eHealth Architecture Principles

Version 3.0
June 2009
Document Control

Details

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<th>Title:</th>
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<tr>
<td>Owner:</td>
<td>Head of Architecture and Design, Scottish Government eHealth Directorate</td>
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<th>Date</th>
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<tr>
<td>12/01/2009</td>
<td>1.0</td>
<td>Published version for comment via eHealth Leads</td>
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<tr>
<td>12/01/2009</td>
<td>1.1</td>
<td>Draft incorporating feedback from review for eHealth internal review</td>
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<tr>
<td>20/04/2009</td>
<td>1.2</td>
<td>Draft for internal discussion &amp; PET approval</td>
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<tr>
<td>06/05/2009</td>
<td>1.3</td>
<td>Published version for info to eHealth leads</td>
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<tr>
<td>13/05/2009</td>
<td>2.0</td>
<td>Published version for eHealth Programme Board approval</td>
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<tr>
<td>19/05/2009</td>
<td>2.1</td>
<td>Approved by the eHealth Programme Board subject to the following changes being included: Updated Principle 12 to include statement on affordability. Updated the Principle 15’s rational to make the statement clearer. Minor formatting and text updates.</td>
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<tr>
<td>01/06/2009</td>
<td>3.0</td>
<td>Published version for eHealth website Minor formatting and text updates.</td>
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1 Introduction

Principles allow us to make decisions without revisiting the fundamentals of what we are trying to achieve. They allow us to make strategic decisions without reinventing strategy. By basing decisions on previously agreed Architecture Principles instead of working from first principles, we can make difficult decisions on Information and Communications Technology (ICT) architecture and solutions consistently, easier and faster. In an organisation as large and complex as NHSScotland, a set of widely understood decision making principles is a powerful technique to build a cohesive ICT architecture.

The eHealth Architecture Principles are aimed at governing:

- the development and maintenance of NHSScotland’s ICT architecture and change plan; and
- the implementation of the architecture, by providing the first tenets for developing and delivering eHealth solutions.
2 eHealth Architecture Principles

The Architecture Principles have deliberately been written in the present tense, even though some of the resources required to underpin the Principles have not yet been developed. Work to develop these resources is either underway or will commence in due course.

Each Principle is presented as a separate section of the document and in the following format:

- **title**: the essence of the principle;
- **description**: a succinct and unambiguous definition of the fundamental principle;
- **rationale**: the business and clinical benefits of adhering to the principle;
- **implications**: an outline of the key tasks, resources and potential costs associated with following the principle; and
- **supporting resources**: to illustrate the resources available and required to support application of the principle.

1 – Adhering to the Architecture Principles

**Description**
The Scottish Government Health Directorates and all NHSScotland territorial and special Health Boards adhere to the Architecture Principles.

**Rationale**
Adherence to the Architecture Principles enables the evolution of an improved architecture that has the security, reliability, flexibility and cost effectiveness necessary to achieve the benefits of the overall eHealth vision.

**Implications**
NHSScotland’s architecture developments and new solutions align with the Principles. Solution owners and or eHealth leads to ensure that solutions comply with the Principles.

**Supporting resources**
- National solution architecture and design checklists (to be developed)

2 – Solutions are based on the eHealth reference architecture

**Description**
The eHealth reference architecture guides the design and delivery of all solutions.

**Rationale**
The reference architecture guides the development of solutions in alignment with the Architecture Vision and the eHealth Strategy.

The reference architecture comprises NHSScotland’s current architecture (encompassing applications, technology, security and data); the target architecture and associated change plan.

OBJ ID: A817352
Implications
The reference architecture is maintained and updated with output from projects. Project teams (solution architects/owners, etc.) contribute to the reference architecture by delivering suitable content (e.g., standards, designs, etc) from their projects.

Supporting resources
- The baseline eHealth reference architecture
- National solution architecture and design checklists (to be developed)

3 – The architecture supports the organisation structure

Description
The target architecture supports the structure of NHSScotland and local variations in clinical and business priorities.

Rationale
To support the overall eHealth vision, the architecture supports the structure of NHSScotland overall, including local variations in clinical and business priorities, and NHS Health Board autonomy.

Implications
Components of the architecture are designed in accordance with the organisation structure, staff capability and capacity and the boundaries of eHealth within the wider infrastructure.

Supporting resources
- eHealth Strategy 2008 – 2011
  [http://www.scotland.gov.uk/Publications/2008/08/27103130/0](http://www.scotland.gov.uk/Publications/2008/08/27103130/0)

4 – Agile architecture and solutions

Description
NHSScotland implements agile architecture and solutions composed of reusable modular components and services, based on Service Oriented Architecture wherever possible.

Rationale
The use of component and service based building blocks enables an agile architecture that is receptive to changing business and clinical priorities.

