# Requirement Specification

## TauNet Messaging Software

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# 1 INTRODUCTION

This section introduces the requirement and specification document for the TauNet messaging software. It provides the purpose and scope of the document and a glossary of terms used throughout this document.

## 1.1 Purpose

The purpose of this document is to present a description of the TauNet messaging software used to utilize the TauNet network. This document will explain the purpose and features of the software system, the hardware needed, general requirements needed to access the TauNet network, and the constraints under which it must operate and how the system will react when used. This document is intended for the developers and the user base for the system.

## 1.2 SCOPE OF THE PROJECT

This software system will be a secure distributed network messenger for use over the TauNet network. The software will allow a user to communicate with other users connected to TauNet network by sending and receiving encrypted messages.

## 1.3 GLOSSARY OF TERMS

| | |
|---|---|
| **Developer** | Person(s) writing software for use on the TauNet network. |
| **Linux Raspian** | Open sourced operating system modeled after UNIX designed for the Raspberry Pi hardware. |
| **Network** | Group and/or system connecting through the internet. |
| **Secure** | Inaccessible from outside the network |
| **Specifications and Requirements Document** | Document that describes the software requirements and constraints in which it operates. |
| **Software System** | The use of the specified software used in conjunction with specific hardware over a network. |
| **Raspberry Pi 2 model B** | Mini-computer hardware that hosts and executes the specified software. |
| **TauNet** | Network of Raspberry Pi's utilizing a specified network protocol that enables communication between users. |
| **TauNet Protocol Specification v.0.1** | The persons sending and receiving messages. |
| **User** | Set of specified instructions to enable communication through TauNet network. |

## 1.4 REFERENCES

Bart Massey

TauNet Protocol Specification v.0.1

CipherSaber RC4

Merriam Webster Dictionary

Requirement Specification Template

## 1.5 OVERVIEW

The remainder of this document outlines a high-level description of the TauNet messaging software. The document describes the general software, assumptions made, dependencies, and use cases in regards to the software system.

# 2 GENERAL FUNCTIONALITY DESCRIPTION

This section will provide a high-level description of the software system and describe the role of the user.

## 2.1 MESSAGING SOFTWARE SYSTEM FUNCTIONS

The software will enable the user to connect to the TauNet network in order to send and receive secure messages to other users on the network.

## 2.2 USER CHARACTERISTICS

The user is the person(s) who uses the software to access the TauNet network in order to communicate with other users. The term User can be separated into two roles: message sender and message receiver.

### 2.2.1 Message Sender

The message sender is the user responsible for inputting the identifying information for the correct intended receiver, writing the message, and ensuring all protocols and formatting requirements, in accordance with the TauNet Protocol Specification v.0.1 document, are met so that the message may be sent successfully.

### 2.2.2 Message Receiver

The message receiver is the user to which the sender sends the message. In order to receive a message, the message receiver must be connected to the TauNet network and follow all protocols as outlined in the TauNet Protocol Specification v.0.1 document.

# 3 General Constraints

This section outlines general constraints on the system and general dependencies.

## 3.1 Software Constraints

This software system will need the Raspian Linux distribution utilizing Debian 8.

## 3.2 Hardware Constraints

This software system is intended for use with the Raspberry Pi 2 model B. At a minimum, the system needs a monitor and keyboard. The use of a mouse is recommended for initial Raspian installation but may not be required for the software system.

## 3.3 Network Constraints

The time taken to send and receive a message may be dependent on the quality of the internet connection and/or the service provider being used and is not an issue that pertains specifically to this software system.

# 4 Assumptions

The software system assumes that the user has an intermediate skill level using computers and computer software.

The software system assumes that the necessary operating system, Raspian, installed successfully and that all hardware is configured properly.

The software system assumes that there is more than one user connected to the TauNet network at any given time.

It is also assumes that the user has a high-speed internet connection to ensure fast transmission of the data.

# 5 Requirement Master List

**REQ 1: Have Required Hardware**

**REQ 2: Connect to Network**

**REQ 3: Encrypt Message**

**REQ 4: Send Message**

**REQ 5: Receive Message**

**REQ 6: Decrypt Message**

# 6 REQUIREMENTS DETAIL

This section provides a broader description of each requirement necessary for the system.

## 6.1 REQ 1: HAVE REQUIRED HARDWARE

The user must have a Raspberry Pi 2 model B with a properly installed Raspbian Linux operating system, a monitor, and a keyboard. A mouse is optional and can be used if desired. If the system software is used on hardware other than the Raspberry Pi 2 model B, there is no guarantee that the software will work as intended.

## 6.2 REQ 2: CONNECT TO NETWORK

The Raspberry Pi 2 model B must be connected to the internet and configured as outlined in the TauNet Protocol Specification v.0.1 document.

### 6.2.1 Specifications

The hardware must have an active internet connection and have the correct ports open in order to send and receive data. If the network connection is not configured properly then sending and receiving messages to and from other users on the TauNet network will result in a failure.

## 6.3 REQ 3: ENCRYPT MESSAGE

All messages will be encrypted before the message is sent to ensure that communication between the sender and receiver is secure.

### 6.3.1 Specifications

All messages will be encrypted using the RC4 stream cipher protocol. The software system will automatically encrypt the message before it is sent. Failure to use this protocol will result in unreadable messages for both the sender and the receiver.

## 6.4 REQ 4: SEND MESSAGE

The message sender will compose a message including all necessary identifiers in accordance with the TauNet Protocol Specification v.0.1.

### 6.4.1 Input

The message sender will use a standard monitor and keyboard to input the message.

## 6.5 REQ 5: RECEIVE MESSAGE

The message receiver must be properly connected to the TauNet network in order to receive a message. The message receiver will need at minimum a standard monitor to display the message received.

## 6.6 REQ 6: DECRYPT MESSAGE

The message sent to the message receiver will be decrypted by the software system in order to properly display the message in a readable format to the message receiver.

### 6.6.1 Specifications

The message will be decrypted using the RC4 stream cipher protocol. The message will be decrypted by reverse engineering the encryption process.

# 7 USER INTERFACE

The user interface will utilize the Command Line Interface (CLI).

## 7.1 SENDING MESSAGES

The user will type in the required format to send a message as specified in the TauNet Protocol Specification v.0.1. The message will then be displayed with, at a minimum, the intended recipient name and the message being sent.

## 7.2 RECEIVING MESSAGES

The user can only receive messages while connect to the TauNet network. When a message is received, the received message will then be displayed with, at a minimum, the identifying information for the user that sent the message and the message intended for the recipient. Messages displayed will only be those meant for the intended message receiver.

# 8 GENERAL USE CASES

The TauNet requires a minimum of two Raspberry Pi's to be connected in order to properly function as a system. Therefore, there are only two generalized use cases that will be described here. Case 1 is if there is one user sending messages to and receiving messages from only one other user on the TauNet. Case 2 is if there is one user sending messages to and receiving messages from multiple users on the TauNet.

## 8.1 CASE 1: ONE-TO-ONE COMMUNICATION

The process for this case is:

1. User 1 sends message to User 2 in accordance with the TauNet Protocol Specification v.0.1.
2. Message is encrypted and sent.
3. User 1 software system displays the recipient information and the message sent.
4. User 2 receives the message.
5. User 2 software system decrypts the message.
6. User 2 displays the sender information and the message received.
7. User 2 responds to the message by returning to step 1.

## 8.2 CASE 2: ONE-TO-MULTIPLE COMMUNICATION

Case 2 will work like Case 1 with the following exception:

1. When the User receives multiple messages, the messages may not be displayed in order by sender. Each message will be displayed in the order the message was received.