCOPING GUIDE

### 2.1 PURPOSE OF THE SEGMENTATION GUIDE

The purpose of an Enterprise Architecture (EA) programme is to develop a plan by which to improve the performance of the government functions and service through the optimal investment, acquisition and operations of IS/ICT resources and processes. The method/process to develop such a plan is defined in the GWEA Framework (as summarised in Annex C).

The EA development process prescribes that business architecture (e.g. business performance objectives, functions and services) drives the development of IS/ICT architecture to *ensure that ICT investments are contributing directly to the performance of government*. The EA development process, as defined in the GWEA Framework, is generic and can be applied to the entire government, a cluster of departments that share similar strategic outcomes or confine their performance to a regional constituency (such as a province), a particular department (national or provincial), or a policy owner for a particular set of transversal function/service areas of government.

This section provide guidance in the form of reference models to guide enterprise architects to scope and define responsibility of different Enterprise Architecture Planning programmes across government in order to improve alignment, cooperation and reduce duplication of effort and investment among EA programmes; as illustrated below:

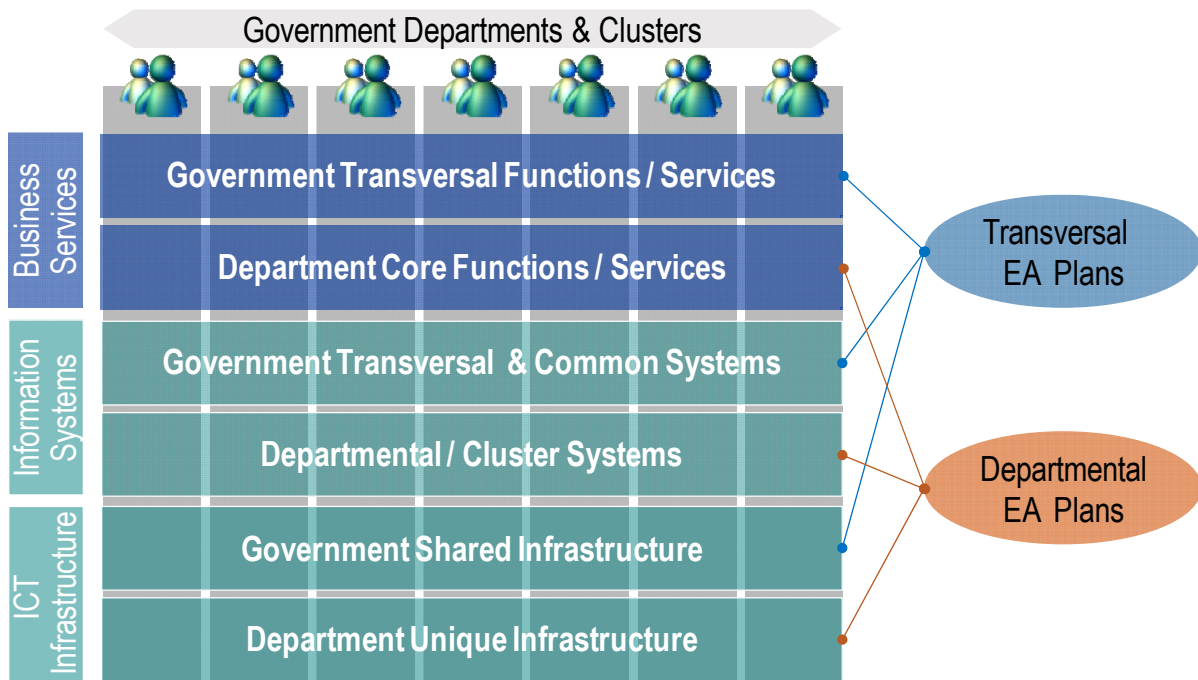


Figure 2: Segmentation of Enterprise Architecture Plans

## 2.2 INFORMATION SYSTEM REFERENCE MODEL

Government comprises many departments, and each department has many functions/services. Most of government resource management functions, such as Human Resource Management and Financial Resource Management, are mandated by transversal Acts and Regulations and applies to all government departments. Information Management Systems (IMS) that enable these functions should therefore be transversal or common across all departments. These systems are commonly referred to as “Transversal” or “Back-End Systems”.

Core functions of a department, on the other hand, are mandated by specific Acts and Regulations and are usually specific to one department or a cluster of departments. Information Management Systems (comprising Data assets and Application Software) that enable these functions are specific to a department or cluster. These systems are commonly referred to as “Core” or “Front-End” systems because of their primary nature to serve the needs of the Citizens and stakeholders of government.

The relationship between transversal and core systems, as illustrated in *Figure 3: GWEA: Information System Reference Model*, inform the scoping of an EA programme.

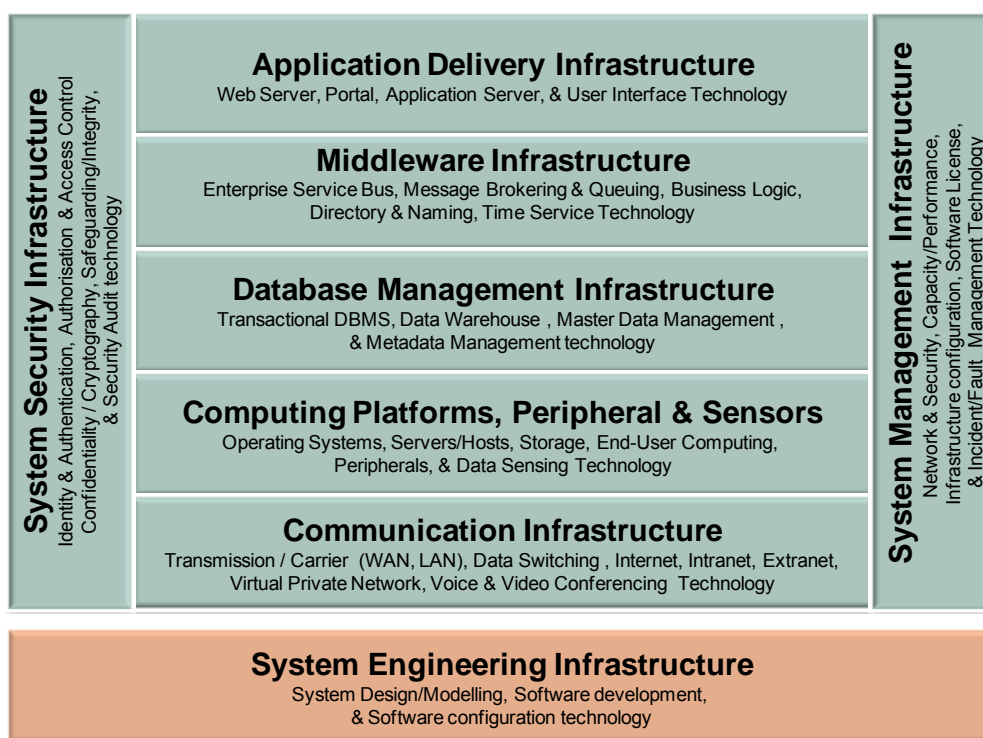
<b>GWEA: INFORMATION SYSTEM REFERENCE MODEL</b>	
<b>TRANSVERSAL</b>	<b>DEPARTMENTAL/CLUSTER CORE</b>
<b>ADMINISTRATION SYSTEMS</b>	<b>CORE MISSION SYSTEMS</b>
Financial IMS	e-Government (G2C) Portals
Human Resource IMS	Agriculture, Forestry, Fishery IMS
Supply Chain IMS	Arts & Culture IMS
e-Government (G2G, G2B) IMS	Communication IMS
Business Intelligence / Reporting IMS	Cooperative Governance / Provincial IMS
Geospatial IMS	Correction Service IMS
Corporate Performance Management IMS	Criminal/Justice IMS
Supplier & Contract IMS	Defence IMS
Customer Relations IMS	Economic Development IMS
Audit & Risk IMS	Education IMS
Information & ICT Service IMS	Energy IMS
	Health IMS
<b>COMMON SYSTEMS</b>	Home Affairs & Citizen IMS
Project/Programme IMS	Human Settlement IMS
E-Mail & Collaboration IMS	International Relations IMS
Events / Calendar Management IMS	Labour / Skills Development IMS
Office Suite (Wordpro, SpreadSheet, Presentation)	Mineral Resource IMS
Electronic Content Management IMS	Public Works / Infrastructure IMS
Workflow Management IMS	Police IMS
e-Learning IMS	Rural & Land IMS
	Science & Technology IMS
	Social Development / Grants IMS
	Sports & Recreation IMS
	State Security IMS
	Treasury & Taxation IMS
	Tourism IMS
	Trade & Industry IMS
	Transport IMS
	Water & Environmental IMS

**Figure 3: GWEA: Information System Reference Model**

## 2.3 TECHNOLOGY REFERENCE MODEL

The Technology Reference Model (TRM), as illustrated in *Figure 4: GWEA: Technology Reference Model*, serves to inform the development of Technology Architecture in an EA programme. These classes of technologies serve as the *common infrastructure* to all government information management systems. All information systems are developed and run using the collection of technology classes in a TRM.

The TRM therefore, serve as a powerful model to identify and reduce duplications; and provide opportunity for sharing and standardisation of technology across government.



**Figure 4: GWEA: Technology Reference Model (TRM)**

## 2.4 EA RELATIONSHIP WITH OTHER ICT DISCIPLINES

Enterprise Architecture is a discipline that interrelates with many other ICT disciplines and capabilities (as illustrated in *Figure 5: EA in relation to other disciplines*).

In context of the System Lifecycle processes<sup>4</sup> and the “V” Model for System Engineering, Enterprise Architecture is positioned as the initial phase, *Architecture / Planning*, which focus on two important processes: (1) the development of Business Architecture and IS/ICT Architecture and plans and (2) monitor and validate that systems that are acquired,

<sup>4</sup> As adapted from ISO SANS 15288, “Systems life cycle processes” and the “V”-model for System Engineering by Forsberg and Mooz.

integrated and implemented are according to the architecture plan. This phase is governed by the GWEA Framework and MIOS and relevant IT Governance standards and best practices such as COBIT (Plan & Organise, Monitor & Evaluate) and ISO SANS 38500 (Direct and Monitor). This life cycle phase concludes with an ICT capital investment plan (i.e. a list of prioritised ICT projects) to inform, and be synchronised with, the government budget and investment cycle.

The *Design / Development* phase, which typically focuses on the technical and management processes relating to project management, solution architecture, technical design, solution development (build), sourcing, buy or procurement and integration of systems components, is governed by relevant standards such as ISO SANS 12207 “Software and System Life-Cycle Processes, COBIT (Acquire & Implement), PMBOK/Prince-II for project management and relevant procurement and sourcing policies. The capabilities inherent to this phase are often collectively referred to as the System Development & Integration function. This phase – although not exclusive to the field of ICT – also focus on the processes of Organisational Development (OD), Public Services Design & Development, Business Process Re-engineering and Change Management. This life-cycle phase concludes with a more accurate operational budget that will be needed to sustain the ICT system investment over its intended life.

The *Production / Operations* phase focuses on the processes of Business Integration, Public Service Operations and ICT Operations to improve performance and service delivery of a department. The ICT Operations is typically governed by standards such as ITIL (IT Infrastructure Library), COBIT (Deliver & Support, Monitor & Evaluate), ISO SANS 27002 (Information technology - Security techniques - Code of practice for information security management), and ISO20000 (Information technology - Service management Part 2: Code of practice).

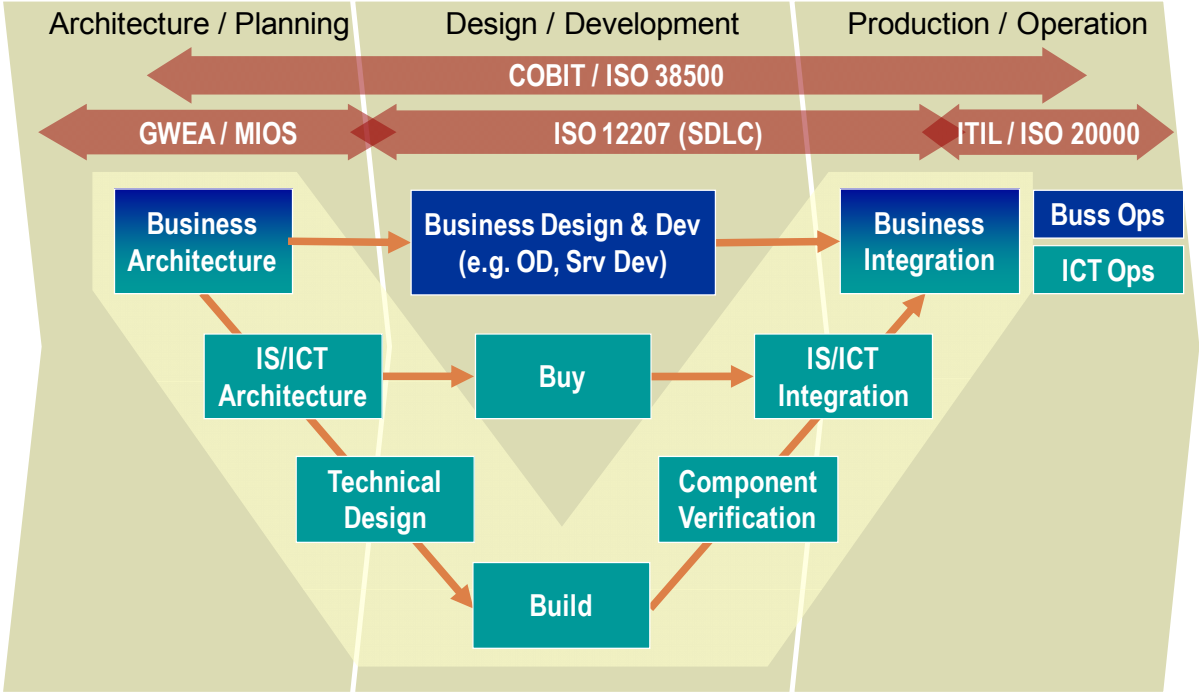


Figure 5: EA in relation to other disciplines

## 3 ENTERPRISE ARCHITECTURE PRINCIPLES

### 3.1 INTRODUCTION

Principles are general rules and guidelines, intended to be enduring and seldom amended, that are used to govern and guide the way in which an organization sets about fulfilling its mission.

Enterprise Architecture principles are used to govern and guide enterprise architecture *development* and trade-off decisions (i.e. strategic planning, alignment, investment and macro design) of Information and ICT<sup>5</sup>, whereas Solution Architecture principles are used to govern and guide the mission of Software and System *development* (e.g. requirement analysis, technical design, construction, procurement, integration).

This set of principles pertains to Enterprise Architecture<sup>6</sup> and must be observed when developing and reviewing Enterprise Architecture for Government<sup>7</sup>. These principles may be expanded and unpacked into Solution Architecture principles (as depicted below).

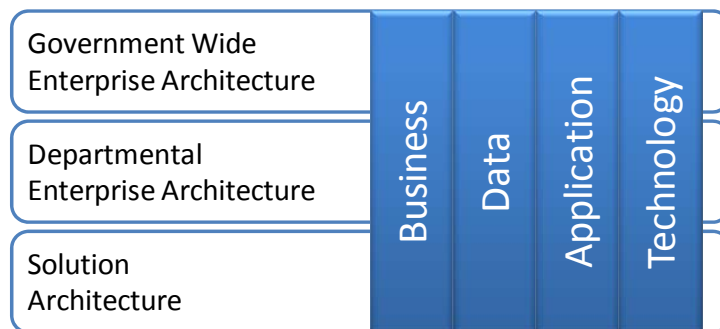


Figure 6: Hierarchy of principles

Principles are defined in terms of a *statement* that expresses the outcome, a *rationale* that motivates its existence, and *implications* that inform enterprise architecture development decisions.

