

Scotland's Digital Future: High Level Operating Framework (version 2)

ACCESS APPROACH DATA
BUSINESS COLLABORATION
DELIVER DEVELOPMENT DIGITAL LOCAL
EFFICIENCY FRAMEWORK ICT
NATIONAL OPEN OPPORTUNITIES IMPROVE INFORMATION EFFECTIVE
PUBLIC SCOTLAND PROCUREMENT
SERVICES SHARING SCOTTISH
STRATEGY SUPPORT
TECHNOLOGIES WORKFORCE
USERS

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1 Introduction

[Scotland's Digital Future – Delivery of Public Services](#) [DPS Strategy] sets out our aims and ambitions for Digital Public Services across the public sector. These aims are defined in a set of national level actions which are supported by sectoral strategies and local priorities. The strategy confirms our need to move at pace with digital transformation and to ensure that the redesign of services is citizen-focused and fully embraces the principle of re-use, before buy before build.

1.1 Purpose

This High Level Operating Framework (the Framework) has been prepared in response to a commitment made within the strategy that:

We will develop a high-level operating framework which supports the strategic goals of this strategy. This national framework will support transformation through

- providing a set of architecture and design principles
- promoting and supporting the use of commonly agreed standards and specifications
- an information assurance approach

The collaboration and integration that this will support, with a focus on reuse before buy, will help to eliminate duplication and avoidable spend. The development and adoption of this framework will be led through our national and sectoral governance arrangements

The initial version of the Framework identified a set of guiding principles and proposed a common architecture approach to the development and delivery of digital public services that achieve:

“public services that are high-quality, continually improving, efficient and responsive to local needs” (National Outcome 16)

The Framework is intended to provide guidance to the public sector and the ICT Industry that works with the public sector, on the design, development and delivery of future digital public services. It applies to any new or upgraded ICT services designed for use by the public to interact with public sector organisations and to any new or upgraded ICT services those organisations use internally to support their employees to deliver services.

Version 2 of the Framework takes account of progress and developments since the initial version, specifically the National level work programmes for Data Management, Scottish Public Sector Portal ([mygov.scot](#)), Scottish Wide Area Network ([SWAN](#)), [Data Hosting and Data Centre Strategy](#) , Secure and Easy-sign for citizens ([myaccount](#)) as well as incorporating feedback from the sectors as to how the Framework has influenced and may continue to influence the management of change in their respective organisations and sectors.

1.2 Vision and Drivers

The Vision as outlined in the DPS Strategy is a key driver and motivation for the practical aims of this Framework.

Our vision for Scotland is a country in which:

- Digital technology provides a foundation for innovative, integrated public services that cross organisational boundaries and deliver to those in most need, and for services for business that promote growth
- Digital technology captures patterns of service use and feedback, so that users of public services are more directly involved in service design and improvement
- This use of digital technologies provides a firm basis for a shared commitment to, and responsibility for, public services

The vision for Digital Public Services is aligned with the ambitions for public service reform which requires all public sector organisations to drive reform at pace and to prioritise actions around the 4 pillars of reform i.e. Prevention, Performance, People and Partnership.

1.3 Audience

The Framework provides guidance to the public sector, and the ICT Industry that works with the public sector, on how to design, develop and deliver future digital public services.

The intended audience for this document is all Chief Executives, Chief Information Officers, Chief Technology Officers and Service Leads and can be applied as follows:

- Chief Executives and Corporate Leads to be aware of the framework and seek assurance from Chief Information Officers/Heads of ICT that re-use, procurement, design, development and implementation of new or upgraded ICT Services are in line with the framework
- Chief Information Officers and Heads of ICT, and Service Leads to make use of the framework and guiding principles in working with strategic and corporate leads to take forward digital initiatives
- Chief Technology Officers, their team leaders and team members including ICT procurement professionals, who will procure, design, develop and implement digital public services to apply the framework
- ICT Industry Leads and teams who work with public sector organisations to take account of the framework and the standards and principles expected by the public sector in service design and delivery going forward

1.4 Governance

The organisations within the scope of this Framework are:

- the Scottish Government, its agencies and non-departmental bodies accountable to Ministers, including Scottish Police and Fire services
- NHS Scotland
- local government
- universities and colleges

The Framework is intended to be of general application across all sectors and also as far as possible to the third sector especially where they are supporting the direct delivery of public services.

The Framework will be reviewed and updated as digital public services priorities develop and as warranted by changing business and technical circumstances. Where changes are applied, the ethos followed when creating these principles should also be applied, which considers each of the above sectors to be part of a wider:

“Scottish Public Sector (SPS) ‘Enterprise’ with a shared collection of common goals”

It should be noted that the term ‘Enterprise’, as used in this context, relates to both the individual organisations within sectors, as well as to the extended enterprise which includes partners, suppliers and customers.¹

Key to the success of the Framework will be its ability to operate effectively in an environment where all organisations/sectors involved in the delivery of digital public services work together to deliver shared outcomes, whilst recognising that organisations/sectors:

- May have, in some cases, different business priorities;
- May be at different levels of maturity in terms of a whole organisation approach (enterprise) to provision of ICT Services;
- May describe the ICT services used by the organisation in a different way.

A ‘federated’ approach should be adopted to allow flexibility where appropriate at individual organisation/sector level within a broad framework of control which, over time, will increase the opportunities for collaboration and sharing and simplify the implementation of any new policy or strategy across the Scottish Public Sector.

The National DPS Strategy defines the context within which each of the sectors’ strategies will align, so the Framework is founded on the basis that the components defined will be reviewed, accepted and owned by a cross-sector governance board - the Technical & Design Board – which will operate under the authority of the National Level Actions Programme Board. The overall Governance structure can be found in Annex A - Governance and Support Structure and the terms of reference for the Technical & Design Board can be found at Annex B – Terms of Reference for the Technical & Design Board

Members of this board will be responsible for ensuring the Framework content is maintained in line with the changing environment, as well as individually confirming (and sharing) the alignment of their respective sector to it. If particular issues arise for a sector, or sectors, this would be referred to the Technical & Design Board through the appropriate representative member.

Similar to the governance arrangements in place for national level work programmes, implementation of this Framework may identify the need for specific projects, reflecting cross-sectoral agreement that a national approach is required. In all these cases, the principle of ‘use or explain’ will be applied, where the expectation is that all relevant bodies will utilise the results of the national project, except where they can identify compelling business needs that require a different approach.

¹[TOGAF 9.1 definition of Extended Enterprise.](#)

1.5 Scope

The Framework consists of a number of inter-related elements as shown in Figure 1 below.

For the purposes of this Framework, the following definitions are used:

