Preconditions

1. You should work on your local machine and should work alone.
2. You should create original work without violating any copyright or licensing terms.
3. You may use technology specific development environment tools which are easily available for evaluation.

Requirements

Overall Objective

Implement the important services and applications of the following Access Control and Attendance System.

Functional Specifications

One of your clients wants to implement customized management of access control and attendance system for its manufacturing facilities. You need to architect and design this system. The following set of functional specifications are given by various stakeholders that you need to take care of.

1. The client has 5 manufacturing facilities located at multiple sites. Each facility has several access points that need to be protected with digital access control systems. The client needs a custom distributed system for the management and monitoring of these access control systems. The access points are either proximity sensor based or biometric finger print based. Each access point has a sensor and a coupled electronic lock (for example an electronically locked door, or an electronically locked machine).
2. The organizational structure is stored in the company LDAP directory.  
   1. Sites, departments, department managers, employees, user groups.
   2. Employee name, email, login and passwords.
3. Need a system for management and monitoring  
   1. It should be possible to delegate management and monitoring rights based upon organizational structure from LDAP.
   2. A manager should be able to allow or deny access points to user groups or individual users.
   3. A manager should be able to view log of accesses (both successful access and failures).
   4. If an access violation occurs (an employee tries to access the wrong access point or when he is not on duty) then the manager responsible for the department should be immediately alerted by email and by text message by the system.
4. The access point hardware is operated using a proprietary software supplied by its vendor through exposed APIs.
5. At the end of each day  
   1. Daily department-wise attendance should be uploaded as a CSV file to an HR department shared drive.
   2. Daily department-wise activity log should be mailed to the department managers.
6. Since the facilities are located at distant sites so it is expected that each site shall be able to function well even in case of connectivity failure. This is a critical requirement as otherwise it would result in productivity losses.
7. Non-functional requirements  
   1. A new relational database should be used for system's data.
   2. Deployment possibilities  
      1. Load balanced services and applications. Some parts could be hosted on cloud.
      2. Users should be able to access the system from both LAN and the internet.
      3. Database load balancing and fail safe configurations.

Technical Specifications

The following list of technical specifications may help you, but you could choose better alternatives

1. Choose any technology mix for the system.
2. Choose the latest popular technologies for development.
3. You should use an SOA mixed with EDA (or as suitable) based open implementation.
4. Assume details, enrich the system with your ideas. Identify missing or conflicting requirements and also mention as feedback.

Implementation

1. Create complete framework for the system.
2. Implement functional code corresponding to the following specifications completely, to produce end to end working components.
   1. All the needed databases with any required tables
   2. The underlined points in the functional specifications section**(c, e)**.
3. In addition to the underlined points you may choose to implement anything else also, if time permits.

Deliverables

Demonstration Video

Record the video demonstration of the system using a screen-cast tool like [Wink](http://www.debugmode.com/wink/download.htm) (or any other tool) intermixed with the execution of all implemented components. Do not upload the video anywhere. Save it to your local machine and include it with the delivery package.

Database scripts

SQL scripts or code migrations to create and seed required databases, if any.

Readme Document

Create a text file with the following information

1. Instructions to install and configure any prerequisites and dependencies to prepare the development environment
2. Instructions to create and initialize the databases (if any)
3. Instructions to configure and prepare the source code to build and run properly
4. Any assumptions made and missing requirements that are not covered in the specifications
5. Any issues faced and any constructive feedback you may wish to give about improving the assignment

Source Code

You should deliver the implemented source code including any dependencies. For the dependencies that could not be included due to size, the readme file should have proper instructions on how to download and install them.

To be evaluated

1. The functional coverage provided by the implementation w.r.t the specifications
2. The quality and novelty of the technical implementation for each component
3. Technology choices made and the design patterns applied
4. Assumptions about the missing requirements which may not be described in the specifications and feedback about the assignment
5. Properly completed demonstration video

Delivery / How to submit

Create and submit an archive named **<your\_name>\_Chief\_Software\_Architect\_NET.zip**containing the following

<your\_name>\_Chief\_Software\_Architect\_NET.zip   
<your\_name>\_Chief\_Software\_Architect\_NET.zip \Readme.doc  
<your\_name>\_Chief\_Software\_Architect\_NET.zip \Demo\    < this folder contains the screen video recording   
<your\_name>\_Chief\_Software\_Architect\_NET.zip \Source\    < this folder contains the complete source code

Check that the size of the archive is less than 30MB. If not, reduce the size of the demo video by removing similar frames and remove the binary dependencies.