**1st slide (Preview)**

Hello everyone, my name is Andrey Volkov and today I’d like to present my project proposal titled «Development of a monitoring system, analysis of anomalies and timely warning for modern IT companies».

**2nd slide (Content)**

I have divided my presentation into 7 parts. There are background, purpose of the project, objectives of the research work, literature Review, methods, results anticipated and conclusion. I shall only take 7 minutes of your time.

**3rd slide (Background)**

Let’s start with the background of the research and focus our attention on the idea of the project.

In the modern world, more and more companies are switching to the online business model. Behind every IT business there are hundreds of applications that keep it running.

However, such work cannot always be called reliable, in the modern world there are many problems associated with the availability of applications and the correct execution of their business logic.

The idea of the project is to develop a monitoring system that will export and analyze application metrics, so application work will be transparent, and business will be warned of problems on time.

**4th slide (Background)**

Let’s continue with the project relevance. There are three main points why a project might be relevant.

The first one is a huge number of IT companies all around the world. According to various estimates, over the past 5 years, the IT services market in North America has grown by 50% - 175 to 261 billion dollars. Which indicates of tremendous growth in this area.

The second one is the need of all IT services to be profiled at each stage of its operations and be analyzed for anomalies in their time series. By this I mean that every application needs to monitor its performance, metrics for resource consumption, the number of processed requests, etc. And each time series have to be analyzed for anomalies.

The last but not the least is the need for timely warning of application problems if they arise. By this I mean a competent alert system that warns about potential problems in time and alerts about existing ones.

**5th slide (Purpose)**

The goal of the project is to develop a system for building monitoring, analyzing anomalies and timely warning for modern IT companies.

**6th slide (Objectives)**

The objectives of the project are the following:

• Study the existing approaches of monitoring in applications and existing infrastructure solutions.

• Determine the system requirements for building monitoring in terms of metrics configuration, anomaly analysis, user interface and infrastructure.

• Study algorithms for analyzing anomalies in time series.

• Develop an API for writing and configuring metrics.

• Expand infrastructure for exporting, collecting, and displaying metrics in real time.

**7th slide (Literature review)**

The literature review reveals the best practices in the industry in the field of application monitoring. Including, Google experience in reliability engineering and Microsoft experience in building time-series anomaly detection service. Review also contains the best practices for effective monitoring and alerting written by leading software engineers in this sphere. And two additional papers: first one on custom EPM system and the second one on industrial study on cloud applications monitoring.

**8th slide (Methods)**

The main technologies that will be used to implement the project:

* Docker. Software for automating the deployment and management of applications in containerized environments.
* Kotlin. JVM-based language that supports the coroutine mechanism, which is an efficient lightweight way to manage asynchronous execution.
* Spring. An open-source universal framework for the Java platform.
* Kubernetes. An open-source software for automating the deployment, scaling and management of containerized applications.

**9th slide (Methods)**

Now I’d like to talk about project system in details. It contains of two parts – client library and infrastructure.

The client library will consist of the following modules:

* Micrometer. A module that provides a convenient and useful API for building and running metrics collection on a schedule.
* Anomaly. Module for analyzing anomalies in time series.
* Grafana. A module for plotting graphs and building dashboards in Grafana, using the “Grafana as a code” principle.

The monitoring system infrastructure will consist of the following components:

* Business applications. These applications use the API of the client library mentioned above.
* Prometheus. Storage for collecting metrics.
* Grafana. User interface for building dashboards and panels with metrics.

**10th slide (Results anticipated)**

The main result of this project will be a developed system for building monitoring, anomaly analysis and timely warning.

The developed system will provide clients with useful API for building metrics and infrastructure "out of the box" for collecting, displaying, and analyzing technical and business metrics. All the source code of the project will be available in an open-source format and everyone can get acquainted in detail with the implementation of the mechanisms of this system.

As anticipated result, the developed system clearly shows the current state of the monitored application and timely warns about potential and current problems in the work.

**11th slide (Conclusion)**

In conclusion, I’d like to say that developed system will be useful for businesses all around the world to help them build high-quality and modern monitoring in their business applications. I also anticipate community support in developing and maintaining our software product.