

MINIMUM INTEROPERABILITY STANDARDS (MIOS) FRAMEWORK

For Government Information Systems

Revision 6.00

March 2017

APPROVAL

I, the undersigned,

- In terms of the Public Service Act, 1994 (Proclamation 103 of 1994) sections 3(1)(f) and 3(1)(g) regarding electronic government norms and standards and the Public Service Regulations, 2016 Chapter 6, regulation 97, and the State Information Technology Agency Act, 1988 (Act 88 of 1998) sections 7(6)(a)(i) and 7(6)(b) and the State Information Agency General Regulations, 2005 (R. 50 of 2005), Part 2, regulation 4.2 and 4.3 regarding interoperability standards and certification, hereby approve and issue the Minimum Interoperability Standard (MIOS) for Government Information Systems version 6.0 set by the State Information Technology Agency (Pty) Ltd ("SITA") after consultation by SITA with departments and the Government Information Technology Officer Council (GITO Council);
- The MIOS v6.0 supersedes and replaces all previous versions thereof, and are effective and must be complied with in terms of Public Service Regulations Chapter 6, regulation 97 from the date of signature; and

Pate

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PUBLICATION ENQUIRIES

The Minimum Interoperability Standards (MIOS) for Government Information Systems is developed by the State Information Technology Agency (SITA): Norms Standards and Quality Department in consultation with GITOC and SC-AGC participating members.

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1 OVERVIEW

1.1 INTRODUCTION

(1) The South African Government, as represented by its National, Provincial and Local spheres and associated agencies, is committed to the continuous improvement of public service delivery. Such commitment has become an underlying theme across all departments' strategic and annual performance plans. Following on this commitment government Information and Communication Technology leaders have embarked on an e-Government programme in 2001, which aspires to achieve the effective, efficient and economic management and utilisation of Information and Information and Communication Technology Resources in government as illustrated in the Government Information and Communication Technology (ICT) House of Value).

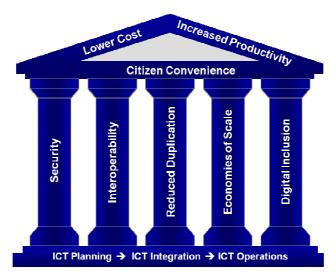


Figure 1: Government ICT House of Value

- (2) The Information and Communication Technology House of Value serves as a reference to measure the performance of e-Government projects and systems, which includes interoperability¹. The strategic drive to advance the maturity on interoperability not only compels government Information and Communication Technology leaders to collaborate on e-Government initiatives by sharing scarce resources, but it also provides a way for information to be exchanged electronically across traditional government system boundaries in order to improve public service delivery.
- (3) The Information and Communication Technology House of value, comprises a roof, pillars and foundation, each representing the following:
 - (a) The **outcomes** (roof) of the e-Government programme on public sector operations are to:

¹ Interoperability (between information systems) means the ability of two or more information systems or technology components to interconnect and exchange data.

- (i) **Lower cost** of government service delivery operations, by reducing time, complexity, repetition and duplication of tasks.
- (ii) **Increased productivity** of government operations, by improving the quality and quantity of traditional public sector outputs or introduce new processes to produce outputs and render services that were previously impossible.
- (iii) **Citizen Convenience** when interacting with government, by offering equal access to government information systems and services, provides more and better information, improves information service quality and privacy, provides remedies for failures and offers best value for money².
- (b) The **value** (pillars) that the e-Government programme contributes to the public sector ICT environment is:
 - (i) **Security,** by ensuring that information systems and related technologies operate in a maintained security environment.
 - (ii) **Interoperability,** by ensuring that information systems and Information and Communication Technology infrastructure of government can interconnect and exchange information.
 - (iii) **Reduced duplication,** by eliminating unnecessary duplications, by promoting sharing and consolidation of Information systems and Information and Communication Technology infrastructure across government.
 - (iv) **Economies of scale,** by leveraging collective purchasing power of government to lower unit prices from industry.
 - (v) **Digital inclusion,** by promoting the South African ICT industry, with a particular emphasis on Broad Based Black Economic Empowerment (BBBEE), labour absorption, and stimulation of equitable economic growth and skills development of Information and Communication Technology in South Africa.
- (c) The **capabilities** (foundation) by which to achieve the outcomes and values of e-Government are:
 - (i) **ICT planning,** the capabilities that set direction and standards for Information and Communication Technology, Enterprise Architecture and to validate/certify conformance and performance thereto.
 - (ii) **ICT integration,** the capabilities that provide and develop Information and Communication Technology Systems and Technology Infrastructure into integrated Information and Communication Technology solutions.
 - (iii) **ICT operations**, the capabilities to ensure that Information and Communication Technology Systems and Technology Infrastructure are maintained in a reliable, available and secure environment.
- (4) The advancement of interoperability in Government is an ongoing process and should be managed as a long-term, dynamic and agile programme. It is therefore incumbent upon the members of the Government Information Technology Officers Council to promote the objectives of interoperability and to observe the principles and comply with the standards as set out in MIOS during the life-cycle management of IS/ICT in government. It is also essential that MIOS remains updated and that it aligns to stakeholder requirements,