Principle - provides high level guidance on the approach to be taken

Standard - provides details on how the approach will work in practice

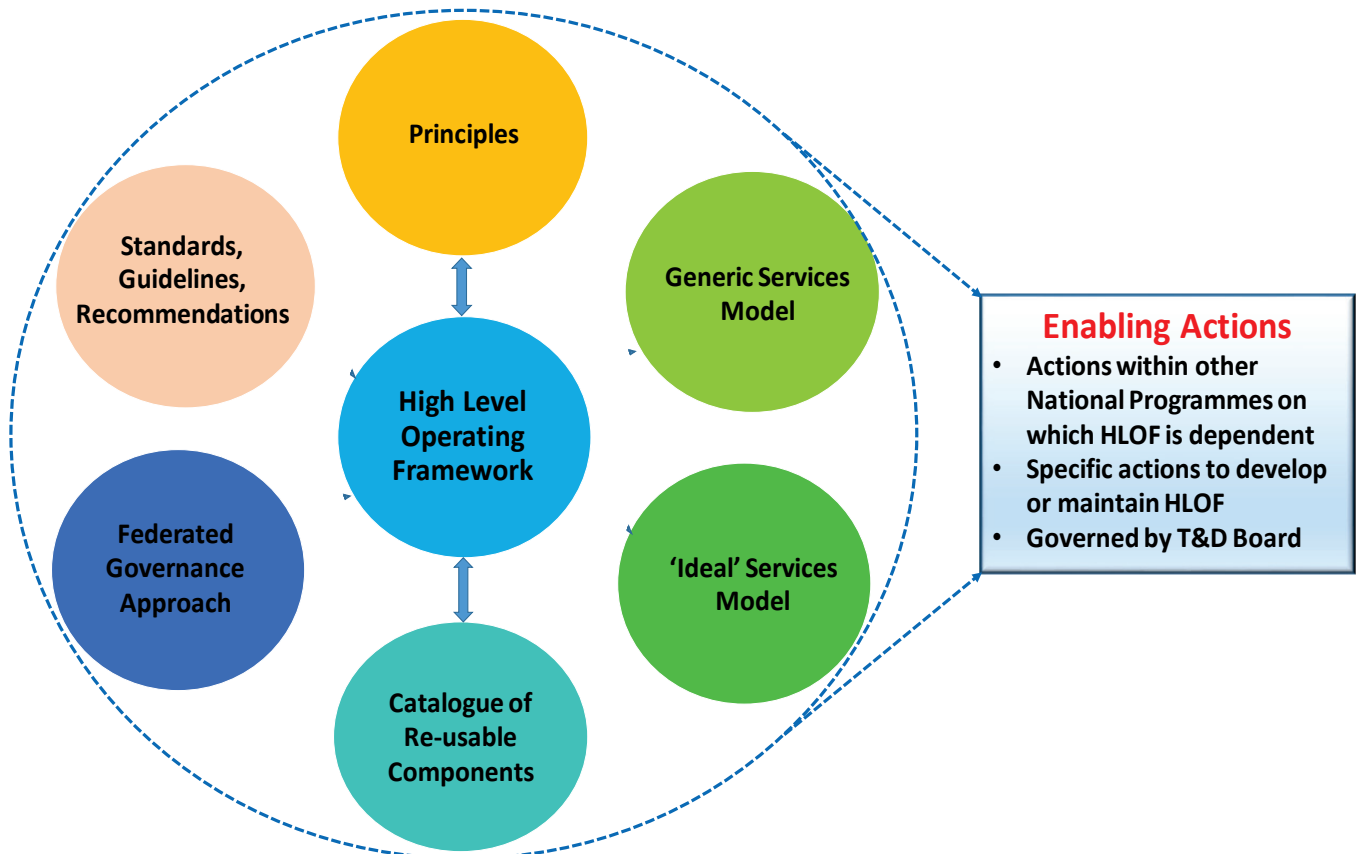


Figure 1 – Components of the High Level Operating Framework (the Framework)

1.5.1 Principles – Strategic

DPS Strategy sets out a number of strategic principles and their implications for service design and associated ICT services. These principles have been accepted by public sector organisations and incorporated into respective strategies in response to the DPS Strategy. These principles are summarised below:

- **Customer/Citizen Focus**
 - adopt an approach of “digital first” in service design; that means that organisations will deliver on line everything that can be delivered on line
- **Privacy and openness: using data appropriately**
 - Make effective use of all forms of data to deliver business outcomes, within a framework that maintains public confidence and meets statutory requirements

- **A Skilled and Empowered Workforce**
 - have a workforce that is motivated and skilled in using digital technologies and gains recognition for doing so
- **Collaboration and Value for Money**
 - through common standards and interoperability facilitate collaboration at local, national and international levels
 - collaborate in planning and procurement of ICT to re-use, aggregate demand, and avoid unnecessary duplication and so reduce purchase and running costs across the public sector
 - have a public sector network which supports resilient high-volume and high-speed communication

1.5.2 Principles – Architecture

This Framework provides a collection of architecture principles, which are relevant to the strategic principles and goals, alongside a number of more general principles to:

- promote following of industry best practice in operational delivery
- encourage reuse and sharing of existing assets
- ensure investment in ICT is made with sharing in mind

1.5.3 Generic Services Model

As Scottish public sector bodies move towards more collaborative procurement, consumption and delivery of ICT services, it is essential to have a common ‘vocabulary’ to provide context for informed decision-making within and across public sector organisations and to help develop the digital capabilities needed for the future. To allow early identification of opportunities for more collaborative approaches to provision of ICT services at a local, regional, sector or national level, a generic ‘model’ is required that will be used by all organisations/sectors to categorise and record their organisational/ sector-specific current and planned ICT services and should also be used when describing requirements for any new ICT Services.

1.5.4 Ideal Services Model

Based on the categories defined in the Generic Services Model, a set of indicators describing what an ideal situation might look like for each of the major service categories is provided to allow organisations to assess their current position and to develop a roadmap for change based on their specific circumstances.

1.5.5 Catalogue of Re-usable Components

Using the structure of the Generic Services Model as a guide, a national catalogue would capture and publicise or signpost where appropriate all re-usable ICT services at a national, sectoral or local level. The catalogue would also be the home for all agreed national standards, guidelines and recommendations so that organisations need only go to one source for all related Framework information.

1.5.6 Federated Governance Approach

There will be two levels of governance to support this version of the Framework - a strategic level fulfilled by the Technical & Design Board as described at paragraph [1.4](#) Governance, and a more tactical level, but just as significant, to be fulfilled by a National Design Authority function described in more detail at [Section 6 Federated Government Approach](#).

1.5.7 Standards, Guidelines, Recommendations

A number of standards, guidelines and recommendations applicable to all sectors and organisations have been developed since the initial issue of this Framework and these are presented in this version. A process for submitting and approving future national level standards is also provided.

1.5.8 Enabling Actions

A set of enabling actions supports Version 2 of the Framework the contents and successful delivery of which will be governed by the Technical & Design Group. These enabling actions consist of two major types:

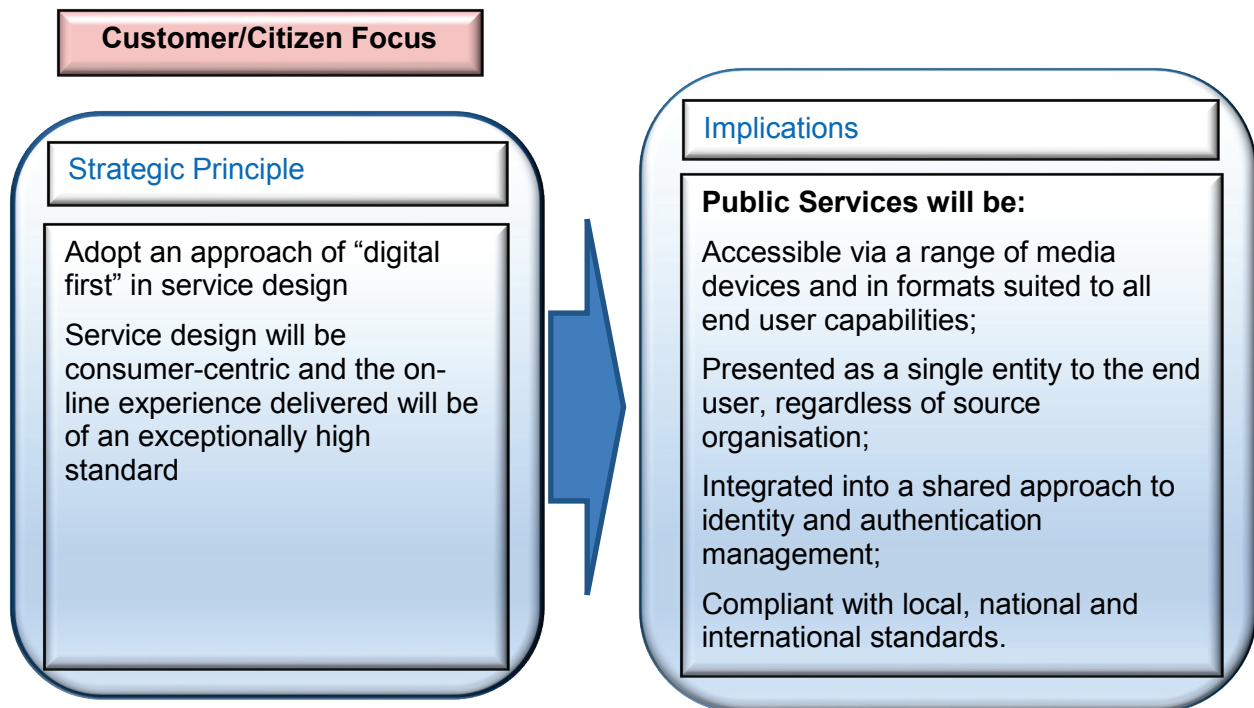
- National Level Actions which are governed as part of other Programmes upon which the Framework depends. This will include any new projects, reflecting cross-sectoral agreement that a national approach is required arising from the operation of the Framework (interdependent national level actions)
- Actions in support of the deployment of Version 2 of the framework (Framework support actions).

Annex C – Enabling Actions contains details of the enabling actions.

