

eHealth Architecture Principles

What are Architecture Principles and why have them?

Just as a city's infrastructure is designed to support the needs and uses of a city, the eHealth Architecture exists to support the needs for a country's or region's health goals and objectives. eHealth Architecture Principles are the underlying guidelines that ensure that eHealth technologies and technology projects support the eHealth strategies and objectives in a way that maximizes the investment. Because architecture principles are foundational, disparate organizations may share similar architecture principles. In summary, the eHealth principles provide a foundation for making conscious decisions about technology.

What do architecture principles address?

TOGAF, The Open Group Architecture Framework, and other architecture processes or frameworks identify different types of architecture principles. To be effective, architecture principles do not need to be organized into categories. However, the following categories serve to help guide thinking about the content areas that architecture principles typically address. While these categories may have some overlapping scope, it may be helpful to ensure that the following types of principles are considered.

- Business Principles - For an eHealth Architecture, these principles define how the architecture will support the Health and/or eHealth goals and objectives of the Ministry of Health. These principles typically address topics such as:
 - Scope of the principles or the business areas that are expected to be aligned with the principles.
 - Alignment with strategic Health and/or eHealth goals.
 - Need for consideration of the full life-cycle of technology.
 - Support for applicable laws and regulations.
- Data Principles - For an eHealth Architecture, these principles define how the eHealth data will be managed and governed. These principles typically address topics like:
 - Expectations regarding data security, data privacy, and transparency.
 - High-level expectations relating to data governance and management.
- Technology and Application Principles - To provide the best service possible, some organizations may have principles about their technology and application development approaches. The principles should be above any specific technology. These principles may address topics such as:
 - A preference for service oriented or agile architecture.
 - A preference for a specific application hosting strategy.
 - If technologies need to be supported and maintained internally, there may be a preference to limit technology diversity or restrict to certain types of licensing.
- Process Principles - These are principles that guide the processes for how technology projects are approached. These principles may address topics such as:
 - A systems approach to ensure the solution aligns with the eco system and is focused on user needs.
 - The desire to participate in open standards and processes.

What does an architecture principle include?

The following is a general structure for architecture principles. Some organizations may use a different format or have additional categories of information that is captured.

Example Architecture Principles Structure:

- Principle name - this is succinct and represents the essence of the principle.
- Description or definition - A two or three sentence definition or description of the principle. It is important to not use vague words like "consider".
- Business rationale - A statement on the value or benefit of using this principle.

What are some examples of architecture principles?

The following are illustrative examples of Architecture Principles. The list is intended to help generate thought around the types of principles that may be applicable to a specific environment. This is not intended to be an exhaustive list and it is expected that principles and descriptions will be modified extensively to fit the needs of the environment. The reference column provided in the table below points to resources where the principle is referenced.

Example Business Principles

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Example Principle Name	Example Description	References to the principle or a similar principle
1. Adherence to the Principles	These principles apply to all eHealth projects in the country.	TOGAF Scotland Health Directorate
2. Maximize Benefit to the Health Ministry and the eHealth Strategy	Information management decisions are made to provide maximum benefit to the country's Ministry of Health and eHealth strategy as a whole.	TOGAF Scotland Health Directorate
3. Inclusiveness	All organizations in the Ministry of Health and all stakeholders participate in information management decisions needed to accomplish health objectives.	TOGAF
4. Legal Compliance	eHealth information management processes comply with all relevant laws, policies, and regulations.	TOGAF
5. Standards Based	The architecture and solutions use relevant open eHealth standards where standards are available.	Scotland Health Directorate USG OpenHIE Digital Principles
6. Build for Sustainability	Plan for sustainability from the start, including planning for long-term financial health e.g., assessing total cost of ownership.	Digital Principles BID
7. Solutions are based upon the eHealth business needs and reference architecture	Solutions will be based upon eHealth business needs and the eHealth Architecture guides the design and delivery of solutions.	Scotland Health Directorate
8. Leverage existing investments	The Country's eHealth solutions will leverage maximum benefit from existing eHealth investments that can be aligned with the eHealth reference architecture.	Scotland Health Directorate
9. Reuse, Buy, Build	Where possible, software solutions are reused. If reuse is not possible and solutions are externally available either via open source or from software vendors, they will be selected. Only where ministry requirements are substantially unique, or where specific constraints arise, will development be considered.	Scotland Health Directorate
10. Accountability	Making roles and responsibilities clear	Ethiopia Information Revolution
11. Transparency	Making it clear on the where, when and how decisions are reached	Ethiopia Information Revolution