#### Note

- The principles are intended to inform and augment (not replace) existing Information Management and ICT Policies in government.
- The decision to adopt a formal method for GWEA development (as per the GWEA Framework) also implies the adoption of principles inherent to the GWEA development method. Therefore, principles inherent to the method, like “business architecture drives system architecture”, are excluded from the list below.

<sup>5</sup> Does not include principles for the disciplines relating to organisational strategy, performance management and organizational development.

<sup>6</sup> Derived from a collection of principles from various sources, including South Africa e-Government ICT House of Values, TOGAF-9 documentation set, US Federal Enterprise Architecture and e-Government programmes.

<sup>7</sup> These principles supersede the principles as defined in the TOGAF-9 documentation.

- These principles do not apply for closed or embedded type systems (i.e. software subsystems that are designed to control and monitor the functioning of, and embedded as part of machinery, equipment or measuring instruments)

## 3.2 BUSINESS ARCHITECTURE PRINCIPLES

### *Principle 1 Enterprise Architecture is aligned with relevant legal framework*

#### **Rationale**

The Legal Framework, as contemplated in the Constitution, Acts and Regulations of South Africa, is designed by legislatures to ensure good governance, accountability, citizenship and an improved public service delivery in South Africa. Compliance to the legal framework reduces the risks of non-conformance and under-performance.

#### **Implications**

- Laws, regulations, and policies should be considered when developing Enterprise Architecture.
- Changes in the law and regulations may drive changes in the Enterprise Architecture of departments and agencies, in particular services, functions, processes and applications.
- Business process improvements may lead to changes in the legal framework.

### *Principle 2 Public and Private collaboration improves public services*

#### **Rationale**

Collaboration between public and private entities, who share government objectives, improves the efficient use of national resources; reduces duplication of effort and inconsistencies, and optimises public service delivery.

#### **Implications**

- The business architecture (structures and functions) on IT Governance includes governance functions (such as direct, evaluate and monitor) for members of interdepartmental councils and forums (e.g. GITO Council and its Standing Committees)
- The business architecture (performance models) includes shared accountability on programmes as reflected in performance scorecards across public service departments and agencies.
- The business architecture (structures and functions) includes partnerships across departments and agencies, and among public and private sector.
- The business architecture (processes) reflects that public service delivery processes traverse across traditional organisational boundaries.
- System architecture reflects integration, interoperability and sharing of Information and ICT systems across all spheres of government to improve and optimise public service delivery.

- Architecture reflects the adoption of open (non-proprietary) standards and industry's best practices.

---

*Principle 3 Public service design is customer centric*

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**Rationale**

The government exists to serve and protect the public customers who want simpler, faster, better and cheaper government services and information.

**Implications**

- Business processes, functions and services are designed to benefit customers, even when the services span across several departments.
- Public Service outlets (locations) offer customers a unified face to government that reduces duplication, complexity and inconsistency of public services delivery.
- Customers have access to public services through various means (service channels).

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*Principle 4 Operations are optimised and simplified*

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**Rationale**

Enterprise Architecture facilitates and enables business process effectiveness and efficiency and the reduction of complexity of systems to the maximum extent possible. Complex business processes and systems with tightly coupled modules are difficult to manage, prone to failure, inflexible to the changing needs of a department, and are expensive to maintain. These complex processes often resulted in diverse solutions and configurations across different department to enable the same or similar business processes.

**Implications**

- Business processes and services are standardised in line with good practice and shared within and across departments.
- Business processes are optimised and performance standards defined before automation requirements are defined.
- Systems and technology architectures are aligned with business processes and performance models in order to maximise the value of ICT investments.
- Systems and software are modular, flexible and loosely coupled.
- Information exchange interfaces are simple and based on open standards for all intra- or interdepartmental solutions.
- Solutions are implemented based on similar business process building blocks and shared system building blocks.

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*Principle 5 Systems are designed to ensure Business Continuity*

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**Rationale**

Critical operations must continue in spite of system failure. System failures disrupt operations and lead to service delivery failures.



### **Implications**

- Mission essential/critical systems are designed according to business continuity and disaster recovery requirements and include the necessary continuity measures (such as redundancy, standby and fail-over components).
- Information Systems inventory is established and maintained and each system is classified commensurate their risk of failure profile (e.g. nonessential, essential, critical).
- Alternative business processes are followed only when recovery operations take place in the event of system failure.
- Essential/Critical systems use technology that is proven to be reliable and maintainable.
- Essential/critical systems are monitored and pre-emptively reconfigured to ensure continued operations.

## **3.3 DATA ARCHITECTURE PRINCIPLES**

### *Principle 6 Sensitive information is secure*

#### **Rationale**

The duty to protect and secure sensitive information must be balanced against the duty to share and release public information. Laws and Regulations of South Africa require the safeguarding of sensitive information (e.g. national security, medical confidentiality and privacy), while permitting free access to public information. In order for government to improve the security of its resources, it must protect its information from unauthorised access, modification or damage.

#### **Implications:**

- Information System Security capability (people, processes and technology) is in place to determine, monitor and maintain the levels of security of the government information assets (data, applications and technology).
- Security architecture is an integral part of business, data, application and technology architectures.
- Security architecture is consistently applied throughout departments and systems.
- Access control to information and data sources is applied within the data architecture (not in the application architecture).

### *Principle 7 Data is shared and duplication is reduced*

#### **Rationale**

Data is a strategic resource that requires effective and efficient management across government. Duplicate information and data sources across government systems result in duplicate labour intensive data management processes and frustrated citizens who needs to provide same information to multiple departments. Duplication also

leads to public service delivery inconsistency; fragmented data management responsibilities, reduced validity of data, poor data quality, and is open for localised exploitation and potential fraud and corruption.

### **Implications**

- Business architecture (processes and functions) of information management includes the roles and responsibilities of “meta-data manager” (person who manages the design of data) and “data governor/steward” (person who manages data quality and integrity on behalf of someone else) as required for data sharing.
- System architecture (data exchange and flow models) reflects intra- and interdepartmental data exchange and verification models for inclusion in departmental transition plans.
- Data sources that are candidates for re-use and sharing across departments are determined in every architecture development project in order to reduce the burden of duplicate data collection (e.g. citizen data, geographic data, etc) and to improve the quality and validity of government data.
- Shared data sources are consolidated into a shared environment to increase the re-use and sharing.
- On-line data exchange and verification interfaces across different data sources are standardised on best practice using data record exchange interfaces, in favour of bulk file transfers (such as large “flat-files” or “data dumps”).

## **Principle 8**    *Data is accessible*

### **Rationale**

Users – public servants and citizens alike – must have access to accurate, relevant and timely data to render or consume an effective government service. A well informed citizenry is necessary to our constitutional democracy; and accurate information to authorised users is critical to effective decision making, improved performance, and accurate reporting.

### **Implications**

- Government wide data catalogue (inventory) is developed and used to identify authoritative sources of high quality information that can be made available for access to empower public servant and citizens alike.
- Default Access control to data is set to “open for all” and made available to all through any means, unless security policy requires access restrictions (i.e. application software should not unnecessarily restrict users to access data).
- “Search” or “Find” functionality exist for all end-user applications/web portals to improve access to data sources.
- Access to data sources is available via various interfaces (access channels) to improve the convenience for the user.

### *Principle 9 Data definitions are consistent and meaningful*

#### **Rationale**

Data definitions that are consistent and meaningful ensure the effective and efficient development, interoperability and use of data and applications throughout government. The power of a common vocabulary and data definition also enable effective dialogue to empower user and citizens. Conversely, inconsistent data definitions lead to poor interoperability, misinterpretations and inconsistent reporting.

#### **Implications**

- Government has a Dictionary of ICT Terms and Definitions on ICT that is freely shared and collectively owned by ICT practitioners.
- Government has a data reference model (a schema that contains the data entities and their definitions), a meta-data model (a schema that defines relationship between the data entities) and a meta-data store (an electronic repository to store it).
- Data definition scheme comply with a common data definition standard as prescribed by the Minimum Interoperability Standard (MIOS)
- Data definitions and ICT Dictionary of terms are available to the whole of government to enable use, integration and common understanding.
- Government meta-data management discipline is established, and data standardization initiatives are coordinated throughout government.

## 3.4 APPLICATION ARCHITECTURE PRINCIPLES

### *Principle 10 Common applications are shared across government*

#### **Rational**

The sharing of applications that are designed to enable common/transversal business processes/functions of government radically improves the economy of IT investments across government – especially in times of economic clamp-down. Sharing of common/transversal applications reduces the burden of maintaining several configurations of the same type of applications, complexities in support contracts and commensurate licensing fees.

#### **Implications**

- Information system catalogue (inventory) is developed and used to identify candidates for common and transversal type applications.
- Provision is made for departments to (1) dispose or modify some of their unique applications in favour of a common/transversal application standard, and (2) adapt existing business processes to align with the common/transversal business process.
- Common/transversal applications use open interfaces to enable development of departmental specific extensions and to enable information exchange with departmental unique application portfolio.

- Departments retain data ownership to comply with legal or security requirements.
- Priorities and funding for the acquisition of common/transversal type applications are determined collectively by all departments.
- Because common/transversal applications components must be made available to all departments, it may be necessary to establish a high-availability shared service environment to host and support common/transversal applications.

### *Principle 11 Applications are independent of technology infrastructure*

#### **Rationale**

Applications that are independent from the underlying technology infrastructure allows applications to be designed, developed, operated on and migrated to a variety of front-office (end-user) and back-office (hosting environment) technology platforms to improve flexibility, end-user convenience, cost effectiveness and lower the risk of technology vendor lock-in.

#### **Implications**

- Application Development Software (aka integrated development environments) that does not support portability or platform independence is avoided.
- Commercial Off-The-Shelf (COTS) applications that are technology dependent are avoided.
- Applications are designed for multi-tier deployment, which separates at least the end-user tier from the back-end tier, and the back-end tier from the database tier.
- Application-to-application interfaces are via a common interface bus (aka Middleware or Service bus). Conversely, applications do not interface directly with other applications.
- Applications-to-data interfaces comply with data interface standards as prescribed by MIOS.
- Traditional client-server applications that demands high-speed communications networks, high-performance end-user computers, or dedicated client (end-user computer) software, are not deployed over wide area networks.

### *Principle 12 Common applications are easy to use*

#### **Rationale**

Common applications (which are intended for broad deployment in government) that have consistent and simple user interfaces reduce the training burden and provide incentive for end-users to use the application.

#### **Implications**

- User interface design is informed by user location, language, competency, and physical capability.
- Applications contain no unnecessary technical options that could reduce productivity and increase the risk of improper use of the application.

- Same type applications have a common “look-and-feel”, support ergonomic requirements and provide context sensitive help.
- User friendliness is part of the test and acceptance criteria, which requires sign-off by an end-user representative, before applications are deployed for general use.

### 3.5 TECHNOLOGY ARCHITECTURE PRINCIPLES

#### *Principle 13 Technological diversity is contained*

##### **Rationale**

Limiting the diversity of technology product mix on a government wide scale will reduce maintenance, supply chain complexities, and reduce the cost of procurement due to leveraging economy of scale; but, it will also dampen healthy competition, technology innovation, and deprive small and medium suppliers to participate in the economy of government. These opposing factors need to be balanced.

##### **Implications**

- The Technology product portfolio that is utilised for common/transversal systems is reduced to a finite manageable set that will strike a balance between the ease and cost of managing the life-cycle of technology on the one side, and stimulating healthy economic competition and growth of the ICT industry of South Africa on the other side.
- The Technology product portfolio that is utilised for departmental unique systems is reduced to a finite set per department. This will allow each department to reduce the complexities per department, but also to have different technology portfolios from each other that will enable fair economic participation of the ICT industry.
- Growing and evolving the ICT portfolio require that emerging, innovative or cutting-edge ICT products must be monitored on a continued basis; and be subjected to proof-of-concept to test for relevance, compliance and impact to government operations before it is introduced into ICT product portfolio.
- The efficacy, efficiency and risk of the existing ICT product portfolio are reviewed on a regular basis to identify candidate products that need to be upgraded or disposed.

#### *Principle 14 Technology components are able to interoperate and exchange information*

##### **Rationale**

Technology components (hardware and software), which cannot exchange information or integrate with each other lead to rampant duplication of data and ICT, increase the number of “islands” and “silos” in government ICT infrastructure, and introduces inconsistency and complexity in the ICT infrastructure portfolio. The cost to support and maintain closed or proprietary technology is usually higher compared to open systems; it further limits the choices on ICT investments and reduces fair and healthy competition in the economy. This problem is alleviated by introducing interoperability standards that enables products from different vendors to physically connect, integrate and freely exchange information with each other.

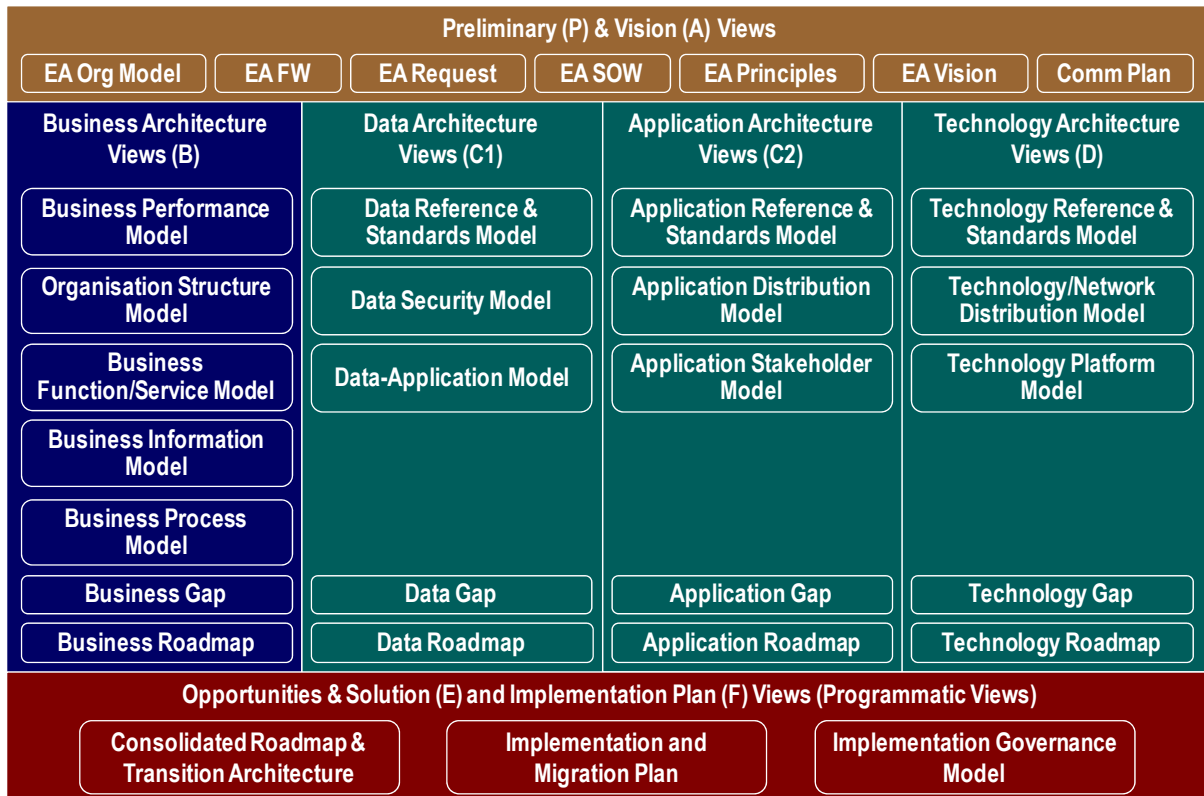
### ***Implications***

- Government adopts interoperability standards whose specifications are freely available, non-proprietary, have multiple implementations and are maintained by non-profit organisations; and publish such standards in a standards catalogue known as the Minimum Interoperability Standards (MIOS) for Government Information Systems.
- ICT products and systems are certified by SITA Certification function for compliance with the standards as published in the MIOS.
- A government-wide technology product catalogue must be developed and maintained to account for all the types of ICT products and to record their level of compliance with MIOS.
- All prospective ICT products must comply with the MIOS before it is implemented in the Government ICT infrastructure; and all existing ICT products that do not conform to the MIOS must be part of a migration plan to become compliant with MIOS.
- The MIOS is reviewed and updated on a regular basis to keep abreast with technological development through a process of research, consultation and consensus among government stakeholders.