² "Batho Pele" (People First) principles for information oriented service delivery

changes in legislative environment, so that government can embrace the potential of technological advancement in the market and address the archival issues inherent to the digital age.

- (5) The Minimum Interoperability Standards (MIOS) provides a set of mandatory standards that will ensure the achievement of the interoperability pillar in the ICT House of Value as illustrated in figure 1 above.
- (6) Previous versions of MIOS were structured in a way which did not allow for sufficient agility to adapt to changing technology fronts or progress. This had the result that these versions of MIOS were found to be irrelevant within a time period of 2 or 3 years, and hence not adding perceived value to Government at large. For the above reason, it was decided to take a different approach with MIOS V6 and on. (Details of these changes are covered in Sections 3.1 and 3.2 of this document)

1.2 MANDATE

- (1) Interoperability between Information Systems and Information-and-Communication Technology (IS/ICT) in government is mandated in accordance with the following legislation:
 - (a) Public Service Act, 1994 (Proclamation 103 of 1994) mandates the Minister of Public Service and Administration ("Minister") to establish norms and standards for Information Management in the Public Service and e-Government respectively;
 - (b) Public Service Regulations, 2016 -
 - (i) Obligates heads of departments to comply with the MIOS.
 - (ii) Mandates the Minister to issue the MIOS.
 - (c) State Information Technology Agency (SITA) Act, 1998 (Act 88 of 1998) sections 7(6) (a) (i) and 7(6) (b) mandates SITA to set standards for interoperability between information systems in government, subject to approval by the Minister and to certify information technology goods and services for compliance against such approved standards.
 - (d) State Information Technology Agency General Regulation (R.50 of 2005) sections 4.2 and 4.3 prescribe the processes to set interoperability standards and to certify compliance of information systems thereto.
 - (e) Public Finance Management Act, 1999 (Act 1 of 1999) section 38(1)(b) and (e) holds an accounting officer responsible for the effective, efficient, economical and transparent use of the resources and to comply with audit commitments as required by legislation.

1.3 PURPOSE AND BENEFITS

- (1) The *purpose* of the MIOS is to prescribe open system standards that will ensure minimum level of interoperability within and between IS/ICT systems that are utilised in government, industry, citizens and the international community in support of the e-Government objectives.
- (2) The *benefits* that MIOS provides to stakeholders are:
 - (a) To government IS/ICT management communities, it provides a framework to ensure compliance with interoperability stipulations as set out in the SITA Act and Public Service Regulations respectively. It further underpins the collective value of IS/ICT as a strategic resource of government that must be valued, shared and used to improve public service delivery.
 - (b) To enterprise architects, solution architects, designers and implementers, it provides a basis for designing, using and implementing open standards based solutions to improve interoperability and reduce duplication across government IS/ICT.
 - (c) To acquirers, it provides the minimum mandatory technical specifications that must form part of all bid documents.
 - (d) To the Certification Authority, it serves as a baseline by which to verify and certify conformance of IS/ICT goods and services for use in government.
 - (e) To SITA, it provides the technical standards that are required to function as the Prime Systems Integrator (PSI) for Government.
 - (f) To ICT goods and service providers, it substantiates government's strategic intent towards the adoption of and migration to open standards and that only MIOS compliant products are considered for integration into the Government Information Infrastructure.

