

# Software requirements specification

**Team Alpha**

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## Video conference system (VCS)

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## 1. Introduction

### 1.1 Purpose

The purpose of this document is to provide a common core set of all the needs and requirements, to support in creating a videoconference system. This is a requirement specification of a Videoconference System (VCS), for use by FINKI at UKIM (Skopje, Macedonia). The requirements illustrate the purpose and complete declaration for the development of the system, as well as system constraints, interface and interactions.

The main objective of this specification is to introduce the developer with the structure of a Videoconference System designed for FINKI. To help with creating of an online platform for an educational system that would mimic a real life educational system with all its capabilities and offerings

### 1.2 Project Scope

The System requirements specification applies to the Videoconference System and addresses all the functions that the VCS must be able to perform to successfully achieve all the primary and detailed functionalities of an educational system.

It is to provide a platform where teaching materials are published to the students, provide an opportunity to make examination of the students, organize online meetings, schedule- reschedule classes, consultation hours and so on.

The scope of the document is limited to common services data platform requirements. This considers the full cycle of a video conference system mostly from the software point of view.

It should be clear that this reference does not discuss the technical details of the System nor how to generate them. Nor does this reference detail the standards to which the system software must comply.

### 1.3 Definitions

For the purpose of this document we assume the working definitions developed within and shared across all working groups of the Video Conference System initiative.

A “Video Conference System”...

- **Implements a logical architecture/content/design that brings together(integrates) data flows within and across system and grants the ability for educational universities to be able to fully mimic a real life educational system online.**
- **Provides the building blocks of online educational services that were never available before.**

“Domain Model”...

- **Conceptual model of the domain that incorporates both behavior and data.**
- **System of abstractions that describe selected aspects of a sphere of knowledge, influence or activity.**
- **In Unified Modeling Language (UML), a class diagram is used to represent the domain model.**

For the purpose of this report, the following terms and definitions apply.

- **Open data:** non-privacy-restricted and non-confidential data. Produced with either private or public resource and is made available without any restrictions on its usage or distribution.
- **Private data:** restricted and/or licensed data including permission, charging, privacy, publication and distribution. Produced with either public or private resource.
- **Commercial data:** restricted and/or licensed data including permission, charging, privacy, publication and distribution. Produced with either public or private resource.
- **Sensory data:** open and/or restricted data collected by different sensors, actuators and devices owned by public and private sector, and citizens. Sensory data is usually diverse in nature and architectural features, mostly location and time dependent, and present different levels of quality.

## 1.4 References

System Requirement Specification for Steward:

[https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs143\\_013173.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_013173.pdf)

Software Requirement Specification – Wikipedia:

[https://en.wikipedia.org/wiki/Software\\_requirements\\_specification](https://en.wikipedia.org/wiki/Software_requirements_specification)

Software engineering Requirement specification – Youtube:

<https://www.youtube.com/watch?v=mGkkZoFc-4I>

OfniSystems User Requirements Specification:

<http://www.ofnisystems.com/services/validation/user-requirement-specifications/>

Wikipedia System Requirements Specification:

[https://en.wikipedia.org/wiki/Software\\_requirements\\_specification](https://en.wikipedia.org/wiki/Software_requirements_specification)

Lifesize Videoconferencing requirements:

<https://www.lifesize.com/en/video-conferencing-blog/video-conferencing-requirements>

SourceSeek Tutorial on Project Specification:

<https://www.youtube.com/watch?v=MCXi4KtRTG0>

Wikipedia Requirement Prioritization:

[https://en.wikipedia.org/wiki/Requirement\\_prioritization](https://en.wikipedia.org/wiki/Requirement_prioritization)

## 2. Goals

The goal of the system is to provide a dependable online education platform where professors can hold all of their classes and consultations all while having all of the upsides of being held online.

The aim is to make the user experience streamlined and easily understandable all while having a set of more complex but completely optional functionalities.

Students will be able to open the service and understand the main functionalities within 5 minutes of usage while moderators will learn how to use the core functions within no more than 1 hour of learning.