2 Principles

2.1 Strategic

DPS Strategy sets out a number of strategic principles and their implications for service design and associated ICT services. These principles have been endorsed by the public sector and incorporated into respective strategies in response to the DPS Strategy. The principles are summarised below:



Privacy and openness; using data appropriately

Strategic Principle

Make effective use of all forms of data to deliver business outcomes, within a framework that maintains public confidence and meets statutory requirements

Personal data will be handled appropriately and securely across all systems and managed in line with legal requirements, applicable standards and good practice



Implications

Organisations delivering public services will:

Use common standards and approaches to collecting, storing, referencing and sharing data;

Reuse those standards to share data across organisations in support of a better, simpler and singular view of government systems for the citizen;

Support update and management of personal information by the citizen and businesses;

Share and reuse data in support of research and analysis in contribution towards national outcomes.

A skilled and empowered workforce

Strategic Principle

Have a workforce that is motivated and skilled in using digital technologies and gains recognition for doing so

Delivery of high quality digital public services and the underpinning ICT systems will be supported by a skilled and supported workforce



Implications

Organisations delivering public services will be:

Flexible in their approach to sourcing and sharing resources across organisations to optimise utilisation, effectiveness and efficiency;

Supportive of collaboration in developing and maintaining services;

Sustainable through on going skills sharing and development across and between sectors;

Designed to encourage innovation, creativity and new ways of working.

Collaboration and Value for Money

Strategic Principle

Collaboration will be the default choice in design and delivery of services and associated ICT infrastructure

Collaboration in planning and procurement of ICT to re-use, aggregate demand and avoid unnecessary duplication and so reduce purchase and running costs across the public sector

Through common standards and interoperability facilitate collaboration at local, national and international levels

Have a public sector network which supports resilient high-volume and high-speed communication

Implications

Organisations delivering public services will:

Adopt common interoperability and connectivity standards to support reuse and sharing of existing & proposed assets;

Consolidate and converge application portfolios where feasible;

Where cost effective, use transaction/usage based services e.g. PaaS, SaaS;

Demonstrate savings on ICT spend, delivered through a 'joined up' approach to ICT procurement.

2.2 Architecture

Architecture principles support the four strategic principles as set out in [Scotland's Digital Future – Delivery of Public Services](#). For simplicity, each architecture principle has been aligned to a primary strategic principle but in reality may support more than one.

The architecture principles define the rules and guidelines that inform and support the way the services and systems in scope of this Framework are designed and delivered. They reflect a level of consensus across National, Sector and Local (individual agency) levels and should be used by all levels of ICT Governance to assess the compliance of any new ICT initiative.

Architecture principles are intended to be enduring and stable and are therefore defined at a high level although it is expected that the principles will be updated/extended over time as necessary. The principles are interrelated and should be applied as a set. In some cases, principles will compete; a resolution process to manage these conflicts should therefore be established within each sector's ICT governance arrangements.

Each architecture principle is described based on the industry standard TOGAF Enterprise Architecture Framework² as follows:

Reference	A unique reference identifier for the architecture principle
Name	An easy to remember name that represents the principle's objectives.
Statement	An unambiguous statement that describes the principle.
Rationale	A statement or list of statements that describe the benefits of following the principle.
Implications	A statement or list of statements that describe the consequences of adhering to the principle.

In order to capture additional detail associated with each principle, a 5th dimension 'Resources' has been included.

Resources	Additional information to support the application of and compliance with the principle. Where standards apply, these will be referred to here.
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² The TOGAF9.1 Enterprise Architecture Framework

2.2.1 Citizen/Customer Focus

Ref. No.	OFP-CC1
Name	Digital Standards
Statement	The design of applications and services (information and transactions) will be user focused and with a presumption of alignment with the technical standards and design principles of mygov.scot
Rationale	A common approach will facilitate effective user journeys across public sector organisational boundaries and reduce the need for citizens to use higher cost channels for all sectors. More fully meeting user needs through citizen-centric design which successfully transcends organisational boundaries will reduce levels of 'failure demand' and associated rework for all sectors
Implications	<p>Service providers will design digital services from a 'citizen needs' perspective which may require services from multiple public sector organisations to be presented to the citizen in as seamless and integrated way as is possible.</p> <p>During the end to end service provision (from the citizen's perspective), disruptive movement between different service providers should be minimised and organisational branding should not overly distract from the perceived seamless flow of the transaction from the citizen's perspective</p>
Resources	<p>Service Standards for mygov.scot (DRAFT – work in progress) Government Digital Service Design Principles</p> <p>See also mygov.scot for the beta version of the mygov.scot external website.</p>

Ref. No.	OFP-CC2
Name	Multi-Channel
Statement	The design of new applications and services shall not restrict service consumers from accessing the new functionality from currently known or defined access devices.
Rationale	Applications and services have a potentially large and diverse client-base that may choose or need to employ a variety of access channels e.g. PC/Mac/Linux devices, secure kiosk, thin client, smartphone or other mobile device. The way in which citizens consume services will change over the life of a solution/service and should not be constrained by the current technology available.
Implications	The solution architecture for any new application or service must be adaptable and provide the capability to support the changes in citizen choice of channel at the appropriate points and in a cost-effective manner.

Resources	The mygov.scot programme maintains and operates a device lab for testing web sites and mobile applications. The lab contains over 40 physical devices including smartphones, tablets, consoles and e-readers and is available for use by other Scottish public sector organisations and programmes. Please contact feedback.mygov@scotland.gsi.gov.uk to enquire further.
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Ref. No.	OFP-CC3
Name	Verification and easy sign-in for citizen access
Statement	Public Sector organisations will use the national myaccount service to verify the identity of citizen access to digital public services as a default. Where this is not currently possible, organisations will ensure that any procured or developed authentication system complies with standards-based federation. Access will be granted once the requester (human or computer) has been authenticated and authorised. The requester shall only be given enough privileges to execute those tasks needed to perform a specified job activity or function; no more and no less.
Rationale	<p>Access to digital public services should be designed for the convenience of the citizen and should take into account modern Internet technology authentication approaches.</p> <p>Having verified their identity in one part of the public sector, citizens should not have to re-present proof of who they are to access services in another.</p> <p>Using the myaccount service as the verification system of choice or as a minimum, implementing an open standards-based solution capable of federating with the myaccount service, will enable service providers to provide citizens and other similar Identity Providers with secure access to their digital services without the need for re-verification.</p>
Implications	<p>Common standards for verifying identity across the public sector are required to ensure that one public sector area trusts the identity created in another.</p> <p>Authentication/verification services rely on service providers being able to match attributes supplied by Identity Providers to locally held data. Service providers verifying identity in the public sector should ensure that, as a minimum, the key attributes of Forename, Surname, Date of Birth and Gender are available for verification purposes. This will provide high levels of confidence when these attributes are supplied by the Identity Provider and matched locally</p> <p>There may be a cost associated with new systems aligning with this principle, particularly where those systems have user provisioning and control embedded within the application code.</p>
Resources	Myaccount Service Provider Portal

2.2.2 Privacy & Openness

Ref. No.	OFP-PO1
Name	Data Management – Open Data
Statement	The Scottish public sector produces huge amounts of data. However, there is relatively little open publishing of that data. By making non-personal information more accessible and encouraging its publication and reuse, opportunities exist to maximise its economic and social value.
Rationale	Publishing of open data for public use supports opportunities to improve efficiency in public services and promotes economic activity and innovative use.
Implications	<p>A cohesive overview of data is required to ensure a consistent approach is taken. Common standards for data will need to be considered. In publishing our data we need to ensure that we do so in such a way as to make it easy for others to find the data and to understand what is contained within the data.</p> <p>Providing accurate metadata with our data is essential. Metadata provides an opportunity to enhance the value of the data and provide clarity on what the data is and what it is not, any limitations to the data and/or its use can also be included within the metadata. Providing good metadata can support those using the data in not only finding it but also bringing together other data sets which relate to it, for instance data consumers can search for data by theme.</p>
Resources	Data Vision and Strategic Action Plan

Ref. No.	OFP-PO2
Name	Data Management – Data Sharing
Statement	The Scottish public sector produces huge amounts of data. However, there is relatively little sharing of that data. Opportunities exist to benefit from and/or improve services via better use of the data, whilst complying with privacy requirements.
Rationale	Better use of data provides the opportunity for organisations to target delivery of services, provide better integrated services and to become more efficient in their working, separately and together.
Implications	A cohesive overview of data is required to ensure a consistent approach is taken and common standards for data will need to be considered. All work in this area must comply with the legal framework for data sharing, respect for individuals' rights to privacy and confidentiality and consider public confidence about when and how personal information is shared.
Resources	Data Vision and Strategic Action Plan Privacy Principles