1.4 SCOPE

1.4.1 Where does MIOS fit into the bigger picture?

The MIOS is an integral part of the Government's envisaged IS/ICT Governance Framework. It is also strongly related to, although not part of, the government structured processes because the MIOS prescribes the architecture model and notation standards needed to achieve interoperability among Enterprise Architecture tools and repositories, and the government structured processes, in turn, prescribes the adherence to MIOS during the development of ICT Plans and Blueprints in government.

1.4.2 What is included in MIOS?

The Minimum Interoperability Standard (MIOS) contains the following:

(a) The management processes and responsibilities for –

- (i) the setting and approval of interoperability standards, and
- (ii) the certification of IS/ICT products and services for compliance with such standards; and
- (b) The set of interoperability standards regarding
 - (i) Data format standards to enable exchange of data between government information systems (IS), and
 - (ii) Technical standards to interconnect, interoperate, access and exchange data among components of government Information and Communication Technology (ICT) infrastructure.

1.4.3 What is excluded from MIOS?

The MIOS **does not** prescribe any standards relating to business processes of IS/ICT services, except for the processes to **set** the standard and to certify compliance with such standards. The IS/ICT business process and service standards, such as ICT Governance practice standards, Enterprise Architecture practice standards, Information System Security practice standards, Quality Management practice standards, System Development Life Cycle (SDLC) practice standard, Project Management practice standard and ICT Service Management standards form part of the prevailing and evolving Government IS/ICT Governance Framework as referenced in par (1.4.1) above.

1.5 APPLICABILITY AND COMPLIANCE

1.5.1 To whom does MIOS apply?

- The MIOS is normative (it is prescriptive and compliance is mandatory) to
 - Heads of National departments
 - Heads of Provincial departments
 - associated agencies/entities as listed in the Schedules to the Public Service Act
- The MIOS is informative (it is descriptive and compliance is <u>not</u> mandatory) to Heads of Local Government

To what does MIOS apply?

- (1) According to the Public Service Regulations, Chapter 6, (Information Management and Electronic Government) regulation 97)—
- (3) Any new information and communication technology system developed or acquired or any upgrade of any existing information and communication system in the public service shall comply with the MIOS.
 - (4) A head of department shall-
 - (a) include compliance with the MIOS in the project approval procedure; and
 - (b) ensure compliance to the MIOS in the acquisition or use of information and communication technology."
- (2) In context of e-Government, MIOS is applicable for compliance to all e-Government systems through their life-cycle of existence, where:
 - (a) e-Government system means "any information system in the public service" and the interoperability of e-Government systems (as illustrated in Figure 2: e-Government information exchange scenarios), is described as
 - (i) Government to Government (G2G) information system any government information system that interconnects and exchanges information with another government information system (including any two information systems within a department).
 - (ii) Government to Business (G2B) information system any government information system that interconnects and exchanges information with a commercial or non-governmental business entity; and
 - (iii) Government to Citizen (G2C) system any government information system that interconnects and exchanges information with a citizen or community.

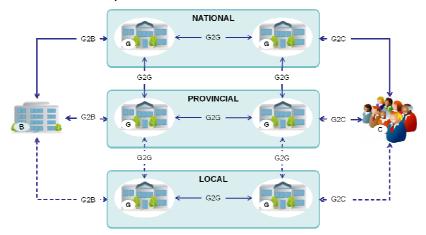


Figure 2: e-Government information exchange scenarios

- (b) The life-cycle stages and conditions when MIOS is applicable, are for
 - (i) A new Government system that is either under development or in acquisition;
 - (ii) An Government system that is upgraded in functionality to enable new business processes or that is upgraded in terms of its technology infrastructure (i.e. same business processes and functionality, but new technology infrastructure)
 - (iii) An existing (legacy) Government system in operation.
 - (iv) All technology stacks currently in use in government are accommodated in this framework. However, all new technologies/software/systems under consideration from the time this framework is adopted must be able to incorporate these standards while ensuring interoperability with legacy systems to ensure investments are protected.

