

Software Requirements Specification

Copyright © 2015 Luke Kazmierowicz

Version 1.1

December 7, 2015

TauNet System

Submitted in partial fulfillment of the requirements of
CS 300 Elements of Software Engineering

Table of Contents

Table of Contents	i
1.0. Introduction	1
1.1. Purpose	1
1.2. Scope of Project	1
1.3. References	1
1.4. Overview of Document	2
2.0. Overall Description	2
2.1. System Environment	2
2.2. Functional Requirements Specification	2
2.2.1 Sender Use Case	2
Use case: Send a New Message	2
Use case: Message is Sent to Unavailable User	3
2.2.2 Recipient Use Case	3
Use case: View a Message	3
Use case: Reply to a Message	4
3.0. Requirements Specification	4
3.1 External Interface Requirements	4
3.2 Non-functional Requirements	4
3.2.1 Hardware Requirements	4
3.2.2 Setup Requirements	4
3.2.3 Security Requirements	5
3.2.4 Messaging Requirements	5
3.2.5 Protocol	5

1.0. Introduction

1.1. Purpose

The purpose of this document is to present a detailed description of the TauNet system. It will explain the purpose and intended use of the system, and the design constraints under which the system must operate. This document is intended for the customer and developer of the TauNet system.

1.2. Scope of Project

The TauNet software system will be a secure method to communicate with friends through the internet. The system will be designed to allow two users to send encrypted text messages to one another over a standard internet connection. It will be designed to run on specific hardware, namely all models of the Raspberry Pi single-board computer.

1.3. References

IEEE. *IEEE Std 29148-2011 Systems and software engineering - Life cycle processes - Requirements engineering*. IEEE Computer Society, 2011

Web Publishing System - Software Requirements Specification document, by Joan Teamleader, Paul Adams, Bobbie Baker, Charles Charlie. April 15, 2004

Interview with Customer - *Bart Massey, October 12th, 14th and 19th, 2015.*

1.4. Overview of Document

The next section of this document, *Overall Description*, gives an overview of how the TauNet system will work. It describes the functionality and informal requirements of the system to form a frame of reference for the technical requirements specification in the section to follow.

The third section, *Requirements Specification*, contains technical information about the functionality of the system written to provide the developers the details required to implement the system.

The second and third sections of this document provide a description for the same TauNet system but are intended for different audiences.

2.0. Overall Description

2.1. System Environment

The software system will have a fixed set of users who will all play the same role. There will be no administrator. Each user will have their own Raspberry Pi with the TauNet software installed.

2.2. Functional Requirements Specification

This section outlines the use cases for a TauNet user. The users are split into two categories, the Sender and the Recipient.

2.2.1 Sender Use Case

Use case: Send a New Message

Brief Description

The Sender selects a user from the list of TauNet users, composes a message, and sends it.

Initial Step-By-Step Description

Before this use case can be initiated, the Sender must have the TauNet software installed and their Raspberry Pi must be correctly connected to the internet. They also must have their desired list of authorized TauNet users loaded.

1. The Sender chooses to view the list of authorized TauNet users.
2. The system displays the list of usernames for the authorized TauNet users.
3. The Sender enters the username they want to send a message to.
4. The system prompts the user to enter a message.
5. The Sender enters some message within the maximum length.
6. The system sends the message to the desired user.

Use case: Message is Sent to Unavailable User

Brief Description

The sender sends a message to a TauNet user whose device is not available.

Initial Step-By-Step Description

Before this use case can be initiated, the Sender must have the TauNet software installed and their Raspberry Pi must be correctly connected to the internet. They also must have their desired list of authorized TauNet users loaded.

1. The Sender sends a message to another TauNet user (See *Use case: Send a Message*).
2. The system informs the user that the intended recipient is unavailable to receive the message.
3. The system tells the Sender to try again later.

2.2.2 Recipient Use Case

Use case: View a Message

Brief Description

The Recipient receives a message from another TauNet user in their list of authorized users and views it.

Initial Step-By-Step Description

Before this use case can be initiated, the Recipient must have the TauNet software installed and running, and their Raspberry Pi must be correctly connected to the internet. They also must have their desired list of authorized TauNet users loaded.

1. The system displays the username of the sender of the new message followed by the message body.

Use case: Reply to a Message

Brief Description

The Recipient views a message (See *Use case: View a Message*) and replies to it.

Initial Step-By-Step Description

Before this use case can be initiated, the Recipient must receive a message from another TauNet user.

1. The system presents the option to reply to the message.
2. The Recipient chooses to reply to the message.
3. The system prompts the user to enter a new message.
4. The Sender enters some message within the maximum length.
5. The system sends the new message to the sender of the original message.

3.0. Requirements Specification

3.1 External Interface Requirements

The TauNet system will not be linked to any external system or server. The TauNet devices (Raspberry Pi's) will communicate directly with one another over the internet.

3.2 Non-functional Requirements

This section contains the technical requirements for the TauNet system.

3.2.1 Hardware Requirements

The software must be designed for the following hardware:

- Raspberry Pi Model B2
- USB Keyboard
- HDMI Display
- Method of connecting to the internet: Ethernet or USB Wi-Fi dongle

3.2.2 Setup Requirements

This section describes the requirements for how the TauNet network should be setup.

- The TauNet software will be installed on a Raspberry Pi running Linux
- Manual enrollment - Each user will be given (in person, manually) a list of IP addresses and a universal encrypt/decrypt key
- Can be setup to work using any internet
- Capable of enrolling at least 12 people
- No need for easy method to add or remove users after initial setup

- To add additional users all existing users must manually update their list of users on the network to include the new user
- To remove a user from the network all existing users aside from the user they are removing must update their encrypt/decrypt keys so the excluded user can no longer receive or send messages on the network

3.2.3 Security Requirements

This section describes how the messages will be securely sent between each TauNet user. For details on how the messages should be encrypted, see section 3.2.5, *Protocol*.

- All text is encrypted before it is sent
- Users must be given (physically, in person) info to connect to the network
- Info given to each user includes:
 - A list of IP addresses (or fully domain-qualified hostnames) to reach each other user on the network
 - A universal key to encrypt and decrypt sent and received messages
 - The key must be between 8 and 54 characters (this will yield a more secure key)
- If a Raspberry Pi on the network is stolen a new encrypt/decrypt key can be manually distributed to the remaining trusted users

3.2.4 Messaging Requirements

This section contains the requirements for messaging between TauNet users. For details on how each message should be formatted, see section 3.2.5, *Protocol*.

- Messages will be UTF-8 text
- Up to 934 characters per message
- Pair-wise communication - message one user at a time
- Be able to view a hard coded list of users you can message
- Recipient device must decrypt message using the key and display it to the user
- The recipient device must display who the message came from
- Messages should be deleted after they are displayed
- User must be informed if the recipient was available to receive the message
- If the recipient is unavailable, the system will prompt the user to try again later

3.2.5 Communication Protocol

The document, *TauNet Communications Protocol*, contains the encryption and message format requirements for each message that is sent between TauNet users.