

Government of Rwanda  
Enterprise Architecture  
Standards



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## 1 Introduction

The Government of Rwanda under the leadership of Rwanda Information Society Authority (RISA) is documenting end-to-end Enterprise Architecture (EA) models for all public entities. This initiative is being undertaken with the goal of presenting a common view of the Business and Technology landscape across all entities. This view will in the long run provide enough information to government entities to help with making investment decisions.

## 2 RISA ROLE

The role of the RISA EA team is to provide guidance to the government entities on this initiative (Refer to *Government of Rwanda Enterprise Architecture Governance.docx*). In this regard, therefore, the RISA EA team defines the Enterprise Architecture framework that will guide the documentation of architecture artefacts across all entities, provide template for completion of defined deliverables such as IT Blueprints and Reference models for documenting the artefacts per architecture domain.

It is expected that each public entity will document their own enterprise architecture based on the provided enterprise architecture standards, framework and set deliverables.

To assist the entities in developing these blueprints, a number of assets are available to guide the teams. Listed below are some of the assets:

- *Government of Rwanda Enterprise Architecture Governance.docx* – This document outlines the governance structure around enterprise architecture within government of Rwanda.
- *Government of Rwanda Enterprise Architecture Framework.docx* – This outlines the boundaries, approach and notation that is used to model the enterprise architecture within Rwandan public entities
- *Government of Rwanda Enterprise Architecture Principles.docx* – This defines the guiding principles for enterprise architecture that should be applied across all public entities
- *Government of Rwanda Enterprise Architecture Standards.docx* – This document defines the standards that should be adhered to in documenting enterprise architecture artefacts
- *Application Portfolio Management Template* – Outlines the attributes that should be captured with regards to documentation of application architecture

- *End to End Enterprise Architecture Data Capturing Template* – Outlines cross domain attributes that should be captured for documenting enterprise architecture for public entities
- *Blueprint development Guideline for Government of Rwanda.ppt* – the step-by-step guide on how to develop architecture blueprints using the set standards

## 3 Purpose of the document

The purpose of this document is to provide some guidelines on the Enterprise Architecture standards.

The rationale behind setting the standards is to ensure that models that are produced by each entity are easily understood across all government institutions.

### 3.1 Enterprise Architecture within Government of Rwanda

Enterprise architecture is not widely applied within the government of Rwanda. The government has, however, recognised the need to not only introduce the practice across all entities, but also ensure its application with the end goal of bringing alignment and integration across all entities.

To achieve this, the government through Rwanda Information Society Authority (RISA) has procured *Sparx Enterprise Architect* as a CASE tool for documenting architecture artefacts across all government entities. The rationale behind the use of a CASE tool such as *Sparx Enterprise Architect* is to make use of its shared objective repository that does not only allow for concurrent users to share the objects but also removes the risk of creating redundancies. In addition, the features in Sparx Enterprise Architect allow for impact assessment before changes are made in an environment.

### 3.2 Enterprise Architecture Standards

The standards that apply for enterprise architecture apply for different areas. These include:

1. Naming convention – there needs to be an agreed upon naming convention of artefacts to facilitate re-use of objects.
2. Tools for developing deliverables – to ensure effective collaboration across entities, there needs to be a standard use of tools which will enable sharing and re-use of models
3. Definition of attributes – an understanding of each object that is created in the repository needs to be the same across all entities. This is enforced through adherence of the set of attributes that should be captured for each entity.

### 3.2.1 Naming Convention Standards

There are more added advantages to be gained from the use powerful features within a tool such as *Sparx Enterprise Architect*. However, these powerful features need to be enhanced with the implementation of set standards that will ensure seamless alignment of artefacts as well as enabling re-use.

Needless to say, an object or artefact is only available for re-use once it has been created within the tool. However, the challenge with CASE tools is that the repository does not have the in-built intelligence to create the relationship between different objects with similar names. In this case therefore, the naming convention is important because the repository is case sensitive. For example, these objects are different.



Figure 1 : Naming of entities is case sensitive

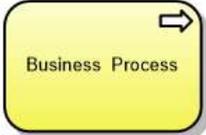
Although the entities above have the same name, the spelling itself gives the entity its own unique identity. *Sparx Enterprise Architect* will identify ‘Customer’ with a capital “C” as a separate entity from ‘customer’ (the name written in lower case) and ‘CUSTOMER’ (written in upper case) etc.

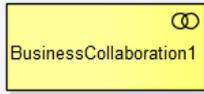
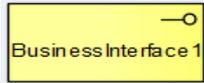
To enable reuse of the objects, it is therefore imperative that specific standards be adhered to when creating artefacts / entities to ensure that they are available for reuse.

The following naming conversion is therefore recommended.

For each name, only the first letter of each word should be in capital letters e.g. **C**ustomer, **M**anager, **H**uman **R**esource **M**anagement, **F**inancial **O**fficer, **C**ustomer **A**cceptance **F**orm

Tabulated below is the proposed naming conversion for entities, processes etc.

