

Project Work in DA376C: Software Development for the Cloud

Project Goals

1. Develop a Cloud based application using technologies you learnt in this and other courses such as Software Development for the Web and Android Programming.
2. Apply sound Software Engineering principles and processes
3. Make an informed decision on choice of Cloud providers based on cost, and sustainability and other relevant issues.
4. Consider security, ethical and sustainability aspects relevant to the envisaged application and take necessary measures to address these issues.
5. Work in groups/team in a Cloud application development environment.

Project Requirements Example

Typical IoT applications comprise of

- RQ1. Data collection units such as sensors (environmental, physiological, etc.)
- RQ2. Data communication units such as a smartphone to forward the data collected by sensors to remote storage
- RQ3. Data storage units to store data permanently, for later processing
- RQ4. Data processing units to analyse and visualize the data

The backend of this application is in the Cloud. Application configuration, security and other features are all managed on the Cloud side of your application.

The first requirement is handled by sensor units that are either integrated to the smartphone or can be interfaced to the smartphone via some other means.

The data communication requirement (RQ2) is handled by an **Android app** developed for this project. The app shall have the necessary web interface to manage settings and user logins.

Data that is collected by the smartphone app is transferred to the Cloud storage for later use.

Remember: your choice of storage affects not only the performance of your application, but also the cost of hosting your service.

Example (cont'd):**Cloud application features:**

- A web interface to allow users to create accounts
- Data storage in appropriate form (tables, blobs, ...)
- A data analysis engine
- A web interface to allow authorized users to view the raw data (graphically and textually) and the output of the analysis engine.
- Secure interface (multi-role) to allow only authorized users to perform the operations they are allowed to (details to be discussed later).

The Cloud platform used for this project shall be one of:

- Microsoft Azure
- Google Cloud
- Amazon AWS

Android Application Features:

- Enable user registration and login
- Collect data from sensors
- Upload sensor data and metadata to the Cloud storage in an efficient way (cost wise and performance wise)
- Change local configurations (sensor settings, data rates, etc.).
- Show battery utilization (helps users to adjust their settings)
- Other features (group specific)

Development process:

- Agile development process
- It should be possible to migrate the system to another Cloud platform with minimal work
- Groups should write/update their reports on a regular basis (to be discussed)
- Group members shall report on the progress of the report during review meetings.

Optional Features:

- Performance/responsiveness (caching)
- Experimentation with AI tools

II. Project Implementation

1. Project progress review: During the project implementation time, project groups should have at least 2 meetings with the instructor.

The first meeting shall be 15-17 April.

2. Project evaluation: The instructor evaluates the performance of individual group members and the progress of the project.
3. You will be informed if your work is considered satisfactory, to be ready for presentation or it needs further improvement.

III. Project Report and Presentation

1. Final product and documentation report: The system documentation report should be available for the instructor to evaluate and test the functionality.

In the report, you should identify the requirements and the methodological approach you followed to meet the requirements/objectives. (Your implementation approach may sometime differ with the initial plan) The report should include the following sections:

- introduction,
 - requirement specification,
 - system design, (including motivation for choice of solution approach)
 - system implementation,
 - testing and results,
 - discussion on:
 1. problems encountered and how you solved them,
 2. Sustainability (environmental) aspects
 3. Economic (cost) aspect
 4. Security aspect
 - most importantly a conclusion part summarizing the key findings of the project and what you have learnt out of it,
 - Appendices: the **source code** (well commented and easily understandable)
2. Project presentation/demonstration.
 - You should upload your work (report + code) before the deadline to be announced. The presentation schedule (the exact time of your presentation) will be posted two days before the presentation date.
 - It is compulsory to attend the entire presentation session.
 - Each group will have at least 20-30 minutes for the presentation and demonstration.
 - You should prepare your presentation slides in power point and upload them after the presentation.

IV. Evaluation and Grades

The evaluation of your work depends on several factors such as:

- Innovativeness of your solution approach
- Complexity/amount of your development work
- Contribution of individual group member
- Clarity and quality of your report
- Your presentation (oral and demo)