Enterprise Architecture Principles of the University of Helsinki

30.9.2016

| Nro | Name | Statement | Rationale | Implications |
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| **General Principles** | | | | |
| **1** | **Enterprise Architecture is applied throughout the University** | Enterprise Architecture methodology must be used in all operational and systems development within the University | This is a core principle which ensures data consistency, interoperability and cost-effectiveness of processes and systems. It helps to prevent uncontrolled exceptions, overlaps and conflicts. | Development projects can be started after their compatibility with Enterprise Architecture is checked. Architecture reviews are made in different phases depending on the project. Exceptions to Enterprise Architecture are acceptable only in such cases where compatible solutions are not available. |
| **2** | **The development of IT systems is based on openness** | Systems development must be open and transparent. Work is based on collaboration between different parties. | Openness contributes to the development of uniform practices and systems. Through open project management, development plans and development, the common and unit-specific needs can be detected, and resources can be allocated more effectively for the implementation of solutions.<br><br>Openness is a prerequisite for achieving interoperability of systems, data and operations, which in turn is essential for improving the efficiency and cost-effectiveness of operations. | All interested parties should be given equal opportunity to participate in the development. Policies, development plans, development projects and outputs will be documented and made available to all who need them.<br><br>In practice, interoperability requires transparency of semantics, data, documentation, interfaces and software or source code. |
| **3** | **Ownership is defined** | The owner is an entity that is responsible for the maintenance and development of the owned entity throughout its life cycle.<br><br>Ownership shall be designate to:<br>• projects<br>• processes<br>• services<br>• data<br>• information systems<br>• technologies<br>• architectures | Ownership must be defined so that responsibilities and development objectives are clear, decision-making is smooth, time is saved and errors in development projects are reduced. | All the necessary ownership responsibilities must be defined at least at the unit level.<br><br>The owner is responsible for the management of the owned entity, as well as for acquiring the necessary resources.<br><br>Tasks related to ownership should be documented. |

| Business Architecture Principles | | | | |
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| **4** | **Enterprise Architecture serves the University's core activities** | When developing operations and information systems, the requirements of the University's basic tasks, user needs and the changes in working methods and processes must be described. | Systems must serve the needs of research and teaching or their support functions because Enterprise Architecture is based on business architecture which is associated with the basic processes and tasks.<br><br>Information systems help to carry out the basic tasks, and on the other hand they are used to automate routine tasks related to the support functions, which contributes to an optimal allocation of resources, and also brings cost savings. | This principle affects the prioritization of development projects: projects which directly serve the basic functions are given high priority.<br><br>The identification and documentation of process-based requirements should be supported and the choice of alternative solutions be monitored.<br><br>The specifications of systems and services must be centrally controlled and they must be easily accessible to all parties. The solutions must be based on the overall benefits for the University and the target architecture requirements. Suboptimization should be avoided. |
| **5** | **Enterprise Architecture supports the University's strategy** | Enterprise Architecture must support the objectives, development targets and measures laid down in the strategy. The objectives must be reflected in all Enterprise Architecture areas. | The strategy describes the means to move towards the organization's goals. System solutions play a key role when the University strives towards its stated goals. Enterprise Architecture should adapt to the changing demands of the strategy.<br><br>Enterprise Architecture supports the development of the University towards its defined target state and enables manageability of the strategy-supporting IT systems. | Strategy formation should take into account the possibilities and limitations of information technology.<br>All information system development must be based on strategy-driven needs, which have been analyzed, defined and described.<br>The definition of operational requirements must be based on the University's strategy, and it must also aim at finding different optimal IT solutions.<br>The development should be based on increased cost-effectiveness, not only on the pressure for change caused by technology. |