1.5.2 Exemption from applicability

- (1) A department or agency may apply to the Minister for a deviation from complying with MIOS in terms of regulation 4 of the Public Service Regulations, 2016.
- (2) Consideration for exemption will only be given, for information systems that are
 - (a) Specific to the unique operational requirements of a Department or Agency, provided that such a system is not an e-Government system; or
 - (b) Governed by strict international health or safety standards; or
 - (c) Embedded systems or closed systems (such as electro-mechanical systems, closed surveillance systems and real-time monitoring systems) that does not interoperate or exchange data with another system.

2 MANAGEMENT PROCESSES

2.1 PRINCIPLES

In addition to the legislation on IS/ICT in government, the following principles regarding MIOS serve as a basis for decision-making:

- (a) Approval of funding for the acquisition (including the development) of new or the modification of existing IS/ICT products or systems are dependent on the IS/ICT product or system being compliant with MIOS.
- (b) It is the responsibility of the accounting officer of a department or agency to ensure that IS/ICT projects and systems comply with MIOS and that such compliance is subject to be audited/verified by the Auditor-general.
- (c) When interconnectivity, data interoperability or information access is required between departments' or agencies' systems, the cost of rectifying a system that does not comply with MIOS rests with the owner of the non-compliant product or system.

2.2 STANDARD SETTING

2.2.1 Standard Setting Responsibilities

- (1) The responsibilities and process for setting interoperability standards are governed in terms of the following legislation
 - (a) Public Service Act states:
 - "3. (1) The Minister [of Public Service and Administration] is responsible for establishing norms and standards relating to $-\dots$
 - (f) Information management in the public service;
 - (g) Electronic government;"
 - (b) <u>Public Service Regulations, Chapter 6, Regulation 97, states:</u>

"Minimum Interoperability Standards

97(1) The Minister shall issue Minimum Interoperability Standards (herein referred to as the "MIOS") for the public service.

(c) SITA Act, states:

- "7(6) The Agency -
 - (a) Must set standards regarding
 - (i) The interoperability of information systems subject to the approval of the Minister;
 - (b) Must certify every acquisition of any information technology goods or services by a department for compliance with those standards."

(d) SITA General Regulations, states:

"4.2 SETTING OF STANDARDS

- 4.2.1 Before setting or amending standards regarding the interoperability of information systems between departments ... in terms of section 7(6)(a) of the Act, the Agency must -
 - (a) Consult with departments and the GITO Council in order to assess the status of implemented systems and the proposed requirements;
 - (b) Conduct an implementation impact analysis and develop a business case demonstrating the cost-effectiveness of such standards; and
 - (c) Give due consideration to all representations received from departments and the GITO Council before submitting proposed standards, or an amendment thereof, to the Minister ... for approval
- 4.2.2 The Agency must set the standards, contemplated in section 7(6)(a) of the [SITA] Act, not later than a date determined by the Minister."
- 4.2.3 The standards set in terms of section 7(6)(a) of the [SITA] Act must be made available to all heads of departments and on the Agency's web site."
- (2) Following above legislation, the stakeholders and their respective responsibilities regarding the setting of interoperability standards are –

No	Stakeholder	Role and Responsibilities
1	Minister of Public Service and Administration (MPSA)	The standards promulgation authority to – a) Approve and issue the MIOS for implementation.
2	State Information Technology Agency (SITA)	 The standards setting authority to – a) Consult with and consider inputs from departments and GITO Council and keep abreast of standards development in the ICT industry. b) Conduct implementation impact analysis of changes to MIOS. c) Select and set the standards in MIOS subject to approval. d) Manage the development, configuration and dissemination of the MIOS.

No	Stakeholder	Role and Responsibilities
		e) Submit MIOS to GITOC for recommendation to Minister.
		Willister.
3	GITO Council	The standards advisory authority to –
		a) Give input to SITA on MIOS.
		b) Recommend the MIOS to the Minister for approval.