## 4 EA MODEL SAMPLES & TEMPLATES

### 4.1 INTRODUCTION

This section provides guidance on how to construct the Business, Data, Application and Technology Architecture deliverables in accordance with the GWEA Framework, as illustrated Figure 7: GWEA Deliverable Framework.



*Figure 7: GWEA Deliverable Framework*

### 4.2 GWEA MODEL RELATIONSHIP

The purpose of an architecture meta-model – a model that defines the structural relationships between architecture models – is to inform the structural design of an EA repository. This in turn enables the re-use and improves the referential integrity of architecture content (artefacts) that is to be stored in an architecture repository.

The GWEA meta-model, as derived from the GWEA Framework, is illustrated in Figure 8: GWEA Model Relationships and Figure 9: GWEA Meta Model respectively.

Ref	Models	Content (Artefacts)												
		Driver	Objective	Measure	Organisation Unit	Function / Service	Actor (Role, Person)	Process (Event, Activity, Rule)	Location	Application (System, Function)	Data (Class, Definition)	Data (Standard)	Technology	Technology Standard
B1	Business Performance Model	■	■	■	■									
B2	Organisation Structure Model				■	■	■		■					
B3	Business Function/Service Model					■	■			■				
B4	Business Information Model					■					■			
B5	Business Process Model					□	■	■						
C1.1	Data Reference Model										■	■		
C1.2	Data Security Model						■				■			
C1.3	Data-Application Model									■	■			
C2.1	Application Reference Model									■				
C2.2	Application Distribution Model								■	■				
C2.3	Application Stakeholder Model						■			■				
D1	Technology Reference Model											■	■	
D2	Technology Distribution Model								■				■	
D3	Technology Platform Model									■			■	

■ Mandatory content  
□ Optional content

Figure 8: GWEA Model Relationships

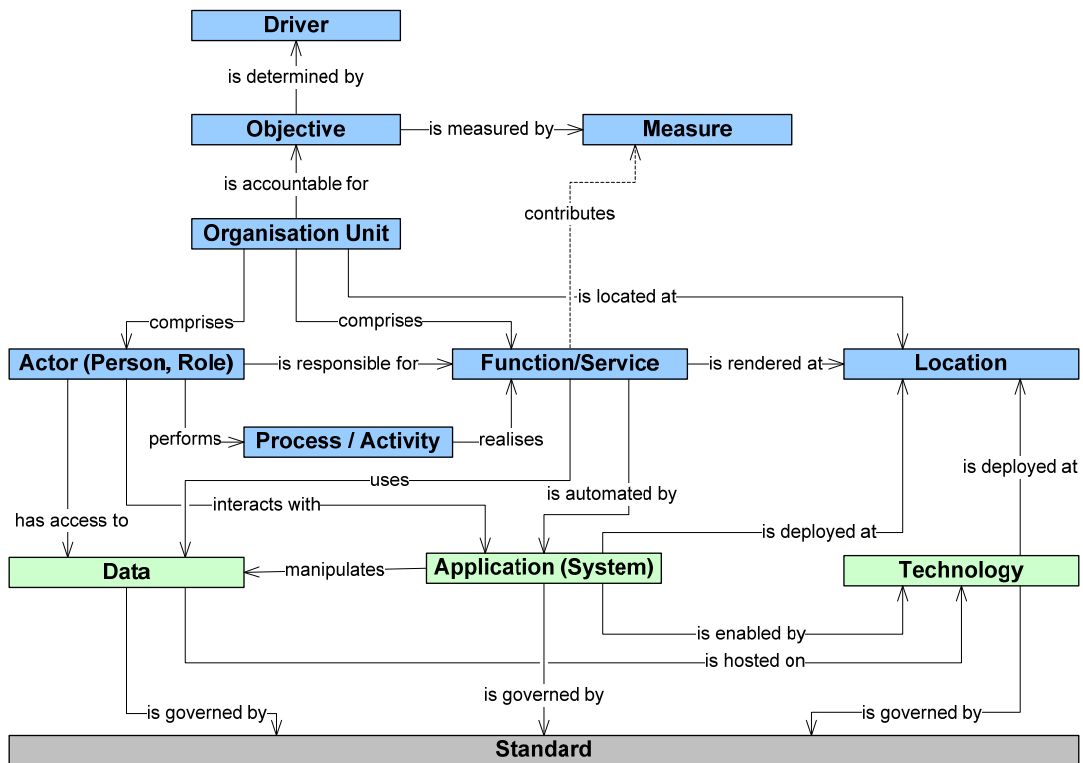


Figure 9: GWEA Meta Model



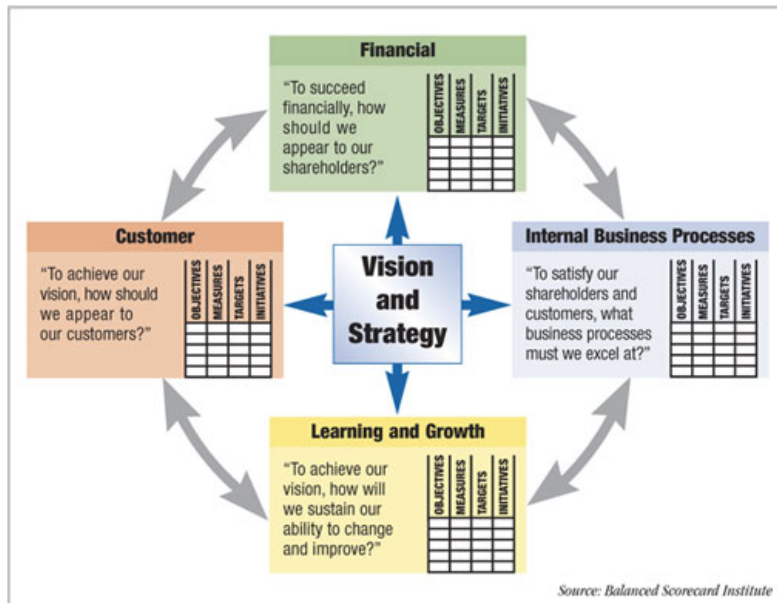
## 4.3 BUSINESS ARCHITECTURE MODELS

### 4.3.1 Business Performance Model

<i>Purpose</i>	To inform stakeholders regarding the performance accountability in an enterprise and the line of sight of an enterprise towards government strategic outcomes.
<i>Definition</i>	A model that defines the relationships between objectives / imperatives as derived from Policy, Act, Regulation and requirements, and the responsible organisation to achieve the objectives, and the measures or key performance indicators (KPI) by which to measure achievements of such objectives.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Driver</li> <li>• Objective</li> <li>• Measure or KPI</li> <li>• Organisational Unit</li> </ul>
<i>Notation</i>	Catalogue
<i>Reference</i>	<ol style="list-style-type: none"> <li>1. TOGAF-9: Chapter 35.9 Driver/Goal/Objective Catalogue and Goal/Objective/Service Diagram</li> <li>2. Framework for Managing Programme Performance Information, National Treasury (<a href="http://www.treasury.gov.za">www.treasury.gov.za</a>)</li> <li>3. SMS Handbook, DPSA (<a href="http://www.dpsa.gov.za">www.dpsa.gov.za</a>)</li> <li>4. Kaplan &amp; Norton, Balanced Scorecard</li> <li>5. Improving Government Performance: Our Approach, The Presidency, South Africa (<a href="http://www.thepresidency.gov.za">www.thepresidency.gov.za</a>)</li> </ol>
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. Objectives are informed by two kinds of drivers: regulatory requirements and customer requirements. Regulatory drivers, such as relevant Government Acts, Policies and Regulations, provide the necessary mandate for the mission of a department; and customer requirements emerge from government stakeholders such as citizens, the state and industries.</li> <li>2. The model is hierarchical – cascading from the National Strategic Outcomes down to departmental objectives that show clear line-of-sight to the Strategic outcomes of Government.</li> <li>3. Objectives should include a timeframe to set priority and inform resource optimisation.</li> <li>4. Objectives should include both core and support objectives of the department, i.e. support objectives pertains to the resources management functions such as the HR and ICT functions.</li> <li>5. The objectives of the ICT function are usually aligned with relevant accepted ICT Governance practices such as COBIT.</li> <li>6. The model should indicate clear accountabilities for each objective, including the shared accountability for transversal or interdepartmental programmes.</li> </ol>

Template / Examples

Objective	Measure	Organisation Unit	Driver



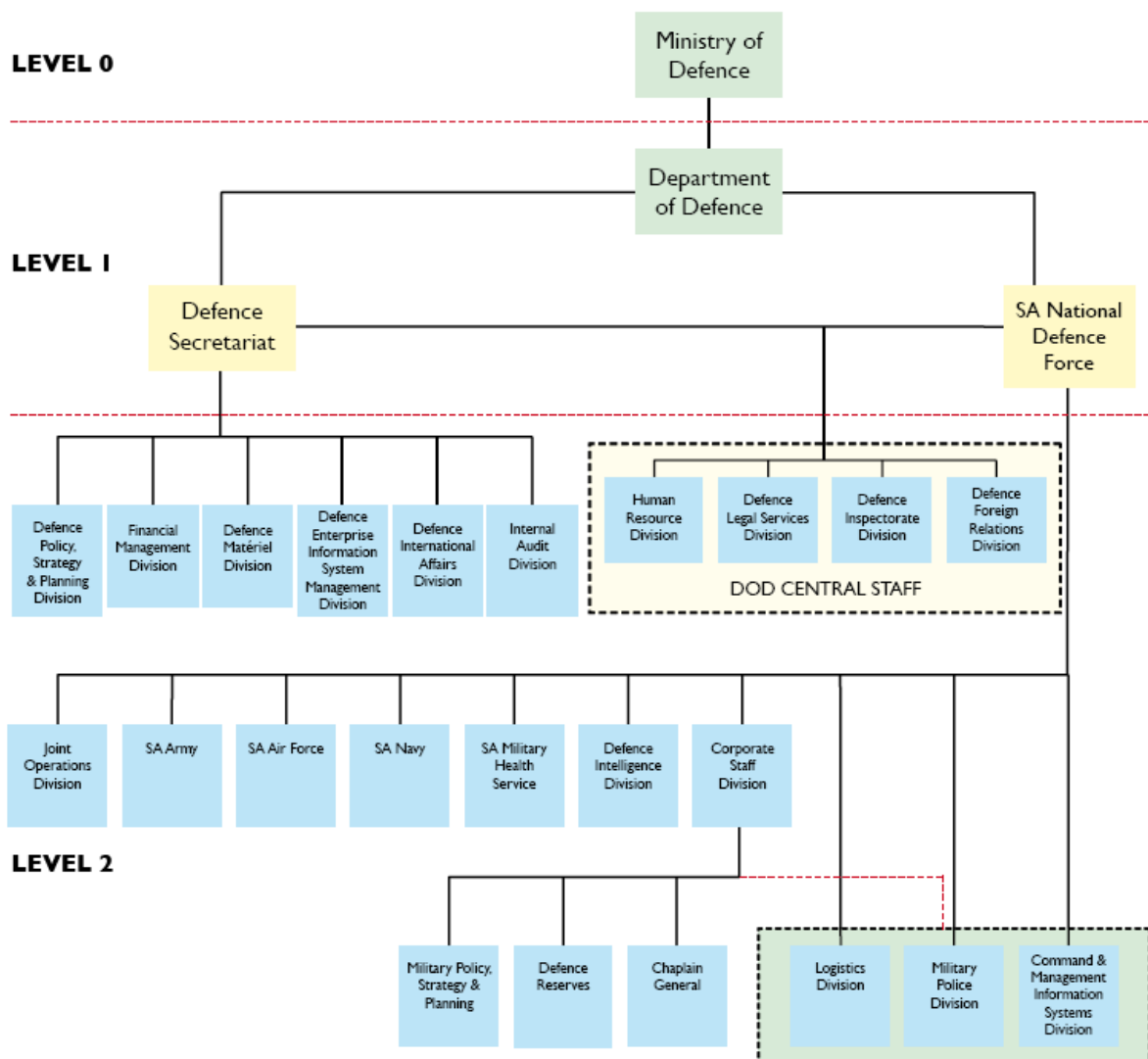
Strategic Priorities	Objectives	Measures	Targets	Initiatives
<b>Financial</b> Financially Strong	F1 ROCE F2 Asset Utilization F3 Profitability F4 Cost Leader F5 Profitable Growth	<input type="checkbox"/> ROCE <input type="checkbox"/> Cash Flow <input type="checkbox"/> Net Margin <input type="checkbox"/> Full Cost/gallon <input type="checkbox"/> Volume Growth <input type="checkbox"/> Premium Ratio <input type="checkbox"/> Non-Gasoline Revenue	<input type="checkbox"/> 18% <input type="checkbox"/> \$500mm <input type="checkbox"/> 11% <input type="checkbox"/> 5%/yr <input type="checkbox"/> 45% <input type="checkbox"/> \$2b	<input type="checkbox"/> Asset Disposition Program <input type="checkbox"/> C Store Alliances
<b>Customer</b> Delight the Customer Win-Win Dealer Relations	C1 Delight the Targeted Consumer C2 Build Win-Win Relations with Dealer	<input type="checkbox"/> Share of Segment <input type="checkbox"/> Mystery Shopper Rating <input type="checkbox"/> Dealer Gross Profit Growth	<input type="checkbox"/> 45% <input type="checkbox"/> 4.5+ <input type="checkbox"/> 25%	<input type="checkbox"/> Mystery Shopper Program <input type="checkbox"/> Dealer Committee
<b>Internal</b> Build the Franchise Increase Customer Value Operational Excellence Good Neighbor	I1 Innovative products and services I2 Best-in-Class Teams I3 Refinery Performance I4 Inventory Management I5 Cost Leader I6 On Spec/On Time I7 Improve EHS	<input type="checkbox"/> New Product ROI <input type="checkbox"/> Dealer Quality Score <input type="checkbox"/> Yield Gap <input type="checkbox"/> Unplanned Downtime <input type="checkbox"/> Inventory Levels <input type="checkbox"/> Run-out Rate <input type="checkbox"/> Activity Cost vs. Competition <input type="checkbox"/> Perfect Orders <input type="checkbox"/> Days Away from Work	<input type="checkbox"/> 20%+ <input type="checkbox"/> 4.5+ <input type="checkbox"/> <3% <input type="checkbox"/> <2% <input type="checkbox"/> 15% Sales <input type="checkbox"/> <90% <input type="checkbox"/> 99%+ <input type="checkbox"/> <250/yr	<input type="checkbox"/> Review Program <input type="checkbox"/> PM Program <input type="checkbox"/> ISO 9000 <input type="checkbox"/> Safety Training
<b>Learning &amp; Growth</b> Motivated and Prepared Workforce	L1 Climate for Action L2 Competencies	<input type="checkbox"/> Employee Survey <input type="checkbox"/> Personal BSC (%) <input type="checkbox"/> Strategic Competency	<input type="checkbox"/> >4.8 <input type="checkbox"/> 80% <input type="checkbox"/> 85%	<input type="checkbox"/> Skills Program <input type="checkbox"/> Competency Dev't

