Enterprise Architecture Principles

1 Executive Summary

These Architecture Principles are a fundamental part of the Enterprise Architecture Framework (EAF). They are derived from the University's IT Architecture and industry best practice.

The principles constitute a basic reference point for every IT project and initiative and are drivers for architecture governance. Each new project will be expected to explain how they will conform to the principles and where not, why not. Conformity with the principles will be evaluated before a new application or product is launched and may result in new risks or issues being raised.

The principles are mapped to architectural layers (Business, Application, Technology), or cross-cutting concerns such as Security or the Environment, as follows:

- Business Architecture – Business Processes
- Information / Data Architecture
- Application Architecture
- SOA – Service Oriented Architecture
- Security
- Environmental/Green IT
- Technology.

All projects will be required to complete an Architecture Compliance Form (ACF), during the Initiation of early Implementation phases, whose purpose is to ensure alignment with the IT Strategy. The ACF will show how the project will conform to the Architecture Principles, Requirements and Standards.

2 Architectural Principles

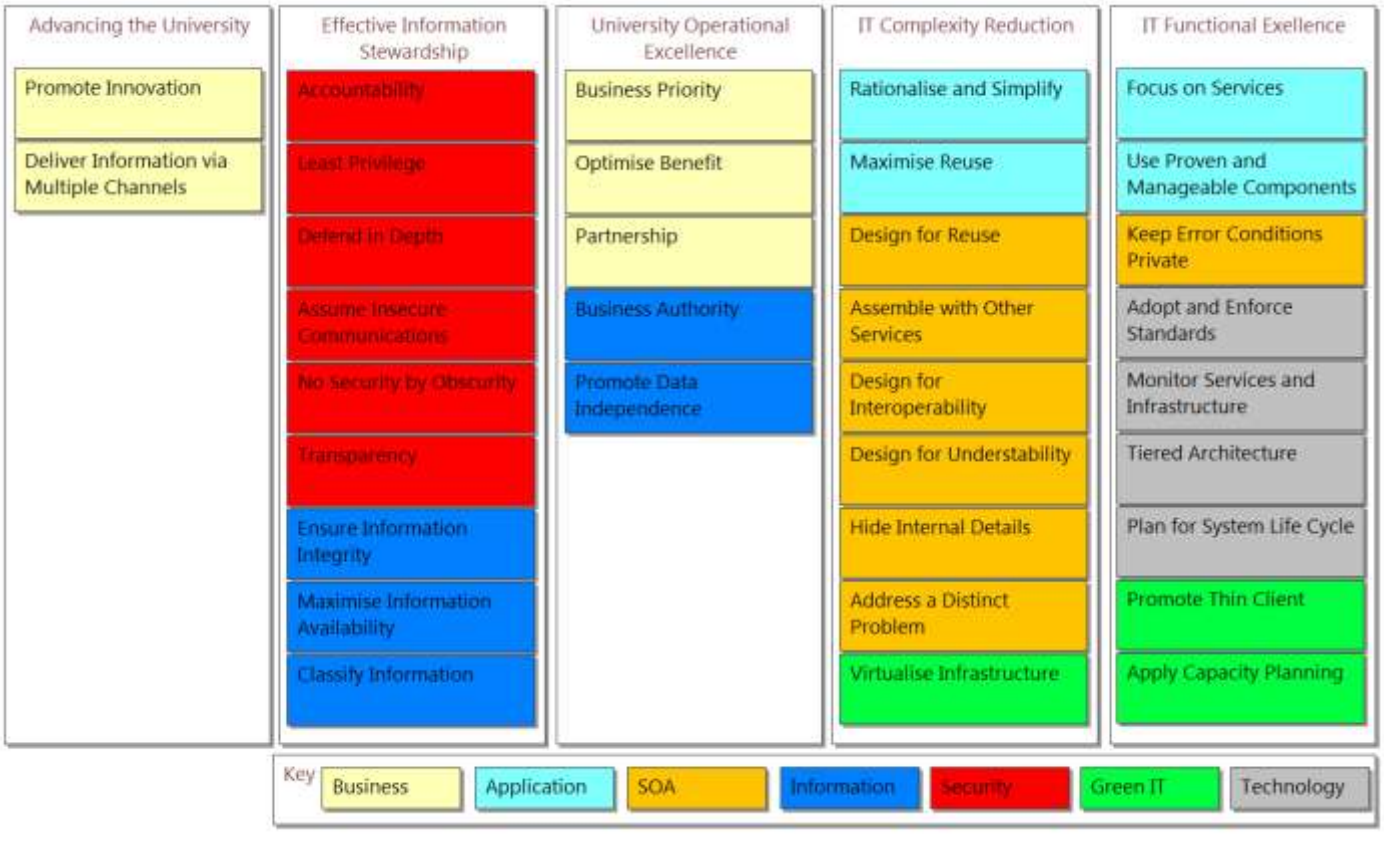

Figure 1 Architectural Principles

The principles have been allocated to IT Strategy themes and coloured according to where their main benefits lie.

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Some principles may apply to more than one strategy theme but they have been mapped to the one that appears most relevant. Projects will be required to document how they conform to the principles and if not, why not. Though in practice, most projects are unlikely to satisfy them all.

Principle		Rationale
Business		
BUS1	**Promote Innovation** Innovate for competitive advantage and productivity.	Helps realise competitive advantage and drives improvements in efficiency and productivity.
BUS2	**Business Priority** Support and promote the University's enterprise vision, business strategies and plans.	Architecture gives most benefit when closely aligned with business strategy and goals.
BUS3	**Optimise Benefit** Maximize the overall benefit to the University by balancing business and technology factors.	The optimal solution for a given project may not yield the highest overall benefit for the University as a whole.