2.2.3 Skilled & Empowered Workforce

Ref. No.	OFP-SW1
Name	ICT work force Capability
Statement	To increase the capability of ICT professionals at all levels in the public sector to support digital public service delivery.
Rationale	In order to deliver and support digital public services, a professional and appropriately skilled ICT workforce is essential.
Implications	A common approach to skills identification and development of the ICT workforce, such as SFIA, and collaboration in their deployment in order to maximise the impact of their skills.
Resources	National Approach to a Skilled & Empowered Workforce

Ref. No.	OFP-SW1.2
Name	ICT Work force Capability – Enterprise Architecture Skills
Statement	To increase the capability of the public sector in the discipline of Enterprise Architecture to support principle OFP-CV4
Rationale	<p>Adoption of an enterprise architecture approach to planning ICT services by public sector organisations will require increased awareness of and skills in the discipline of Enterprise Architecture. Increased awareness and skills in this discipline will make it easier to identify opportunities for re-use and convergence at individual agency, sector and national levels and therefore accelerate the realisation of the benefits to be achieved through these initiatives (cost avoidance, cost reduction).</p> <p>Increased awareness and skill in this discipline will also provide a common base of understanding and language to make it easier for agencies to collaborate in cross-sector service planning and design and accelerate the realisation of the benefits to be achieved (improved inter-agency working, improved service delivery for citizens).</p>
Implications	<p>Increasing capacity in this discipline will incur costs in terms of formal training and initial loss of productivity although formal certification is not essential to provide an acceptable level of capacity.</p> <p>The current public sector skills gap analysis (Scotland's Digital Future: Delivery of Public Services: Skills Gap Survey and Analysis November 2014) does not identify Enterprise Architecture as a skills gap or shortage although other skills gaps identified suggest a requirement for these skills by inference - Business Intelligence and Information Security as examples which require an enterprise level view of an organisation's business, data, applications and IT infrastructure to be effective.</p>

Resources	<p>TOGAF Architecture Skills Framework</p> <p>SFIA Professional Profiles Chart</p> <p>Zachman Enterprise Architecture Certification</p> <p>Recommendation in Enabling Actions Plan – propose a pilot project as part of the National Workstream Skills Action Plan to support skills development and training collaboration among all public sector organisations in the area of Enterprise Architecture.</p>
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2.2.4 Collaboration & Value for Money

Ref. No.	OFP-CV1
Name	Reuse, Before Buy, Before Build
Statement	<p>The design of ICT solutions/services must seek to maximise reuse of existing services across the Scottish Public Sector.</p> <p>Adoption and use of services and capabilities developed at a national or sector level will be the default position when considering any new or upgraded ICT Services.</p> <p>If existing services do not meet the business requirements and cannot be extended cost-effectively, then a supplier will be sought to provide that product or service and make it available for re-use across the sector.</p> <p>If there are no existing services to reuse or suitable COTS packages that can be obtained cost-effectively, then bespoke solutions that strictly conform to the architecture principles will be considered.</p>
Rationale	<p>Will increase the ability to deliver ICT services in the most flexible and cost-effective manner across a range of (internal and external) customers with differing technology domains. For long term stability and maintainability of the ICT Services required across the public sector, the focus should be on maximising reuse of existing services.</p> <p>However, depending on the business requirements and timeframe, buy/build options cannot be precluded.</p>
Implications	<p>The requirements analysis and change management disciplines that underpin this principle must be embedded in the individual sector governance processes.</p> <p>The use of COTS products reduces the amount of bespoke coding required whilst also leveraging 3rd party investment and future development. With the existence of architecture principles, the requirements governing a COTS procurement must be considered from a more holistic strategic perspective.</p> <p>Providing a means by which individual organisations can search for appropriate re-usable services (using a standard service definition along service catalogue lines) is essential to support this principle</p>
Resources	<p>Our National Collaborative Agreements</p> <p>The Public Contracts Scotland Forward Plan for a full list of national and sectoral procurement agreements.</p> <p>Whilst the Catalogue of Re-usable Components is being created, a full list of current re-usable components is contained at paragraph 7.1 Current Standards, Guidelines and Recommendations of this document.</p>

Ref. No.	OFP-CV2
Name	Collaboration
Statement	Collaboration is now the default choice in the design and delivery of services and in the procurement and deployment of ICT services to support this.
Rationale	The public services delivery sector should collaborate across organisational boundaries to ensure that the services delivered – whether at national, sectoral or local level – can be truly joined up to meet the needs of the users of public services, the citizens and businesses of Scotland.
Implications	The requirements analysis and change management disciplines that underpin this principle must be embedded in the architecture governance processes. The requirements governing any collaborative development or procurement must be considered from a holistic and strategic perspective.
Resources	National Procurement Portfolio Plan ICT Technical Assurance Process for Investment Board (SG Agencies only)

Ref. No.	OFP-CV4
Name	Use of Open Standards in Software
Statement	Wherever possible organisations should seek to procure new or upgraded ICT services based on Open Standards which are defined as standards that are made available and developed through a collaborative, consensus-based approach. Open Standards are non-proprietary (i.e. not restrictive) and facilitate interoperability and data exchange among different products and services.
Rationale	Benefits of using open standards include: <i>Interoperability & integration</i> – use of open standards increases the likelihood that solutions provided by different vendors will be capable of inter-operating. <i>Avoiding vendor lock-in</i> – successful open standards are readily implemented by a broad variety of software vendors in either open source or proprietary solutions. This reduces the effort and complexity associated with use cases such as transitioning away from a system that is no longer supported or moving from one solution to a competitor that is more cost effective. <i>Sustainability</i> – open standards allow large contracts to be broken down into several smaller components. This enables incremental delivery of complex solutions thus reducing risk, as well as providing a more level playing field for SMEs during procurement.
Implications	A set of open standards endorsed by the Scottish Government will be identified using the standards approval process described in the Framework (which would be part of the Catalogue of Re-usable

	Components)
Resources	Open Standards and Open Source Software Policy – Work in Progress

Ref. No.	OFP-CV5
Name	Use of Open Source software
Statement	<p>Wherever possible, and subject to compliance with the principles of fair and open procurement, organisations should seek to procure new or upgraded ICT services based on Open Source software, where Open Source Software is defined as computer software where the underlying source code is made available under a license which gives organisations freedom to access and modify the source code and to redistribute and reuse the software.</p> <p>With the licence granting them these rights, an organisation is able to improve the software or adapt it to better meet their needs. Improvements can be shared with the wider community. Proprietary software, by contrast, is closed source; with a restrictive copyright licence, the source code cannot typically be distributed or modified.</p>
Rationale	<p>Benefits of using Open Source software include:</p> <p><i>Simpler collaboration</i> – For several Scottish public sector organisations to work collaboratively on a shared service or solution, there must be clear agreement on and understanding of, how intellectual property rights will be managed. Open source licensing resolves this issue ensuring that an acceptable, well understood set of rights are conferred to all parties.</p> <p><i>Flexibility of use</i> – licenses for open source solutions typically confer a more comprehensive set of rights compared to proprietary software. This freedom allows the user to run, change, improve and distribute the software, as required, to meet their needs.</p> <p><i>Value for money</i> – a charge is not typically applied to license open source software; solutions, applications or libraries created by a Scottish public sector body may be easily re-used by other bodies under an open source license.</p>
Implications	<p>Scottish Government Guidance is required around:</p> <ul style="list-style-type: none"> • the practicalities of acquiring and integrating open source applications / libraries, particularly around the procurement and legal implications (e.g. copy left licenses); • how to ‘publish’ Scottish public sector applications / libraries or documentation as open source; • creation and maintenance of a registry of open source apps and libraries published by Scottish public sector; (this would be part of the Catalogue of Re-usable Components) • creation and maintenance of a catalogue of open source alternatives to proprietary applications; (this would be part of the Catalogue of Re-usable Components)
Resources	Open Standards and Open Source Software Policy – Work in Progress

Ref. No.	OFP-CV6
Name	Single Approach to Identity & Access management for public sector employees
Statement	<p>Access to ICT systems for public sector employees should follow the same principles as access for citizens to digital public services and should take into account modern Internet technology authentication approaches as well as nationally developed services/capabilities which may be available in the near future via SWAN.</p> <p>Where possible, organisations should adopt a standards-based federated identity management solution/single user authentication process to allow employee single sign-on to permitted ICT systems across the organisation.</p>
Rationale	Having a standards based authentication system will allow simpler and faster access to ICT systems for public sector employees both within their own organisations and with ICT systems of other public sector organisations where suitable protocols have been agreed.
Implications	Achievement of this principle will require a single (potentially federated) information source against which public sector employees can be authenticated when accessing ICT systems which will confirm their identity as well as the permissions they have for such access.
Resources	SWAN Value Added Services Strategy, initial Value Added Services List – Work in Progress