### 4.3.2 Organisation Structure Model

<i>Purpose</i>	To inform stakeholders regarding the accountability and responsibility towards the services that are routinely rendered by an enterprise – be it an internal service or external service; and the business footprint to inform capacity and network design.
<i>Definition</i>	A model that defines the Organisational structure (hierarchical decomposition), the functions/service performed by each organisational unit, the geographic location where these organisation unit reside, and the responsible authority (owner) of these organisation units.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Organisation Unit</li> <li>• Function/Service (Business)</li> <li>• Actor (Owner)</li> <li>• Location</li> </ul>
<i>Notation</i>	UML (Class) or Nested Box Diagram
<i>Reference</i>	<ol style="list-style-type: none"> <li>1. TOGAF-9: Chapter 35.9 Business Service/Function Catalogue, Organisational Decomposition Diagram, Location Catalogue, and Business Footprint Diagram</li> <li>2. Guide and Toolkit on Organisational Design, DPSA (<a href="http://www.dpsa.gov.za">www.dpsa.gov.za</a>)</li> </ol>
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. This model makes provision for both process oriented (“what people do”) and service oriented (“what people produce”) organisational design.</li> <li>2. This model is an hierarchical organisation structure diagramme. It must indicate responsibility and ownership of functions/services down to the level where a group of likewise services are rendered, i.e. it’s the macro organisational design. The hierarchy is usually cascaded as follows: Division → Business Unit → Function/Service</li> <li>3. Location is important, because it informs the distributive and logistical nature of service delivery, which in turn informs supply chain, capacity and network design.</li> <li>4. The model should define personnel structures for both natural line functions and virtual structures (such as governing bodies, committees, boards, councils).</li> <li>5. Model should include structures of core functions that are particular to a department and support functions that are transversal across all departments (e.g. HR, Finance, Supply Chain, and Information Management/ICT).</li> </ol>

**Template / Examples**

Organisation Unit	Function/Service	Owner	Location
Unit 1	Service 1.2	Manager 1	Pretoria
	Service 1.3	Manager 2	
	Service 1.4	Manager 3	Polokwane



### 4.3.3 Business Function/Service Model

<i>Purpose</i>	To inform stakeholders regarding the Service Catalogue of an enterprise, the degree of automation of each function/service, and the roles (people) required to perform the function/service.
<i>Definition</i>	A model that defines the Core and Support Functions/Services of the Enterprise, the Information Systems that enable the function/service, and the roles of the actors that participate.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Function/Service (Business)</li> <li>• Information System (Enabler Application)</li> <li>• Actor (role)</li> </ul>
<i>Notation</i>	Format: Catalogue, Nested Box Diagram or UML Use Case
<i>Reference</i>	<ol style="list-style-type: none"> <li>1. TOGAF-9: Chapter 35.9 Business Service/Function Catalogue, Functional Decomposition Diagram, Business Use Case Diagram, and Business Footprint Diagram.</li> <li>2. Batho Pele Handbook, DPSA (<a href="http://www.dpsa.gov.za">www.dpsa.gov.za</a>)</li> </ol>
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. It is also called the Service Catalogue of a department and should contain/re-use all the functions/services as identified in “Organisation Structure Model”.</li> <li>2. Services/functions are informed by the “operating model” or “value chain”, which should be developed as part of Preliminary phase, “EA VISION”.</li> <li>3. The “Function/Service” represents “what” the organisation produces and serves as a complete catalogue of all the “outputs” of an organisation. It is not a model of the activities of the organisation or a representation on how the organisation go about to produce these outputs (that should be reflected in the “Business Process Flow Model”). To ensure a customer service oriented enterprise, like Public Service, each service itself should be expressed as an “output” that is delivered to the customer.</li> <li>4. Services categories are both internal services, i.e. those services rendered to internal customers that are considered to be the “back-end” or “enabling” services (e.g. Financial Service, HR Service, Supply Chain Service and ICT Services); as well as external services, i.e. those services that are rendered to external customers – citizen, private industry or the state – that are considered “front-end” or “core” services (e.g. safety and security services, health services, education services, social welfare service, etc).</li> <li>5. The scope of ICT Services/Functions are informed by the services and functions inherent to the GITOC endorsed good practices, such as COBIT, ISO/SANS 38500, ITIL, ISO/SANS 27002, ISO/SANS 12207 and the King-III report Chapter 5.</li> <li>6. The Service Catalogue form the basis of the “Public Service Charter” as contemplated in the Batho Pele Handbook.</li> <li>7. Each Service should be indicated as manual or automated; and if automated or planned to be automated, then it should indicate the name of the information system or project that is, or will be, used to automate it.</li> <li>8. Actors should include both producer/provider (service owner as per</li> </ol>

Organisation Structure Model) and the consumers (beneficiary) of a service.

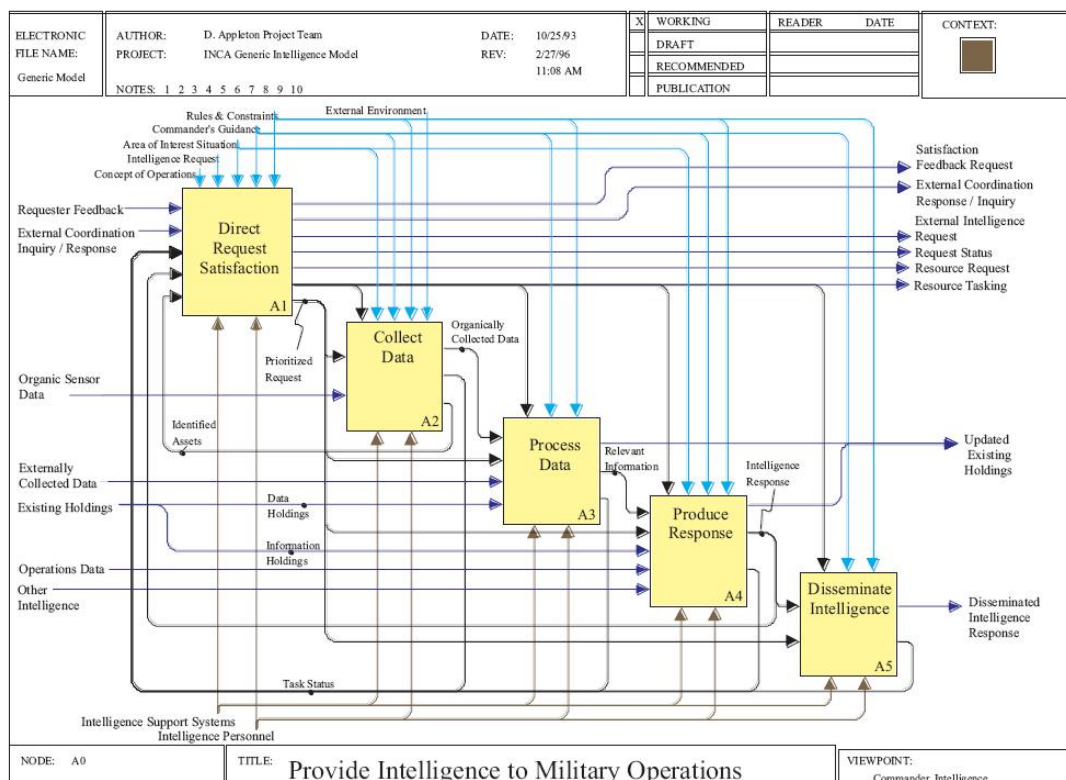
**Example / Template**

Service	Actor (Consumer)	Actor (Producer)	System
Issue Identity Document	Citizen	DHA: ID Practitioner	National Population Register System
Procure Goods	Line Manager	Buyer	Electronic Procurement Portal

### 4.3.4 Business Information Model

<b>Purpose</b>	To inform stakeholders regarding the data entity classes that the enterprise must manage through its life-cycle.
<b>Definition</b>	A model that defines the Information asset requirement that are consumed and produced by each Business functions/services, including information exchange requirements with external business functions/services.
<b>Content</b>	<ul style="list-style-type: none"> <li>Function/Service (Business)</li> <li>Data (entity)</li> </ul>
<b>Notation</b>	Catalogue, or IDEF0
<b>Reference</b>	TOGAF-9: Chapter 35.9 Business Service/Function Catalogue, and Business Service/Information Diagram
<b>Guidelines</b>	<ol style="list-style-type: none"> <li>The Functions/Services are informed by the Business Function/Service model.</li> <li>The aggregate of all inputs and outputs of respective functions/services is the information requirement of the enterprise and it forms the basis to develop the Data Architecture models.</li> <li>The model should indicate both internal and external information exchange requirement among business functions/services.</li> <li>The “outputs” is a good source to determine the KPI’s or measures of every function in the enterprise.</li> </ol>

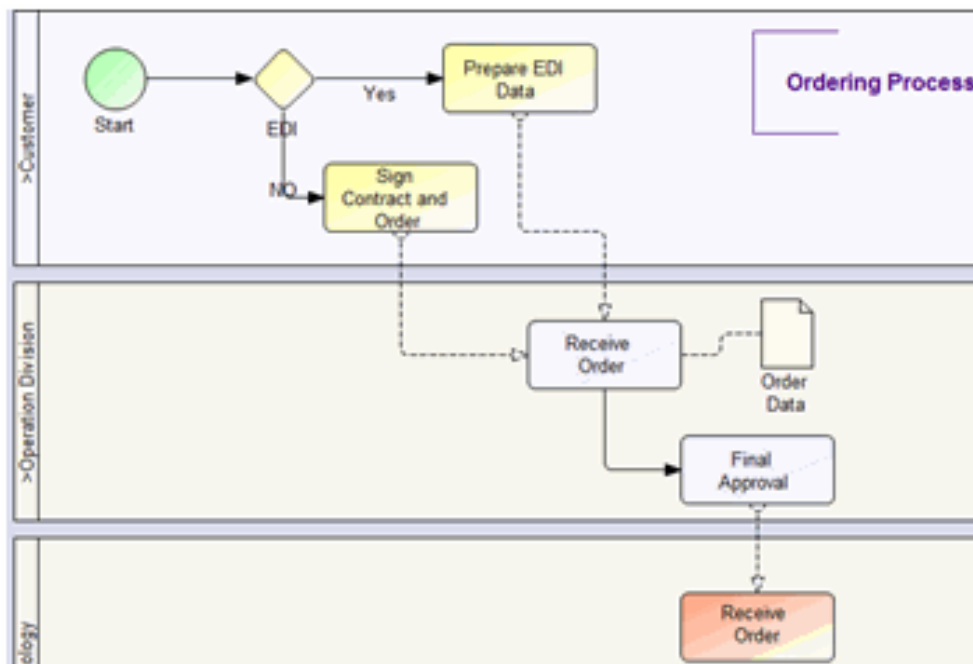
### Example / Template



### 4.3.5 Business Process Flow Model

<i>Purpose</i>	To inform stakeholders regarding the workflow (and information flow) that is needed to produce a product or render a service.
<i>Description</i>	A model that defines the business processes of the enterprise, in the form of events, activities, rules and responsibilities
<i>Content</i>	<ul style="list-style-type: none"> <li>• Event / Request</li> <li>• Activity</li> <li>• Rule</li> <li>• Actor (responsible)</li> </ul>
<i>Notation</i>	UML Activity or BPMN
<i>Reference</i>	TOGAF-9: Chapter 35.9 Process Flow Diagram and Event Diagram
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. This model shows HOW a service is rendered or a product is produced.</li> <li>2. Each function/service of an enterprise has a process.</li> <li>3. The Business Process Flow Model represents human activity; it is not a software workflow diagramme.</li> <li>4. Events and Activities should be informed by the Services in Business Function/Service Model.</li> <li>5. Actors should be informed by Organisation Structure Model.</li> <li>6. Rules are informed by relevant Business Policies and its Regulatory Framework.</li> <li>7. Business process model should show interaction between departments where processes traverse across traditional organisational boundaries.</li> </ol>

#### Example / Template





### 4.3.6 Business Gap Report

<i>Purpose</i>	To inform stakeholders regarding the extent of change that is required to move the business from the baseline state to the target state.
<i>Description</i>	A model that indicates the deficiencies and opportunities for improvement that is derived from a comparison between the Baseline Business Architecture models and the Target Business Architecture models.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Organisational Performance gap</li> <li>• Organisation Structure gap</li> <li>• Location gap</li> <li>• Function/Service gap</li> <li>• Information gap</li> <li>• Information System gap</li> <li>• Process gap</li> </ul>
<i>Notation</i>	Text or Catalogue
<i>Reference</i>	TOGAF-9: Chapter 8.4 “Perform Gap Analysis”, 27 “Gap Analysis” and 36.2 “Architecture Definition Document”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Gap report is a comparative analysis between Target and Baseline Business Architecture by indicating what needs to change: i.e. what needs to be retained (keep), improved (modify), created (new) and eliminated (redundant or duplicated).</li> <li>2. A gap report can be done by means of a matrix – with the x-axis (columns) being the baseline elements and the y-axis (rows) being the target elements and the intersection the change indicators (such as retain, modify, new or dispose).</li> <li>3. Business Performance gap is a change in drivers, objectives or measures.</li> <li>4. Organisational Structure &amp; Location gap is a change to directorates and organisation units as well as the change in the geographic locations of service outlets, offices, fixed assets, installations, facilities and the climate or geological environment in which these assets are inhabited.</li> <li>5. Function/Service gap is a change to the portfolio of services/functions that a department performs.</li> <li>6. Information System gap is a change to the Information System portfolio that is used to automate the service/functions of a department.</li> <li>7. Information gap is a change to the information requirements of a department.</li> <li>8. Business Process Gap is the change in the way (activities, steps, flow and rules) a service is rendered or a function is performed.</li> </ol>

**Example / Template**

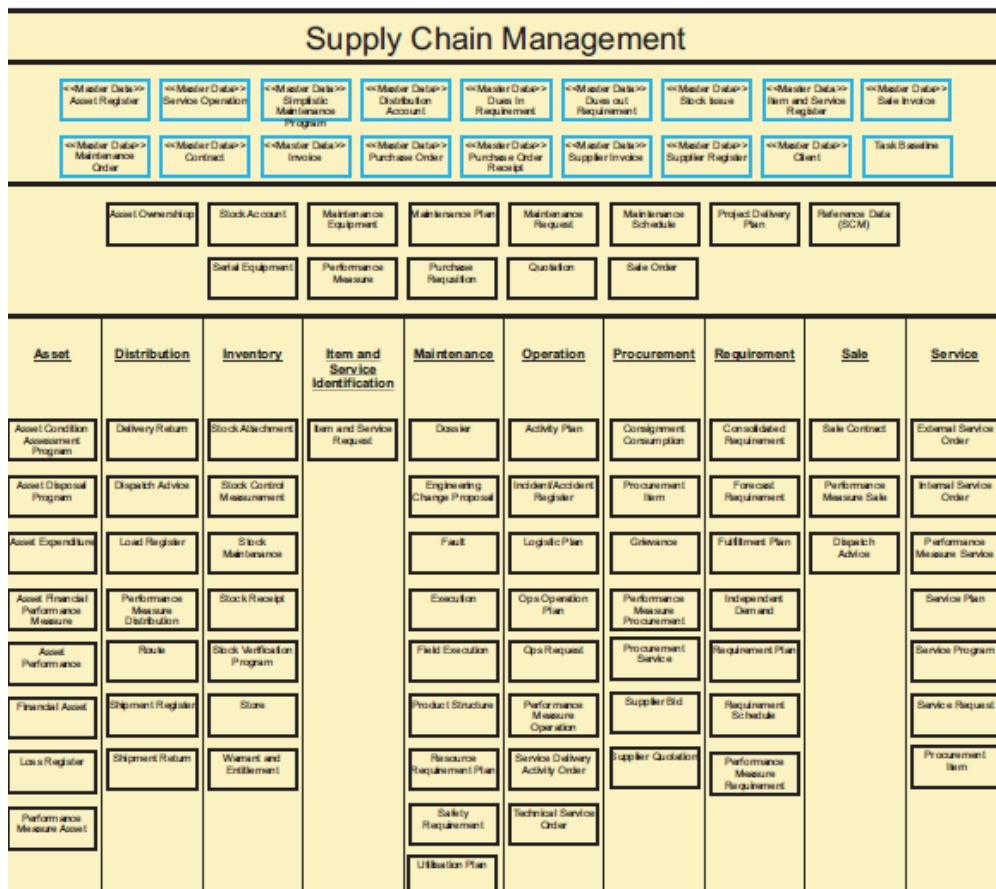
Baseline →	New	Service B1	Service B2	Service B3	Service B4	Service B5	Service B6
Target ↓							
Dispose				X			X
Service T1		Enhance					
Service T2			Keep				
Service T3					Replace	Replace	
Service T4	X						
Service T5	X						
Example: Service T3 will replace both Service B4 and B5; Service T1 will enhance Service B1 Service B3 and B6 should be disposed							

