ICT Strategy for the Public Sector in Wales

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for the
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1. Introduction

Delivering a Digital Wales is the Welsh Assembly Government's framework for addressing the challenges of rapidly evolving trends in information and communications technology (ICT), digital media and the internet in a citizen-focused way and, embracing the opportunities and imperatives of this rapidly evolving world. *Delivering Digital Wales* provides a Welsh perspective on many of the issues raised in *Digital Britain*, published by the UK government in June 2009. *Delivering a Digital Wales* formulates a vision for a Digital Wales, with emphases on: inclusivity and the participation of all citizens, the development of skills at all ages and levels, the use of ICT to strengthen the economy, transformation of public services and its role in supporting Welsh creativity, culture and language.

This document is the *ICT Strategy for the Public Sector in Wales* and provides the technical strategy, architecture, infrastructure and standards to implement *Delivering a Digital Wales* and is written primarily for the ICT profession working in the Public Sector in Wales.

The *ICT Strategy for the Public Sector in Wales* is closely aligned with the UK *Government ICT Strategy* and where appropriate collaboration and use of services provided from the UK strategy are envisaged.

This *ICT Strategy for the Public Sector in Wales* confirms that Wales will have its own ICT Strategy, architecture and design process. This will allow Wales to robustly and safely ensure that ICT implementation decisions are based on evidence that they meet the needs of the citizens of Wales.

Extensive redesign of public services is to be expected as the implementation of *One Wales* takes shape. Effective use of information is essential to the provision of these services, especially for the collaboration of service professionals from different sectors and areas in support of service delivery to the citizens of Wales. It is essential that the *ICT Strategy for the Public Sector in Wales* can support the current situation, the intended final state and, most importantly, the transitions between the two. Furthermore, the transitions will not be uniform across Wales. This reinforces the need for an overall strategy and design that is not dependent on a particular organisational configuration.

In broad terms, the *ICT Strategy for the Public Sector in Wales* has to migrate from the current organisational diversity of ICT across Wales to a corporate arrangement that can meet the requirements of current and future public services. It is recognised that, whilst the existing organisational strategies and supporting architectures and infrastructures have provided a good service locally, the scale of technology change required in the future will necessitate a whole Wales approach involving extensive redesign and investment. Failure to update the architecture and infrastructure into a more common, corporate arrangement will put at risk the implementation of *One Wales*.

This *ICT Strategy for the Public Sector in Wales* recognises the importance of building trust and confidence of the Welsh Assembly Government, public sector workers and citizens in the use of ICT to improve public services. The implementation of this strategy will therefore work closely with users to ensure the design meets the requirements. Extensive communications will be augmented with an incremental process of delivery to reduce risks and ensure benefits are delivered.

The main objectives are therefore:

- Establishing a common, corporate architecture, design and delivery programme that delivers benefits from the outset and provides the common platform for future developments and the redesign of public services envisaged in *One Wales*

- Supporting the organisational changes which are underway at the moment

- Increasing the return on ICT investment, by using common products and approaches and reducing any unnecessary duplication of effort

- Securing ICT to help prevent any loss of data, including person identifiable and organisation sensitive information

- Provide high quality and responsive ICT services to support integrated public service delivery

- Working together across all public services in Wales to establish a common approach on relevant ICT projects. The Public Sector Broadband Aggregation (PSBA) project has already laid the foundations for this.

  The *ICT Strategy for the Public Sector in Wales* also sets down basic principles:

- To be safe

- To be incremental by design and make best use when possible of existing ICT and processes

- To make use of UK government ICT standards where appropriate (e.g. e-Gif)

- To enable interoperability across Wales and with the rest of the UK and where appropriate European partners

- To achieve the right balance between ICT efficiency and ICT investment to enable improvements in downstream public service delivery.

- To allow for differing organisational priorities, opportunities, and constraints whilst migrating to national designs and solutions

- To remain valid in the face of public services redesign

- To recognise the statutory and business obligations and requirements of the public sector in Wales e.g. requirements of Welsh language legislation

- To be affordable.

This *ICT Strategy for the Public Sector in Wales* has been developed to reflect the following factors:

- The organisational changes currently being planned and undertaken by the Welsh Assembly Government

- The increasing pressure on budgets expected over the next few years as a result of the current financial climate

- Increasing opportunities for collaboration across the public sector in Wales to deliver better value for money and more effective ICT solutions as detailed in 'Making the Connections'

- Increasing security requirement to prevent against loss of data, including person identifiable information

- New opportunities resulting from changes in technologies

- The Welsh Assembly Government commitment to a bilingual Wales and the need for service provision in two or more languages.

This *ICT Strategy for the Public Sector in Wales* considers the following technology areas:

- Networking Services (PSBA)
- Data Centres
- Desktop deployment and management strategy
- Mobile working
- The Wales 'Cloud' (Cwmwl Cymru)
- The Wales Application Store or 'W-AS'
- Collaborative services
- Internet infrastructure and services
- Architecture and standards
- Open source, open standards and reuse strategy
- The One Wales Government's commitment to further Welsh language provision
- Citizen access to public services
- The Greening Wales ICT Strategy
- Security
- International alignment and co-operation.

Citizens' interactions with ICT systems should be provided bilingually (Welsh and English). Examples of this would be bilingual web sites, bilingual auto attendant systems and bilingual SMS information services. During the citizens initial contact with an ICT system, they should be prompted to select the language of choice (or need) for that session. There should not be an assumption that either language should be the default. For example, the front page on websites, or the first interaction with auto attendant systems should prompt users to select which language they wish to use. Additionally, websites should allow a user to swap between languages on every page. For all Welsh (and other) language provision translation memory technology, should be used, to share translations to increase consistency, speed and to further contribute to the multilingual landscape of Wales. This joined-up approach will ensure a consistency of experience, and the translation memories thus produced can then be used as a base for Example Based Machine translation.

ICT systems developed or procured for use by the public sector in Wales should fully support the provision of bilingual services in accordance with statutory duties. Systems which are not wholly public-facing may be used to support the provision of services to the public, for example when producing automated output such as letters, forms etc. The output from any systems intended for use within the provision of services should be designed and developed to support bilingual services.

Furthermore, in order to empower citizens to choose the most appropriate services for themselves, ICT systems should provide information about services that are available through the Welsh language. Examples of this would be to show citizens which GPs within a practice can speak Welsh, or which counsellors within a team are able to provide their services in Welsh. All this technology should use the principles outlined in the Welsh Language Board's *Standards and Guidelines* document for bilingual software, and its associated Accreditation Scheme.

2. Wales ICT in the 21st century

Demand for public sector services and expectations of levels of service are ever increasing. Citizens and businesses expect the same levels of access and personalisation that they see from large private sector organisations such as Amazon and Tesco. They expect to be able to access their services from multiple locations on multiple device types and in ways that suit the user, rather than the provider of services. The UK public sector has already made real progress in simplifying access to services and meeting this increased demand.

- In 2007/08, 13m motorists renewed their car tax online (30% of total). This is a 73% increase on last year's figures
- 5.8 million self-assessment tax returns were completed online – which is a 56% increase on last year's number
- DirectGov now has over 15 million visits a month, and the customer satisfaction rate for Businesslink.gov.uk is over 90% (as reported in its May 2008 survey), which puts it ahead of the best commercial comparators such as Amazon.com
- NHS Choices had 2m visits by the end of the 07/08 financial year.

The pervasive use of ICT goes beyond the public sector. In the UK, the ICT Industry employs about 1 in 20 people. There are over 100,000 ICT companies and many sell to the public sector. Half of Europe's productivity gains in the last few years have been attributed to ICT investment. So much so that the Gross Value Add per ICT job is £81,400, some 2.5 times higher than the UK average – this may be attributed to the high skill set of those employed within ICT - 55% of ICT people are qualified to at least level 4, nearly double that of the UK working population.

It is estimated that there are over 35,000 IT Professionals in the UK public sector after outsourcing. Research from e-skills indicated that the public sector employs in total over 10% of the entire UK ICT workforce, at some 135,000.

Technology changes offer a real opportunity for the public sector to maximise services and increase efficiency. The UK Chief Technology Officer Council is responsible for horizon-scanning on behalf of the UK CIO Council - identifying emerging technologies which could be used to improve the delivery of public services and meet known public sector challenges and business drivers.

There are many transformational technologies that will become mainstream in less than five years[1]. Those of particular interest in a UK government context are: interactive (web 2.0) tools and processes, cloud computing technology and service-oriented architecture (SOA). SOA provides a set of governing principles and concepts that define how services will operate with each other and requires a common approach to the detailed information (metadata) associated with services. Longer term there is potential for context based delivery architectures to have an impact.