Encapsulating functionality provided by a series of applications into a set of components and services that can be reused across NHSScotland will promote future flexibility and interoperability, and reduce the cost and risk of implementing new solutions.

Implications
Architecture and solutions are designed in a manner that supports the implementation of a service-based architecture for NHSScotland.

Consideration must be given to using published services and building blocks when architecting solutions.

Consistency with the eHealth Reference Architecture.

OBJ ID: A817352
The architecture supports variations in NHS Board priorities and business processes.

Supporting resources
- eHealth reference architecture
- Integration and interoperability standards (to be developed)
- Other standards to be identified and included within the eHealth standards library

5 – Complying with standards

Description
The architecture and solutions comply with relevant standards published within the eHealth standards library.

Rationale
Standards help to ensure consistency, promoting interoperability between systems and introducing convergence, improving systems manageability, user satisfaction and protecting eHealth investments. Complying with standards and, in particular, open standards, helps to maximise return on investment and minimise costs.

The use of proprietary standards increases the risk of excessive integration complexity and expense; open standards simplify the integration of solutions and, therefore, help to minimise the costs and risks associated with the implementation.

The use of open standards will support NHSScotland’s ability to leverage developments in the wider healthcare sector.

Implications
The evolution of NHSScotland’s architecture drives the need for the continuous analysis and development of standards within the eHealth standards library.

Solutions conform to Scottish Government, NHSScotland, United Kingdom, European and other relevant standards published within the eHealth standards library.

Wherever possible solutions should avoid the use of proprietary standards and careful consideration is necessary to ensure that the impact on NHSScotland’s architecture is both recorded and understood.

Supporting resources
- Design checklists.
- eHealth standards library: [http://www.ehealth.scot.nhs.uk/?page_id=88](http://www.ehealth.scot.nhs.uk/?page_id=88)
- Interoperability working group (IOWG)

6 – Leveraging existing national applications

Description
NHS Scotland’s architecture leverages maximum benefit from existing eHealth investments.
Rational
NHSScotland already has significant achievements in eHealth based on its existing investment in a range of national applications. However, there are substantial opportunities to increase the content, usage and coverage of these applications to realise additional benefits for patient care.

Implications
The architecture incorporates existing national applications.
The capabilities of existing national applications are considered when designing solutions to meet new business and clinical requirements.

Supporting resources
• eHealth reference architecture

7 – Information is governed

Description
The architecture and solutions adhere to NHSScotland’s standards for information governance.

Rationale
Patients entrust NHSScotland with personal information in the expectation that it will be appropriately stored, and be shared only with those who need to know.
Without robust information governance there is a risk of unauthorised disclosure that could undermine patient, public and professional confidence. Robust information governance is key to enabling solutions to reach their full potential.

Implications
The architecture and solutions comply with NHSScotland’s and Scottish Public Sector standards for information governance.
Information governance is considered in solution design.

Supporting resources
• Standards for information governance (to be developed) – the eHealth Directorate is undertaking an information governance study which aims to answer many of the complex questions associated with managing access to the personal health information held by NHSScotland.

8 – Information is accessible

Description
Information is available and accessible to authorised individuals and groups across NHSScotland.

Rationale
Safe, efficient and effective decision making, either clinical, administrative, or managerial, is directly dependent on the availability and accessibility of information. Information gathered in one part of the organisation may have value to another, and therefore systems storing information make that information readily available to authorised (identified, authenticated and audited)
individuals and groups across the service, and facilitate the sharing of health information with patients.

**Implications**

NHSScotland’s architecture and solutions comply with relevant standards to ensure that information is accessible to authorised systems and individuals in other parts of the organisation. Within agreed constraints, the architecture and solutions enable access to real-time operational and management data. Within agreed constraints, the ICT architecture and solutions support the sharing of information with the Scottish Government, local authorities, other organisations and recognised NHS bodies in the UK, as appropriate.

**Supporting resources**

- Portal standards (to be identified and developed)
- Integration and interoperability standards (to be identified and developed)
- Other standards to be identified and included within the eHealth standards library

9 – Information is secure

**Description**

All information is secured against unauthorised access, modification or loss in accordance with NHSScotland’s information security policy.

**Rationale**

Information systems are responsible for managing, storing and transmitting patient health information and therefore meet the requirements of NHSScotland’s information security policy.

**Implications**

The architecture and solutions, including people, systems, processes and physical components, comply with NHSScotland’s information security policy, balanced with the need to make information accessible.

Solution owners ensure that technical configurations and measures are in place to enforce compliance with NHSScotland’s information security policy, and ensure that such configurations and measures are in proportion to the level of security risk.

**Supporting resources**

- NHSScotland Security Policy and Standards
- Other standards from the eHealth standards library

10 – Common vocabulary and data definitions

**Description**

Data is defined consistently throughout NHSScotland, and the definitions are understandable and available to all users and systems.