## 4.4 DATA ARCHITECTURE MODELS

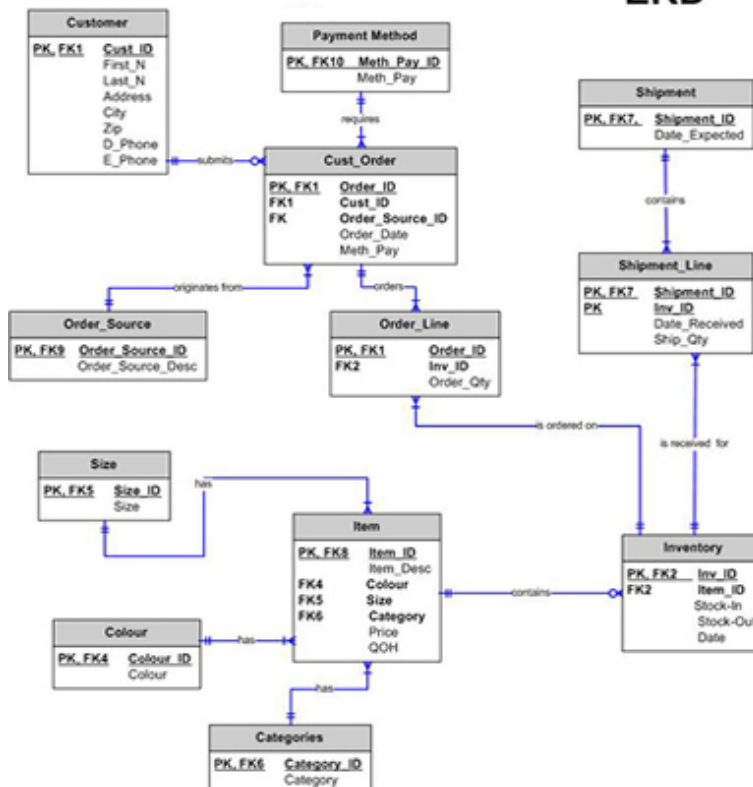
### 4.4.1 Data Reference and Standard Models

<i>Purpose</i>	To inform stakeholders regarding the data assets of an enterprise in a consistent manner that will enable re-use and data sharing.
<i>Description</i>	A model that defines the data classes and relationships, data definitions and interoperability standards used in the enterprise.
<i>Content</i>	<ul style="list-style-type: none"><li>• Data Class</li><li>• Data Definition</li><li>• Data Interoperability Standard</li></ul>
<i>Notation</i>	Catalogue or UML Class
<i>Reference</i>	TOGAF-9: Chapter 35.10 “Data Entity/Data component catalogue” and “Class Diagram”
<i>Guidelines</i>	<ol style="list-style-type: none"><li>1. The classes in the Data Reference Model (DRM) are informed by the major data classes as defined by Business Information Model.</li><li>2. The DRM should provide meaning (data definition) to the different data classes, context through the relationships amongst the different classes, and relevant data content standards (such as commercial or bespoke XML Schemas) applicable to each data class to enable data exchange and data re-use.</li><li>3. Data definitions are usually expressed in terms of data attributes.</li><li>4. The DRM is a meta-data design that is free of any implementation; i.e. it not a detail technical design of the department’s databases or data implementations.</li><li>5. The DRM of a department usually comprises a set of bespoke data definitions that is unique to the department as well as a set of industry data definition that are informed by recognised good practices.</li><li>6. The DRM should indicate which data classes are Master Data classes (also known as Referential Data classes).</li><li>7. Data Interoperability standards are informed by the MIOS and relevant recognised data schema standards.</li></ol>

## Example / Template



### ACCOUNTING SYSTEM: STOCK and DEBTORS



#### 4.4.2 Data Security Model

<i>Purpose</i>	To inform stakeholders regarding the security and responsibilities of the data assets in a department in order to improve data accountability.
<i>Description</i>	A model that defines the security classification of data classes and the roles in the organisation that need access thereto.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Data Class</li> <li>• Actor Role</li> </ul>
<i>Notation</i>	Catalogue
<i>Reference</i>	TOGAF-9: Chapter 35.10 “Data Security Diagram”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. Data Classes are re-used from the Data Reference Model.</li> <li>2. Actor Role should be re-used from the roles defined in the Organisation Structure Model.</li> <li>3. Data Classes and Actors should be associated in two ways: Firstly to assign responsibilities regarding data classes (e.g. owner, steward, quality manager, user) and secondly to assign access rights (e.g. none, create, read, update and delete).</li> <li>4. Access control indicators on data classes should be defined per organisation function or role.</li> <li>5. Data classes should be attributed by a generic security classification as per Minimum Information Security Standard classification scheme (e.g. RESTRICTED, CONFIDENTIAL, etc).</li> </ol>

#### Example / Template

Role →	Supply Manager	Buyer	Goods Receiver	Finance
Data Class ↓				
Order				
Supplier				
Address				
Product				
Service				

CRUD

### 4.4.3 Data-Application Model

<i>Purpose</i>	To inform stakeholders regarding the affinity (or relationship) between data classes and applications in an enterprise that is needed to inform the development, integration and deployment of software solutions.
<i>Description</i>	A model that defines the interaction (e.g. create, read, update, delete) between applications and data.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Data</li> <li>• Application</li> <li>• CRUD Indicator</li> </ul>
<i>Notation</i>	Catalogue
<i>Reference</i>	TOGAF-9: Chapter 35.10 “System/Data Matrix”.
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Data in the model is re-used or informed by what is defined in the Data Reference Model.</li> <li>2. The Application in the model is re-used or informed by what is defined in the Application Reference Model, in particular the functional components of the application.</li> <li>3. The model should include the interfaces to or sharing of data with external systems.</li> <li>4. The model should be used to prioritise solution development by observing the principle that applications that “Create” data should be developed and implemented before applications that “Read” data.</li> </ol>

#### *Example / Template*

### Order Processing System CRUD Diagram 2

	Customer	Customer Order	Customer Account	Customer Invoice	Vendor Invoice	Product
Maintain CustomerOrder	U		U		RU	
Terminate CustomerOrder	U		U		RU	
Receive CustomerOrder	R	C	CR			
Process CustomerOrder	CRU		RU			R
Fill CustomerOrder	RU		RU			RU
Invoice Customer	RU		RU	C		
Ship Customer Order			U		C	
Validate Vendor Invoice					R	
Pay Vendor Invoice					RU	
Maintain Inventory						CRUD

#### 4.4.4 Data Gap Report

<i>Purpose</i>	To inform stakeholders regarding the redundancies and deficiencies of data in an enterprise.
<i>Description</i>	A model that indicates the deficiencies and opportunities for improvement that is derived from a comparison between the Baseline Data Architecture models and the Target Data Architecture models.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Data scarcity / redundancy gap</li> <li>• Data availability gap (not available to the right systems or at required location)</li> <li>• Data integrity gap</li> </ul>
<i>Notation</i>	Text or Catalogue
<i>Reference</i>	TOGAF-9: Chapter 10.4 “Perform Gap Analysis”, 27 “Gap Analysis” and 36.2 “Architecture Definition Document”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Gap report is a comparative analysis between Target and Baseline Data Architecture by indicating what needs to change: i.e. what needs to be retained (keep), improved (modify), created (new) and eliminated (redundant or duplicated).</li> <li>2. A gap report can be done by means of one or more matrices (depending on the type of gaps that needs to be determined. For each matrix, the x-axis (columns) is the baseline elements and the y-axis (rows) is the target elements and the intersection is the change indicators (such as retain, modify, new or dispose).</li> <li>3. The data availability gap is informed by the Data-Application Model.</li> <li>4. The data integrity gap is informed by the Data Security Model.</li> </ol>

#### **Example / Template**

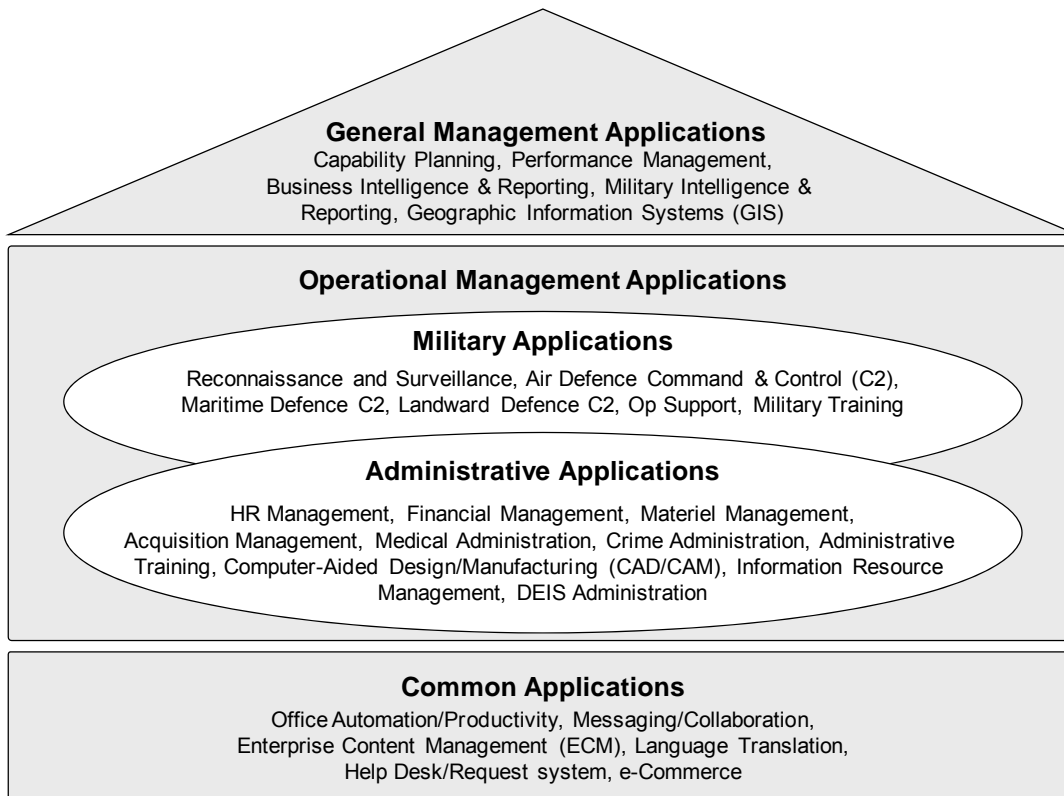
See “Business Gap Report”

## 4.5 APPLICATION ARCHITECTURE MODELS

### 4.5.1 Application Reference Model

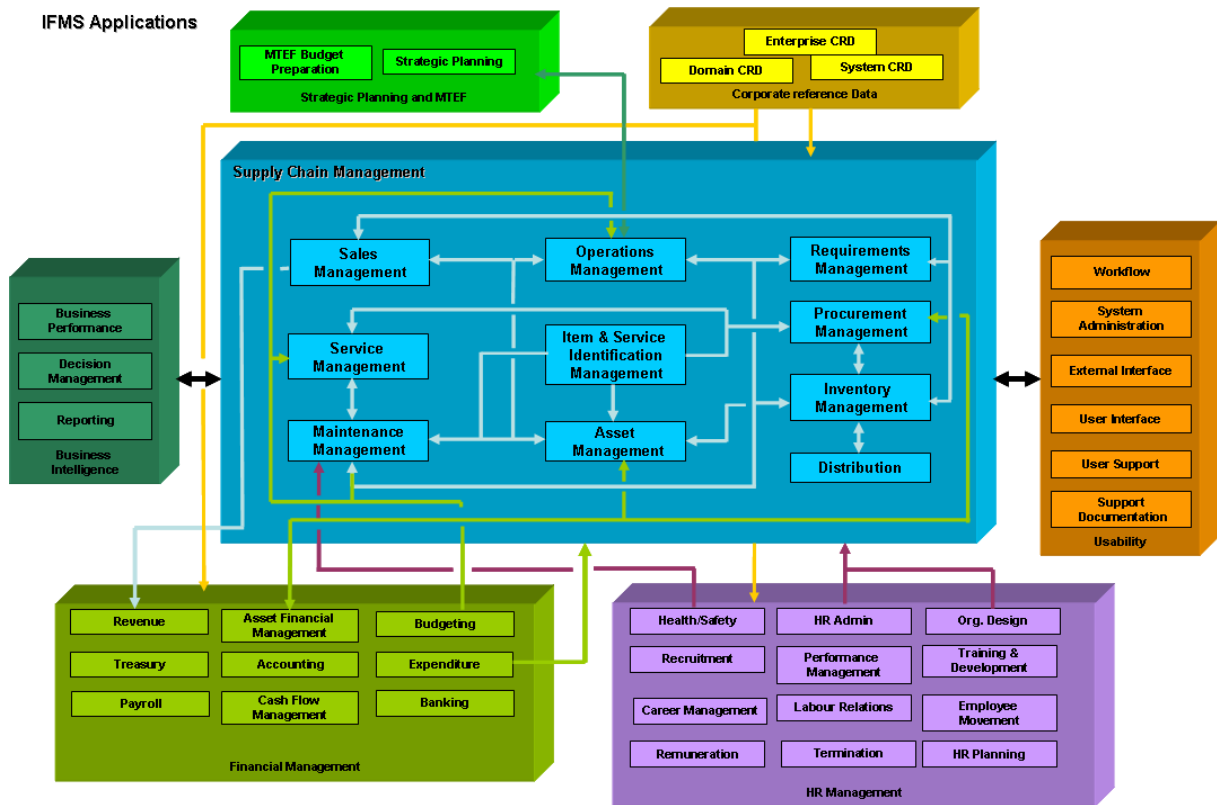
<i>Purpose</i>	To inform stakeholders regarding the major kinds of applications (software) that are needed to automate or enable the functions/services of a department.
<i>Description</i>	A model that defines a portfolio of applications and its service/function decomposition.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Application Class &amp; Definition</li> <li>• Function/Service (Application)</li> </ul>
<i>Notation</i>	Catalogue, Nested Box Diagram or UML Class
<i>Reference</i>	TOGAF-9: Chapter 35.11 “Application Portfolio Catalogue”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Application Reference Model (ARM) conforms to the Application Vision and Application Architecture Principles.</li> <li>2. The Application classes (i.e. the type of applications) in the ARM are derived from and/or informed by the Business Service/Function Model and should include both “support” and “core” type applications.</li> <li>3. The Functions/Services of an application is informed by the Business Process Model and relevant industry accepted good practice.</li> </ol>

