Software architecture design

Chosen technologies

**Programing language**

Python

The system will be written in python and this language will handle the connections to the server, create the sockets and send and receive requests and response events to the various interfaces thought the different platforms.

The program will be written on the Django framework which implies that it will be high performing and elegant and since it is a Web application, it is not restricted by any hardware architecture or software incompatibilities that may prevent other applications from running successfully.

Java

The Java language is used to build the android interface using the trivial android API’s as well as several libraries that perform tasks such as animation and smoothness for the application that is to run on any interface that runs the appropriate android operating system or simulation software that can render the application.

**Database**

The database of choice is MySQL. This database is very convenient as it is broadly used, hence it is quite convenient and easily pluggable to a lot of applications.

* **It’s secure**: MySQL is secure as it includes a solid security layer that protects sensitive data from intruders. Rights can be set to allow some or all privileges to individuals. Passwords are encrypted
* ***It's fast***: In the interest of speed, MySQL designers made the decision to offer fewer features than other major database competitors, such as Sybase\* and Oracle\*. However, despite having fewer features than the other commercial database products, MySQL still offers all of the features required by most database developers.
* ***It's scalable***: MySQL can handle almost any amount of data, up to as much as 50 million rows or more. The default file size limit is about 4 GB. However, you can increase this number to a theoretical limit of 8 TB of data.
* ***It manages memory very well***: MySQL server has been thoroughly tested to prevent memory leaks.

**Application server**

Apache Web server as well as the Django application server.

Django application server

The Django web server will host and handle the interactions from various interfaces with the python program, thus the service will handle all the requests and response events.

It has the advantage of business justifications to do with new platforms such as

* Outlay cost.
* Running cost
* Great support through vendors
* Maturity and how well proven something is
* Interoperability with existing key systems and open source.

Apache Web server

The current services that are on the computer science web site ([www.cs.up.ac.za](http://www.cs.up.ac.za)) run on a Apache Web Server, thus this server will be used as an interface between the computer sciences offered services such as lecturer and tutors names and the python written application that servers as a mark serving utility.

**Chosen framework**

**Django web framework**

The Django framework uses the model view controller pattern (MVC) and it emphasis the component of reusability, preventing one from repeating themselves.

It offers certain prominent framework features that make it ideal for overall application e.g

Object relational mapper

Allows you to define your data modules in python, thus you get a rich, dynamic database-access API.

Automatic admin interface

Saves us the trivial task of creating various interfaces to add and update content.

Template system

Uses Django’s powerful, extensible and designer friendly template language to separate design, content and python code (Module View and Control).

**Object-Relational Mapper**

Django is the chosen Object-Relational mapper used to obtain, retrieve and transfer data between a variety of plate forms such as from the MySQL database to the web client and android interface.

**Chosen protocols**

Security

Lightweight Directory Access Protocol (LDAP)

LDAP is an application protocol that is used to access as well as maintain distributed directory information services over an internet protocol.

The LDAP system is used for authentication, it used by the Computer Science Department. Thus only users that pass this authentication phase have access to the system.