Emerging technologies, such as cloud computing will have a dramatic effect on how public sector ICT is delivered behind the scenes. From an external perspective, citizens and businesses are likely to notice an increase in use of web 2.0 and social networking tools and methodologies. These will help improve public sector interaction with citizens and businesses, providing opportunity for empowerment and participation, promoting transparency and improving services. Internally, the use of Cloud technology enables different business models to be developed for the procurement, use and re-use of applications. Hosting applications within a Wales Cloud (Cwmwl Cymru) means that organisations will be able to create a payment model based on the character of the

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[1] Hype Cycle for Emerging Technologies 3, Gartner 2009

organisation and user community. They will be able to access a software licence that is assigned to the crown and transferable across the public sector; organisations will have greater flexibility in defining the payment model focused on when applications are being used. Implementation of a service-oriented architecture will enable delivery of the Cwmwl Cymru and the Wales Application Store, promoting reuse and efficiency in a secure environment.
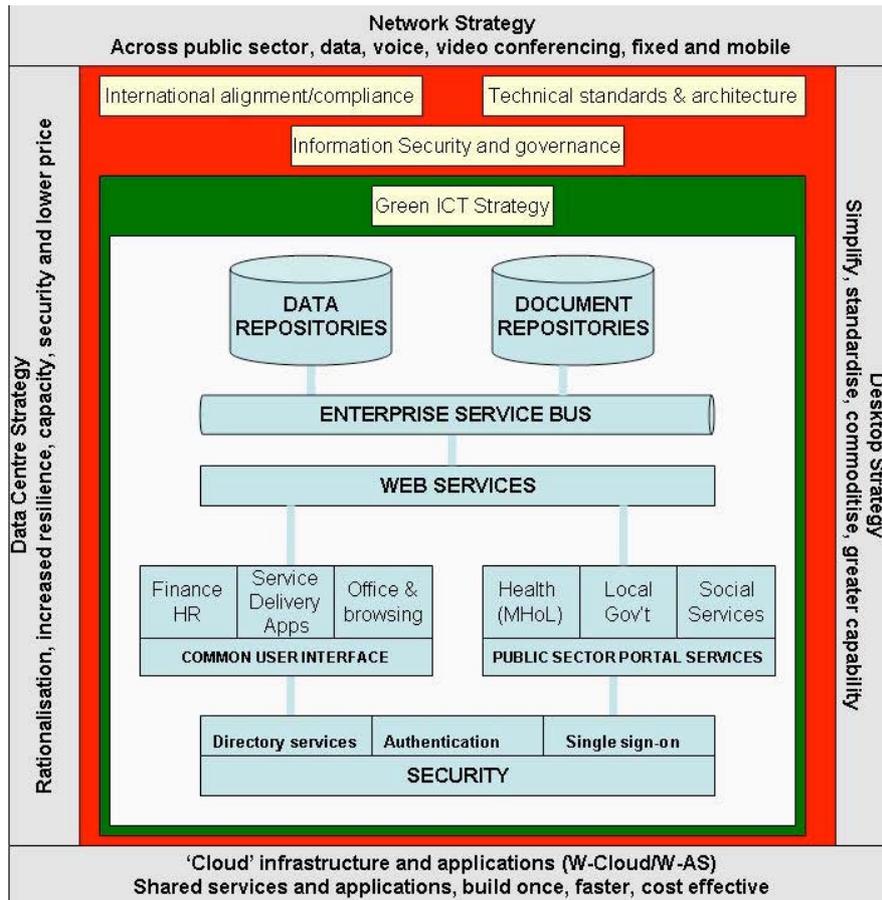
In the longer term - 2015-2020 - additional emerging technologies will begin to be identified. Semantic technologies, when used in software, will separate data and content files from application code and meanings. This means that changes can be made more quickly, more cheaply and with reduced risk. Semantic technologies can also be applied to the internet (Semantic web) so that computers can find, share and combine information on the web. This means that computers will be able to undertake many of the transactional tasks (such as searching for public services available in your local area) that currently require human intervention. Location-aware services and developing technologies that enable more energy efficient operations are also likely to play a large part in shaping government's future ICT infrastructure, assets and processes. There are also technology developments that will be more applicable within certain sectors than others. For example, developments in Human-Computer interaction will enable greater penetration of technology in the clinical (health) environment, working with disabled people, house bound and helping single parent families back to work. For instance, removing the need to use a keyboard or a pointing device will bring a step forward in the use of ICT in all healthcare settings. This strategy provides the flexibility for new technology developments and sector specific requirements to be incorporated as they arise. All these developments, of course, will be undertaken in the context of the bilingual nature of Wales.

As well as being the largest employer of IT Professionals in the UK, the public sector is also a significant customer to ICT vendors. The public sector spends approximately £16bn per year on technology which accounts for 4.6% of overall public sector expenditure as detailed in the recent independent benchmarking undertaken by the Operational Efficiency Programme by Dr Martin Read.

3. Summary of the ICT Strategy for the Public Sector in Wales

The *ICT Strategy for the Public Sector in Wales* has a very close alignment with the UK *Government ICT Strategy*. Wales will have its own ICT Strategy, architecture and design processes. This will allow Wales to robustly and safely ensure that ICT implementation decisions are based on evidence that they meet the needs of the citizens of Wales.

The *ICT Strategy for the Public Sector in Wales* – A pictorial view of the strategy and supporting architecture.

Network Strategy
Across public sector, data, voice, video conferencing, fixed and mobile

International alignment/compliance

Technical standards & architecture

Information Security and governance

Green ICT Strategy

DATA REPOSITORIES

DOCUMENT REPOSITORIES

ENTERPRISE SERVICE BUS

WEB SERVICES

Finance HR	Service Delivery Apps	Office & browsing

COMMON USER INTERFACE

Health (MHoL)	Local Gov't	Social Services

PUBLIC SECTOR PORTAL SERVICES

Directory services	Authentication	Single sign-on

SECURITY

Data Centre Strategy
Rationalisation, increased resilience, capacity, security and lower price

Desktop Strategy
Simplify, standardise, commoditise, greater capability

'Cloud' infrastructure and applications (W-Cloud/W-AS)
Shared services and applications, build once, faster, cost effective

The *ICT Strategy for the Public Sector in Wales* supports delivery of core public sector goals:

- Improving public service delivery
- Improving access to public services
- Increasing the efficiency of public service delivery
- The promotion and facilitation of the use of Welsh throughout the public service.

These goals are set in *One Wales,* Delivering a Digital Wales, Digital Britain, Building Britain's Future. Each Department, Local Government and wider Public Sector organisation also has their own service strategy to deliver specific services and commitments. The *ICT Strategy for the Public Sector in Wales* provides a standardised, flexible and efficient infrastructure which enables delivery of individual sector and departmental business objectives. It provides public sector staff with the confidence that they can deliver their objectives effectively and securely in a sustainable manner. It reduces inefficiency, replication of systems and duplication of effort.

The strategy will go further by providing Accounting Officers with the confidence that services available across the Welsh public sector have met procurement legal requirements and provide value for money to their business.

The public sector is facing significant pressures:

- Citizens are demanding access to services at times and in ways that are convenient to them rather than the provider

- Citizens and businesses have higher expectations of the levels of service and interaction they require from service providers
- To build confidence for citizens in the security of the information that the public sector maintains
- The global economic downturn of 2008/2009 will have long-term ramifications for market structures and investment models, leading to greater pressure for efficiency and savings.

The time is now right for the public sector in Wales to take a fresh approach to its ICT and to review how ICT services and systems can be fully exploited to enable organisations to meet the challenges they face. This strategy addresses core infrastructure, standardisation and simplification of ICT standards and designs, embedding of core policy and the development of capable people – both internal and external to the public sector.

3.1. Common Infrastructure

The ICT Strategy will create a common, secure, flexible infrastructure that is available to the public sector. To achieve this, the strategy sets out the vision for:

- **Networking – Public Sector Broadband Aggregation (PSBA):** A single holistic telecommunications infrastructure that will deliver secure converged voice, video and data communications across the Welsh Public Sector. The PSBA will deliver facilities to any location, running over a core network that is secure, based on open standards, interoperable, energy efficient and competitive.

- **Data Centres:** In order to deliver large cross-sector economies of scale, meet environmental and sustainability targets and provide secure, resilient services, it is necessary to significantly rationalise the current base of data centres in use by the public sector in Wales. Aligned with the development of the Cwmwl Cymru below, is a programme of activity that will consolidate and reduce the number of data centres in use from the hundreds of facilities to a small number of 'paired' data centres. This will deliver improved highly resilient, secure data centres that reduce cooling and power consumption by approximately 20% on current infrastructure. Wales will work with partners across Government in the UK and share ideas and potentially facilities to meet our objectives.