#### Example / Template





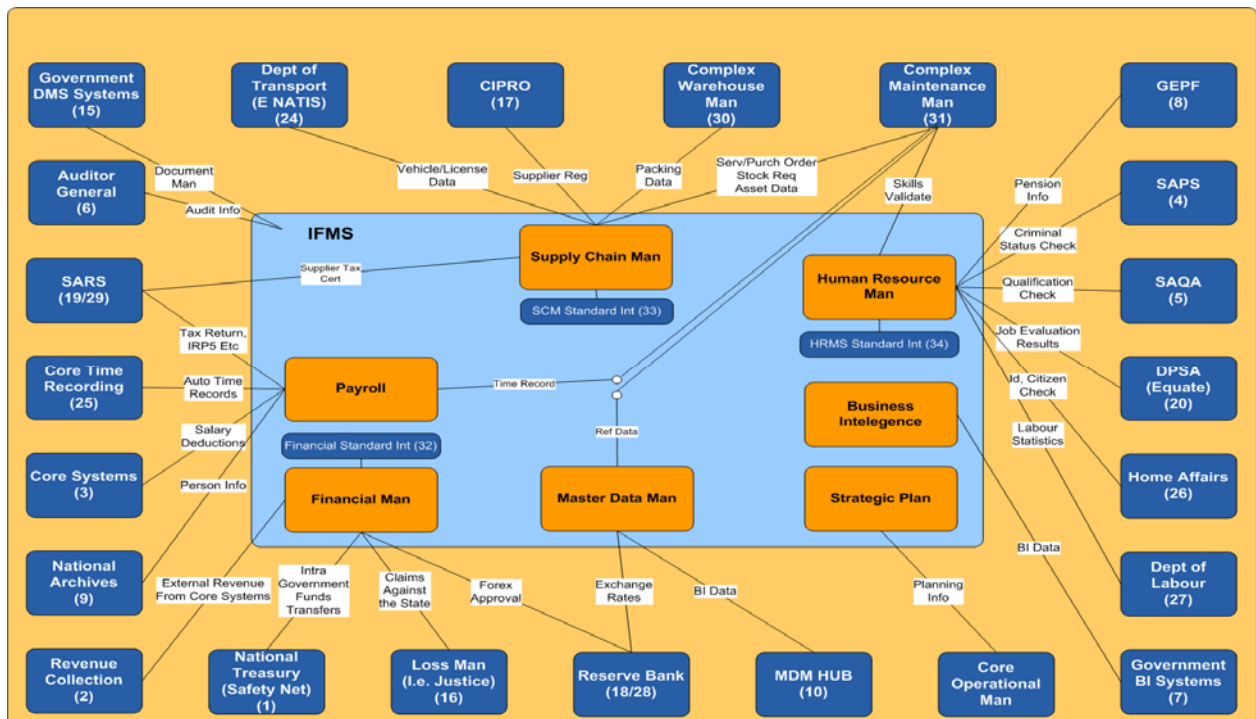
IFMS Applications



## 4.5.2 Application Distribution Model

<b>Purpose</b>	To inform stakeholders on how applications or application components are distributed across the footprint of the organisation and how they interface or integrate with each other and the environment.
<b>Description</b>	A model that defines the applications, their locations and the interfaces between applications.
<b>Content</b>	<ul style="list-style-type: none"> <li>• Application</li> <li>• Location</li> <li>• Interface</li> </ul>
<b>Notation</b>	Nested Box Diagram, or UML Package
<b>Reference</b>	TOGAF-9: Chapter 35.11 “Interface Catalogue”, “Application and User Location Diagram” and “Software Distribution Diagram”
<b>Guidelines</b>	<ol style="list-style-type: none"> <li>1. The model is coherent with Application Architecture Principles.</li> <li>2. The applications is re-used or informed by Application Reference Model.</li> <li>3. The locations are re-used or informed by Organisation Structure Model (Locations).</li> <li>4. The model must include interfaces within (intra) application components and to external systems (inter).</li> </ol>

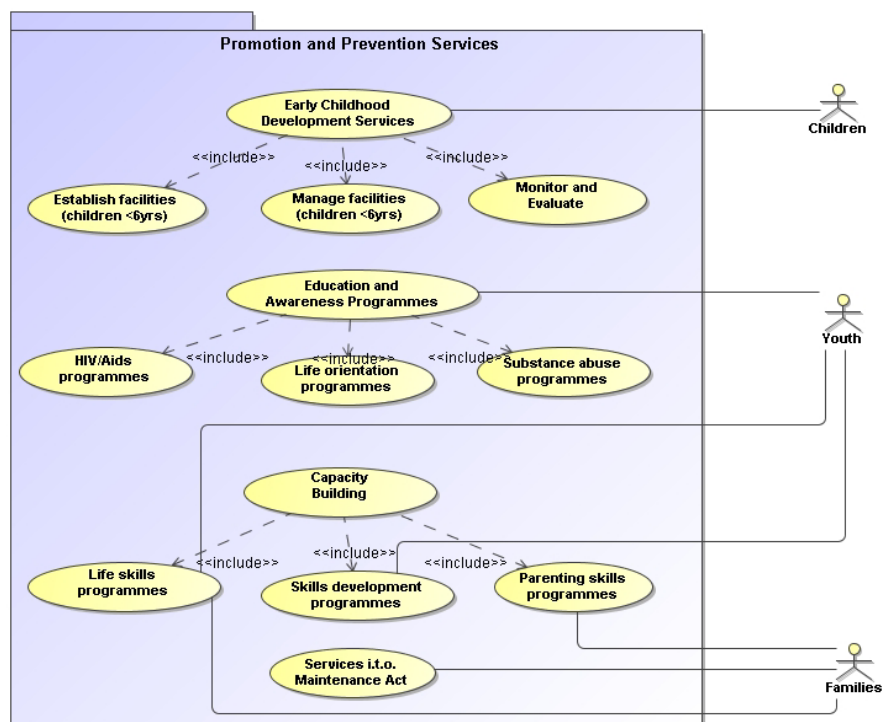
### Example / Template



### 4.5.3 Application Stakeholder Model

<b>Purpose</b>	To inform stakeholders of the different kind of people actors (internal and external) that will interact with the applications of the enterprise.
<b>Description</b>	A model that defines the interaction between applications and users.
<b>Content</b>	<ul style="list-style-type: none"> <li>• Application</li> <li>• Actor (user)</li> </ul>
<b>Notation</b>	Catalogue, or UML Use Case
<b>Reference</b>	TOGAF-9: Chapter 35.11 “Application Interaction Diagram” and “System Use Case Diagram”
<b>Guidelines</b>	<ol style="list-style-type: none"> <li>1. The model is coherent with Application Architecture Principles.</li> <li>2. Application is re-used or informed by the Application Reference Model</li> <li>3. Actors are re-used or informed by roles/functions as defined in the Organisation Structure Model.</li> </ol>

#### Example / Template



#### 4.5.4 Application Gap Report

<i>Purpose</i>	To inform stakeholders regarding the redundancies and deficiencies of applications in an enterprise.
<i>Description</i>	A model that indicates the deficiencies and opportunities for improvement that is derived from a comparison between the Baseline Architecture models and the Target Architecture models.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Application deficiency / redundancy gap</li> <li>• Application interface gap</li> <li>• Application distribution gap</li> </ul>
<i>Notation</i>	Text or Catalogue
<i>Reference</i>	TOGAF-9: Chapter 11.4 “Perform Gap Analysis, 27 “Gap Analysis” and 36.2 “Architecture Definition Document”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Gap report is a comparative analysis between Target and Baseline Application Architecture by indicating what needs to change: i.e. what needs to be retained (keep), improved (modify), created (new) and eliminated (redundant or duplicated).</li> <li>2. A gap report can be done by means of one or more matrices (depending on the type of gaps that needs to be determined. For each matrix, the x-axis (columns) is the baseline elements and the y-axis (rows) is the target elements and the intersection is the change indicators (such as retain, modify, new or dispose).</li> <li>3. The application interface gap as well as the application distribution gap is informed by Application Distribution Model.</li> </ol>

#### **Example / Template**

See “Business Gap Report”

## 4.6 TECHNOLOGY ARCHITECTURE MODELS

### 4.6.1 Technology Reference Model

<i>Purpose</i>	To inform stakeholders regarding the major kinds of technologies and standards that are needed as a common infrastructure to enable the integration, execution, distribution and management of Information management systems (data and applications) of an enterprise.
<i>Description</i>	A model that defines the major classes of technology components/services (infrastructure software, hardware, and network) and the interoperability standards associated thereto.
<i>Content</i>	<ul style="list-style-type: none"><li>• Technology Service Class &amp; Definition</li><li>• Interoperability Standards (in accordance with MIOS)</li></ul>
<i>Notation</i>	Catalogue, Nested Box Diagram or UML Class
<i>Reference</i>	TOGAF-9: Chapter 35.12 “Technology Standards Catalogue” and “Technology Portfolio Catalogue”]
<i>Guidelines</i>	<ol style="list-style-type: none"><li>1. TRM domains of a department should be coherent with GWEA Technology Reference Model (TRM).</li><li>2. The Technology components should conform to the Technology Architecture Principles.</li><li>3. Interoperability Standards inherent to the TRM must conform to the MIOS.</li></ol>

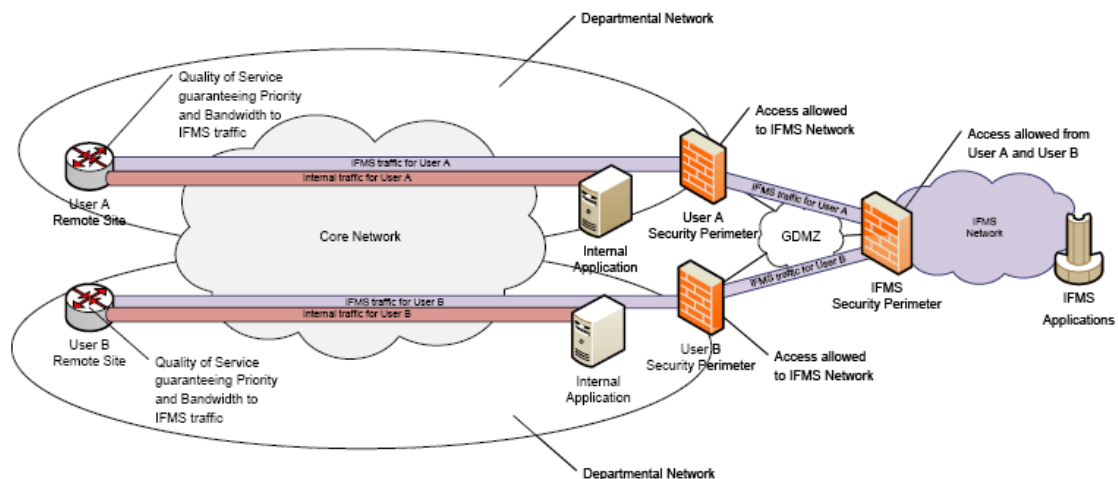
#### ***Example / Template***

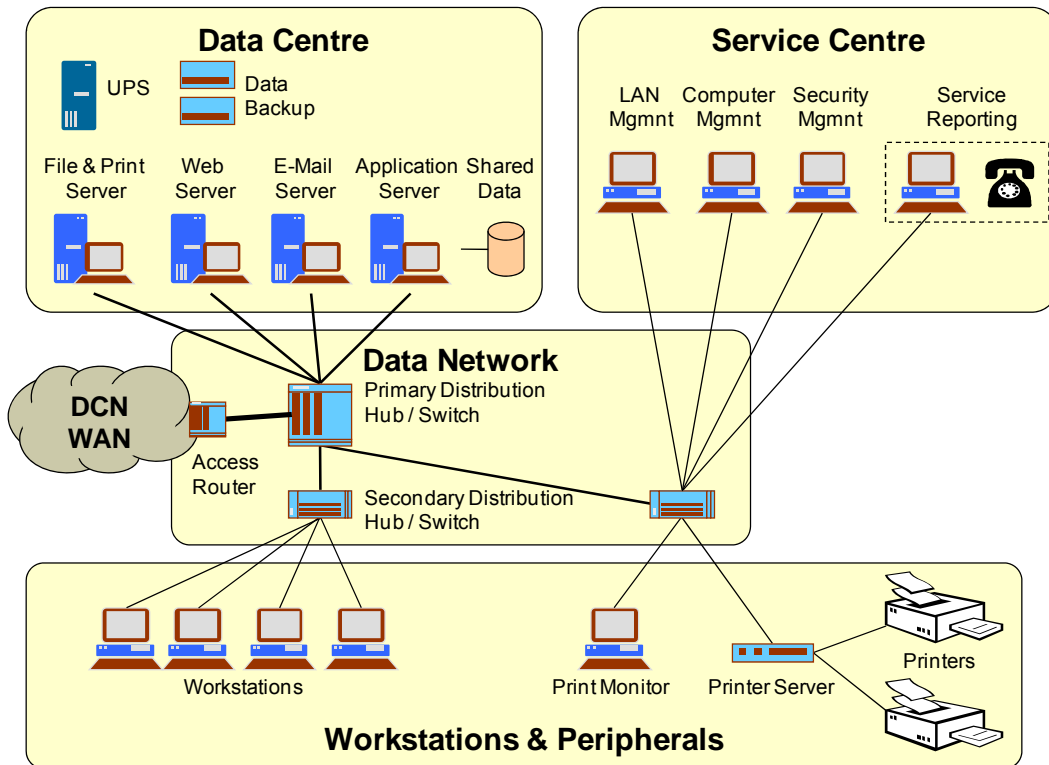
See Figure 4: GWEA: Technology Reference Model (TRM)

## 4.6.2 Technology Distribution Model

<b>Purpose</b>	To define the distribution of technology components for a distributed operating environment that will reduce duplication and optimise the re-use of shared infrastructure whilst providing optimal access channels to information intensive services to the intended users.
<b>Description</b>	A model that defines the technologies in different locations/environments
<b>Content</b>	<ul style="list-style-type: none"> <li>• Technology</li> <li>• Location</li> </ul>
<b>Notation</b>	Nested Box Diagram or Network Diagram
<b>Reference</b>	TOGAF-9: Chapter 35.12 “Environment and Location Diagram” and “Communication Engineering Diagram”
<b>Guidelines</b>	<ol style="list-style-type: none"> <li>1. The model should conform to Technology Architecture Principles (e.g. reduce duplication, sharing, security).</li> <li>2. The model is usually informed by industry good practice on deployment/distribution patterns for a particular type of system.</li> <li>3. The model should include distribution patterns or technology configurations for the Development, Hosting, Support and End-User Operating environments.</li> <li>4. The end-user environments should be aligned with service outlets of the organisation as defined in the Business Architecture Organisation Model (locations).</li> <li>5. The model must include interfaces and connectivity to external infrastructure where appropriate.</li> </ol>

