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Technological architecture for a higher education institution

Rafaela Blanca Silva-López[1], José Ignacio Castillo-Velázquez[2], José Ángel Hernández-Rodríguez[3], Hugo Pablo-Leyva[3]

r.silva@correo.ler.uam.mx, icastillo@ieee.org, hrja@correo.azc.uam.mx, hpl@correo.azc.uam.mx

[1] Universidad Autónoma Metropolitana, Unidad Lerma
[2] Universidad Autónoma de la Ciudad de México
[3] Universidad Autónoma Metropolitana, Unidad Azcapotzalco

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Introduction

HEI (Higher Education Institutions) usually does not have a plan to make equipment purchases that impacts on the fulfilment of institutional strategic objectives. Generally, the acquisitions are carried out with a short-term vision, to solve the urgent problems, but it generates an inefficient use of resources coming from technological acquisitions.

The UAM (Metropolitan Autonomous University) has a structure based on Departments and Academic Divisions, each Department assumes the acquisition of technological infrastructure according to its own needs, but just looking for solving problems that arise in the short term, offering a very low impact on what is established in the institutional development plan. For those reasons, its more than justified the design of an institutional architecture from enterprise architecture based on UAM´s key processes, identifying the needed data to build a digital management system for supporting the management activities developed at UAM. The proposed technologic architecture must support data, applications and must be aligned to institutional key processes, considering the optimal use of resources invested when acquiring technologic infrastructure.

TOGAF key process model

TOGAF 9.1 framework (The Open Group Architecture Framework), is one of the most complete business architecture proposals. The business architecture proposed by TOGAF is based on the following components: a business architecture, a data architecture, an application architecture, and a technology or infrastructure architecture as shown in Fig. 1.

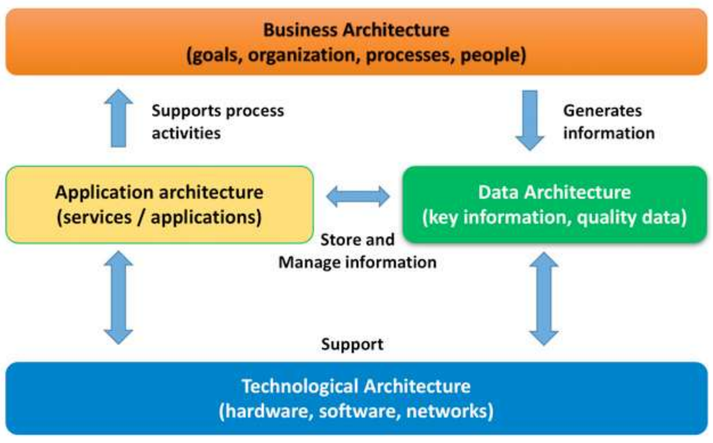

Figure 1. TOGAF business architecture.

Methodology

Methodology used includes the following activities:

- Compilation and analysis of key processes (classify them into three groups: strategic, operational and support);
- Design of the administrative meta-model;
- Design of data architecture (classified into master data, system data and catalogues);
- Design and implementation of the application architecture (aligned with the data and key processes identified, integrated by application of services, document management and reports);
- Design of technological architecture, it integrates the software and hardware used to support the developed applications.

Technological Architecture for HEI

Institutional Architecture

The Institutional Architecture was designed using TOGAF 9.1 framework as a base; TOGAF is one of the most complete enterprise architecture proposals. It is integrated from four architectures: 1) a business architecture; 2) a data architecture; 3) an application architecture; and 4) a technology or infrastructure architecture, those architectures are shown in figure 2.

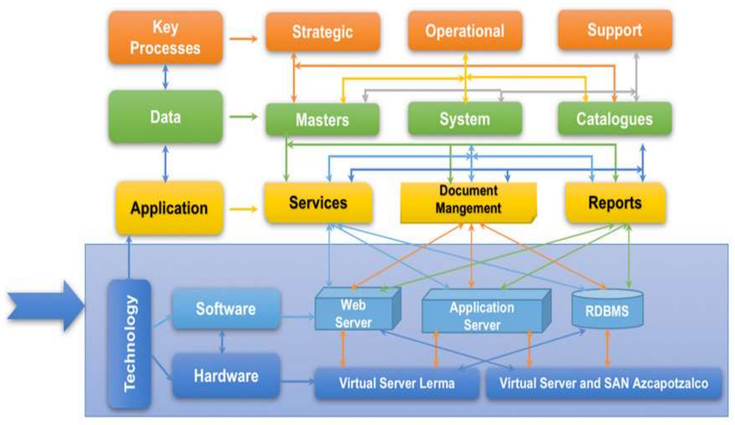

Figure 2. Institutional Architecture.

Technological Architecture

Figure 3 shows the diagram of the proposed technology architecture, indicating the corresponding layers.