- **Cwmwl Cymru (Wales Cloud):** A Government cloud infrastructure that enables public bodies to host their ICT systems from a secure, resilient and cost-effective service environment. Multiple services will be available from multiple suppliers which will make it quicker and cheaper for public sector bodies to switch suppliers if they face service or delivery issues. This service will be provided from within Wales and organisations migrating from their existing products, services and contractual arrangements when feasible. Again, Wales will work with partners across Government in the UK and share ideas and potentially facilities to meet our objectives.

- **Wales Applications Store (W-AS):** The Wales Application Store (W-AS) will be an online portal that enables sharing and reuse of business applications, services and components across the public sector. Rather than create bespoke solutions each time a requirement is identified, reuse will become the norm with organisations migrating from their existing products and contractual arrangements when feasible. This is potentially a collaborative service with UK Government.

- **Collaborative Services:** In recent years, the collaborative services culture across Wales Government and public services has been building both within and between departments – providing Finance, HR and Procurement services. This approach can save both money and headcount and over 80% of UK civil servants are now supported by a collaborative service solution. Collaborative Services will be provided via the W-AS and Cwmwl Cymru to further exploit opportunities. Further collaborative service opportunities will be explored as part of the implementation of this Strategy and potentially include sharing facilities and services across the UK Public Sector.

- **Desktop Services:** All public sector bodies need to provide their staff with access to business critical and specialist systems together with services such as email, word processing, spreadsheets and internet browsing. Historically, each public sector organisation has separately specified, built and run their desktop service. The *ICT Strategy for the Public Sector in Wales* will provide the public sector with a set of common desktop designs and all suppliers will be required to deliver common designs and collaborative services at the lowest price available. These designs will conform to Information Governance (IG) and Sustainability and bilingual requirements (e.g. interfaces, spellcheckers and grammar checkers) and will deliver significant economies of scale. The desktop strategy and designs will include how applications will be delivered to the desktop including the use of the Cwmwl Cymru service.

3.2.   Common Standards

All products, services and assets contained in the Wales ICT infrastructure will benefit from a suite of common standards. This will assure security, interoperability and common data standards which will facilitate easier data sharing and joining up of public services.

- **Architecture and Standards**: The technical architecture and standards work underpins all elements of the *ICT Strategy for the Public Sector in Wales*. This work will ensure that each element of the strategy can interoperate and be reused across the public sector, delivering agile, bilingual public services that are efficient, responsive and tailored to meet the needs of citizens and businesses.

- **Open Source, Open Standards, Reuse**: Traditionally, the public sector has relied on Commercial Off The Shelf (COTS) software from global providers, though some sectors in Wales having thriving in-house development strategies service specific functions. In some cases opportunities exist to reuse solutions, increase flexibility to manage assets efficiently and facilitate greater ability to switch suppliers when problems occur. The Open Source, Open Standards, Reuse strategy will provide the public sector with Open Source alternatives to COTS software that meet public sector requirements for Information Assurance, resilience and ongoing support and integration with existing systems. UK Government already commits to only using open standards for documentation. This Strategy will build capability within the public sector in Wales to increase the amount of open source code and software in use and to make it available for reuse elsewhere. This will involve collaboration with UK Government. The potential, for example, for reuse and sharing of translations is evident here.

- **Greening Wales ICT**: ICT globally emits more carbon than the aviation industry and use and emissions continue to grow. Recognising this, the UK Greening Government ICT strategy sets two challenging targets which support delivery of mandatory SOGE (Sustainability on the Government Estate) targets. The Greening Government ICT strategy is embedded , in all elements of the *ICT Strategy for the*

Public Sector in Wales and will deliver significant cash savings from smarter working practices as well as reduced energy consumption, alongside lower carbon emissions.

- **Information Governance and Security**: Recent data losses within the public sector have rightly raised the profile of Information Governance (IG). However, without appropriate levels of data sharing, the Welsh Assembly Government will be unable to meet its aim of joining up services and providing easier access to personalised services for citizens and businesses. Effective, proportionate management of information risk is essential to meet the challenge of delivering personal services enabled by ICT, as well as making us more effective and efficient. Work to enhance Information Governance and Security through the National IG Strategy cuts across all elements of this ICT Strategy and is embedded within all work-streams. The *ICT Strategy for the Public Sector in Wales* will deliver a secure and proportionate infrastructure that will allow public sector bodies to match their information risk appetite with their information risk exposure.

3.3. Common Capability

Cultural change is a critical success factor for the delivery of the ICT Strategy. People and their skills are the key element of delivery of an ICT infrastructure that meets the requirements of users, customers and stakeholders. The common capability strategy for Wales is detailed in a separate document *Building the capacity and capability to support the ICT Strategy for Wales*.

3.4. Common Delivery Approach

It is expected that across the range of projects identified a common delivery approach will be undertaken. This will mean that national procurements or in-house builds be the norm in order to ensure the pooling of expertise and maintaining best value for money. These collaborative activities should extend to further projects where there is a robust business case.

3.5. Implementation

This strategy sets out the direction for Wales ICT in the Public Sector for at least the next 5 years. It will be delivered and implemented through individual public sector organisations who want to exploit the infrastructure available to them to enable delivery of their business plans and objectives. It is therefore critical that the delivery structures of the strategy (governance) reflect the needs and experiences of front-line delivery organisations and these will detailed in the next version of this ICT Strategy.

This is a substantial strategy for the Welsh Assembly Government. Transforming services against a backdrop of such economic pressure, requires leadership and a fundamental change in the way we specify, procure and deliver ICT to the public sector. This strategy provides the means to achieve the benefits outlined above. Chief Information Officers (CIOs) and their Departments and Services will implement the strategy and provide transformed ICT, that supports and enables the public sector to meet its core aim of improving the lives of the citizens in both the national languages of Wales. Overall strategic leadership and performance management will be the responsibility of the Welsh Assembly Government CIO.

4. The ICT Strategy for the Public Sector in Wales

The *ICT Strategy for the Public Sector in Wales* has to migrate from the current organisational diversity of ICT across Wales to a corporate arrangement that can meet the requirements of current and future public services. It is recognised that, whilst the existing organisational strategies and supporting architectures and infrastructures have provided a good service locally, the scale of technology change required in the future will necessitate a whole Wales approach involving extensive redesign and investment. Failure to update the architecture and infrastructure into a more common, corporate arrangement will put at risk the implementation of *One Wales*.

This *ICT Strategy for the Public Sector in Wales* recognises the importance of building trust and confidence of the Welsh Assembly Government, public sector workers and citizens in the use of ICT to improve public services. The implementation of this strategy will therefore work closely with users to ensure the design meets the requirements.

Extensive communications will be augmented with an incremental process of delivery to reduce risks and ensure benefits are delivered.

The architecture, infrastructure, applications and services will need to provide the inherent flexibility to adapt to local diversity and migration plans.
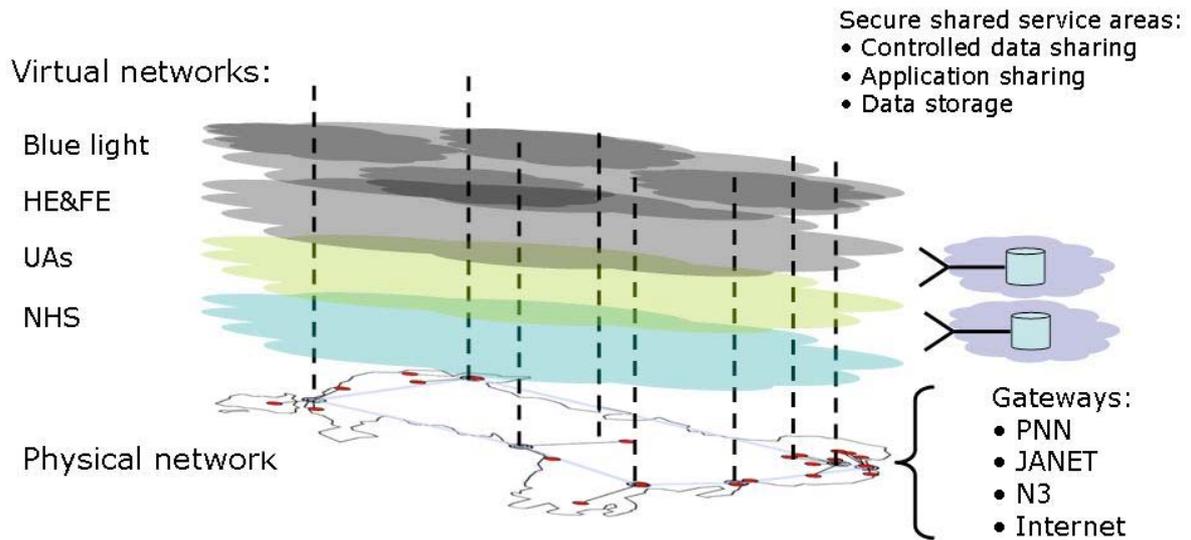
Therefore, the ICT Strategy for Wales consists of 14 streams of delivery, each of which is covered in more detail in the following sections.