### 3. Functional Requirements

- The system shall use the CAS for authentication of the professors and students. - *Priority 1*
- The system shall create separate profiles for professors and students. - *Priority 1*
- The system shall allow professors to create online sessions for lectures, consultation hours or online meetings. - *Priority 1*
- The system shall allow professors to hold online classes. - *Priority 1*
- The system shall allow students to participate in online classes that are held by the professors. - *Priority 1*
- The system shall allow voice communication during, before, and after lectures. – *Priority 1*
- The system shall allow live chat for the participants of the lectures. - *Priority 1*
- The system shall be able to support more than 400 users during a lecture. - *Priority 1*
- The system shall allow a virtual whiteboard for the professor and the teaching assistants to write and draw on. - *Priority 2*
- The system shall store the online classes and recordings. - *Priority 2*
- The system shall allow uploading of .pdf files and slides from the professors side. - *Priority 2*
- The system shall allow users to upload a limited number of files to their account. – *Priority 3*
- The system shall allow private chatting between users. - *Priority 3*
- The system shall allow users to change their custom status. (for example: “Hand Raised” to indicate that the student wishes to ask a question) – *Priority 3*
- The system shall allow the creation of polls by the professors during the live lectures. - *Priority 3*
- The system shall allow creation of groups for certain projects given by the professors to the students. - *Priority 3*

## 4. Use Cases of Functional Requirements

### 4.1 Specification Orientation

This document uses goal-oriented modelling for eliciting, elaborating, structuring, specifying, documenting, and modifying requirements. Goals represent the objectives which the videoconference system should achieve through cooperation of actors in the intended system and in the environment. They capture, at different levels of abstraction, the various objectives the system should achieve. Through goals modelling we consider how the intended solutions connect across the stack, how the videoconference system meets goals, why the system and its functionality are needed, and how the stakeholders' interests may be addressed. In our specification, we present the overall goal (the value proposition) that the system should aim to achieve in order to be considered as a viable final product, and a set of sub-goals (intended solutions) it should maintain in the long run so that the overall goal can be unceasingly achieved. By using this approach, the low-level technical requirements can be traced back to high level strategic objectives of system.

### 4.2 Hierarchy and Authentication between users

Rationale: Through the Central Authentication Service system allow the users depending on their authority such as professors, assistants, students, other staff members, to be able to login into the system and each one of the users to have access to different management processes such as for the professors providing online sessions for lectures, having consultation hours or online meetings, the students having access only to certain materials from their studying program, granting the ability for the assistants to edit the system in terms of creating, sharing and providing the students with online materials including

auditory exercises, sharing information to the students. Making authorized order for each individual as to who has access to what in the system.

### **Basic Stimulus and Response**

1. The platform prompts the user for a username and password.
2. The User enters their information.
3. Platform verifies information and creates account.
- If non-valid information is entered, platform shows error message and returns to step 1.
4. Platform provider checks the database and approves login.
5. The Platform checks what type of individual the user is (a student, assistant, staff member etc.) and based on the authority grants access to the user to the suitable usabilities from the system.
6. End of Authentication.

## **4.3 Providing a secure and fast Connection and management of the infrastructure**

Rationale: In order to provide seamless ubiquitous services, network speed and security is the essential fact. The users have to use all of the functionalities that the system has to offer with no or very slight insignificant latency issues, especially when listening to, watching or providing a video conference where loss of information must not be tolerated and admissible. In case of an attack such as a DDoS attack from outer sources, the system has to be able to recover from in a very short amount of time and inform the users about the case and how the issue is going to be resolved without system failure.

### **Basic Interaction and Response**

1. Platform keeps monitoring services at run-time to ensure smooth operation and integrity of the data
- If system failure occurs, the platform activates mechanisms for recovery based on pre-defined rules
- Platform logs issue and issue alert messages to platform providers
2. Platform logs operation capabilities (e.g. performance, mean of time failure, issues, etc.)

## **4.5 Record and playback**

Rationale: The system will allow both students and professors to record the session, including the chat that will allow the user to then download the same recording. Aside from that, the user will be able to rewind the stream for a few seconds in case they missed something, and then be able to fast forward back to live.

**Pre-Condition:** The user has to be authorized as a staff member or assistant in the System

### Basic Interaction and Responses

1. Platform prompts the staff member while the staff member is creating the videoconference if he wishes to record the class lecture from the videoconference.
2. Staff member selects to record the session.
3. Platform starts to record the session.
4. At the end of the recording the staff member clicks on end of recording button to end the recording.
5. The platform ends the recording session and uploads it on courses.