### Example / Template

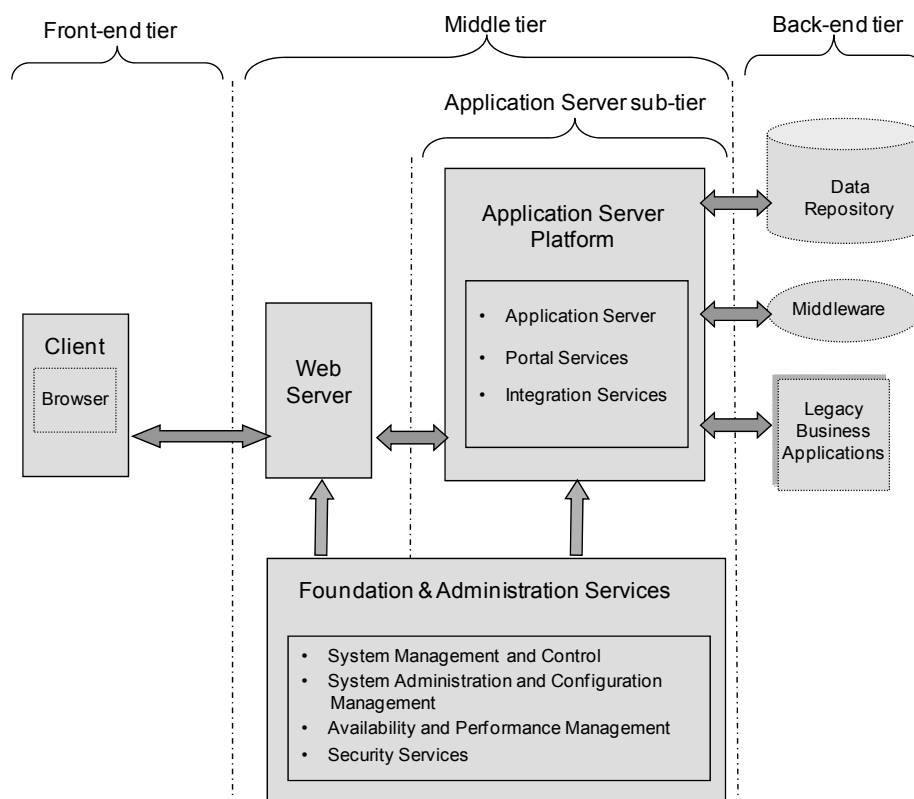




### 4.6.3 Technology Platform Model

<i>Purpose</i>	To inform stakeholders regarding the redundancies and deficiencies of technology in an enterprise.
<i>Description</i>	A model that defines the Technologies in relation to the different subsystems in a distributed computing or client-server configuration. (Note: Also known as the “technology stack” of a specific system).
<i>Content</i>	<ul style="list-style-type: none"> <li>• System (or subsystem)</li> <li>• Technology</li> </ul>
<i>Notation</i>	Nested Box Diagram or UML Package
<i>Reference</i>	TOGAF-9: Chapter 35.12 “Platform Decomposition Diagram”, “Processing Diagram” and “Networked Computing/Hardware Diagram”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The System components are informed by Application and Data Architecture.</li> <li>2. The model should indicate n-tier system integration patterns.</li> </ol>

#### Example / Template





#### 4.6.4 Technology Gap Report

<i>Purpose</i>	To inform stakeholders regarding the redundancies and deficiencies of technologies and interoperability standards in an enterprise.
<i>Description</i>	A model that indicates the deficiencies and opportunities for improvement that is derived from a comparison between the Baseline Architecture models and the Target Architecture models.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Technology Component gaps.</li> <li>• Technology Distribution gaps.</li> <li>• Technology Interoperability Standards gaps</li> </ul>
<i>Notation</i>	Text or Catalogue
<i>Reference</i>	TOGAF-9: Chapter 12.4 “Perform Gap Analysis”, 27 “Gap Analysis” and 36.2 “Architecture Definition Document”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Gap report is a comparative analysis between Target and Baseline Technology Architecture by indicating what needs to change: i.e. what needs to be retained (keep), improved (modify), created (new) and eliminated (redundant or duplicated).</li> <li>2. A gap report can be done by means of one or more matrices (depending on the type of gaps that needs to be determined. For each matrix, the x-axis (columns) is the baseline elements and the y-axis (rows) is the target elements and the intersection is the change indicators (such as retain, modify, new or dispose).</li> <li>3. The technology distribution gaps are informed by Technology Distribution Model.</li> </ol>

#### **Example / Template**

See “Business Gap Report”

## 4.7 OPPORTUNITIES & SOLUTIONS

### 4.7.1 Consolidated Architecture Roadmap & Transition Architecture

<i>Purpose</i>	To inform stakeholders regarding the major initiatives (or project) to be undertaken by the ICT function of and enterprise to address the deficiencies and redundancies as identified during the prior gap analysis.
<i>Description</i>	A consolidation of Business, Data, Application and Technology Architecture Roadmaps, which outlines a list of individual increments of change over a timeline to show progression from the Baseline Architecture to the Target Architecture.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Opportunity Portfolio (Consolidated gaps, solutions alternative assessment, dependency assessment, cost benefit assessment, capability increments, interoperability and co-existence requirements)</li> <li>• Work Packages for architecture implementation (scope, objectives, deliverables)</li> <li>• Milestone &amp; Transition Architecture (transition architecture components per milestone)</li> <li>• Implementation Factors (Risks, Issues, Assumptions, and Dependencies)</li> </ul>
<i>Notation</i>	Text or Catalogue
<i>Reference</i>	TOGAF-9: Chapter 28 “Migration Planning Techniques, 36.2.7 “Architecture Roadmap”, and 36.2.22 “Transition Architecture”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Roadmap should conform to the Enterprise Architecture principles. In particular, the development of the Opportunity Portfolio should observe the Architecture Principle to ensure optimal and equitable economic participation of the ICT industry.</li> <li>2. The roadmap itself is a consolidation of the Business, Data, Application and Technology Architecture Roadmaps and it satisfies the requirement as expressed in the Architecture Vision.</li> <li>3. The opportunity portfolio is informed by the various sourcing options: Buy, Build, Re-use, and dispose.</li> <li>4. In the case of buy options, the work packages should include the relevant procurement processes and product evaluation and solution alternatives case studies of products available in the marketplace; and for build, re-use and dispose options the work packages should include the relevant Software Development Life Cycle processes.</li> <li>5. The transition model includes temporal components and interfaces needed during the implementation phase. These temporal components are necessary to ensure a smooth transition from baseline to target, and are usually disposed of once the implementation is complete.</li> </ol>

#### **Example / Template**

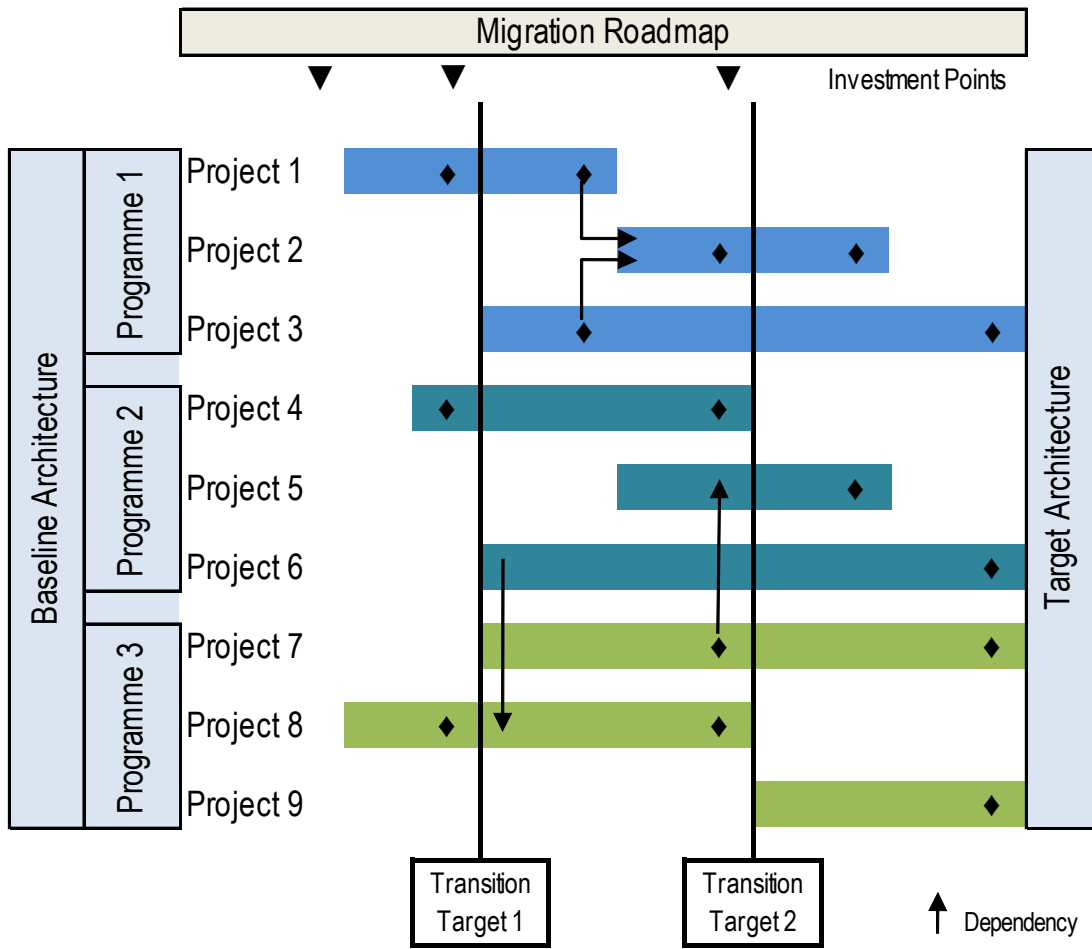
See “Implementation & Migration Plan”

## 4.8 MIGRATION PLANNING

### 4.8.1 Implementation and Migration Plan

<i>Purpose</i>	To inform the stakeholders of the optimal ways (methods) as well as the necessary resources and sequence by which to implement the projects as identified during the previous phase.
<i>Description</i>	The Implementation and Migration Plan defines a strategy and plan to implement the architecture.
<i>Content</i>	<ul style="list-style-type: none"> <li>• Implementation and Migration Strategy (Strategic implementation direction, Implementation sequencing approach)</li> <li>• Interactions with other management frameworks and standards (government business planning framework, project management framework, solution development framework, IT Service Management/Operations framework)</li> <li>• Project Charters and Plans (Project Scope, Outcome/Benefits, Objectives, Deliverables, Risks/Assumptions, Dependencies, Work Breakdown Structure, Milestone schedule, Resource schedule, Cost schedule, Time schedule)</li> </ul>
<i>Notation</i>	Text
<i>Reference</i>	TOGAF-9: Chapters 36.2.14 “Implementation and Migration Plan”
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. The Implementation and migration Strategy is informed by Consolidated Architecture Roadmap and is usually represented as the collection of interdependent projects needed to transform the enterprise from a baseline to target state (as illustrated below).</li> <li>2. The plan should include for each project, the funding requirements or the budget that has been secured in order for the project to commence as well as to proceed through each of the transition milestones.</li> <li>3. The plan informs Design &amp; Solution Development Phase, and should therefore include personnel and technology resources required to design, build, test and implement the identified projects.</li> <li>4. The plan also informs System Operation and Support phases and should include strategies for hosting, network, maintenance, support/service centre, and change management.</li> </ol>

#### ***Example / Template***



## 4.8.2 Implementation Governance Model

<i>Purpose</i>	To inform the stakeholders of the governing structures and processes required ensure (govern) that the implementation of projects are done in accordance with the architecture plans.
<i>Description</i>	A model that defines the governance process and controls, quality criteria and governance structures to ensure that the Architecture Implementation (i.e. System Development) activities adhere to the direction as determined by the Architecture Development phases (TOGAF phases B through F). (Note: System Development processes are defined by ISO/IEC 12207, Information Technology — Software Life Cycle Processes, and ISO/IEC 15288, Systems Engineering — System Life Cycle Processes.)
<i>Content</i>	<ul style="list-style-type: none"> <li>• Implementation Governance process/controls.</li> <li>• Implementation Governance organisation structure.</li> <li>• Implementation Governance roles and responsibilities.</li> <li>• Implementation Governance checkpoints and success/failure (quality) criteria.</li> </ul>
<i>Notation</i>	Text
<i>Reference</i>	<ol style="list-style-type: none"> <li>1. TOGAF-9: Chapters 36.2.14 “Implementation and Migration Plan”</li> <li>2. TOGAF-9: Chapter 47 “Architecture Board”</li> <li>3. TOGAF-9: Chapter 48 “Architecture Compliance”</li> </ol>
<i>Guidelines</i>	<ol style="list-style-type: none"> <li>1. Implementation Governance Model is informed by and aligned to Solution Development Management Framework and Project Management Framework.</li> <li>2. The architecture implementation governance structure usually takes the form of a committee (e.g. Architecture Review Committee or Design Authority) that is governed by a terms of reference or governing charter. The committee should be chaired by the leading architect of a particular department or programme and the committee responsibilities should include monitoring and ensuring that all solution technical designs, product functional and non-functional specifications, solution development, and integration conform to the Enterprise Architecture models.</li> <li>3. In order to promote cooperation, re-use and sharing among different departments, the chairman of an implementation governance structure should also be part of a national governing structure on enterprise architecture (i.e GITOC Standing Committee on Architecture).</li> </ol>

### **Example / Template**

*See References for typical roles and functions of the Architecture Board*

## 5 BIBLIOGRAPHY

1. Government Wide Enterprise Architecture (GWEA) Framework, Version 1.2 [GWEA-00006, SITA, Jun 2009]
2. The Open Group Architecture Framework Version 9 [TOGAF 9, The Open Group, USA, January 2009]
3. Architectural Principles for the [US] Federal Government, August 2007, [www.egov.gov](http://www.egov.gov)
4. Cross-Agency Services Architecture Principles, Department of Finance and Administration, Australian Government Information Management Office, April 2007
5. Architecture Principles, Integrated Finance Management System (IFMS) Architecture v2.0, Feb 2008.