Ref. No.	OFP-CV7
Name	Enterprise Architecture Approach to ICT Planning
Statement	An Enterprise Architecture approach to ICT planning will be adopted by all Scottish Public Sector organisations.
Rationale	<p>In order to identify opportunities for re-use and convergence of existing business or ICT services at an early stage and to support the planning and design of new services which cross organisational boundaries, it is essential that an approach to planning exists which provides a logical, organisation-agnostic view of how the organisation delivers its core business.</p> <p>Some public sector organisations have used an Enterprise Architecture approach to do this for some years and it is therefore recommended as an approach for all public sector organisations. Having a common approach based on Enterprise Architecture concepts and principles in all sectors will create a common framework and language which will assist organisations to communicate more easily when opportunities for re-use, convergence or cross-sector service delivery is required.</p> <p>The advantages that result from a good Enterprise Architecture bring important benefits, which are clearly visible in the operating</p>

	<p>costs of an organization:</p> <ul style="list-style-type: none"> • A more efficient business operation • A more efficient ICT operation • Better return on existing investment, reduced risk for future investment • Faster, simpler, and cheaper procurement
Implications	Organisations and sectors will be able to identify target opportunities for cost avoidance and cost savings in a disciplined and objective way at an earlier stage than may have been possible without such an approach.
Resources	Approach to Architecture in Health Architecture Principles in Health Government of Australia Approach

Ref. No.	OFP-CV8
Name	Service Oriented Approach (SOA) to Design of ICT Solutions
Statement	Wherever possible, design of any new or upgraded ICT solutions should use the principles of Service Orientation
Rationale	<p>The principles of Service Orientated design will drive the creation of more modular software applications which will increase the potential for re-use within the software application itself as well as by other applications that require the same type of functionality. Additionally, as one of the key tenets of an SOA approach is that the components must be designed to be interoperable at the outset, the requirement for complex and costly integration efforts to create new or enhanced digital public services, will decrease.</p> <p>Coupled with the Architectural Principles of Open Standards and Open Source, this principle will create a rich source of software components which can be written once but used by many different software applications and organisations.</p>
Implications	Cross-sector agreement to the Generic Services Model element of this Framework will be critical to maximise the benefits to be gained from an SOA approach.
Resources	Current SOA work in E-Health Architecture – Work In Progress

3 Generic Services Model

The high level categories of Services at Figure 2 below represent a combination of models currently being used across the Scottish Public Sector to provide a common vocabulary for strategic ICT Planning.

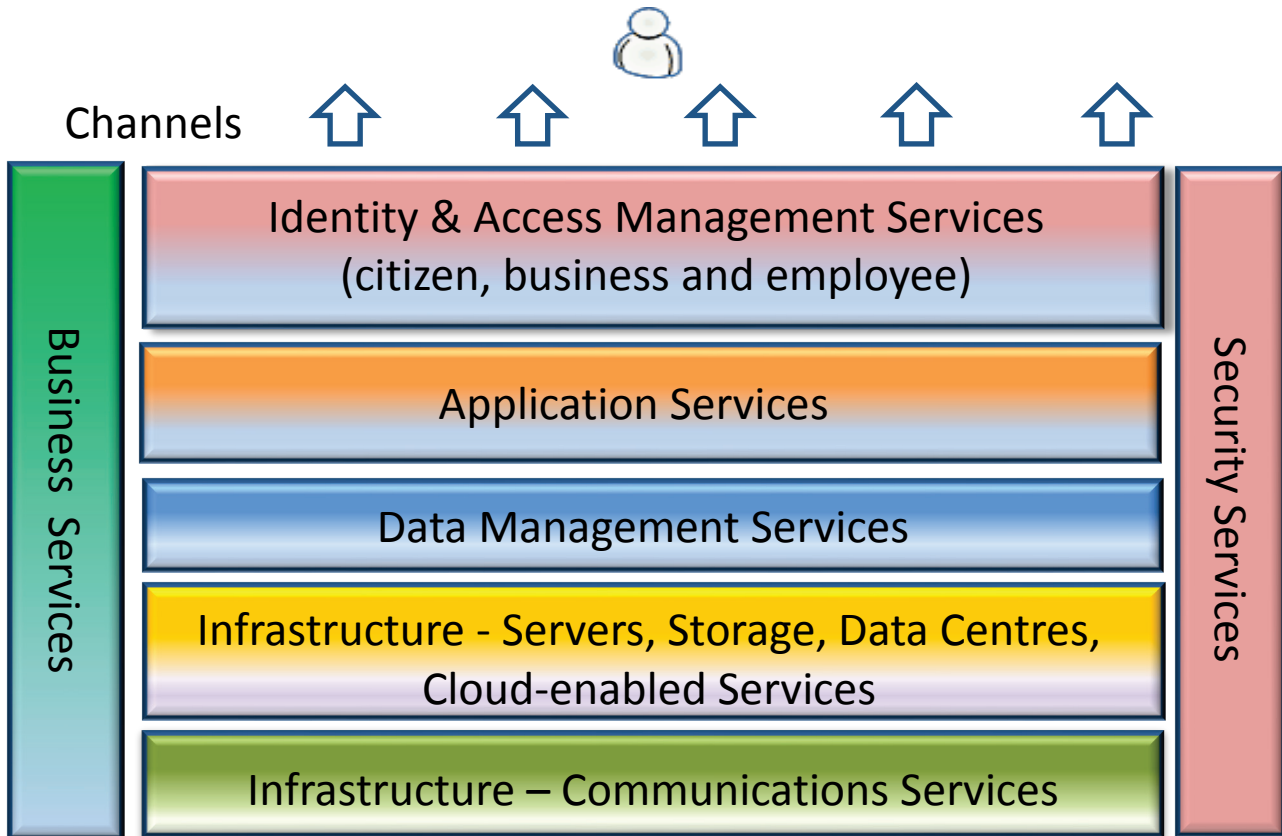


Figure 2 – Generic Services Model

Each of the components is outlined in the following paragraphs and expanded at Section 4 to describe what these components might look like in an 'Ideal Services Model'.

3.1 Business Services

Business Services are fully integrated into the ICT service delivery model, relying on all aspects of the services. While internal and external customer service is provided through the channels, business processes are supported at all layers of the architecture. This model represents the two-way relationship between ICT and Business architectural strategies.

3.2 Channels

Business processes are integrated into the applications that are supported by ICT and are delivered through the many channels available. Applications and services have a potentially large and diverse client-base both internal and external customers, that may choose or need to employ a variety of access channels e.g. PC/Mac/Linux devices, secure kiosk, thin client, smartphone or other mobile device. Common standards and approaches will support the delivery of services over these channels in as efficient means as possible.

3.3 Identity & Access Management Services

Security needs to be central to how modern business operates. Within the public sector specifically, there is a need to:

- support the concept of “The Citizen” nationally, across sectors and locally
- share information more readily (e.g. within the health, social services and criminal justice domains)
- enable public or citizen access to an increasingly diverse service base in a uniform and consistent manner

Common security and ID management processes, services and tools are essential elements to enable all of these aspirations.

3.4 Applications Services

3.4.1 Office Productivity Applications Services

Standard office productivity applications like Word, Excel and email are widely prevalent in the user community today. Their interoperability and the incorporation of new ‘standard applications’, such as emerging social media platforms, are vastly common across the Scottish Public Sector. Where there is a perceived unique requirement in this tier, this should be considered the exception rather than the rule.

3.4.2 Common Business Applications Services

In some sectors, organisations can operate similar to independent businesses having their own individual employment processes, payroll, finance, facilities management etc. Therefore there are a number of business services, payroll, HR, etc. which are similar in their application across all organisations and sectors. As noted in the national and draft sectoral strategies, organisations are expected to standardise and re-use across these services rather than buy or build, compromising on business process fit to allow standardisation to take place.

3.4.3 Line of Business Applications Services

Line of Business Applications can in some cases by definition, be specific to the agency/public body that requires them. In a number of cases they may be bespoke applications. However, even at this level, there will be opportunities to share data, or perhaps compromise on process to allow for standardisation of applications.