## 4.6 Manage Data

**Pre-Condition:** The user has to be authorized as a staff member or assistant in the System.

Rationale: Manage resources provides the services and functions for updating, maintaining and accessing both data and metadata, as well as tracking the usage of resources by users. Ideally the owners of the resources should be the only authorized user to manage resources, and other authorized users can track the usage of the resources in the platform. The platform must provide a database update response indicating the status of the update, avoid update errors to be propagated in the platform, and should keep an audit trail of all actions to enable rollback. Data usage tracking includes performing queries on the data management data to generate result sets, and producing reports from these result sets

### Basic Interaction and Responses

1. Platform provides user with an interface for resources management(e.g. data and metadata, data usage)
2. User chooses to edit or delete data
3. If edit selected, user revise metadata associated with the data(license, provenance, ownership, access-control, semantics);
4. If delete selected, user selects dataset(s) to be removed
5. User confirms action
6. Platform quickly process users request
7. Platform confirms execution of request
  - If valid request, platform acknowledges process has been processed successfully
  - If no-valid request, platform returns to step 1.
8. End of data management.

## 4.7 User Interface Functionalities

Rationale: Each user when accessing the system has its own personal data within the system. When attending an online video class, there needs to be a service of interaction provided between the students and the teaching staff including a chat provider where users can interact with each other through chatting and private chat between every student so that there can be order in the communication established throughout the conference. Each user is obliged to have a Microphone and Camera access for more advanced tasks that the teaching staff requires in order to improve the quality of the class and examine the activity of the student more precise. The teaching staff is going to have an option for allowing every student to use the microphone when needed and the student is going to have the option for asking permission to speak inside the system.

## Basic Stimulus and Response

1. Staff Member starts videoconference for a class lecture.
2. Platform finds the users enrolled to the class lecture and makes the option to enter the videoconference available.
3. User joins the videoconference.
4. The Platform prompts choice alert for the user to select how to watch the videoconference system (listen-only or use mic while listening)
5. User joins the videoconference system
6. The platform prompts for authorization of the user to use his camera.
7. The user authorizes.
8. The user can now successfully watch the videoconference from the staff member.

## 5. Nonfunctional Requirements

### 5.1 Performance Requirements

The system must be interactive and the delays involved must be less .So in every action-response of the system, there are no immediate delays. In case of opening windows forms, of popping error messages and saving the settings or sessions there is delay much below 2 seconds, In case of opening databases, sorting questions and evaluation there are no delays and the operation is performed in less than 2 seconds for opening ,sorting, computing, posting > 95% of the files. Also when connecting to the server the delay is based editing on the distance of the 2 systems and the configuration between them so there is high probability that there will be or not a successful connection in less than 20 seconds for sake of good communication.

### 5.2 Security Requirements

The system shall use the CAS authentication system and will fully integrate it so that all of the user's files on the platform will be secured.

Users will not be allowed to access other users files, the only exception being professors and other moderators.

Rationale: Ability of the system to enforce the intended confidentiality, trust, integrity and service and data access policies, and to detect and recover from failure in these security mechanisms.

Drivers: Manage the data and services in a way that ensures its integrity, and compliance with data protection regulations

Relevance: Relevant to the systems that share and collect information that may raise public concern. Urban platforms may become a valuable target for attackers which can potentially leave huge swathes of information exposed. It could potentially undermine trust in the government and damage its reputation.

## 6. Conclusion & Forward Plans

This document represents the first set of requirements specification for videoconference system. In this requirement prioritization we implemented some techniques such as the numeral assignment technique for prioritization and used sub processes such as requirements management gathering and organizing. By analyzing each requirement thoroughly we came up with new ideas and additions to each requirement specifically, allowing us to have a clear and complete direction on what is to be done and how it needs to be approached. Through user case scenarios we were able to successfully track the information that is introduced with the system. Future activities will collaboratively assess, resolve requirements conflicts, prioritize, and validate the requirements of the system. Ultimately, this document will become a complete final requirements specification document to guide and speed up the development open platform for other video conference systems out there.