BUS4	**Partnership** Every IT investment will have a business owner and an IT steward	Business and IT must work cooperatively to realise the benefits of IT investments.
BUS5	**Deliver Information via Multiple Channels** Make information available over multiple channels such as personal or laptop computers, smart phones, tablet computers and other devices.	Allows the University to work smarter and improves general productivity.
Data (subject to review and update).		
INF1	**Business Authority** Ensure there is a designated business owner for all business information with authority over its creation, change, access and deletion.	Those with the most knowledge of the data have the best chance of and most interest in getting it right. Integrity is improved and maintenance is simplified.
INF2	**Ensure Data Integrity** Capture business data once at the point of creation and manage it actively throughout its life cycle up to and including eventual disposal.	Promotes the accuracy and consistency of data and the efficiency of data management processes.
INF3	**Treat Data as an Asset** Organize and manage data to maximise its value to the University.	Organizing and managing the key data assets of the University drive the business processes needed to run the enterprise.
INF4	**Classify Data** Apply a coherent classification scheme and manage data accordingly.	Different classes of data need to be managed, stored, protected and disposed of differently.
INF5	**Promote Data Independence** Decouple data from applications and, where feasible, make it available over standardised interfaces.	Insulating consumers of enterprise data from its structure reduces complexity and lowers the maintenance overhead of changes.
Application		
APP1	**Focus on Services** Prefer loosely-coupled, modular components that implement services.	Resilience, flexibility, performance and scalability are improved by minimising interdependencies.
APP2	**Maximise Reuse** Design and implement reusable components.	Reduces development costs and time; leverages investments in existing systems and improves the ability to adapt to changing requirements.
APP3	**Rationalise and Simplify** Eliminate duplication and reduce complexity.	Lowers costs through economies of scale and reduces overhead of managing complexity.
APP4	**Use Proven and Manageable Components** Select market-leading products and reuse proven bespoke components where appropriate	Reduces risk and frees-up development resources to focus on areas where competitive advantage is available.