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| **6** | **Unified methods and solutions are used in common functions all over the University** | Operative methods and practices in University-wide functions should be as unified as possible. | Practices should be harmonized as far as possible, in order to achieve flexible co-operation and a comparable outcome.<br><br>Uniform practices allow for the use of common information system solutions, which in turn reduces costs. The use of common systems will facilitate cooperation between the different organizational units. | Compliance with the harmonized practices and the use of common services and information systems requires cooperation among the various parties and a commitment to satisfy the common interest.<br><br>Information system projects that support common practices, policies, and related processes and services must be promoted.<br><br>The implementation of services requires the documentation of operations (e.g. processes, objectives, rules, responsibilities). |

| Information Architecture Principles | | | | |
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| **7** | **Information management and IT systems are based on common concepts and vocabulary** | Definitions of the concepts are available to all who need them. The concepts comply with national and international standards. | The defined concepts give a better picture of the activities of the University, and form the vocabulary for process documentation. The conceptual framework provides the basis for the data structures of the new information systems so that the information can be used in local projects. A uniform terminology will facilitate cooperation with stakeholders. | All projects must take into account the uniform concepts. If necessary, the data model of an off-the-shelf solution must be adapted to the data model of the University. |
| **8** | **Data are shared** | The University's units provide information for their own needs and for external use. The principle of open data is applied.<br><br>Data are shared taking into account the eventual publicity limitations and data protection requirements. For example, access to data related to research, business and trade secrets, personnel management and intellectual property rights may be limited. | The same information is needed for a wide range of uses by many different organizational units. The sharing and distribution of data will reduce data management and maintenance costs.<br><br>Data availability, integrity and quality are the key prerequisites for the efficiency and quality of operations.<br><br>All information is public, if it is not specified that it be kept secret. | Data interoperability also requires comprehensive documentation, information about data storage locations, the right tools for processing information, as well as high data quality.<br>Interoperability and availability also requires data uniqueness.<br><br>The principle of open data requires that the data be technically available, free of charge, reusable, discoverable and comprehensible.<br><br>Data life cycle management includes the definition of the data's storage value, when the availability of data of prolonged or permanent lifespan can be ensured already at the initial stage, and when other data can be disposed of efficiently once they have become obsolete. |
| **9** | **Data security and data protection are managed during the whole life cycle of the data/system** | Information security means the safeguarding of data, data processing environments and processes.<br>Information security is designed to protect the confidentiality, integrity and availability of computer system data from those with malicious intent. | Information security is ensured throughout the life cycle of the data.<br>Information is managed in accordance with the data protection requirements.<br>The data owner is responsible for the setting of security objectives. The information system owner is responsible for the implementation of the security procedures within the system. | Data security instructions must be complied with, users are trained in their content, and they are updated on a regular basis.<br><br>The project model includes information security checkpoints. |

| System Architecture Principles | | | | |
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| **10** | **Systems are interoperable** | Various departments of the University will be able to use common solutions to support common functions. IT systems are utilized as widely as possible. Parallel, overlapping solutions are avoided. | If a common process is supported by various different systems or system instances, the system implementation, maintenance and management costs will increase while collaboration and shared use of data will be affected.<br><br>Shared use of systems will reduce the number of different systems, reduce the cost of maintenance and management, and improve the shared use of information. | System interoperability also requires uniform practices. The transition to common practices should be supervised and supported by appropriate means.<br>In connection with procurement of information systems, development projects and deployment, the potential of already existing, reusable solutions must be reviewed.<br><br>Modularity and substitutability of components is required for the solutions.<br><br>Solutions and their specifications shall be documented in such a way that their reusability can be evaluated. |
| **11** | **Compatibility of IT systems** | Systems must be interoperable with other university systems and the necessary external systems. Interoperability applies to all elements of the systems. | A central starting point for Enterprise Architecture development work is to ensure the interoperability of systems. Interoperability ensures the shared use of the information system to be processed and the achievement of the organization's overall interests .<br>Common interfaces in accordance with the general standards will ensure interoperability.<br>The standards are independent of suppliers, and support a multi-vendor environment and the integration of various suppliers' products. | System interoperability is ensured at the logical and technological levels. The standards and common interfaces should be agreed on, defined and described. Open interfaces and standards will be used by default.<br><br>Direct links between the systems must be avoided, and shared integration solutions, such as the Enterprise Service Bus, shall be used. |