2.2.2 Standard setting process

- (1) The process to review and set interoperability standards is inclusive. Therefore, all stakeholders, including Government Departments and their agencies, industry and the users are all encouraged to participate in improving interoperability, and to provide support on the implementation of the MIOS.
- (2) The process to review and set interoperability standards for inclusion in MIOS is a consultative decision-making process that comprises a few steps involving a rule based filtration of interoperability standards as illustrated in Figure 3: Standards selection and setting process, and described as follows —

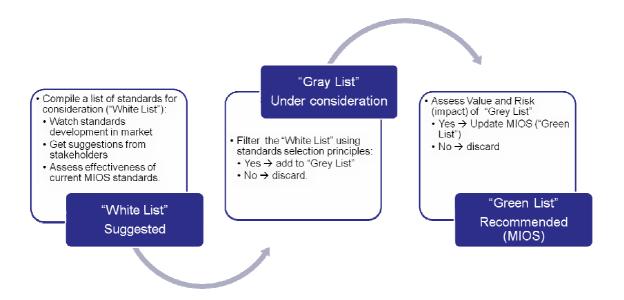


Figure 3: Standards selection and setting process

- (a) Step1: Compile a list of standards for consideration referred to as the "White List". The White List is an unbounded (unscreened) list of new or revised interoperability standards that are suggested by all stakeholders to be considered by the standards setting task team for inclusion into MIOS. This list is compiled by means of the following activities
 - (i) Watch or keep abreast of standards development in the ICT market that involves periodic research into national and international standards development organisations and exploring the developments of other governments' e-Government and interoperability programmes.
 - (ii) Consult with and solicit inputs from government stakeholders and interoperability champions.
 - (iii) Annual re-assessment of the effectiveness and relevance of the interoperability standards that are contained in the existing MIOS to identify standards that are not contributing (anymore) to the advancement of interoperability in government.
- (b) Step 2: Filter the "White List" using the standards selection principles (as contained in section 2.2.3 below) and produce a list of candidate standards referred to as the "Grey List". The standards setting task team considers each standard in the White List and test it for conformance with the standard selection principles
 - (i) A conformant standard is placed in the "Grey List", which will be considered, subject to a further evaluation, for inclusion into MIOS.
 - (ii) A non-conformant standard is discarded, and will not be considered for further evaluation.
- (c) **Step 3:** Assess the value and risks of standards in the "Grey List" and produce a list of recommended standards that will be added to or supersede existing standards in the MIOS referred to as the "Green List". The standards setting task team considers each standard in the Grey List and perform a benefit-risk impact assessment
 - (i) A standard that passes the benefit-risk impact assessment is placed on the "Green List" and will be added to or supersede existing standards in the MIOS.
 - (ii) A standard that fails the benefit-risk impact assessment will be discarded and flagged as deprecated. A deprecated standard does not contribute to the advancement of interoperability in government anymore or it will introduce an unacceptable high risk to the public service delivery.

2.2.3 Standards Selection Principles

There are number of definitions of open standards which emphasise different aspects of openness, including of the resulting specification, the openness of the drafting process, and the ownership of rights in the standard.

The list below contains frequently cited indicators of the openness of a standard. For the purposes of the MIOS, a standard shall be considered open if it meets all of these criteria. There are standards which we are obliged to adopt for pragmatic reasons which do not necessarily fully conform to being open in all respects. In such cases, where an open standard does not yet exist, the degree of openness will be taken into account when selecting an appropriate standard:

- It should be maintained by a non-commercial organization;
- Participation in the ongoing development work is based on decision making processes that are open to all interested parties;
- Open access: all may access committee documents, drafts and completed standards free of cost or for a negligible fee;
- It must be possible for everyone to copy, distribute and use the standard free of cost;
- The intellectual rights required to implement the standard (e.g. essential patent claims) are irrevocably available, without any royalties attached;
- There are no reservations regarding reuse of the standard; and
- There are multiple implementations of the standard.

The following principles shall apply during the selection of interoperability standards for inclusion or amendment to the MIOS:

- (a) **Interoperability:** The standard is designed to advance interconnectedness and data exchange within and between systems.
- (b) **Openness:** the specifications for the standards is open, which is characterised by:
 - (i) The standard should be maintained by a non-commercial organization.
 - (ii) The standard development and decision-making processes are inclusive and open to all interested parties.
 - (iii) The standards development outputs, including documents, drafts and completed standards, are accessible to anyone at no cost or at a negligible fee
 - (iv) The intellectual rights required to implement the standard (e.g. essential patent claims) are irrevocably available, without any royalties attached.
 - (v) The standard must not favour or provide exclusive rights to a particular vendor or product brand.
- (c) **Industry support**: the standard is widely supported by the industry, and is likely to reduce the cost of and the risk inherent to systems.

