

Software Design Specification**

*** Analysis of ROS Nodes with Visualizations***

Version 1.0

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Revision History

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1.0 Introduction

A **Rosbag** or **bag** is a **file format** in **ROS** for storing **ROS** message data. These **bags** are often created by subscribing to one or more **ROS** topics, and storing the received message data in an efficient **file** structure. The contents of the bag files, including start and end times, topics with their types, message counts and median frequency, and compression statistics.

1.1 Purpose

Develop an interactive graphical interface that visualize the various relevant information extracted from the ROS bag file for efficient analysis of the interactions of the ROS topics.

1.2 Requirements

1.2.1 Functionality:

1. From the meta data of the ROS bag file, identify and analyze specific topics.
2. Identify the Topics of interest and monitor it's respective component activity.
3. It is required to identify the components of the system as a function of time, and find the relation between them.
4. With the relevant information extracted, a visualization is to be provided, for instance using a Gantt Chart.
 - 4.1 Visualize with varying time line - 1 day, one week or even a month.
 - 4.2 Visualize communication between multiple node at a specific time.
 - 4.3 Visualize the node behavior.

1.2.2 Usability

- a. Provide a user-friendly graphical interactive interface that displays the visualization.
- b. Enable the user to choose from a drop-down list, the topic of interest.
- c. Provide scrolling option along the time-line axis to view the visualization in days, weeks or months.

1.3 Scope

1. The application developed should be independent of the platform, shouldn't require installation of ROS software to view the visualizations for analysis.
2. The application should also be enabled to run live with live data streaming in from the Robot via bag files. (Under discussion, not confirmed for phase 1 development plan)
3. It should be feasible that the developed software could be further embedded into other relevant applications.

2.0 Project Plan outline

The methodology adapted is Agile Software development and hence the the project plan outline involves the following phase:

- Conception phase - The project objective and viability are discussed and prioritized. - DONE.
- Inception - Initial high level requirements are discussed with stakeholders and the brief requirements are decided and signed upon - ONGOING
- Iteration - Development kickoff with n -sprints planned.

Sprint 0 -

- Creation of Software design and development document
- Design thinking
- Proof of concept
- Review with stakeholder.
- Prototype.