4.1. Networking - The Public Sector Broadband Aggregation (PSBA)

The Public Sector Broadband Aggregation (PSBA) strategy has delivered the capability for a single holistic broadband infrastructure for the whole of the public sector in Wales, rather than each public body designing, developing, installing and maintaining its own; an approach which historically has led to fragmented, unreliable and expensive service delivery.

The PSBA high level design is described in the diagram below.

Secure networks for each sector

Secure shared service areas:
• Controlled data sharing
• Application sharing
• Data storage

Virtual networks:

Blue light

HE&FE

UAs

NHS

Physical network

Gateways:
• PNN
• JANET
• N3
• Internet

The PSBA Programme has been established to:

- Deliver wide area networking and associated services including data, voice and video conferencing across the Public Sector in Wales
- Create a shared resource for the public sector in Wales
- Establish a strong collaborative governance model
- Enabling collaborative service delivery across technical, commercial and governance streams
- Plan the transition of public sector organisations to the new approach and implement the governance regime to manage the environment.

PSBA was founded initially with three founding sectors; health, higher/further education and Unitary Authorities. There were two legacy networks (LLN and DAWN2).

The vision is that by 2012 all public bodies in Wales will migrate to PSBA.

Additional services will be added to the PSBA portfolio potentially including telephony, CCTV and video conferencing.

4.2.   Data Centre Strategy

The Data Centre Strategy will deliver a significant rationalisation of the data centres that provide information based services to public sector organisations in Wales. This will bring substantial savings in cost and energy consumption, and at the same time improve service standards and the ability to cope with service disruption. The data centre strategy is aligned with other elements of the *ICT Strategy for the Public Sector in Wales* in particular

networking (PSBA), and provides the enabling platform for the Cwmwl Cymru and W-AS services (see later sections).

Recent development of the data centre infrastructure in the public sector in Wales has followed a similar pattern to that in most large organisations. Budgets and procurement decisions have been devolved to local organisations. Whilst procurement decisions have been progressed in the best interests of each individual organisation, at the strategic level this has resulted in an increasingly costly proliferation of data centres that now makes it difficult to:

- Achieve large, across Welsh public service economies of scale
- Meet environmental and sustainability targets
- Protect against natural disasters or human initiated incidents
- Provide consistent security controls across the public service
- Deliver ICT systems that are flexible and responsive to demand in order to support transformational government
- Take advantage of new technologies in order to deliver faster service benefits
- Procure in a way that supports and encourages a dynamic and responsive supplier marketplace.

In late 2008, members of the UK CIO Council and the UK Intellect Public Sector Council initiated joint work that concluded the opportunity now exists to progress a data centre strategy for the whole of the UK public sector. The intention is to consolidate public sector data centres (whether in house or outsourced), firstly in central government (including NDPBs and Executive Agencies), and then moving into the wider public sector.

The strategy in Wales will be to align our approach with the UK initiative from a technical perspective wherever feasible. This may lead to collaboration over establishing data centre facilities. **However, a primary objective of the Data Centre strategy in Wales will be to ensure that scaled capacity is available for Welsh public sector services in Wales.** This will include new capacity but may also include existing data centres in from both public and private sectors in Wales where they meet the defined requirements and standards.

This approach can be characterised in exactly the same manner in which the central Government Data Centre Strategy has, as:

- **Move UP:** transfer suitable services to Cwmwl Cymru as soon as possible. New collaborative service applications, such as finance, HR/Payroll systems, should be developed to be capable of being run in the Cwmwl Cymru.
- **Move IN:** by moving infrastructure from individual data centres and consolidating it into larger, more modern, cost efficient, environmentally sustainable data centres
- **Switch OFF:** The major cost savings are achieved when existing data centres are decommissioned and there should be a focus on shutting down existing infrastructure by enabling new, fully virtualised systems where ever possible.

The priority of the migration will be based upon:

- Addressing the 'burning, out of date, inefficient and un-secure platforms' within the current estate, then by
- Identifying legacy workload to migrate based on expected contract renewals and investment plans, and
- In parallel, new workloads should be deployed directly into the new data centres and where ever possible, as a Cwmwl Cymru solution, i.e. a platform open to all.

The Data Centre Strategy will be delivered in a way that enables and leverages the new approaches pioneered by the large Internet firms for data centre design, thus enabling the Cwmwl Cymru "infrastructure as a service model" that will substantially drive up the efficiency of asset utilisation.

Our vision for data centres is that over the next few years, pairs of highly resilient strategic data centres for the public sector are implemented to common standards. As mentioned previously we will explore the opportunities to provide data centre capacity in Wales as part of a collaboration with UK Government.

Establishing these strategic data centres will enable consolidation of existing public data centres into highly secure and resilient facilities - provided by a managed number of suppliers delivering best practice. In the short term this will be achieved through the PSBA service. The benefits will include savings on ICT infrastructure costs and a significant contribution to environmental targets through a reduction of up to 20% in power and cooling requirements. These benefits will be achieved in parallel with improved service standards - the new ICT infrastructure will be more resilient, will have significantly reduced reliability, and significantly greater and more consistent ability to recover from major incidents.

The Data Centre Strategy will therefore be implemented in a way that delivers benefit at the earliest opportunity. Consideration will be given to the early introduction of a data centre space brokerage service to reduce the need for new data centre space to be procured by public sector bodies - unused space exists in a number of existing facilities which will be re-used where possible. Public service staff will be able to store their data in the knowledge that it is secure, accessible and sustainable.

4.3. The Common Desktop Strategy

Organisations across the public sector share a common need to provide their staff with access to computer facilities including common functions (email, word processing, spreadsheets, internet browsing, etc) which are regarded as essential, day to day "tools of the trade". Historically, however, each organisation has independently specified, developed and delivered the hardware, software and networking solutions to meet that need. This has resulted in divergent design and product choices which impede collaboration, incur repeated procurement and development costs and miss opportunities for economies of scale in delivery and insufficiently widespread tools to aid content creation in Welsh (and for translation).

This situation requires us to:

- **Simplify and standardise:** Common technology solutions start with common requirements
- **Adopt common models:** Technologies developed and proven by one organisation should be available for use by others. The commercial, contractual and cultural barriers to the adoption of existing solutions and to bilingual provision must be removed
- **Commoditise:** Desktop computing systems should be available bilingually "off-the-shelf". Bespoke development should be restricted only to facilities which are genuinely unique
- **Increase capability:** By standardising products and sharing the outputs of past investment, spending on repeatedly solving the same problems can be eliminated and resources released to focus on enhancing and adding to system functions
- **Lower price:** Procurement and delivery costs can be reduced; the re-use of established technology within and between desktop services can enable faster

deployments with fewer faults and reduced reworking. If the operating cost of every public sector desktop were to be reduced by just £100 pa it would yield huge savings.

Our aim is to see desktop computing across the Welsh Public Service delivered through common models and collaborative services.

New desktop implementations whether developed in-house or externally, will conform to a standard design.   Common designs will drive the achievement of economies of scale in purchasing and licensing components. Confirmed standard designs will be in place and all desktop procurements using proprietary products will require suppliers to contract to deliver them to common designs and through collaborative services at the lowest price available to any public sector customer.

The desktop design will evolve to converge with the Cwmwl Cymru strategy.

The provision of these designs will provide assurance to procurement experts, Senior Responsible Owners (SROs) of programmes and Accounting Officers that solutions meet minimum Wales standards on Information Assurance, Value for Money and utilise mandatory technical standards such as those in e-Gif.   E-Gif will soon be updated and known as the Standards and Architecture Framework. Public service staff will not have to think about their desktop services – they will be robust, meet their needs and provide value for money to the tax-payer.

4.4.   Cwmwl Cymru (Wales Cloud)

Recent developments in ICT have made it possible to share ICT infrastructure in a way that delivers increased flexibility and responsiveness to public service needs whilst reducing costs. This change involves a move from ICT that has been procured separately by organisations as ICT infrastructure, to a new model where ICT is provided as a utility which is known as "cloud computing". This paradigm shift has been likened to the changes in the electricity industry during the early part of the 20th century as organisations moved from buying their own generators to procuring electricity as a utility.

The term cloud computing was originated by the large Internet firms where the rapid change and growth in their businesses provided the driver for developing a new approach to the provision of ICT infrastructure; an approach where the provision of standard ICT services needed to support consumer facing activities was separated from the detail of the computer systems in use and their physical locations. As the sophistication of this approach developed, these businesses became able to regard ICT infrastructure as a pool (or cloud) of infrastructure resources. This concept, products and services are being moved from provision to the consumer into the business sector.