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| **12** | **User-friendliness of IT systems** | Ease of use and accessibility of systems is taken into account in the system design and procurement.<br>User interfaces of different systems are as uniform as possible. | Good usability of systems will facilitate the use of the systems and diminish the number of errors made by the users.<br><br>The consistency and accessibility of the user interfaces of different systems allows users to carry out more tasks, which will increase the flexibility and efficiency of the organization. | Information systems must be available independent of time, place and device.<br>Operational requirements as well as general usability and accessibility requirements, guidelines and standards must be taken into account in user interface design.<br>Usability features common to different applications shall be defined and documented jointly. |
| **13** | **System architecture is based on vendor-independent solutions** | The system architecture should be independent of closed technology solutions and individual solution providers. This allows for the use of different technical platforms and a smooth transition to other technologies. | Information systems support the University's basic operations and support functions, whose life cycles are much longer than those of the technologies the systems are based on. Thus, the information systems must be independent of quickly aging platform technologies. | Technological independence should be taken into consideration when making decisions on system solutions. Significant dependence on certain suppliers should be avoided. Server and database platforms must be as replaceable as possible. |

| Technology Architecture Principles | | | | |
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| **14** | **Consistent technology architecture** | The technology architecture is as uniform as possible. The solutions are based on commonly agreed upon, standards-compliant technologies that ensure interoperability of the whole and its parts, efficiency, cost-effectiveness, maintainability and ease of development. | Maintenance of non-standard technologies will cause additional costs, and maintaining a heterogeneous environment requires special expertise.<br><br>Uniform technical environments and a unified technology framework facilitate e.g. system procurement, testing and deployment as well as better cost-effectiveness. Consistent technology will facilitate problem solving. Less comprehensive skills are required in support services. | Information system development should be based on common and open standards and commonly agreed on technology solutions. Possible deviations must be agreed on separately. Purchasing policy and procedures must support the agreed on technology architecture. The technology selection process must adapt to the changing needs of the organization. The focus will be on commonly used and cost-effective technology solutions. |
| **15** | **Technology choices are based on the maturity of technologies** | Information technology choices are based on technological maturity, life cycle phase, extent of use and the availability of support and expertise. | With the introduction of mature technologies it is possible to avoid the problems and risks associated with new technologies and diminish maintenance work due to constantly changing to new technologies.<br><br>By observing the life cycle phase of the technology it is possible to avoid a premature commitment when the technology is not yet well established, or a late commitment when it is already becoming obsolete.<br><br>Widespread use of a technology will ensure that the support for it is also available in the future. Commonly used, stable technologies improve interoperability and reduce technology risks and indirect costs. | The choice of new technologies and significant technology investment decisions must be assessed according to the criteria described above. The technology to be introduced must be sufficiently stable, and on the other hand must have a sufficient remaining lifespan. |

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| **16** | **Technology choices are based on sustainable development requirements** | In the design of information technology equipment and facilities, such solutions are preferred whose environmental impact is as minimal as possible. | As the first multidisciplinary scientific university, the University of Helsinki has joined the Green Office program.<br><br>The University is a prominent social actor, and is expected to comply with generally accepted values such as sustainable development. The University must strive in all of its operations for as environmentally beneficial solutions as possible.<br><br>Information technology consumes a great amount of energy, so the potential for savings should be realized and benefited from. | From the information technology point of view, the energy efficiency of equipment and IT facilities as well as recycling are emphasized.<br>The energy consumption of desktop computers, servers, peripherals and data center solutions should be optimized and life cycles prolonged as much as possible. |