

# **Group Projects B3 – Architecture**

Project presentation

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Use: Students  
Author: Samuel CUELLA

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## 1 PROJECT OVERVIEW

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McMahon and Tate is an advertising agency that use IT solutions from various vendors for their office work. They have no proper “information system”. They are using Windows machines, Unix servers (mostly Solaris and AIX) and some Apple OS X systems (mainly used by graphic artists).

They have decided to consolidate (through their IT Department) and re-design their infrastructure from the ground up in order to better fit their needs and improve the IT System cost effectiveness. The IT Department has written a functional specification (with some technical requirements as well).

Your team has decided to work on that case and try to come up with the solution that they need while being cost-effective.

## 2 FUNCTIONAL EXPRESSION

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### 2.1 NETWORK

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Your solution should include a reworked network infrastructure for a 100 employee company with the following departments:

- Management: 11
- Accounting: 13
- IT: 11
- Graphic artists: 33
- Ad writers: 32

Your network infrastructure will also include network-support related services like DHCP and DNS.

### 2.2 PRIVATE CLOUD

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At the moment, the company is running all its servers as physical machines only. As a result, some servers are almost idle most of the time while some others are in a chronic over-capacity.

For their new architecture, the IT Department insists that all servers must be converted to virtual workloads. To run all workloads, they want a virtualization cluster capable of:

- Move virtual machines from one virtualization host to another (live migration)
- Ensure high-availability: If a virtualization container goes down, the virtual workload must be resumed on another cluster node, while ensuring minimum impact on users.
- Upscale easily. The cluster will start as a four nodes cluster, but it must be growable with minimum effort and minimum (or none at best) additional software costs.

- The cluster should also be able to notify on-duty administrators of occurring problems.

Virtual workloads will be stored on an iSCSI SAN. The SAN should also be built out of clustered “regular” servers. The servers in the SAN should provide access to the volumes over iSCSI while ensuring data integrity and availability.

## 2.3 CORE SERVICES

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### 2.1.1 User Accounts

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User accounts must be stored in a single location and all machines and users should also be able to use this database as an authentication source. Users having being authenticated once should not be bothered anymore with credentials during their session.

The chosen solution must be compatible with all major platforms (Linux/Win32/OS X).

### 2.1.2 VPN

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Users should be able to access the company private network from outside. The IT Department as settled for an IPSec VPN. They want to have a Win32 server acting as the VPN “gateway”.

Win32, Linux and OS X clients must be configured to connect to the VPN using this protocol. You must prepare a proof of concept for all of these operating systems.

### 2.1.3 Mail

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Your solution must include a mail server. Users should be able to read their mail using the standard protocols (IMAP/POP) and through a webmail as well.

Of course the mail server has to be integrated with the centralized user database.

## 2.4 APPLIANCES AND PROFILES

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For some services the IT Department wants to be able to quickly provision, run and manage virtual workloads from “templates”. They want to be able to define configuration templates (that can be easily modified) and deploy/manage/updates those templates at will.

The solution must be compatible with Win32 and Linux (all GNU-based flavors) operating systems.

## 2.4.1 File servers

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A file server profile/template/... must exist. It'll allow the IT Department to create new file servers at will. The default configuration must configure the virtual machine to integrate with the existing infrastructure.

## 2.4.2 Web servers

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The company uses web server for two different tasks:

- Hosting various in-house intranet portals
- Test beds for Web developers

The first template is integrated with the company infrastructure, while the second just ensures that all needed software and development frameworks (HTTPd, ...) are installed.

## 3 DELIVERABLES

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The “main” exam is the simulated pre-sales meeting where students will present their proof-of-concept.

Students should include the following elements in their final delivery:

- Project documentation, based on the template.
  - Technical documentation explaining your choices and/or implementation choices/details on the following items (at least):
    - Appliances / Templates
    - Virtualization solution and clustering
    - Software vendors
- Any additional document you find relevant

**These documents are meant to explain why the chosen solutions are the best to fit the client needs. Address the reader as a client, not a teacher. These documents can be in French or in English, at your option.**

## 4 GRADED ITEMS

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The project will be graded as follows, on a 70/66 scale:

## Documentation (2 points)

- Spelling and grammar (0.5 points)
- Relevancy (0.5 points)
- Technical documentation (1 point)

## Network (4 points)

- Network infrastructure (2 points)
- Support services (2 points)

## Private cloud (21 points)

- The cluster runs virtual machines (3 points)
- Virtual machines can be migrated from one node to another (2 points)
- Virtual machines are migrated on node failure (2 points)
- It's easy / not expensive to add nodes to the cluster (5 points)
- Administrators are notified on failures / critical events (2 points)
- The SAN exports volumes over iSCSI (3 points)
- If a SAN node fails, the SAN is still available (4 points)

## User accounts (10 points)

- User accounts are centralized (2 points)
- Authentication is centralized (2 points)
- There is no need to authenticate twice during a session (2 points)
- All major platforms can use the service (4 points)

## VPN (6 points)

- It's possible to connect to the private network from outside over IPSec (3 points)
- From all major platforms (3 points)

## Mail (8 points)

- Users can send and receive mail (2 points)
- POP/IMAP Support (2 points)
- Webmail (1 point)
- Bound to user db (3 points)

## Appliances and profiles (15 points)

- It's possible to deploy new virtual machines from templates (5 points)
- It's possible to modify the templates configuration (3 points)
- Template modifications are applied to already deployed instances (5 points)
- File server template (1 point)
- Web server templates (1 point)

## Bonus (4 points)

**Factors (Average of these applied to the whole mark)**

- Lightweight factor (0.4 – 1) 1 being 100% lightweight
- Cost-effectiveness (0.4 - 1) 1 being 100% cost-effective