2.2.4 MIOS review frequency

- (1) The MIOS Framework should be reviewed once every two years or as the need arises, unless determined otherwise by the Minister. This review will be known as a <u>major version update</u>. (Note: The latest approved version of MIOS will remain in effect until it is superseded by an updated version).
- (2) The Catalogue of Standards to MIOS Version 6 must be reviewed at least once per annum to incorporate advancements and changes of IS/ICT in government and industry. This review will be known as the "MIOS Catalogue update". Version control on the Catalogue will be designated by the addition of sequential numbers e.g. MIOS 6.01, 6.02, 6.03, etc. The number "6" will link the addendum to the framework which carries the same number. When the MIOS framework gets updated, a new number range will commence i.e. 7.01, 7.02 etc.

2.3 STANDARDS CERTIFICATION

2.3.1 Standards Certification Responsibilities

- (1) Standards Certification is a process that verifies whether a system complies with the standards that are contained in MIOS. The responsibility to certify that e-Government systems comply with the MIOS are governed in terms of the following legislation:
 - (a) Public Service Regulations, 2016 Chapter 6, regulation 97 states:
 - "(4) A head of department shall
 - (a) include compliance with the MIOS in the project approval procedure; and
 - (b) ensure compliance to the MIOS in the acquisition of use of information and communication technology"
 - (b) SITA Act, states:
 - "7(6) The Agency ... (b) must certify every acquisition of any information technology goods or services by a department for compliance with those standards."
 - (c) SITA General Regulations, states:
 - "4.3 CERTIFICATION OF INFORMATION TECHNOLOGY GOODS AND SERVICES
 - 4.3.1 The Agency must, conduct standard certification in respect of all information technology goods or services, which were acquired by departments before the commencement of these Regulations. ...
 - 4.3.3 The Agency must conduct standard certification of information technology goods or services –
 - (a) acquired ... by a department from the Agency; ... and
 - (b) procured ... by a department through the Agency ..."

(2) From the above legislation, the stakeholders and their respective responsibilities regarding standards certification are as follows:

No	Stakeholder	Role and Responsibilities
1	Head of Department	The Accounting officer, who must ensure and account/report that all e-Government systems (assets) under his/her control comply with the MIOS.
2	SITA	The Certification Authority, who must certify that all e-Government systems – in acquisition and in operation – comply with MIOS.
3	Supplier / ICT Industry	Supplier, Provider and/or Integrator of e-Government systems, who must provide evidence that the e-Government system complies with MIOS in accordance to the MIOS Applicability Assessment provided by SITA's Certification Authority.

3 MINIMUM INTEROPERABILITY STANDARDS (MIOS)

3.1 BACKGROUND

- (1) The approach to MIOS 6 entails a physical split of the MIOS Framework and Principles Document and that of the Catalogue which contains the actual list of categories and standards. The two documents are linked again through means of cross referencing.
- (2) This approach will shorten the approval of the selected standards to ensure that these stay up to date and relevant to changing ICT progress and landscape within organs of state.

3.2 VALIDITY OF THIS DOCUMENT

(1) This document is validated by means of the signature of the Minister and will remain valid until a new version is approved.

Annex A: ABBREVIATIONS

BBBEE Broad Based Black Economic Empowerment

BPMN Business Process Modelling Notation

EA Enterprise Architecture

GCIO Government Chief Information Officer

GITO Government Information Technology Officer

GITOC Government Information Technology Officers Council

GWEA Government Wide Enterprise Architecture
ICT Information and Communication Technology
ISO International Organisation for Standardisation

MIOS Minimum Interoperability Standards

SC-AGC Standing Committee on Architecture, Governance and Compliance

SITA State Information Technology Agency

OMG Object Management Group

TOGAF The Open Group Architecture Framework

UML Unified Modelling Language