Principle		Rationale
Service Oriented Architecture (SOA) Applies to SOA with appropriate middleware and infrastructure; embodies good practice for application component design.		
SOA1	**Design for Reuse** Define services that are internally consistent, self-contained and independent from other services.	Provides the largest unit of functionality that may be useful in different contexts.
SOA2	**Assemble with Other Services** Design 'plug and play' services that are useful to the largest number of potential consumers.	Services may be assembled to create new services and applications – sometimes in unforeseen ways.
SOA3	**Design for Interoperability** Use common standards for the exposure and use of services.	Permits reuse across different environments.
SOA4	**Design for Understandability** Ensure the service is comprehensible in its own right without reference to other services.	Potential consumers are more like to use a service if it performs a clearly defined and understandable function.
SOA5	**Hide Internal Details** Design interfaces separately from the service implementation – both functionality and data.	Avoids implicit dependencies in service consumers and cooperating services.
SOA6	**Keep Error Conditions Private** Discreetly inform consumers of business error conditions. Ensure services always maintain data integrity. Keep error conditions within the service.	Limits the direct impact of errors and decouples the service consumers; thus avoiding the 'cascading errors' syndrome.
SOA7	**Address a Distinct Problem** Restrict the scope of the service to a distinct and well-defined problem domain.	Ensures that the service is self-contained and independent.
Security		
SEC1	**Accountability** All user and system interactions and access to information must be attributable to authenticated (reliably identified) people and systems.	The University has legal and moral obligations to be a responsible custodian of information and protect sensitive or confidential information.
SEC2	**Least Privilege** When allowing access to a resource, assign the minimum necessary privileges to complete the job in hand.	Reduce the possibility that users or systems will abuse the privileges granted them to make unforeseen changes or gain unauthorised access.
SEC3	**Defend in Depth** Implement a succession of barriers that an intruder must overcome before gaining access.	Good security does not rely on a single measure to protect against unauthorised access.
SEC4	**Assume Insecure Communications** Re-authentication will be required directly on the application or data server before access is granted.	The campus network is relatively open and insecure. Therefore user authentication at the point of initial sign-on cannot be relied upon at the server.
SEC5	**No Security by Obscurity** Security must be designed-in and not rely on hiding information.	Security should not be compromised by the release of network diagrams, system specifications etc
SEC6	**Transparency** Security mechanisms should not impair the ability of the University to function.	Security mechanisms should be non-intrusive, as far as possible, and comply with usability and performance requirements.
Environment / Green IT		
ENV1	**Virtualise Infrastructure** Remove the dependencies that link systems to specific hardware devices – includes server virtualisation, network addressing etc.	Virtualisation promotes flexibility, allows more efficient use of hardware resources and reduces energy consumption.

Principle		Rationale
ENV2	**Promote Thin Client** Prefer web-browser based applications that do not rely on specific components or applications that must be deployed to the user work station.	Browser-based applications are easier to deploy and manage. Thin client reduces the need for client-side hardware resources.
ENV3	**Apply Capacity Planning** Ensure infrastructure is sized appropriately to meet the non-functional requirements and allow for predictable growth. Do not over-specify.	Oversized infrastructure wastes money and increases energy consumption.
Technology		
TEC1	**Adopt and Enforce Standards** Formally adopt technical standards and select preferred products. Non-compliance needs to be justified and explained.	Standardisation helps achieve economies of scale, reduces complexity and improves flexibility.
TEC2	**Monitor Services and Infrastructure** Deploy automatic monitoring tools that cover application and data services as well as the underlying infrastructure.	Reduce down time and the unavailability of services due to failures or exceptions – hardware and software.
TEC3	**Tiered Architecture** Separate concerns through tiered architecture.	Improves security, scalability and promotes more efficient platform utilisation.
TEC4	**Plan for System Life Cycle** Consider complete life cycle through Retirement.	Technology road maps and the calculation of total cost of ownership should include the impact of Retirement and allow for any intervening upgrades and changes.