OBJ ID: A817352
Rationale
Systems contain information that has value to deliver care and manage resources in the wider service. This includes information required for management and clinical purposes other than direct patient care, for example healthcare planning, public health, clinical audit, research and clinical governance.

In order that information can be shared and unambiguously understood, solutions adhere to a common vocabulary and data definitions, as specified through NHSScotland’s national data standards.

Implications
The architecture and solutions comply with NHSScotland’s national data standards to ensure that the end to end integrity of clinical meaning is maintained.

Supporting resources
- Standards from the eHealth standards library

11 – Application usability and delivery

Description
Consistency is applied to presentation mechanisms for delivering and presenting applications and information to end-users.

Rationale
Providing standard presentation mechanisms across NHSScotland simplifies access to the functionality that end-users require. Enabling end-users to be self-sufficient improves efficiency, reduces the need to complete additional training and reduces the possibility of mistakes being made.

Implications
The architecture incorporates portal standards, to which solutions conform.

When designing solutions, consideration is given to using portals as the standard presentation mechanism.

Supporting resources
- Portal standards (in development)
- Other standards to be identified and included within the eHealth standards library

12 – eHealth solutions will be cost efficient – ‘Reuse over buy’ and ‘buy over build’

Description
Where approved standard solutions and technology platforms exist in NHSScotland, they will be considered for reuse. Where they do not exist in NHSScotland, but are externally available either via open source or from software vendors, they will be selected. Only where NHSScotland requirements are substantially unique, or where specific constraints arise, will development be considered.

OBJ ID: A817352
Rationale
Solutions that are built to leverage and/or extend existing solutions and technology platforms will, in general, be most cost effective in terms of implementation and support, and will be simpler to integrate into an existing architecture.

The requirements of NHSScotland are common to other healthcare providers. Developing complex applications is a time consuming, costly and risky exercise, the service is best served by taking advantage of the experience and effort of others by using Commercial-of-the-Shelf (COTS) solutions or open source software. In making a decision the total cost of ownership must be considered and local or internal development should only be considered as a preferred option following sound analysis and business case.

The total cost of ownership of COTS applications is likely to be less than that of equivalent custom-build solutions. Similarly, the cost and risk associated with the implementation and integration of COTS applications is likely to be lower than that associated with equivalent custom-build solutions.

In all cases solutions have to be affordable to NHSScotland with the required capital and resource investment matching available budgets.

Implications
The architecture consists of reusable building blocks.
Systems, capabilities or services specified by the architecture are reused whenever possible.
Systems expose services and information to interoperate with other systems.
Any proposed custom-build solution is carefully examined to understand the associated costs, benefits, risks of implementation and available alternatives.

Supporting resources
- eHealth Reference Architecture

13 – Controlling technology diversity

Description
Technology diversity is controlled to minimise the cost of maintaining expertise in, and connectivity between, multiple platforms.

Rationale
Minimising the variety of technology platforms (applications and infrastructure) used to support NHSScotland minimises the total cost of ownership and simplifies maintenance.

Implications
Solutions adopt existing technology standards as the preferred option, and consider the cost of integration and support for any non-standard technology.

Supporting resources
- Technology standards from the eHealth standards library
## 14 – Critical services are maintained

**Description**
The architecture is capable of supporting and maintaining critical business and clinical processes.

**Rationale**
As NHSScotland is increasingly dependent on eHealth to deliver healthcare, the reliability and resilience of the overall architecture and its component parts must correspond to the importance of the business and clinical processes which they support.

**Implications**
Solutions are designed in proportion to the criticality of the services which they support.

Consideration is given to any potential impact on existing health systems and measures appropriate to the criticality of the system are taken to ensure no detrimental effect on existing service levels.

Business continuity and disaster recovery are considered within the architecture and solution design.

**Supporting resources**
- Resources to be identified

## 15 – Compliance with Laws and Regulations

**Description**
Solutions will comply with all relevant laws and regulations, and should be able to take account of changes to these.

**Rationale**
NHSScotland is obliged to abide by relevant laws and regulations.

**Implications**
Solutions that are in breach of any applicable laws, regulations or policies are not compliant with NHSScotland’s architecture vision.

Compliance with the relevant legal and regulatory frameworks (e.g. Disability Discrimination Act or Data Protection Act) must form part of business requirements.

Compliance with policies, such as NHSScotland's standards for information governance, must form part of the requirements.

Where changes to relevant laws, regulations or policies are likely/possible, solutions should have the necessary flexibility to accommodate with these.

Changes to the law, regulations or policies, which have an impact on NHSScotland's architecture, need to be understood and managed in a coordinated manner.

**Supporting resources**
• Central Legal Office
  www.clo.scot.nhs.uk