3.5 Data Management Services

The Data Management Services category includes ICT services to enable information sharing and re-use, via the standard description and discovery of common data and the promotion of uniform data management practices. It includes 4 major areas where provides a standard means by which data may be described, categorised and shared.

Within the model there are four standardisation areas:

- **Data Description:** provides a means to describe data uniformly, thereby supporting its discovery and sharing
- **Data Context:** facilitates discovery of data through an approach to the categorisation of data according to taxonomies

- **Data Sharing:** supports the access and exchange of data where access consists of ad hoc requests (such as a query of a data asset) and exchange consists of fixed, recurring transactions between parties. It is enabled by capabilities provided by both the Data Context and Data Description standardisation areas
- **Data Ownership:** Data is owned by the business and accountability for its quality lies with business owners

3.6 Infrastructure - Servers, Storage, Data Centres, Cloud Enabled Services

The deployment of physical ICT assets has evolved dramatically in recent years. Critical business applications, for example ones which impact the safety of the public or employees, require high availability, which can best be delivered through modern data centres. Public Sector organisations should refer to the guidance in the Scottish Public Sector [Data Hosting and Data Centre Strategy](#) and Scottish Public Sector Guidance on [Cloud Computing](#), [Virtualisation](#) and [Co-location](#) when assessing how and where to host their data Infrastructure - Servers, Storage, Data Centres and Cloud Enabled Services.

3.7 Infrastructure – Communications Services

This high level category contains services relating to the provision of data and voice telecommunications.

3.8 Security Services

Security Services are required by all other services and provide the means by which information is secured, made available and integrity is maintained. Security Services is a blend of process and technology to provide assurance that the value of public information is sustained throughout its usable life.

4 Ideal Services Model

It is recognised that public sector organisations will have different capabilities for each of the service components described above. In addition, they will not all be at the same level of adoption or be able to advance at the same rate.

Using the high level categories from the Generic Services Model, broad characteristics of an ideal state for the service category are described in Figure 3, which organisations could use to evaluate their current capability and map out their short term plans and longer term strategies for adoption and change.

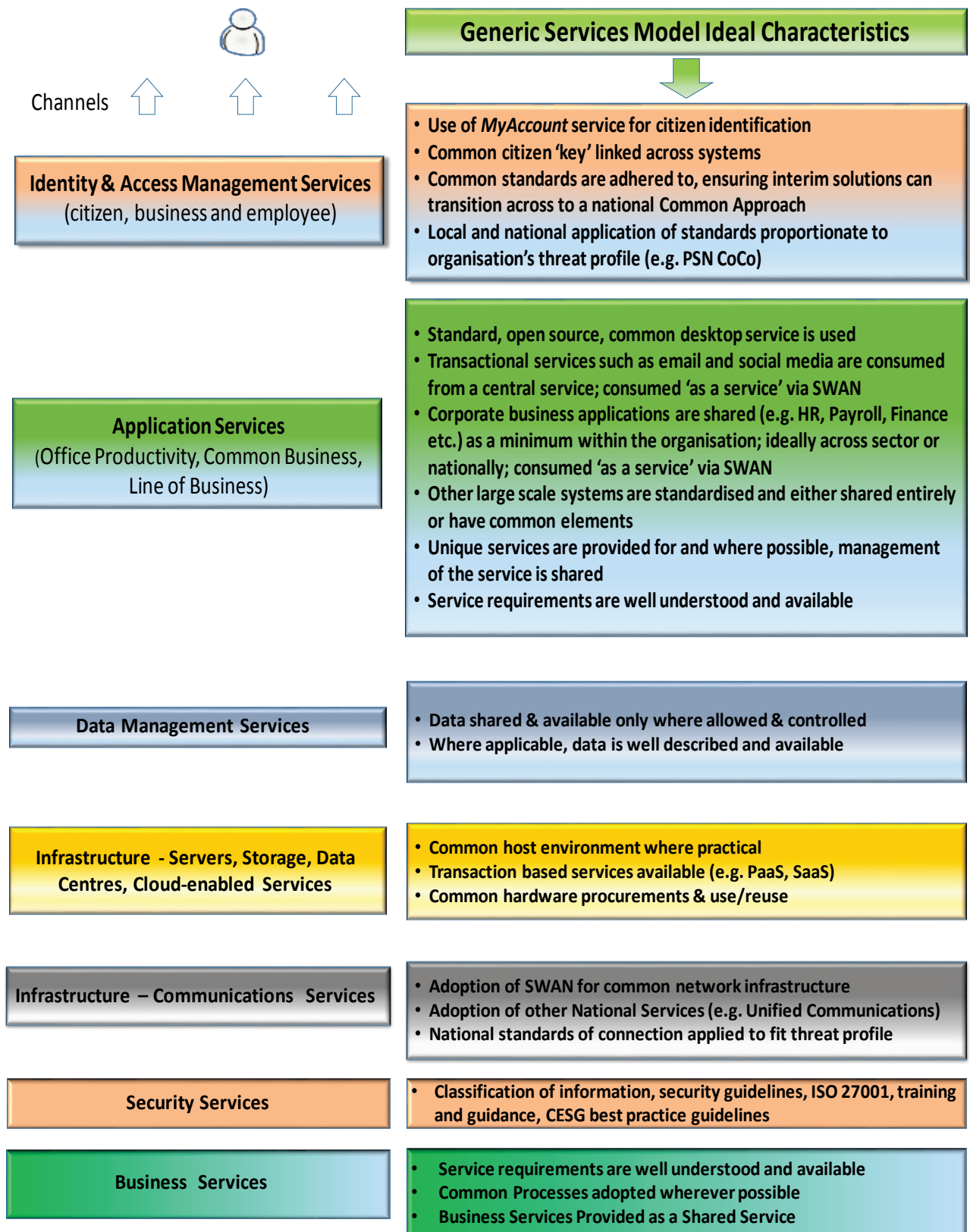


Figure 3 – Ideal Services Model

Note that Channels are not included in the above model, as their development and uptake will be drivers for the above service delivery routes evolution, rather than being part of an organisation's delivery capability.

5 Catalogue of Re-usable Components

In support of the Collaboration & Value for Money Strategic Principle and the Architectural Principle of “Re-use Before Buy Before Build”, a means of raising awareness of existing and planned ICT services, standards and guidelines which have been designed with re-use in mind, is required. A national catalogue of re-usable components will:

- Provide information about components which may be a standard, a guideline or an ICT service available for re-use at a national, sectoral and local (individual organisation) level. ICT services available for re-use will use the Generic Services Model as a starting point. The information about each item in the Catalogue should be sufficient to allow understanding of the scope of the component and its current applicability plus some form of signposting for further assistance
- Be designed and owned by a national federated Design Authority function (see Section 6 for details of this) fully supported by the sector level Design Authorities
- Be managed as a service by Digital Directorate
- Be populated initially from existing shared/re-usable services already provided at national or sectoral levels (e.g. by the Improvement Service, ISIS, SWAN, JISC, NSS)
- Be built using tools and infrastructure already available, scaled for cross-sector use with any additional funding provided from all sectors.

6 Federated Governance Approach

As the Framework moves into a more practical application phase, an additional level of support is required to the function provided by the Technical & Design Board. This additional support will take the form of a national federated Design Authority function.

A Design Authority function within an individual organisation (or as in the case of E-Health, within a sector), normally exists to assure the sustainability and interoperability of any new or upgraded ICT services by testing proposals against the organisation’s policies, architecture and standards. This testing will usually be done within a set of pre-agreed guidelines and tolerances and any proposed new ICT service falling within those pre-agreed guidelines and tolerances can be approved directly by the Design Authority but if it falls outside these, the proposal would require to be referred to a business governance function for further consideration and approval.

This concept is extended to introduce a federated Design Authority function at a National (Scottish Public Sector) level whose membership consists of Design Authorities from across all sectors and whose primary remit is to consider proposals from individual organisations or sectors for any element of ICT Services for re-use by other sectors or for adoption as a national standard. These proposals could include standards which may have value in being mandated at a national level (Video Conferencing standard as an example), guidelines/ checklists for procurement in line with the Framework and national level ICT services. A process for proposing and approving national level components is outlined in [paragraph 7.2](#) of this Framework.

Additionally, it has been agreed that individual Design Authorities will also take on responsibility for assuring Framework compliance for layers in the Generic Services Model as depicted in Figure 4 below

For this approach to be successful, the remit of each individual Design Authority needs to include responsibility for identifying and promoting candidate proposals for national level consideration as an integral part of their organisational/sectoral Design Authority function.