As well as enabling business flexibility, the cloud approach also provides other benefits. Specifically:

- Standards that make it possible to deploy applications on any available computer systems, rather than the previous proprietary configured solutions
- Unit costs of computer resources fall substantially as the flexibility of allocating workload to any available computer system enable much higher system utilisation levels to be achieved.

The cloud model enables further significant cost savings over and above those from data centre rationalisation - the additional benefits arise from the flexible allocation of computer resources to workload and the cloud model also enables further reduction in energy consumption and much greater flexibility.

While the cloud model is sufficiently proven for there to be clear benefits to the public sector, it is still very early days. The main challenges to overcome include confidence in information governance, security, achieving guaranteed service levels and determining the appropriate standards to adopt. It is clear however that there will be a major shift in the ICT industry to the cloud model, and that the benefits will be substantial. In the short term, it will be possible to mitigate many of the risks through putting in place a private cloud for the public service in Wales potentially in collaboration with the UK Government project G-Cloud.

Our vision is to develop and implement a Wales Cloud (Cwmwl Cymru) infrastructure that enables public bodies to source ICT infrastructure, development capabilities and software applications from a secure, resilient, flexible and cost-effective service based environment. The Cwmwl Cymru could form part of the UK Government G-Cloud initiative and these decisions will be made once the design, build, delivery and service management opportunities have been analysed.

Establishing the Cwmwl Cymru will involve a major change in the way that ICT is procured and supplied and will require significant change both in ICT suppliers and public sector organisations. Cloud commercial and business models are in their infancy and we will need to support the industry in developing the business case for investing in this new model.

4.5. The Wales Applications Store (W-AS)

The Wales Applications Store (W-AS) strategy sets out to enable a substantial reduction in the thousands of unique applications and applications contracts that are currently used by public sector organisations in Wales. The goals are to enable financial savings, to heighten the Welsh public sector's ability to respond to change, and to move to standard approaches for providing citizen and business facing services across the public sector.

The vision for the W-AS is for the reuse of existing assets to become the standard approach across the public sector for delivering new ICT solutions – including those for both policy and efficiency driven initiatives. In contrast to today's approach, where new business requirements almost always result in development of bespoke solutions and thus the proliferation of systems, reuse will become the norm across the entire range of ICT enabled services – from relatively common back-office requirements through to customer facing front office services that are unique to the organisation Involved.

The W-AS will be an online portal that enables sharing and reuse of business applications, services and components between Welsh public sector organisations. Even where organisations have unique requirements it is normal to find that many steps in the business process are similar to those of other organisations, even those that have radically different roles. For example the approaches used for authenticating employees, and authenticating customers, and making payments through the banking system are similar in most organisations.

The future will see each of the steps in a process being defined as a reusable service - these reusable services can then be used as the basis of new business solutions, joined together using "mash up" technology, with only any additional and unique components of the new business solution being implemented as an additional service.

The W-AS will thus enable re-use of existing assets to become the standard model for delivery of new business services. The approach will be closely integrated with the PSBA, data Centre and Cwmwl Cymru strategies, and the combination establish the Architectural Platform on which reusable services will be delivered, removing today's inherent technical barriers.

The net effect will be to increase visibility of software already owned by the public sector so that other public sector bodies, and those bidding for public sector work, can see what's available at no or limited basic cost. Re-use is, in principle, already accepted as the preferred delivery approach across the public sector. However in most cases today, it is easier to do a fresh procurement.

New assets in the applications store will benefit from the policy that future public sector ICT procurements will be done on behalf of the Crown rather than the purchasing organisation, enabling reuse across the public sector. The W-AS will provide automated bilingual electronic support for the applications procurement lifecycle and reduce the overhead costs of reuse of applications. Providing this automated electronic support will use capabilities that are proven today - including an online store front with search and user feedback capabilities, e-procurement platform technology that automates the "procurement to payment" process, and an interlinked online repository providing access to software, documentation, tools and related assets.

A key dependency for achieving this change will be overcoming a major cultural challenge that exists across the public sector. Business leaders are accustomed to specifying unique requirements that are then met on a bespoke basis - today's approach is costly and leads to proliferation of systems. Under the new model there will be the expectation that existing capabilities will be re-used on an "as is" basis wherever possible. Unique requirements will be implemented only where this is unavoidable and where there is very clear business justification for the additional life cycle costs. Where this is required, any such functionality must be delivered in line with this ICT Strategy, making use of the architecture and standards, being accessible through the Common User Interface, and utilising common information services and facilities provided by the W-AS and Cwmwl Cymru, to avoid duplication of these services.

The W-AS project will work closely with the UK Government G-AS and it is possible that the W-AS will form part of a broader UK initiative.

The UK CIO Council as part of the UK Government Strategy is building support for the new approach amongst senior business leadership across the public sector. Wherever possible, reusable business services that are already owned by the Crown will be provided "free at the point of use" to public sector organisations. There will be a charge only for those aspects of the service that directly impact cost for example G-Cloud usage costs, support services, helpdesk calls and printed outputs. As the number of assets in the Government Applications Store increases over time, the business case for public sector organisations to progress a reuse based approach will become ever more compelling.

4.6.   Collaborative Services, moving Public Service Systems to the Cwmwl Cymru

The Strategy for collaborative services involves a number of key strands:

- Wider use of systems across Wales and other public services to improve efficiency
- Creating visibility of applications that can be shared across the public sector (e.g. Electronic Document and Records Management (EDRM), CRM, Ministerial correspondence, banking, vetting etc)
- Ensuring through collaborative procurement that we 'buy once and use many'
- Moving both managed services and shared applications in to the Cwmwl Cymru
- Creating the W-AS of business services and components to ensure re-use across the public sector.

The adoption and wider use of Shared Services in the UK Public Sector has already saved money and headcount by rationalising HR, Finance and Procurement delivery and increased exploitation of current technology (shared Enterprise Resource Planning platforms). Over 80% of Civil Servants across the UK are now supported by a Public Sector Shared Service solution and the Departments running them have declared some significant savings.

The current programme of UK Public Sector corporate service benchmarking will be used on an ongoing basis to continue to improve the performance of the back office and to drive more Welsh public sector organisations towards the Collaborative Service model.

This *ICT Strategy for the Public Sector in Wales* means that a step change in the way that Collaborative Services are perceived, operated and paid for. The Cwmwl Cymru and W-AS will provide a one stop shop for the internal needs of Welsh Public Sector organisations. Many back office business activities will have been commoditised and will be accessible to all public sector organisations and employees via an on-line portal. Additionally, once the shared ICT infrastructure will be located in the Cwmwl Cymru. The greater visibility of applications afforded by the W-AS will ensure that the public sector will buy once and use many times.

4.7.   Internet infrastructure and portal services

The development and implementation of Internet infrastructure and services has followed a similar pattern to other ICT services in the Public Sector in Wales. Strategy, design, procurement and implementation have been devolved to local organisations. At the strategic level this has resulted in an increasing proliferation of configurations, designs, products and services.

This has resulted in a sub-optimal financial and technical solution for citizens, staff and their organisations.

This Strategy will create a rationalisation and consolidation of Internet infrastructure and information services scalable to meet all the needs of all Public Sector organisations in Wales. This will be hosted centrally in the new national data centre facilities and/or via specialist Internet Service Providers.

This will inevitably involve the rationalisation of Content Management Systems and a redesign based on the architecture described above. Portal services, standards and user interface will be assumed to be consistent across user communities (i.e. citizens and staff). However, the design phase may require differences to be delivered albeit within a holistic design architecture and approach.

It is envisaged that the citizen and business will have four points of entry:

• DirectGov (for UK public services e.g. driving licence, Inland revenue)

• Business link

• Welsh health (to include Myhealthonline, NHS Direct Wales etc)

• All other Welsh services (via www.wales.gov.uk).

As mentioned above all Welsh Internet services will use to the same infrastructure, tools and services.

Work will need to be completed at identifying existing Internet Infrastructure that could be used as a basis for scaling for the integrated national solution. This will include the Wales Internet Service, NHS, Local Government etc.

Further work will be required to explore the opportunities for integration of public sector portal services and portlets provided within the growing web 2.0 consumer commodity tools such as google, facebook etc. Increasingly, citizens will want to use their own portal.

4.8. Mobile working

Over the lifetime of this *ICT Strategy for the Public Sector in Wales* the importance of delivering ICT to users wherever services are required will be critical to the implementation of modern public services.

It is recognised that many of the projects described in this strategy will have a mobility component. The importance of ensuring pervasive access to ICT is available the decision has been made to ensure these are given the profile they require by establishing a separate project.