Example Data Principles

Example Principle	Description	References
1. Information is an asset and is governed	Data and Information are assets and are managed and governed accordingly. Each data element has a data steward responsible for the definition of the data and ensuring that there are processes to ensure accuracy, and reliability. There are defined rules on who can create, modify, view and delete data.	Scotland Health Directorate TOGAF
2. Privacy and Security of data	All information is secured against unauthorised access, modification or loss. Consider the context and needs for privacy of personally identifiable information when designing solutions and mitigate accordingly.	Scotland Health Directorate Principles for Digital development
3. Common Vocabulary and Definitions	Data is defined consistently throughout the enterprise, and the definitions are understandable and available to all users and systems.	TOGAF Scotland Health Directorate
4. Data is Shared and Accessible (open data)	Users have access to the data necessary to perform their duties; therefore, data is shared across enterprise functions and organizations. Data is accessible to users as necessary to complete their jobs and in compliance with privacy and security designs.	TOGAF

Example Technology and Application Principles

Example Principle	Description	References
1. Service Oriented Architecture	Where possible, architecture and solutions are composed of reusable modular components and services, based on Service Oriented Architecture.	TOGAF Scotland Health Directorate
2. Technology diversity	Technology diversity is controlled to minimise the cost of maintaining expertise in, and connectivity between, multiple platforms.	Scotland Health Directorate
3. Ease of use	Applications are easy to use. The underlying technology is transparent to users, so they can concentrate on tasks at hand.	TOGAF
4. Common Use	Development of applications used across the enterprise is preferred over the development of similar or duplicative applications which are only provided to a particular organization	TOGAF
5. Responsiveness	Applications are available and responsive to needs	Ethiopia Information Revolution

Example Process Principles

Example Principle	Description	References
1. Understand the existing ecosystem	Ensure projects and programs are built, managed, and owned with consideration given to the local ecosystem.	Principles for Digital Development
2. Design with the user in mind	Include representatives of stakeholders in planning, design, development and assessment of solutions. Develop context appropriate solutions informed by user needs.	
3. Data Driven	Design projects so that impact can be measured at discrete milestones with a focus on outcomes rather than outputs.	Principles for Digital Development
4. Project Governance	eHealth projects will be managed under the eHealth governance process.	
5. Open	Use open standards, open source and open innovation.	BID OpenHIE Principles for Digital Development

References and Resources

The following are a list of examples and resources that can be used to help guide in eHealth Architecture development.

- TOGAF (The Open Group Architecture Framework) - Architecture Principles: http://pubs.opengroup.org/architecture/togaf8-doc/arch/chap29.html#tagcjh_2
- National Health Service Scotland - Architecture Principles: <http://www.ehealth.nhs.scot/wp-content/uploads/sites/7/documents/standard-architecture-principles1.pdf>
- Principles for Digital Development: <http://digitalprinciples.org/>
- BID (Better Immunization Data) project principles - <http://bidinitiative.org/the-principles/>
- OpenHIE Principles - <https://wiki.ohie.org/display/documents/Architecture+Governance+and+Principles>
- overview presentation - <https://docs.google.com/presentation/d/1HV7QiRxxRQussCOpWIWOyBGnJd1IsyLtSwEDAfDT4AM/edit#slide=id.p>