Artifact	Symbol type	Name (example)
Entity / Actor		Customer, Manager, Finance Department, Minister of Justice / Justice Minister, Patient, Citizen etc
Business Process		Change Request, Approve Requisition, Refer for Approval

Business Function		Human Resources Management, Financial Management, Operations Management etc.
Business Event		Customer Applies for ID, Citizen Applies for ID, Customer Requests Service
Business Service		Issue ID, Process Visa Application, Process Order
Connection		Uses, Requires, Yes , No, Approved, Rejected
Business Collaboration		
Business Interface		

The above describes objects have a relationship with each other. None of them exists in isolation. Their relationship to each other is depicted in a Meta Model that has been defined for government of Rwanda. Depicted below is a simplified Meta Model highlighting the alignment and relationship between the objects.



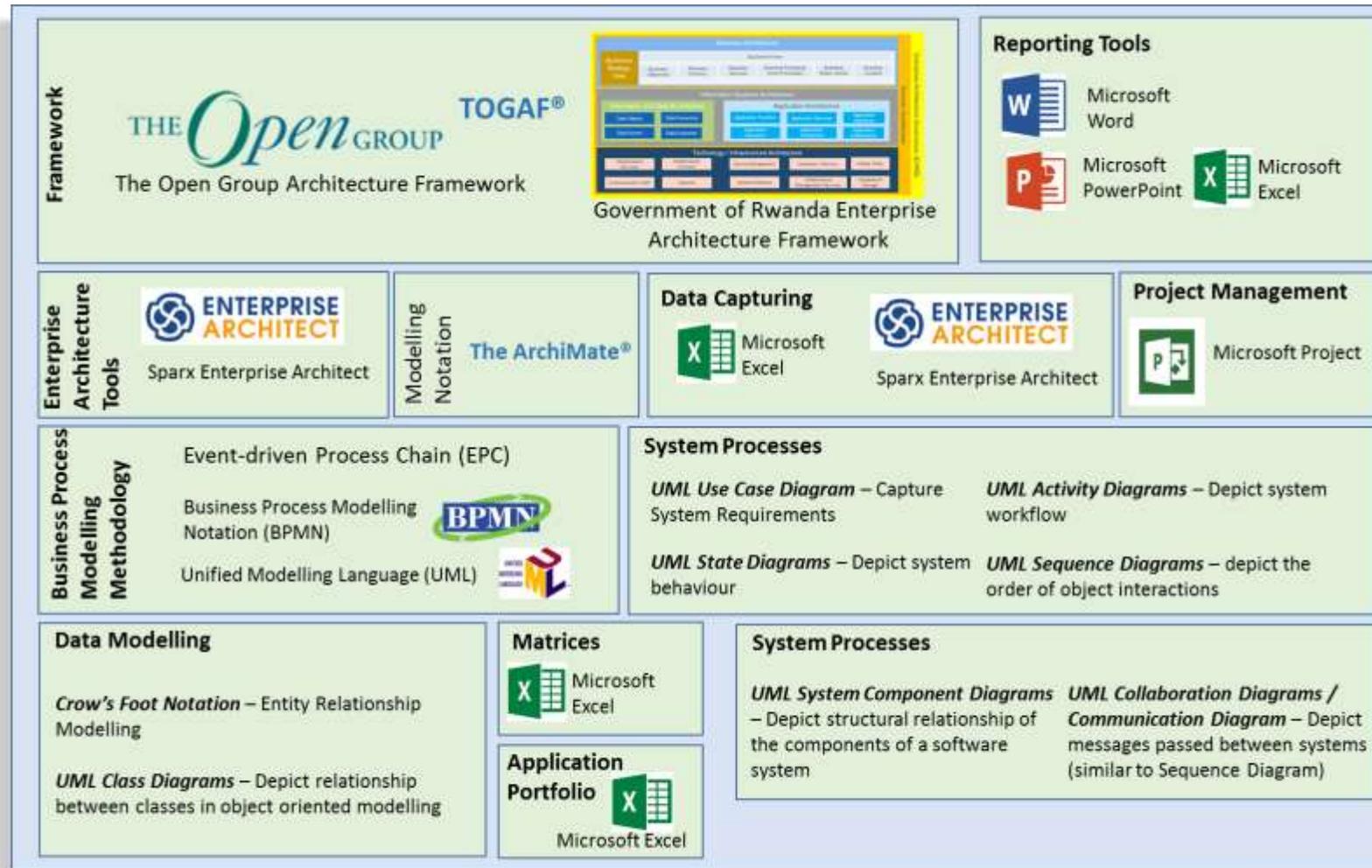


Figure 3: Government of Rwanda Enterprise Architecture Standards

Asset	Standard	Comment	Rationale
<b>Framework</b>	TOGAF	The Government of Rwanda has selected The Open Group Architecture Framework (TOGAF) for enterprise architecture implementation. The reasoning behind selection of TOGAF is because of its completeness in covering end-to-end enterprise architecture.	Completeness of the framework provides a lot of guidance on how to architect an enterprise
	Government of Rwanda Enterprise Architecture Framework	TOGAF has been modified to suit the specific needs of government of Rwanda. This has resulted in the development of the Government of Rwanda Enterprise Architecture Framework	Modified to suit the needs of government of Rwanda
<b>Enterprise Architecture Tool</b>	Sparx Enterprise Architect	The tool utilizes a shared object repository which allows for re-use of object across different models.	Multiple concurrent users can access the repository and re-use objects
<b>Modelling Notation</b>	ArchiMate	The Notation makes it easier to design and read models	It is aligned to TOGAF
<b>Business Process Modelling Methodology</b>	Event-driven Process Chain (EPC)	Powerful and yet easy to read models developed using this methodology	Widely used modelling methodology
	Business Process Modelling Notation (BPMN)	Used in conjunction with the EPC model, makes business process modelling very easy to understand with the use of swimlanes	Widely used modelling methodology
	Unified Modelling Language (UML)	UML State Diagrams – used to model system processes UML Class Diagrams – used to model data objects, tables. Generates schemas for tables in a databases	Widely used modelling methodology

Asset	Standard	Comment	Rationale
<b>Data Modeling Notation</b>	Crow's Foot Notation	Data modelling notation that makes entity relationship diagrams easy to read	Widely used modelling methodology
<b>Data Capturing</b>	Microsoft Excel	Ease of use	Extensible
	Sparx Enterprise Architect	The tool utilizes a shared object repository which allows for re-use of object across different models.	Multiple concurrent users can access the repository and re-use objects
<b>Project Management</b>	Microsoft Project	Ease of use, all entities already have licences and therefore facilitates sharing and understanding of project plans	
<b>Reporting Tools</b>	Microsoft Word		
	Microsoft Excel	Ease of use, all entities already have licences and therefore facilitates sharing and understanding of documentation	
	Microsoft PowerPoint		
<b>Application Portfolio Management</b>	Microsoft Excel		