4.8.1.   Wireless Local area networking

Wireless Local Area Networking (WLAN) is a technology that allows devices (e.g. laptops or PDAs) to connect to a physical network or to each other without the use of any physical wired connections. Public Sector organisations will increasingly provide WLAN services for their own staff (and staff from other sectors) to enable flexible working arrangements. Therefore, the strategic aim will be to provide pervasive and secure WLAN coverage to support mobile working as an enabler for process re-design.

4.8.2.   Mobile networking connectivity

Mobile network connectivity refers to technologies such as General Packet Radio Service (GPRS) and Third Generation Networks (3G / HSDPA) which provide wireless connectivity to IT services such as the PSBA network from a wider geographical area (i.e. locations other than public sector sites. There is an increasing requirement for providing network connectivity for users working in the community where there is no direct access to LAN, WAN or WLAN services.

The strategic aim will be to make appropriate use of mobile network technologies in order to support mobile working, wherever the citizen and service provider are situated. This will include working with the mobile network providers to increase the coverage of high speed data mobile services in the rural areas.

4.8.3.   Remote access services

Highly available and secure remote access services will be provided for access from both public sector owned / managed devices and other devices (e.g. home PCs, cybercafés etc) Access to applications will depend on the location that the user connects from, the device used and the strength of the authentication method.

4.8.4.   Common desktop/laptop

The common desktop/laptop design described elsewhere will ensure, wherever feasible, that access to applications is consistent with wired services. This will include capabilities for offline syncronisation services when network services are unavailable.

4.8.5.   PDAs and Smartphones

Personal Digital Assistants (PDAs) and Smartphone refer to the personal electronic devices that can store and process information including email, contacts, calendars, etc. Both classes of devices now commonly come with integrated mobile phones and mobile network

connectivity capability. Our strategic aim will be to provide a secure and fully managed solution for providing mobile access to users, which supports a variety of mobile devices and carriers.

4.9. Architecture and Standards

The architecture and standards strand underpins all elements of the *ICT Strategy for the Public Sector in Wales.*

Through setting the right standards we ensure that each element of the strategy can interoperate with each other, and through defining a consistent architecture we ensure that the strategy is implemented in a way that can be reused and deployed across the whole of the Welsh public sector. The technical architecture describes the technology and solutions that will be used to build the Cwmwl Cymru and W-AS. Standard reference architectures are used to define the agreed way to build reusable technical services that could run in the Cwmwl Cymru. Provision of common technical standards and designs that are available through the Cwmwl Cymru and the applications in the W-AS will be a key enabler of efficient reuse of solutions and assets. They ensure interoperability, assure information security and will maximise the opportunity from open source code and open standards.

Much of this section is derived from similar work being undertaken across the UK Government. Under this *ICT Strategy for the Public Sector in Wales*, Welsh Public Sector ICT Staff will contribute to this activity, in order both to ensure that the Welsh architecture and standards are aligned with a wider framework, and to ensure that this framework will meet Welsh needs and can incorporate good practices developed in Wales.

4.9.1. Enterprise Architecture

An Enterprise Architecture is a framework for the design and implementation of information systems and services to ensure these can be deployed and used effectively to meet an enterprise's objectives. The Enterprise Architecture for the Welsh public sector will be established to enable the aims of this *ICT Strategy for the Public Sector in Wales*, and will be built on the work being done within the UK Government's Chief Technology Officer (CTO) Council on a cross-Government Enterprise Architecture (xGEA).

The first release of the UK xGEA focussed on building the initial portfolio of opportunities to share. The following items were identified to support this:

- An xGEA Reference Model (xGEARM) to enable communication through an agreed set of terms and definitions; this categorises the main elements of the Enterprise Architecture and shows the relationships between them
- An opportunity portfolio of potential exemplars
- A set of processes based on industry practices for describing the exemplars and the EA models
- A repository with Enterprise Architecture assets captured for all government to use, e.g. the exemplars and processes mentioned above, and the standards described below.

The UK CTO Council has continued to focus on the necessary technical work which underpins the development and adoption of the xGEA. Work is now in progress on:

- Common infrastructure based on the open standards and proven interoperability implemented with commercial off the shelf products
- Common standards to help facilitate reuse and sharing
- Inclusion of Information Assurance into all aspects of design and build

- Rationalising government data and voice networks
- Adopting a consistent approach to identity management.

4.9.2. Information Architecture

Common information architecture is vital to ensuring that information and data can flow across government to provide seamless, efficient, secure and trusted services. It provides opportunities for the re-use of public data, benefiting the economy and fuelling innovation. The Information Domain of the CTO Council works closely with the Knowledge Council and the Making Public Data Public initiative to ensure that their aims are supported through ICT.

The CTO Council is therefore drawing together a Public Sector Information Architecture covering seven key themes:

- Semantics - the meaning of information
- Syntax - the format of information
- Data Quality - the confidence to re-use information
- Authorisation - the right to use specific information
- Transport - how to use information
- Authentication - who can use information
- Information Governance - the behaviour and culture to protect and exploit information
- Bilingualism is an obvious cross-cutting theme in all of these.

This strand will also consider how the public sector will manage its information – for example, will the public sector hold multiple copies of information or will it be held centrally (either for all public sector bodies, or for all within a particular business sector) and accessed by many?

The Information Architecture has implications for all strands of the *ICT Strategy for the Public Sector in Wales*, particularly Data Centre rationalisation, Cwmwl Cymru and Information governance and Security. It also affects decisions core to the public sector network as it will define bandwidth requirements and likely volumes of data transfer.

The Information Architecture will be based on the Standards described below, in particular for semantic and syntactic definitions. In addition, application specification will need to consider the presentation of information in light of these standards, especially for data that is complex, e.g. highly structured and containing significant meaning.

4.9.3. Integration Domain

The Integration Domain is one of the areas of the cross-Government Enterprise Architecture Reference Model, and deals specifically with the principles and artefacts that enable the sharing of information and the re-use of services. For Wales, as well as building on UK work, the Integration Domain will make use of experience already gained in some of the business sectors.

The Welsh Public Sector Enterprise Architecture will incorporate "service-oriented" principles to ensure that components are re-usable. This includes:
- identifying the services that need to be provided by information systems, at different levels which include business transactions, support for common activities, provision of information, etc., so that these can be re-used in different contexts

- ensuring that these services are "de-coupled", to reduce dependencies between individual systems and hence facilitate change
- defining standards for the service interfaces and the way in which they are invoked
- providing common utilities to manage the communication between services, giving economies of scale.

These principles define different types of integration, which include file transfer (primarily for "off-line" transport of information) and presentation-level integration to provide some aspects of the Common User Interface. The main approach to integration will be based on the interchange of **messages** between information services, with the use of Web Services as the message endpoints. As part of the *ICT Strategy for the Public Sector in Wales*, common facilities for managing these messages will be provided, which can be described as an Enterprise Service Bus or Messaging Fabric.

These approaches to integration are reflected in the diagram in section 3 of this Strategy which gives a pictorial view of the components.

4.9.4. Standards

Better public services tailored to the needs of the citizen and businesses, require the seamless flow of information across government. The Enterprise and Information Architectures described above are enabled by standards that determine how information is defined, used and transported, and how information systems will be designed and deployed.

International Standards are the basis for the standards to be used in this ICT Strategy, as these will have the widest support from ICT suppliers and will facilitate information flows outside as well as inside Wales.

The UK e-government Interoperability Framework (eGIF) set out the government's technical policies and specifications for achieving interoperability and ICT systems coherence across the public sector. It defined the essential prerequisites for joined-up and web-enabled government; its main thrust was to adopt the Internet and World Wide Web specifications for all government systems. Work has now started on a UK-wide basis to update the standards captured in eGIF and align them to the assets the public sector is identifying for reuse.

As part of developing the cross-Government Enterprise Architecture (xGEA), the specification of ICT standards rests with the UK CTO Council, through its domain teams. CTO Council will only centrally manage standards that are required across a number of organisations and that are not specific to a particular business area (e.g. education, taxation or transport). Accordingly, three types of standard have been identified:

- **Universal:** fundamental standards that are required by all public sector organisations (e.g. the choice of technical standards such as XML)
- **Common:** standards used across multiple business domains (e.g. shared information models and reference data structures)
- **Local:** where responsibility is federated out to local domains/ businesses/ regions

The Welsh Assembly Government will engage in discussion with the Welsh Language Board and UK CTO in order to discuss widespread standards for a bilingual computing. This can then be used for other UK languages and for wider multilingual provision.

Domain teams focus only on universal and common standards and liaise with external standards bodies, monitoring their activities to ensure that Government interests are supported and not compromised. Precedence is given to standards with the broadest remit, so appropriate international standards will take preference over EU standards, and EU standards will take preference over UK standards. Standards are primarily driven by the needs of citizen and business-facing services. Priority is being given to standards that serve the requirements of services or processes that are generic across many public sector organisations. Facilitation of new, joined-up services and inter-organisational process developments are also given precedence.