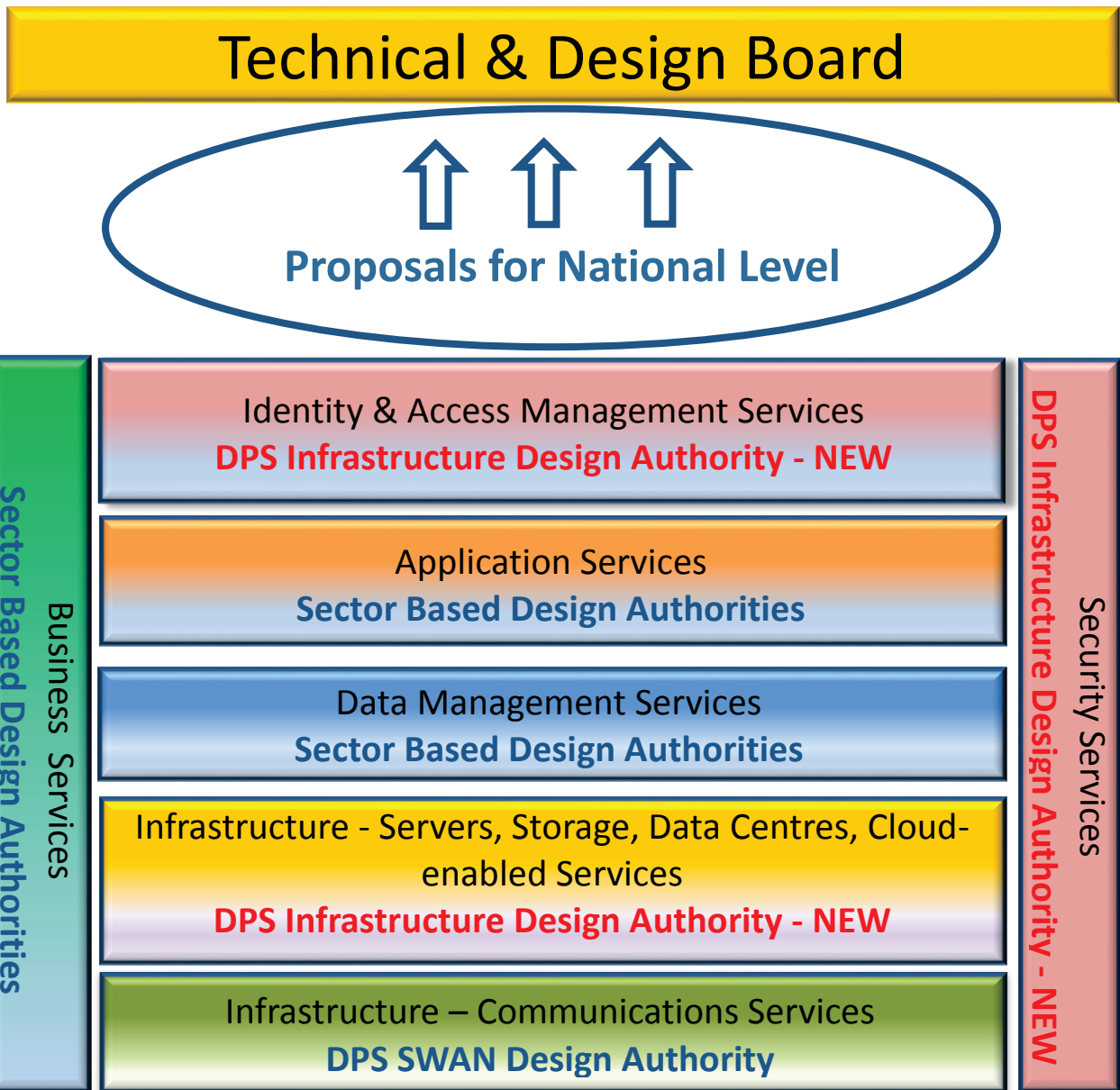


Figure 4 – Design Authority Responsibilities

7 Standards, Guidelines and Recommendations

7.1 Current Standards, Guidelines and Recommendations

There are a number of nationally agreed standards, guidelines and recommendations which have been developed since the initial issue of the Framework and these are listed below. More detail of their content will be contained in the Catalogue of Re-usable Components which is owned and maintained by the National Design Authority function:

Subject Area	Link
Data Vision and Strategic Action Plan and Privacy Principles	Data Vision and Strategic Action Plan
	Privacy Principles
Scottish Public Sector Portal	mygov.scot
Citizen Authentication Service	Myaccount
National Skills Workstream	National Approach to a Skilled & Empowered Workforce
Enterprise Architecture Skills Frameworks	TOGAF Architecture Skills Framework
	SFIA Professional Profiles Chart
	Zachman Enterprise Architecture Certification
Procurement Agreements & Processes	National Collaborative Agreements
	Public Contracts Scotland Forward Plan
	National Procurement Portfolio Plan
	ICT Technical Assurance Process for Investment Board
Open Standards & Open Source Software Policy	Open Standards and Open Source Software Policy – Work in Progress
Examples of Enterprise Architecture Approaches	Approach to Architecture in Health
	Architecture Principles in Health
	Government of Australia Approach
Scottish Public Sector Data Hosting and Data Centre Strategy	Data Hosting and Data Centre Strategy
Guidance on Cloud Computing	Cloud Computing
Guidance on Virtualisation	Virtualisation
Guidance on Co-location	Co-location
List of data centres for co-location	List of data centres for co-location
SWAN – Core Services	SWAN Core Services
SWAN Value Added Service Strategy	SWAN Value Added Services Strategy, initial Value Added Services List – Work in Progress
Use of National Entitlement Card for any smartcard services	National Entitlement Card Programme
Technical Standard for Video Conferencing Solutions	Video Conferencing Technical Standard
Collective Approach to Spatial Data Management (Improvement Service)	Spatial Information Programme
Use of UPRN as a data standard in property management (Improvement Service)	Spatial Information Programme

7.2 Process for Recommending & Endorsing National Standards

There will be an agreed process to proposing and approving standards at a national level. This process is based on the UK level Government Digital Services Standards Hub approach but with a focus on standards proposed from within the Scottish Public Sector Design Authority community initially. Once the process is established, it will be considered for extension to wider citizen involvement. The process which is currently in draft is described here [Standards Endorsement Process](#)

8 Enabling Actions

For ease of maintenance, the details of the Enabling Actions associated with Version 2 of the Framework is contained at Annex C – Enabling Actions and updates to these actions will be reviewed by the Technical & Design Board at their regular scheduled meetings. Status updates and any escalation required related to the action items in this plan which are governed by other boards and organisations, will be through the Programme Board for National Level Actions via the chair of the Technical & Design Board.

9 Decision Support Checklist

The concept of a maturity assessment model in the initial version of this Framework was not perceived as helpful for organisations in incorporating the principles into their day to day decision-making. However, the concept of a checklist or template to support organisations to do this was viewed by stakeholders as a more helpful proposition. The Improvement Service has created an Assurance Matrix and Compliance Checklist both of which are work in progress to support its business case approval process. More details are provided at Annex E – Assurance Matrix and Compliance Checklist and is proposed as an *example* of how the principles of this Framework can be incorporated into an organisation's existing processes that may be useful for other organisations to adapt for their own use.

Annex A - Governance and Support Structure



This governance structure is correct as at the 20th of July 2015. Some changes are due to be made by September 2015, an up-to-date version of this structure can be accessed at: <http://www.gov.scot/Topics/Economy/digital/digitalservices/governance>

Annex B – Terms of Reference for the Technical & Design Board

Digital Public Services Technical and Design Board

Remit

To provide technical and strategic input from the public sector technical community into the delivery of the recommendations set out in:

- The McClelland Review of ICT Infrastructure in the Public Sector in Scotland, and in;
- Scotland's Digital Future Delivery of Public Services.

The Technical and Design Board reports into the Digital Public Services National Level Actions Programme Board.

Roles and Responsibilities

The board will be responsible for the following:

- Support the delivery of the Scottish Government's public sector ICT infrastructure agenda, and contribute to delivering the identified efficiencies, benefits and outcomes.
- Support the development of the technical and design requirements and standards at national and sectoral levels, to ensure that where national solutions are developed these can be implemented for all areas of the public sector.
- Support the development of a Technical and Design Authority to consider requirements and standards. Put clear methodology in place to differentiate between the roles and responsibilities in identifying and considering design requirements and standards that have a national and cross sector impact.
- Maintain a High Level ICT Operating Framework, ensure that this document is periodically reviewed and updated where appropriate. Ensure relevancy of this document by allocating the technical and design requirements and standards as they are agreed, and engage with public and private sector to enable all sectors to fully sign up to the joint approach.
- Based on the findings and good practice across public and private sector set out options for the on-going mandate/control of the ICT architecture and operating framework.
- Explore the opportunities to ensure existing initiatives, infrastructures and technical forums can support vital areas of standards, security and protocols.

