BLEKINGE INSTITUTE OF TECHNOLOGY

Project Proposal

TCP Evaluation in Semi-Live Streams

"Team Enigma"

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Preface

The proposal of this project aims at meeting the requirements of the CEO, client and the advancement team of the company.

The first edition is v1.0. The next version is v1.1 is the newly revised edition providing updated definitions and details.

This document gives an outlook on the entire project. The organizational structure includes glossary and abbreviations, background of the business environment, the proposed solution, expected limitations risk factors and finally the time plan of the project.

Release v1.1 on 2015-04-20
- Updated the GUI definition in the Glossary and Abbreviations.
- Modified the cross correlation information about 3rd party data sources offering a RESTful API.
- Limitations section has been updated.
- A time plan using Project Libre is added.

Release v1.0 on 2015-04-13
- Initial release

Glossary and Abbreviations

RTT – Round Trip Time
The total time taken for a packet to be sent from source to destination and the acknowledgement to be received from destination to source.

GUI – Graphical User Interface
Allows the user to interact with electronic devices through graphical icons and audio-visual indicators.

API – Application Programming Interface
A set of routines, protocols and tools for building software applications.

TCP – Transmission Control Protocol
Protocol used to exchange data between two communicating hosts through an established connection.

HTTP – Hyper Text Transfer Protocol
This is the underlying protocol used by the World Wide Web which defines how messages are formatted and transmitted.

Client : Patrik Arlos
CEO : Dragos Ilie

Background

Information sharing in the current world scenario revolves around networking. For this sharing to be efficient, the performance of any networking system is of dire concern. In the computing world, performance is one entity which is widely discussed but not really well understood.

The client is a Data Centre Company which provides rack space, networking and power to the customers. Recently, client company has been receiving complaints regarding TCP performance in networking from their customers.

In this project, a solution tool will be developed to measure the TCP performance of the data streams.

Proposed Solution

A tool is to be developed in measuring the TCP performance. The primary aspects measuring the TCP performance of the measurement streams (Data Streams).

- Round Trip Time (RTT)
- Socket Setup Time (three-way handshaking)
- Data Rate per Stream

RTT

RTT is measured in a particular TCP stream between the client and the server in both the directions by injecting measurement points at different critical points. In the figure below, P_1 is an injected measurement point in the TCP stream.
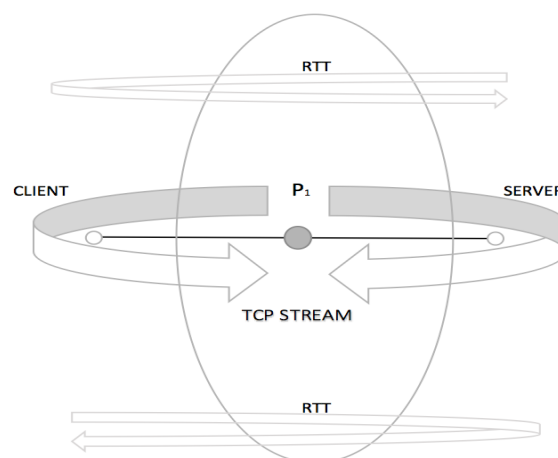
<u>Socket Setup Time</u>

The time taken to establish a two-way communication link between two communicating entities which helps us to see how responsive those devices are. Socket set up is a three-way handshake.

<u>Data Rate per stream</u>

The time series effects on the RTT of the stream as a function of the time.

In association with Data Rate, window size and retransmission have to be found. Also an efficient way of detecting retransmission may be found. All the above mentioned aspects are observed on a single stream. These aspects must also be observed on multiple streams. Hence the aggregate of each aspect can be observed graphically.

Based on the aggregated data, threshold levels of each aspect must be defined namely,

- Normal (expected level)
- Warning
- Critical

For each of these metrics, there would be different threshold levels. When this threshold is achieved or surpassed, notifications are configured/controlled dynamically.

A web interface with a simple user authentication must be created for the client to access the created tool (system).

The client can get the desired TCP performance measurement on the created web interface by real-time/raw data graphs, time series graphs and aggregated data or historical data graphs (up to 4 weeks).

The created tool will also be able to analyze cross correlation with any third party data source that offer a RESTful API.
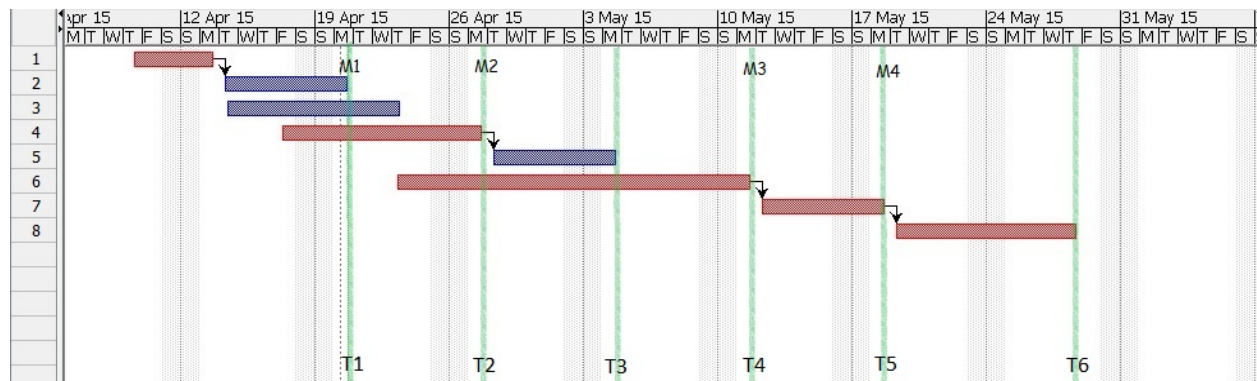
Limitations

- The developed tool limits the measurement of the TCP performance only to the devices within the data center not including the client's of the customer's clients.
- The measurement of performance metrics might be focused only upon a few aspects in this project.
- Time factor and knowledge play an important role.

Time Plan

Task	Date
Project Proposal	20th April '15
Project Specification & SRS	27th April '15
Designing a document	4th May '15
Acceptance test plan and code generation	11th May '15
Project verification	18th May '15
Final submission	28th May '15

		Name	Duration	Start	Finish	Predecessors
1		Project Proposal	2.375 days	4/9/15 2:00 PM	4/13/15 5:00 PM	
2		Updated project proposal	5 days	4/14/15 8:00 AM	4/20/15 5:00 PM	1
3		Literature review	7 days	4/14/15 11:00 AM	4/23/15 11:00 AM	
4		Project specification & SRS	7 days	4/17/15 8:00 AM	4/27/15 5:00 PM	
5		Design document	5 days	4/28/15 8:00 AM	5/4/15 5:00 PM	4
6		Acceptance test plan & code generation	13 days	4/23/15 8:00 AM	5/11/15 5:00 PM	
7		Project verification	5 days	5/12/15 8:00 AM	5/18/15 5:00 PM	6
8		Final submission	8 days	5/19/15 8:00 AM	5/28/15 5:00 PM	7

Milestones are used for progress monitoring.

M1 - Project plan with updates.

M2 - Software Requirements and Specifications with required literature review.

M3 - Final code with full documentation.

M4 - Report before delivery.

Toll gates are imposed by the customer.

T1 - Project proposal (Checkpoint 1)

T2 - Project specification and SRS (Checkpoint 2)

T3 - Design document (Checkpoint 3)

T4 - Acceptance test plan with code (Checkpoint 4)

T5 - Project verification (Checkpoint 5)

T6 - Final submission (Checkpoint 6)