Standards activity for Wales, as with all elements in this section will build on the standards work of the CTO Council. However, this needs to recognise that the Welsh Public Sector is both a "local domain" as one of the UK Devolved Administrations, but also needs common standards with other business sectors (e.g. Health, Social Services).

4.10. The Open Source, Open Standards and Reuse Strategy

Traditionally, the public sector in Wales, in common with most large organisations, has relied on commercial off the shelf (COTS) software to run ICT systems and processes. In most instances, this comes from global commercial enterprises such as Microsoft and Oracle. This COTS software uses proprietary code and cannot easily be reused across the public sector – reducing value for money, flexibility and agility. Importantly, this also impacts our opportunity to reduce risks to service delivery.

In 2004, UK Government formally articulated the policy that it would seek to use Open Source wherever it gave the best value for money in delivering public services. However, there were many barriers to widespread adoption of Open Source. The software and wider IT markets were immature and did not have competitive products that were easy to include in enterprise business solutions. Suppliers of COTS software were often opaque in their dealings with Government regarding supply chain, terms and conditions and a refusal to treat Government as a single entity.   This made like for like comparisons with Open Source extremely difficult. In addition, the Government IT profession had limited skills and a risk-averse culture that limited uptake of Open Source and did not challenge suppliers about technology solutions.

In recent years, many public sector organisations have since demonstrated that Open Source can be best for the taxpayer – in web hosting services, infrastructure as components in critical systems such as DirectGov and Electronic Vehicle Licensing. The software and wider ICT market have also developed and made Open Source products more competitive and easier to include in enterprise business solutions. UK Government has addressed some of the internal barriers to Open Source - through the development of the IT Profession to re-establish skills and cultures, the establishment of the UK CIO Council (leading to more openness and exchange of information) and crucially, the agreement to the Cross Government Enterprise Architecture framework. The techniques and cultures of Open Source have been adopted in other parts of Government business, for example in the London Borough of Camden development of their web content management tool and the work of the Cabinet Office Digital Engagement team.

The UK Government Open Source, Open Standards and Reuse Strategy was published in February 2009. It states that Government will actively and fairly consider open source solutions alongside proprietary ones in making procurement decisions. In addition, Government will, wherever possible, avoid becoming locked in to proprietary software. In particular it will take exit, re-bid and rebuild costs into account in procurement decisions and will require those proposing proprietary software to specify how exit would be achieved. The strategy includes an action plan that is a positive programme to ensure an effective level

playing field between open source and COTS software. It also includes actions which will ensure Government will use open standards in its procurement specifications and will require solutions to comply with open standards. Government will continue to use only open standards for documentation such as ODF, PDF and OOXML.   The Cwmwl Cymru will host the W-AS which will hold existing open source code and solutions for reuse across the public sector.

 In order to achieve the key outcomes desired by UK Government, the UK CIO Council have commissioned OGC and Cabinet Office to ensure implementation of the action plan.   Using the Open Source, Open Standards, and Reuse working group will deliver clear and open guidance for ensuring that open source and proprietary products are considered equally and systematically for value for money. By 2011, public bodies in Wales will store and share records of their approval and use of Open Source software on the Cwmwl Cymru. The Government Applications Stores will hold Open Source solutions that are available for reuse in the public sector and by 2015 UK public bodies will review existing solutions available before going to market for new solutions.

4.11.   The Greening Wales ICT Strategy

Welsh Public Service runs massive computer systems that are now an essential element in the delivery of public services. Thousands of public sector workers can use their desktop computers to work far more efficiently than we could have dreamed possible as recently as 20 years ago.

However, ICT is a major user of energy and natural resources at 2-3% of global carbon emissions. As spending and accountability has been devolved through the public sector, the number of devices and volumes of data used by the public sector has exploded. Efficiency and sustainability have been the victims of duplication and silo working. Industry and suppliers have also grown in the same way and have treated each ICT requirement individually rather than considering the efficiencies and reduced environmental impact that could be achieved by taking a more strategic approach. Not only is this having a significant environmental impact, it is also costly and wasteful.

The UK Government launched its strategy for Green ICT in June 2008. The CIO Council appointed a Green Champion for Government ICT and also supported the creation of the Green ICT Delivery Unit (GDU). One year on, the UK Government has published a report detailing progress by Central Government, Local Government, the Wider Public Sector and the Welsh Assembly Government. Each central department has produced a Green ICT action plan detailing the progress already made to increase the sustainability of ICT operations and the plans in place to take this further.

18 key areas have been identified for ICT carbon reduction. These cover:

- PCs and laptops
- Other office IT equipment (e.g. printers)
- Data Centres.

In order to demonstrate success, the public sector in Wales will ensure that Green ICT principles are incorporated into all elements of the ICT Strategy for Welsh Assembly Government, including supply chain and procurement strategies.

4.12.   Information Governance Strategy

The Wales ICT Strategy will deliver a standardised environment in which converged services can evolve to meet public sector business needs in a cost-effective and business-enabling

way. The environment has two key characteristics which will shape the Information Governance (IG) elements of the strategy. These can be summarised as:

- **Complexity:** the Wales environment will comprise interconnecting services operating across multiple organisational boundaries within the public sector
- **Convergence:** the convergence of voice and data services will support flexible working, minimising business dependence on location whilst providing access to data and IT functionality using fixed and mobile communications seamlessly.

Against this complex environment, the use of information will remain central to the challenges facing the public sector. Information Governance – information sharing protocols (WASPI), confidence in the security, integrity and availability of information systems - is essential to underpin the challenge of delivering personalised services via ICT, as well as making us more effective and efficient.

The UK Government National Information Assurance Strategy (NIAS) was published in 2003 and updated in 2007. The NIAS aims by 2011 to create "A UK environment where citizens, businesses and government use and enjoy the full benefits of information systems with confidence". However, the management of information risk has not always enjoyed the high profile it now holds. A number of reviews of high profile data losses have highlighted significant issues. For example:

- Accountability for information risk was not always clear
- Policy was complex and did not always keep pace with business change
- The necessary culture to comply with policy and protect information properly was not in place.

The Cabinet Secretary's Data Handling Review (DHR) was published in June 2008. The DHR set out significant changes in the way that Government departments address IA issues, with a strong focus on personal data. These changes can be divided in to 4 main areas:

- **New mandatory policy measures:** a series of mandatory minimum measures are now in place across government, including encryption of removable media and compulsory testing of the resilience of systems by independent experts
- **Cultural change:** More than 300,000 civil servants dealing with personal data have undertaken mandatory annual training. Cabinet Office has also made Privacy Impact Assessments mandatory for new projects, as recommended by the Information Commissioner
- **Stronger accountability:** data security roles within departments have been standardised and enhanced to ensure clear lines of responsibility
- **Increased scrutiny:** Departments report annually on their performance in handling information risk, and the Information Commissioner has begun conducting spot checks of government departments.

At the centre of Government, the governance of Information Assurance has been improved and strengthened with enhanced oversight now in place at Ministerial and senior official levels. Furthermore, CESG (the information assurance arm of GCHQ) have expanded their responsibilities in supporting the delivery of IA in government and have put in place a process of transformation to support their new role.

The vision for information security and assurance remains the realisation of a UK environment where citizens, businesses and Government use and enjoy the full benefits of information systems with confidence. Good progress has been made through improvements

in the handling of personal data in the last year, but in the next decade this progress must be consolidated and embedded into the way Government delivers services through ICT. In the light of the complex, converged environment set out above, IA will be built into every public sector ICT system from requirements capture through design to implementation. This will deliver the technical and process controls that will enable citizens, public bodies and their delivery partners to match their risk appetite with their risk exposure, in the knowledge that systems have been designed with IA integrated from the outset.

Three principles will underpin and enable the delivery of the IA element of the UK Government ICT strategy: **partnership**, **professionalism** and **pace**.

- **Partnership:** Public sector organisations will need to work together to deliver the right IA outcomes. In particular Cabinet Office will work closely with its key partner CESG (the National Technical Authority for IA) and CPNI, to drive implementation as well as to engage with the IA Industry that is vital to the success of this strategy
- **Professionalism:** There will be recognised and widespread professionalism in IA encompassing those in risk ownership roles in the public sector, Industry partners, and government IA profession specialists
- **Pace and agility:** will become the dominant characteristic of design-to-market delivery of IA capability, evaluation of products and services, response to incidents and management of risk impact.

The changes and principles set out above will not, on their own, be sufficient. Information Assurance is a broad and cross cutting area of Government business. The recent Digital Britain report, the Cyber Security initiative, the development of Knowledge and Information Management all have implications for the way that Government protects and handles information. This will be reflected in a refreshed National IA Strategy, which will incorporate the coordination and delivery of the cross-cutting IA elements of each of the ICT strategy work strands. Finally, the process of change begun by the Data Handling Review must be sustained and deepened. The culture of protecting information must be consolidated; policy must remain responsive, relevant, clear and accessible; and the new governance arrangements at the centre of Government must fully mature.