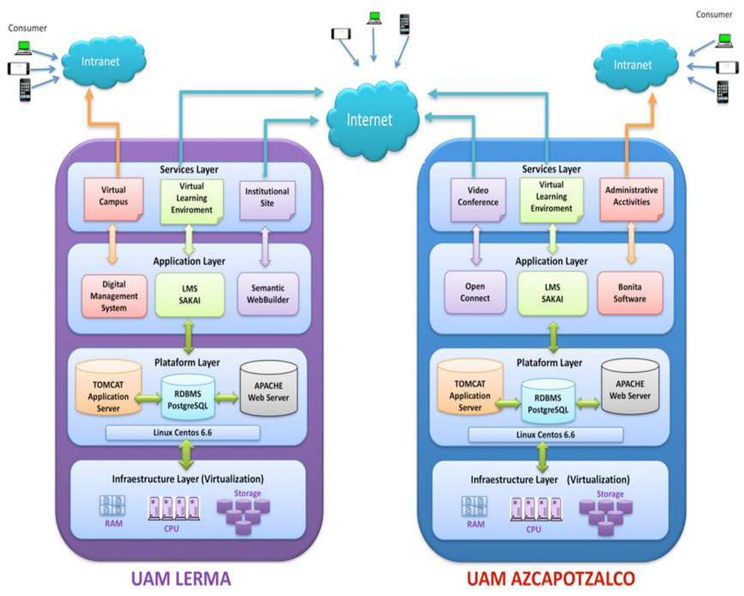

Figure 3. Diagram for the platform in layers.

Communication engineering diagram is shown in figure 4 where the main communications mechanisms and security are configured with the components of the institutional architecture, also with client and server´s connection and the corresponding network infrastructure.

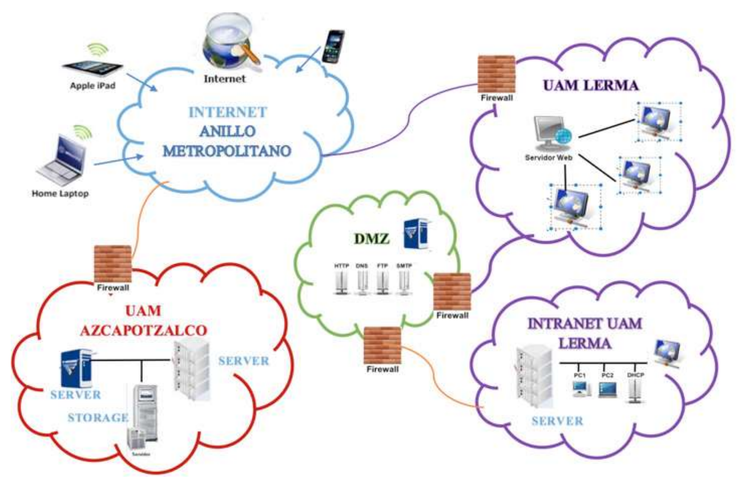

Figure 4. Communication engineering diagram.

Results

Today technology infrastructure implemented at UAM-Lerma campus supports virtual campus applications: 1) Request for tutors and scholarships; 2) Assignment of tutors; 3) Administration of scholarships; 4) Labor equality and gender equity survey; 5) Request for countryside practices; 6) Request for the exit of possessions; and 7) Request for services. The use of these applications reduces human errors, improves the attention times for the end user, takes a control of the state and process flow, which allows to identify where the process is stopped or delayed.

Table 1 shows information for virtualized servers located at Lerma campus, considering assigned IP address, RAM´s quantity, assigned disk space, number of processors and physical equipment characteristics.

Table 1. Technology infrastructure at UAM-Lerma campus (hardware).

Name	IP	RAM	CPU	Disk	Location
campus-virtual.ler.uam.mx	148.206.31.6	32113.1 MB	Intel(R) Xeon(R) CPU E5-2660 0 @ 2.20GHz stepping 07 (4 CPUs)	402.7 GB	UAM Lerma
sakai.ler.uam.mx	148.206.31.5	1877.3 MB	Intel(R) Xeon(R) CPU E5-2660 0 @ 2.20GHz stepping 07 (1 CPUs)	171.8 GB	UAM Lerma

Conclusions

The designed and implemented technological architecture supports the complying of some objectives requested by the development plan for UAM-Lerma campus, maintaining alignment with institutional key processes. All this has a positive impact when applying efficiently the technology infrastructure budget. It also warranties the security and availability of services to students, professors and administrative personal.

Technological architecture implementation lets centralize data and so avoiding data duplicity from a diversity of sources, minimizing the inconsistence problems.

Technological architecture establishes the computational platforms, databases, as well as the mechanisms of data storage, data networks, data processing and integrated services in data centers.

References

The content of this poster is a summary of the article:

R.B. Silva-López, J.I. Castillo Velázquez, J.A. Hernández Rodríguez, H. Pablo-Leyva (2017) TECHNOLOGICAL ARCHITECTURE FOR A HIGHER EDUCATION INSTITUTION, EDULEARN17 Proceedings, pp. 1010-1017.

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