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Distributed Systems

TBAA Report

For my project, I was tasked with creating application that simulates a distributed systems environment based on the industry of Centralised Log Management.

3 Sufficiently Complex Services:

The 3 services that I have designed for this project are:

**System Logs:** This service allows the user to send multiple request which will allow the service to get status on current System logs found, store new Logs, create a System Log Report and Create a spreadsheet containing all logs.

**Event Logs:** This service allows the user to send multiple request which will allow the service to get status on all Event Logs currently stored, search for a specific Event log and alert/notify other users via email

**Network Logs:**

Use Of jmDNS:

When the server class starts up, it creates an instance of jmDNS is in which all the services available on it are then registered and then added to the server with the server’s information such as ServerType, ServerName and port also.

A screenshot of a social media post

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Use of gRPC:

Each service was implemented using a proto file which contained all necessary fields such as messages and info on the types of rpc’s that would be called which would then generate the necessary stubs that would be then used to on the application.

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Remote Error Handling:

A series of try catch statements was used to look for all NullPointExceptions that might have occurred when any requests were being sent from the client to the server.

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GUI:

A GUI for the application could not be made in time sadly by the project is visibly functional on BloomRPC where you can see a visual representation of the different rpc’s that are being called on the system and returning the requested information.

Github:

The final project is pushed to a public repository with the following link: <https://github.com/PaddyK95/DSTBAAproject>. The repo has a history of commits also.

Section (B) Related Questions:

Q1- The chosen service I have decided to implement as a publish-subscriber MQTT messaging protocol is System Logs as seen below:

The publisher which publishes a new topic to the server in which any subscribers can then view.

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The subscriber which listens for any new publishes made on the server after it is connected.

A screenshot of a computer

Description automatically generated

There are 3 different types of QOS’s(Quality of Service) which specify the delivery quality of messages being sent

0 – Messages delivered at most once.

1. Messages may be delivered buy may be duplicated.
2. Once and once only delivery

Q3- Below is an implementation of one of my services with IDL(Interface Definition Language).

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An service that is created using IDLs consist of 3 main classes (Client, Server, Servant).

Client Class:

A screenshot of a cell phone

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Server class:

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Description automatically generated

And finally, the Servant Class:

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Result:

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A picture containing bird

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1. The purpose of an IDL is to describe the softwares API’s that are going to be used. It describes the interface as language independent which allows the communications of different components that are in different programming languages. It also specifies the different operations and fields that will be passed between the server and client.