	Sparx Enterprise Architect	The tool utilizes a shared object repository which allows for re-use of object across different models.	Multiple concurrent users can access the repository and re-use objects
<b>Matrices</b>	Microsoft Excel	Ease of use	

### 3.2.3 Attributes for models

#### 3.2.3.1 Application Modelling

Application Architecture modelling seeks to present a pictorial view of the application landscape within a given organization. At the core of Application Architecture is the interdependency and relationship between disparate system.

The goal of application architecture is to enable informed decision making. In this regard, therefore, the attributes that are recorded for application architecture are crucial. They must cover a wide are and present information from different perspectives.

The captured information and attributes about any application must include – but not limited to – the following:

Attributes	Symbol	Example
Application Name	N/A	Water Information System (WIS)
Description	N/A	Used for capturing the volumes of water that are drawn from a dam per day and the areas where it is distributed, the impacted population...
Vendor Developer	N/A	N* Technologies
Development Language	N/A	Java
Release / Version Number	N/A	5.0.1.1
Business User	N/A	Finance, Facilities
Business Unit Owner	N/A	Finance
Purpose / Usage	N/A	HQs
Installed Locations	N/A	HQs
Age of application	N/A	3
EOL Target Date	N/A	2019
Application Integration	N/A	Y
Source Code Owner	N/A	Proprietary

Supported by	N/A	N* Technologies
Annual Maintenance Contract	N/A	\$800,000.00
Contract Renewal Date	N/A	21 Sept 2019
Application Environment	Development N/A	UAT, Production
Server/Hardware	N/A	SUN Solaris UNIX, Microsoft
Server OS	N/A	Sequel Server 2003
Client UI Platform	N/A	Windows
Database Type	N/A	Sql Server 2005
Database Size (in GB)	N/A	25
Comment	N/A	Web Content Management System. Release 1 scheduled for 2018/02/28. Hosted on 3rd party web server because in-house PHP / CMS support is not available

**NOTE:** Distinction should be made between Application and Software Architecture. Application Architecture looks at the relationship between different applications and their modules while Software architecture concentrates on the make-up of a specific application.

The deliverables from Application Architecture exercise include the following:

### 3.2.3.2 Business Process Modelling

Business processes describe the activities that an entity undertakes in delivering a service to customers. Within the public sector, the customer will include a citizen, patient (at a hospital or clinic), another government institution (e.g. a Ministry would have local government offices and agencies as some of its customers), private entities etc.

The process that the public entity executes in the delivery of service must be clearly defined. Tabulated below are some of the attributes that should be captured for each process.

Attributes	Symbol	Example
Process Name	N/A	Register Voter
Description	N/A	A citizen who is eligible to vote needs to trigger the process. They must apply for registration through completion of the voter registration form, present a form of identification and residential details....
Comment	N/A	This process applies to both new voters and ones who have relocated from their previous residential areas. A new voter will be a citizen who has attain the legal age to vote or an individual who has qualified for citizenship and is eligible to vote