## Annex A : ABBREVIATIONS AND DEFINITIONS

### A.1 ABBREVIATIONS

ADM	Architecture Development Method
BPMN	Business Process Modelling Notation
EA	Enterprise Architecture
GITO	Government Information Technology Officer
GITOC	Government Information Technology Officer Council
GWEA	Government Wide Enterprise Architecture
ICT	Information and Communication Technology
ISO	International Organisation for Standardisation
IDEFO	Integrated Definition for Function Modelling (Definition Zero)
MIOS	Minimum Interoperability Standards
SCARC	Standing Committee on Architecture
SITA	State Information Technology Agency
OMG	Object Management Group
TOGAF	The Open Group Architecture Framework
UML	Unified Modelling Language

### A.2 DEFINITIONS

(Note: Refer to TOGAF-9 Documentation for more comprehensive set of definitions)

<b>Term</b>	<b>Definition</b>
Activity	A task or collection of tasks that support the functions of an organization [TOGAF].
Actor	A person, organization, or system that has a role that initiates or interacts with activities or a system. [TOGAF]
Architecture	(1) The fundamental conception of a system in its environment embodied in its elements, their relationships to each other and to its environment, and the principles guiding its design and evolution. [ISO/IEC 42010:2008] (2) The formal description or blueprint of the fundamental conception of a system in its environment embodied in its elements, their relationships to each other and to its environment, and the principles guiding its design and evolution. [Adapted TOGAF and ISO/IEC 42010:2008]

Architecture Domain	An architecture focus area within the context of Enterprise Architecture that is concerned with the development of one of business, data, application or technology architecture [Adapted TOGAF]
Architecture Framework	A classification scheme that defines the principles, method and deliverables by which to develop architecture for different stakeholders within an organisation. [Adapted TOGAF]
Architecture Principle	A qualitative statement of intent that should be met by the architecture; and contains at least a supporting rationale and a measure of importance [TOGAF].
Application	The software product that enables one or more functions or services of an organisation. [Adapted TOGAF]
Application Architecture	The architecture of the application (or software) that are needed to process the data and enable one or more functions or services of an organisation. [TOGAF]
Baseline Architecture	The existing or as-is architecture that is used as a basis for transformation or change [Adapted TOGAF].
Business Architecture	The architecture of the business strategy, organization structure, functions/services, key business processes and information requirements, as well as the relationships between these concepts. [Adapted TOGAF]
Business Service	The output of a capability.
Capability	(1) An arrangement of business resources (means) that is able to produce a product or render a service, where resources usually include people, competencies, processes, information, information technology and machines. [Adapted TOGAF] (2) The inherent function(s) of computer hardware or software.
Deliverable	A work product (output) of a particular step in an architecture development method. [Adapted TOGAF]
Data	A collection of facts usually collected as the result of experience, observation or experiment, or processes within a computer system, or a set of premises. This may consist of numbers, words, or images, particularly as measurements or observations of a set of variables. Data are often viewed as a lowest level of abstraction from which information and knowledge are derived. [Wikipedia]
Data Architecture	The architecture of the data resource inherent to an information system. [Adapted TOGAF]



Enterprise	The highest level of description of an organization and typically covers all missions and functions. An enterprise will often span multiple organizations. [TOGAF]
Enterprise Architecture	The Business, Data, Application and Technology Architectures required to enable and support the Enterprise missions over time; including a baseline architecture, target architecture, and an implementation plan. [Derived TOGAF]
Information Technology (IT)	<p>(1) A general term use to refer to one or more of the subject areas relating to the computer industry, such as Business Continuity, Business IT Interface, Business Process Modelling and Management, Communication, Compliance and Legislation, Computers, Content Management, Hardware, Information Management, Internet, Networking, Programming and Software, Security, Standards, Storage, Voice and Data Communications. [Adapted TOGAF]</p> <p>(2) The name of the department within an organisation that are tasked with responsibilities to provide computer related or information management services to the organisation. [Adapted TOGAF]</p>
Function	<p>(1) Organisational: a specific task or set of activities that an organisation is designated to perform.</p> <p>(2) Computer science: the specific action or task that a piece of software is designed to perform. [Wikipedia]</p> <p>(3) Computer engineering: the specific action or task that a hardware system or subsystem is designed to perform. [Wikipedia]</p>
Interoperability	<p>(1) The ability to share information and services. [TOGAF]</p> <p>(2) The ability of two or more systems or components to exchange and use information. [TOGAF]</p>
Model	A representation of a subject of interest (view) that addresses the concerns (viewpoint) of a particular stakeholder. [Adapted TOGAF]
Organisation	A self-contained unit of resources with line management responsibility, goals, objectives, and measures. Organisations may include external parties and business partner organisations. [TOGAF]
Roadmap	An abstracted plan for business or technology change, typically operating across multiple disciplines over multiple years. Normally used in the phrases Technology Roadmap, Architecture Roadmap, etc. [TOGAF]
Target Architecture	The future state (to-be) architecture for an organisation or system. [Adapted TOGAF]

Technology Architecture	The architecture of the foundation software, hardware and telecommunications capabilities that are required to enable processing and deployment of business, data, and application services, which includes application processing infrastructure services, naming and directory services, middleware, database management infrastructure, telecommunication network infrastructure, computer hardware, storage and peripherals, security infrastructure, system management infrastructure and interoperability standards [adapted from TOGAF]
System	<p>(1) systems that are man-made and may be configured with one or more of the following: hardware, software, data, humans, processes (e.g. processes for providing service to users), procedures (e.g. operator instructions), facilities, materials and naturally occurring entities (e.g. water, organisms, minerals).” [ISO/IEC 15288];</p> <p>(2) software products and services [ISO/IEC 12207]; and</p> <p>(3) software-intensive systems “any system where software contributes essential influences to the design, construction, deployment, and evolution of the system as a whole” to encompass “individual applications, systems in the traditional sense, subsystems, systems of systems, product lines, product families, whole enterprises, and other aggregations of interest” [ISO/IEC 42010:2008,].</p>
TOGAF	The Open Group Architecture Framework. TOGAF is an architecture framework that defines the methods and tools for assisting in the acceptance, production, use, and maintenance of an enterprise architecture. It is based on an iterative process model supported by best practices and a re-usable set of existing architecture assets. [TOGAF]

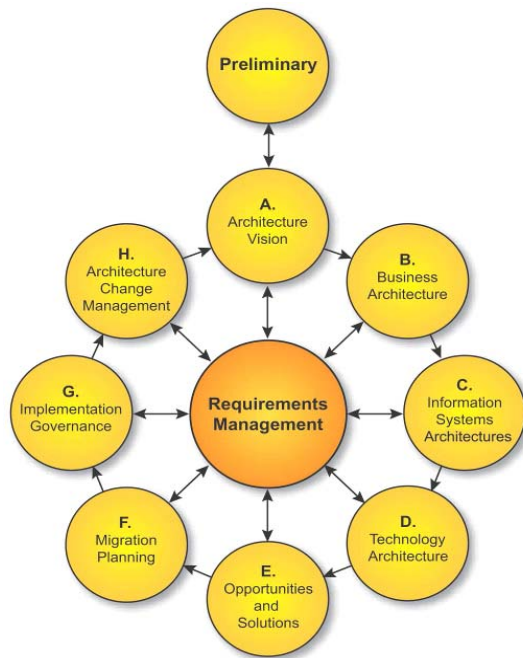
## Annex B : PARTICIPANTS

The development of the Government wide Enterprise Architecture Framework Implementation Guide was developed by the Chief Enterprise Architect (Government Wide Enterprise Architecture) under leadership of the Chairman of the GITOC Standing Committee on Architecture (SCARC), in collaboration and consultation with SCARC members.

No	Name	Representing Department / Agency
1.	Ms Vuyo Menye <i>Deputy Chair SCARC &amp; CIO</i>	Armcor (Pty) Ltd
2.	Mr Dextor Foba <i>Director: e-Government</i>	Communications PNC on ISAD
3.	Col Gert Barnard <i>Director (Acting): DEIS Management Division</i>	Defence & Military Veterans
4.	Mr Jan Opperman <i>Advanced Specialist: Technology Architecture</i>	Defence & Military Veterans
5.	Mr Henton Katz <i>Assistant Director: Defence Enterprise Information System Architecture</i>	Defence & Military Veterans
6.	Mr Terry Vandayar <i>CIO</i>	Government Communication & Information System
7.	Mr Anele Apleni <i>Enterprise Architect</i>	Home Affairs
8.	Mr Barry Myburgh	Home Affairs
9.	Mr Mashapa Machaba <i>Enterprise Architect</i>	Home Affairs
10.	Mr Daven Moodley	Justice & Constitutional Development
11.	Mr Cecil Spencer <i>Chief Director</i>	National Treasury
12.	Mr Samuel Khoza <i>Director: e-Government Integration</i>	Public Service & Administration
13.	Mr Zaid Aboobaker <i>Chief Director: e-Government Architecture</i>	Public Service & Administration
14.	Ms Ronel Brandt	Statistics South Africa
15.	Mr Maropeng Nakana <i>Enterprise Architect</i>	Social Development
16.	Mr Gerrit Botha <i>Enterprise Architect</i>	South African Police Service
17.	Col Ricky van Onselen	South African Police Service
18.	<b>Mr Bulelani Dediza</b> <i>Chairman SCARC &amp; CIO</i>	<b>Transport</b>
19.	<b>Mr Willie Needham</b> <i>Chief Enterprise Architect (GWEA)</i>	<b>State IT Agency (SITA)</b>
20.	Ms Khomotjo Moloisi <i>Enterprise Architect</i>	State IT Agency (SITA)

## Annex C : EA DEVELOPMENT PROCESS

The process and method by which to develop an Enterprise Architecture Plan is defined and described in The Open Group Architecture Framework: Architecture Development Method Version 9 (TOGAF ADM), available at [www.opengroup.org](http://www.opengroup.org), as illustrated below.



Cycle	Phase	Goal
Architecture Contextualisation	Preliminary (P)	To prepare the organization for successful enterprise architecture projects. Undertake the preparation and initiation activities required to meet the business directive for a new enterprise architecture, including the definition of an Organization-Specific architecture framework and tools.
	Phase A: Architecture Vision	To set the scope, constraints, and expectations for an enterprise architecture project; create the Architecture Vision; define stakeholders; validate the business context and create the Statement of Architecture Work; obtain approvals and definition of architecture principles
Architecture Model Development	Phase B: Business Architecture	To develop the Business Baseline ("As-Is") and Target ("To-Be") Architectures and perform a gap analysis.
	Phase C: Information Systems Architectures	To develop the Data and Application Baseline ("As-Is") and Target ("To-Be") Architectures and perform a gap analysis.
	Phase D: Technology Architecture	To develop the Technology Baseline ("As-Is") and Target ("To-Be") and perform a gap analysis.
Architecture Transition Planning	Phase E: Opportunities & Solutions	To perform initial implementation planning and the identification of delivery vehicles for the building blocks identified in the previous phases; identify major implementation projects and group them into Transition Architectures.
	Phase F: Migration Planning	Analyze cost benefits and risk; develop detailed Implementation and Migration plan.
Implementation Governance	Phase G: Implementation Governance	Provide architectural oversight for the implementation. Prepare and issue Architecture Contracts (Implementation Governance Board); ensure that the implementation project conforms to the architecture.
	Phase H: Architecture Change Management	Provide continual monitoring and a change management process to ensure that the architecture responds to the needs of the enterprise, and maximizes the business value.

**Note:** Architecture Development is initiated by the "Preliminary (P)" phase and concludes with "Phase F: Migration Planning". Phases G and H focus on the implementation of Architectures and are therefore not parts of the Architecture Development process.

# Annex D : GWEA AND MSP CORRELATION

Ref	Deliverables	MSP	GWEA																
			Initiation	MSP Project Initiation	Business Articulation	Business Strategy	Business Architecture	Current IMST Assessment	IMST Inventory (IGIS)	Skills Gap Analysis (SCA)	Application Metadata Extraction (AME)	Current IMST Assessment Report	Business / IMST Alignment	IMST Strategy	IM/IT Organisation	Conceptual Architectures	Strategic IMST Plan	IMST Strategy Plan	Strategic IMST Management
			Ma B3.1	Ma B3.2	Ma B3.3	Ma B3.4	Ma B3.6	Ma B3.5	Ma B3.7	Ma B3.8	Ma B3.9	Ma B3.10	Ma B3.11	Ma B3.12					
<b>P</b>	<b>Preliminary</b>																		
P1	Organisation Model for Enterprise Architecture.		□																
P2	Tailored Architecture Framework	○																	
P3	Request for Architecture Work		■																
<b>A</b>	<b>Vision</b>																		
A1	Architecture Statement of Work (SOW)		■																
A2	Architecture Principles																		
A3	Architecture Vision																		
A4	Communications Plan	○																	
<b>B</b>	<b>Business Architecture</b>																		
<b>B1</b>	<b>Business Architecture Baseline</b>																		
B1.1	Business Performance Model (Baseline)			■															
B1.2	Organisation Structure Model (Baseline)				■														
B1.3	Business Function/Service Model (Baseline)	○																	
B1.4	Business Information Model (Baseline)				□														
B1.5	Business Process Flow Model (Baseline)				□														
<b>B2</b>	<b>Business Architecture Target</b>																		
B2.1	Business Performance Model (Target)			■															
B2.2	Organisation Structure Model (Target)				□														
B2.3	Business Function/Service Model (Target)	○																	
B2.4	Business Information Model (Target)				■														
B2.5	Business Process Flow Model (Target)				□														
<b>B3&amp;4</b>	<b>Business Gap &amp; Roadmap</b>																		
B3	Business Gap Report																		
B4	Business Architecture Roadmap																		
<b>C.1</b>	<b>Data Architecture</b>																		
<b>C1.1</b>	<b>Data Architecture Baseline</b>																		
C1.1.1	Data Reference model (Baseline)																		
C1.1.2	Data Security model (Baseline)	○																	
C1.1.3	Data-Application model (Baseline)																		
<b>C1.2</b>	<b>Data Architecture Target</b>																		
C1.2.1	Data Reference model (Target)																		
C1.2.2	Data Security model (Target)	○																	
C1.2.3	Data-Application model (Target)																		
<b>C1.3&amp;4</b>	<b>Data Architecture Gap &amp; Roadmap</b>																		
C1.3	Data Gap Report																		
C1.4	Data Architecture Roadmap																		
<b>C2</b>	<b>Application Architecture</b>																		
<b>C2.1</b>	<b>Application Architecture Baseline</b>																		
C2.1.1	Application/Service Reference Model (Baseline)																		
C2.1.2	Application Distribution Model (Baseline)																		
C2.1.3	Application Stakeholder Model (Baseline)	○																	
<b>C2.2</b>	<b>Application Architecture Target</b>																		
C2.2.1	Application/Service Reference Model (Target)																		
C2.2.2	Application Distribution Model (Target)																		
C2.2.3	Application Stakeholder Model (Target)																		
<b>C2.3&amp;4</b>	<b>Application Architecture Gap &amp; Roadmap</b>																		
C2.3	Application Gap Report																		
C2.4	Application Architecture Roadmap																		
<b>D</b>	<b>Technology Architecture</b>																		
<b>D1</b>	<b>Technology Architecture Baseline</b>																		
D1.1	Technology Reference Model (TRM) (Baseline)																		
D1.2	Technology Distribution Model (Baseline)																		
D1.3	Technology Platform Model (Baseline)	○																	
<b>D2</b>	<b>Technology Architecture Target</b>																		
D2.1	Technology Reference Model (Target)																		
D2.2	Technology Distribution Model (Target)																		
D2.3	Technology Platform Model (Target)																		
<b>D2</b>	<b>Technology Architecture Gap &amp; Roadmap</b>																		
D3	Technology Gap Report																		
D4	Technology Architecture Roadmap																		
<b>E</b>	<b>Opportunities &amp; Solutions</b>																		
E1	Architecture Roadmap & Transition Architecture																		
<b>F</b>	<b>Migration Planning</b>																		
F1	Implementation and Migration Plan																		
F2	Implementation Governance Model																		

Key: ■ Strong correlation  
□ Some correlation (product in GWEA contains more attributes than in MSP)  
○ No Correlation

## Annex E : DEPARTMENTAL CLUSTERS

DEPARTMENTS	CLUSTERS						
	Infrastructure development	Economic sectors and employment	Human development	Social protection and community development	International cooperation, trade and security	Governance and administration	Justice, crime prevention and security
1 Agriculture, Forestry & Fisheries		X					
2 Arts & Culture			X				
3 Basic Education			C				
4 Communications	X	X					
5 Cooperative Governance & Traditional Affairs	X			X		X	
6 Correctional Services							X
7 Defence & Military Veterans					C		X
8 Economic Development	X	X					
9 Energy	X						
10 Health			D				
11 Higher Education & Training		X	X				
12 Home Affairs						C	X
13 Human Settlements	X			X			
14 International Relations & Cooperation					D		
15 Justice & Constitutional Development						x	C
16 Labour		X	X	X			
17 Mineral Resources		X					
18 National Treasury	X	X			X	X	
19 Police							D
20 Public Enterprises	D	X					
21 Public Service & Administration						D	
22 Public Works	X			D			
23 Rural Development & Land Reform		C		X			
24 Science & Technology		D	X				
25 Social Development				C			
26 State Security					X		X
27 Sport & Recreation South Africa			X				
28 Tourism		X			X		
29 Trade & Industry		X			X		
30 Transport	C			X			
31 Water and Environmental Affairs	X			X	X		
32 Women, Children & People with Disabilities				X			
33 The Presidency: National Planning Commission	X						
34 The Presidency: Monitoring & Evaluation						X	

C = Chair, D = Deputy Chair, X = Member