COS 301 ASSIGNMENT
GROUP 2 B

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February 2015

1 Introduction

2 Architecture Requirements

2.1 Architectural Scope

2.2 Quality Requirements

2.2.1 Scalability

- Manage resource demand.
- Scale out resources.
- The system must be able to operate effectively under the load of all registered students within the department of Computer Science and guest users.

2.2.2 Performance requirements

- Throughput: The rate at which incoming requests are completed.
- Manage resource demand.
- Minimise response time.

2.2.3 Maintainability

- Ability to back track to a state in which system was safe.
- Corrective maintenance: Reactive modification of the system performed after delivery to correct discovered problems.
- Adaptive maintenance: Modification of the Buzz system performed after delivery to keep the system usable in a changed or changing environment.
- Perfective maintenance: Modification of the Buzz system after delivery to improve performance or maintainability.
- Preventive maintenance: Modification of the Buzz system after delivery to detect and correct latent faults in the system before they become effective faults.

2.2.4 Availability

- Prevent faults.
- Detect faults.
- Recover from faults.
- Cross platform.
- Cross browser.

2.2.5 Reliability

- Prevent faults.
- Detect faults.
- Recover from faults.

2.2.6 Security

- Detect attacks from unwanted and unauthorised users.
- Resist attacks from unwanted and unauthorised users.
- Recover from attack from unwanted and unauthorised users.
- Minimize access and permissions given to users who do not have the required privileges.
- All communication of sensitive data must be done securely through encryption and secure channels.
- All system functionality is only accessible to users who can be successfully authenticated through the LDAP system used by the department of Computer Science.

2.2.7 Monitorability and Auditability

- Logs: Logs system activities such as the time a user logged into/out of the system.
- Each action on the system must be recorded in an audit log that can later be viewed and queried.
- Information to be recorded must include:
  - The identity of the individual carrying out the action
  - A description of the action
  - When the action was carried out

2.2.8 Testability

- Controllability: The degree to which it is possible to control the state of the component under test as required for testing by using Test driven development.
- Understandability: The degree to which the component under test is documented or self-explaining.
- Each service provided by the system must be testable through a unit test that tests:
  - That the service is provided if all pre-conditions are met, and
  - That all post-conditions hold true once the service has been provided.

2.2.9 Usability

- Efficiency
- Ease of use
- Learnability
- Satisfaction (How pleasant it is to use the system?)

- The average student should be able to use the system without any prior training.
- Initially only English needs to be supported, but the system must allow for translations to the other official languages of the University of Pretoria to be added at a later stage.

2.2.10 Integrability

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2.3 Integration and access channel requirements

2.4 Architectural Constraints

3 Architectural patterns or styles

4 Architectural tactics or strategies

5 Use of reference architectures and frameworks

6 Access and integration channels

6.1 Integration Channel Used

6.1.1 REST - Representational State Transfer

- Uses standard HTTP and thus simpler to use.
- Allows different data formats where as SOAP only allows XML.
- Has JSON support
  - faster parsing.
- Better performance and scalability with the ability to cache reads.
- Protocol Independent, can use any protocol which has a standardised URI scheme.

6.2 Protocols

6.2.1 HTTP - Hypertext Transfer Protocol

- Standard web language.
- Easy to write pages.

6.2.2 PHP

- Allows dynamic pages to be built.
- Easy integration of JavaScript and HTML with PHP functions.

6.2.3 IP - Internet Protocol

- Allows Communications between users.
- In charge of sending, receiving and addressing data packets.

6.2.4 SMTP - Simple Mail Transfer Protocol

- Sends emails.
- MIME (Multi-purpose Internet Mail Extensions) which allows SMTP to send multimedia files.

6.2.5 TSL - Transport Layer Security

- Alternative to SSL
- Newer and more secure version of SSL.

7 Technologies