- Identify opportunities to develop technical policies and standards in support of Digital Public Services and ensure that work on these is progressed to satisfactory standards.

Resourcing

- A core group, with representation from all sectors, will form the Technical and Design Board.
- Each sector will identify suitable technical expertise and existing groups and forums that can contribute to the technical and design considerations. Sectors will be asked to backfill resourcing to any business critical experts where possible.
- Dedicated resource will progress all aspects of work such as upkeep of the High Level Operating Framework.
- The Digital Public Services programme office will provide secretariat and programme management support.

Membership

- Each member should have a nominated deputy, in the event of their being unable to attend Board meetings. Digital Public Services programme office shall maintain a list of nominated deputies.
- If a member fails to attend three Board meetings in succession, their membership shall be revoked.

Meetings

- The Board will aim to meet quarterly, following the meeting of the National Level Actions Programme Board to which it reports.

Governance

- The Technical and Design Board reports into the Digital Public Services National Level Actions Programme Board and is represented on this Board by its chair who is in attendance.
- The Technical and Design Board will provide advice and guidance as required to other DPS governance boards, Sectoral Boards and associated workstreams.

Engagement

- The Board will, where possible, use the stakeholder engagement channels set by Digital Public Services. If there are additional requirements they should be

agreed with the Digital Public Services programme office to ensure continuity and to avoid duplication of effort.

Project Documentation

- The project documentation will be held by the programme office through the project support function and will be consistent with the overall programme methodology – Managing Successful Programmes.

Revised November 2014.

Annex C – Enabling Actions

Focus Area	Action	Timeline	Lead
Category 1 - National Level Programme Actions on which Framework is Dependent			
Citizen Customer Focus- Digital Standards	<ul style="list-style-type: none"> • Priority route map of digital services • Define and document the standard for mygov.scot services • Identify and endorse open standards • Mygov.scot website available to the public • Collaborate with public sector partners in redesign of public services 	<ul style="list-style-type: none"> • On-going • On-going • On-going • On-going • On-going 	Digital Public Services and Business Transformation
Citizen Customer Focus- Identity & Access Management	<ul style="list-style-type: none"> • Implementation programme and wider engagement – suggest rewording • Implementation of myaccount, the service which is delivering secure and easy sign-in to online public services. • Development of policy around business sign-in to public services 	<ul style="list-style-type: none"> • COMPLETE • COMPLETE • On-going 	Identity & Access Management w/s
Privacy & Openness - Data Innovation (Big and Open Data)	<ul style="list-style-type: none"> • Develop an Open Data Strategy for Scotland • Development of a data action plan for Scotland 	<ul style="list-style-type: none"> • COMPLETE • COMPLETE 	Identity & Access Management w/s
Privacy & Openness - Data Sharing	<ul style="list-style-type: none"> • Information Sharing Board to Publish Information Sharing Strategic Framework. 	<ul style="list-style-type: none"> • COMPLETE 	Identity & Access Management w/s
Workforce – ICT capability	<ul style="list-style-type: none"> • Undertake a Skills Gap survey to assess current and future skills issues and gaps within public sector ICT workforce. This should take account of both technical skills and knowledge as well as wider context of programme/project management and business skills required by ICT professionals. 	<ul style="list-style-type: none"> • COMPLETE 	Workforce w/s
Category 2 – Framework Support Actions			
Collaboration and Value for Money – Version 2.0	<ul style="list-style-type: none"> • A scoring sheet will be developed to enable organisations to assess themselves against the maturity model. 	<ul style="list-style-type: none"> • COMPLETE 	Technical and Design Board. 24/07/2015

Create an agreed measurements and benefits framework			
Collaboration and Value for Money- Identify excellence and develop a framework for sharing and supporting the adoption of good practice	<ul style="list-style-type: none"> Develop sector based ICT Operating Frameworks, where needed, using the same model as supplied here. Work with volunteer organisations who have undertaken the maturity model assessment. 	<ul style="list-style-type: none"> COMPLETE COMPLETE 	Technical and Design Board.
Collaboration and Value for Money - efficiency and re-use	<ul style="list-style-type: none"> Identify commonality and opportunities (for example Green ICT). Develop an Open Standards catalogue that will include Open Source 	<ul style="list-style-type: none"> COMPLETE Superseded by Catalogue of Re-usable Services in Version 2 of HLOF 	Technical and Design Board.
Governance	<ul style="list-style-type: none"> Agree the remit and establish a Technical Design Authority 	<ul style="list-style-type: none"> COMPLETE 	Technical and Design Board.
Catalogue of Re-Usable Components	<ul style="list-style-type: none"> Provide an online system which will signpost all re-usable components (ICT services using generic definitions as above, standards, guidelines, policies, checklists) which will be owned by a Federated Design Authority function with responsibility for its use and currency Catalogue to be pre-populated from already approved National Programmes/capabilities (SWAN, SWAN Value Added Services, MyGov.scot, Myaccount, National Entitlement Card, Shared service for INSPIRE compliance Sectoral Design authorities to put forward candidates for new re-usable services through the Federated Design Authority function 		Technical and Design Board.

New!

New!	Governance	<ul style="list-style-type: none"> • Formalise a Federated Design Authority function from existing (and new) sector level Design Authorities • Create Framework level Design Authorities to oversee layers in the Generic Services Model: <ul style="list-style-type: none"> ○ Sectoral Design Authorities ○ DPS Infrastructure Design Authority 		Technical and Design Board.
	Architecture Principle - Workforce	<ul style="list-style-type: none"> • Propose a pilot project as part of the National Workstream Skills Action Plan to support skills development and training collaboration among all public sector organisations in the area of Enterprise Architecture. 		Technical and Design Board.
New!	Architecture Principle – Use of Open Source Software	<ul style="list-style-type: none"> • Propose that Scottish Government author guidance on <ul style="list-style-type: none"> ○ the practicalities of acquiring and implementing open source applications / libraries, particularly around the procurement and legal implications (e.g. copyleft licenses); ○ how to ‘publish’ Scottish public sector applications / libraries or documentation as open source; • Create and maintain a registry of open source apps and libraries published by Scottish public sector; (this would be part of the Catalogue of Re-usable Components) • Create and maintain a catalogue of open source alternatives to proprietary applications; (this would be part of the Catalogue of Re-usable Components) 		Technical and Design Board.
New!				

Annex D – Glossary of Terms

Term	Meaning
COTS	Commercial Of The Shelf software
DPA	Data Protection Act
FOI	Freedom of Information Act
HLOF	High Level Operating Framework (this document)
ICT	Information & Communications Technology
PAAS	Platform As A Service
Principle	Provides high level guidance on the approach to be taken
SAAS	Software As A Service
Service Provider	A generic term for an organisation, a physical device or an application system which is providing a service
Standard	Provides details on how an approach will work in practice
TOGAF	The Open Group Architecture Framework
UPRN	Unique Property Reference Number



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W W W . G O V . S C O T

Annex E – Assurance Matrix and Compliance Checklist

The Improvement Service has created 2 templates for its own use (which are work in progress) as follows:

An Assurance Compliance Checklist – which can be used to assess the compliance of any proposal against the High Level Operating Framework plus the organisation’s own policies, strategies and principles.



Assurance
CheckList - Template

An Assurance Matrix – which can be used to weight each element that the organisation wishes to consider in its options appraisal and to assess the merits of each option against each element and arrive at a score.



Assurance Matrix -
Template.xlsx

The Assurance Matrix has 3 tabs:

- Base Data - holds the business drivers being considered in the appraisal plus the weightings assigned to each
- Score Sheet - replicates the base data and provides a scoring mechanism
- Score Sheet Weighted - the same as the Score Sheet except the weighting factors are automatically applied to each score

It is recommended that this sheet is completed with key stakeholders in 2 phases -

Phase 1 - go through each of the business drivers including the principles of the High Level Operating Framework plus the organisation’s own policies, strategies and principles and assign a weighting to each. Complete the Base Data tab

Phase 2 - go through each option being considered and score how well each business driver or principle is met by that option. Complete Score Sheet tab.