4.13. Security and related infrastructure services

A National Directory Services design will be established across the public service in Wales that:

- Allows users to easily identify colleagues in all public service organisations
- Allows users to easily share appropriate information with colleagues in other organisations
- Allows users to move between organisations
- Supports organisational reconfiguration.

A single electronic identity for every public service staff member

- Assurance processes in place to ensure that the staff member is who they claim to be when the electronic identity is assigned to them
- Appropriate technologies in place to secure the use of the electronic identity (i.e. having a multi factor authentication process, not just relying on username and password combinations).

This would also allow for the development of digital signing of electronic documents.

Given the importance of security a separate *National Security Strategy for Wales* will be developed to provide additional information on user identity management.

User Directory Services

- The user directory holds user account details and provides network authentication and authorisation services. Initially, this will be established for authentication for desktop access and a national email system but will be extended to be used across relevant public service applications

- All Wales public service organisations to use the national directory

- All new applications use the national directory for authentication

- User account provisioning and de-provisioning process is tightly integrated with appropriate HR systems and other user databases

- Self service password reset tools provided for all users, in order to reduce unnecessary calls to IT helpdesks. This will also facilitate the mandating of stronger ('complex') passwords on the national directory.

National Email Service

- All users to use the national email service

- Some address book information will need to be automatically synchronised to other 'authoritative' sources of information (e.g. HR systems)

The design stage may indicate the use of federated authentication with secure inter-system links, rather than moving all public sector users to one system.

Encryption Services

- All organisations to adopt the national products for encryption and removable media control

- National policy for the protection and encryption of personal information

- Encryption services to be aligned across all organisations to allow easy exchange of encrypted information

- Development of National service to protect against malicious attack

- Multi layered perimeter defences protecting public facing services

- Multi layered internal defences protecting national services

- Desktop defences

All based on CESG recommendations and standards.

Certificate Services / Public Key Infrastructures

- Ad-hoc use of certificate services across public service bodies in Wales and mixed assurance processes in place to accompany these. They are typically used for such activities as authentication to wireless networks.

- SSL certificates (web server certificates used with HTTPS) are purchased from trusted third parties

- Strategic aim is to create a national PKI supporting

  o Strong authentication

  o Document signing

  o Encryption

- National certificate management solution for Wales
- Nationally approved certificate carrying devices and readers for use throughout Wales
- This is likely to be a smart card based system.

Secure Online Authentication

- Common gateway for access to public services

- Authentication of the Citizen prior to accessing public services

- Directory of public services available to the Citizen

- Common user interface for the Citizen.

The Welsh Assembly Government has agreed in principle that Government Gateway will be the solution used to deliver the above online authentication services for Citizens.

4.14. International Alignment and Co-ordination

While this strategy brings together information services across Wales, the delivery of these services does not stop at Welsh or even the UK borders. A key element of this strategy therefore, is to ensure alignment and compliance with UK and EU strategies, agreements, decisions and treaties. Sharing best practice and solving common problems will ensure that we continue to exploit technology to its full effect in our efforts to deliver constantly improving services.

To deliver ICT-enabled cross-border services and polices set out in a wide range of European Union agreements, decisions and treaties, Member States need secure electronic networks, agreed data protocols, and common information frameworks to work to. The information sent over these networks varies widely – from farm subsidies to vehicle details, to professional qualifications and social security information. Enabling such networks and agreements across 27 Member States is challenging and every effort is made to ensure Member States avoid duplicating the same solutions and instead add value by sharing common business and technical processes.

4.14.1. UK

The delivery of public services to the citizens of Wales is a shared responsibility between Wales and government departments and agencies in other parts of the UK. The information needed to support these services must therefore also be shared and made available, both to staff working in the public sector and citizens themselves.

There are three models of shared delivery, and the ICT Strategy will need to cater for each of them to ensure the seamless provision of information:
- services that are delivered by UK government departments either to all UK citizens, or for England and Wales together (e.g. Inland Revenue, Social Security);
- services that are delivered by specific organisations outside Wales on behalf of Welsh citizens, and vice versa (e.g. Health services to/from English Trusts);
- services that are similar across the UK but are delivered separately in Wales.

By adopting common architecture models and standards, both within the Welsh public sector and aligned with UK government (see section 4.9 above), the ICT Strategy will support these delivery models.

4.14.2. Europe

If we look towards Europe, Welsh citizens are free to live and work in any Member State and UK businesses are free to trade anywhere within the Union. Similarly, citizens and businesses from Europe are free to live and work or trade in Wales and the rest of the UK. ICT-enabled public services are often the enabler to making this happen and more simply than traditional paper-based methods. To make this a reality, Europe needs common policies and agreements which require Member States to join efforts to implement the objectives of European legislative requirements. Standards for multilingualism in ICT have an obvious part to play here - Wales could lead the way.

Much of the liaison between EU Member States is carried out at the UK level, supported by co-ordination activity with the Devolved Administrations and the business domains. Some of this activity is described below; the Welsh Public Sector will continue to contribute to this, ensuring that this ICT Strategy can evolve to meet changes in this area.

The UK is seen as one of the world leaders in ICT-enabled service delivery and makes every effort to continue to share our experience with other governments around the world. Learning from our international peers helps the UK to improve existing services and innovate in new areas. With so many of the world's population being multilingual, Wales could be a world leader in multilingual software, bringing economic and employment benefit to the sector in Wales.

Historically, the Office of the Government CIO and its predecessors have engaged internationally, be it through ongoing policy and delivery commitments with the rest of Europe, or through multinational networks for knowledge and best practice sharing, such as the Organisation for Economic Co-operation and Development (OECD).

The Office of the Government CIO also maintains two substantial commitments within a European Union (EU) context: taking forward the i2010 Ministerial eGovernment Declarations, which form part of the umbrella i2010 EU Information Society strategy and delivering against the subsequent Action Plans; and, along with other Member States, providing committee oversight of the current 'Interoperable Delivery of European eGovernment Services to Administrations, Businesses and Citizens' programme.

We are also involved in other wider networks such as the 'OECD Network for Senior eGovernment Officials', the '5-Nations CIO Group' (members of which are the relevant government bodies in Australia, Canada, United States, New Zealand and the UK), the 'International Council for IT in Government Administration' and the 'European Public Administrations Network'.

Bringing together senior policy and delivery officials across government and the Devolved Administrations, the OGCIO is the secretariat for the European Interest Group, the aim of which is to share knowledge and best practice, solve common problems and overcome barriers in the delivery of ICT-enabled Europe Community projects and programmes.

As individual strategy leads, OGCIO officials provide specialist policy and delivery guidance to other government departments who work on their own sectoral commitments to Europe.

Much progress has been made in recent years to build understanding, common ground and approaches, although more remains to be done.

- **Best practice:** we will engage further with our International and European counterparts, learning from their best practice in service delivery. We will work with other European Member States and will continue to be a force of strength in overcoming obstacles which hinder our progress in the delivery of efficient and effective delivery of public services across Europe
- **Aligned interoperable strategies and technology:** in order to continue being at the forefront of ICT Strategy development, we will continue to engage with European and multinational networks. Without the support of our external peers, we risk developing our own strategy in a vacuum. When so much of our service delivery crosses borders, it is imperative that we maintain these links. The adoption of international standards for interoperability will also simplify interoperability across the UK.
- **Simplification, standardisation, interoperability:** to deliver on the aims of the various initiatives, common frameworks and guidelines must be established. The OGCIO will increase its engagement in the development and implementation of the European Interoperability Strategy and Framework. Without common agreement, duplication will be rife and business processes multiplied unnecessarily

5. Conclusion

The Welsh Assembly Government and the wider Wales Public Sector faces major challenges – the scale of services delivered across organisational, the requirements of citizens and the need for ever-increasing efficiency mean that we cannot continue with a fragmented infrastructure that duplicates processes and solutions. This strategy delivers three significant benefits to the public sector in Wales:

- A secure and resilient architecture and infrastructure providing flexible and efficient services to the public sector
- A simplified and standardised architecture and infrastructure across the public sector that enables interoperability and data sharing where appropriate to deliver improved public services to citizens and businesses
- Economy of scale and sharing of expertise, resources and services provides better value for money in difficult economic times.

This is a substantial strategy for the Welsh Assembly Government. Transforming services against a backdrop of economic pressure requires leadership and a fundamental change in the way we specify, procure and deliver ICT to the public sector. This strategy provides the means to achieve the benefits outlined above. CIOs and their organisations will implement the strategy and provide transformed ICT that supports and enables the public sector to meet its core aim of improving the lives of the citizens it is here to serve.