

An investigation into the effects of various network redundancy protocols on the performance of a simulated campus style network.

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1. Introduction

With over 95% of the UK population being active users of the internet (networked computer infrastructure) the expectation of reliability has become commonplace [1].

This project analyses several of the software protocols commonly used to achieve this expected reliability, these being the Layer 2 protocols **PVST**, **RPVST**, **MST** and the layer 3 protocols **GLBP**, **HSRP** and **VRRP**.

this project analyses how these protocols operate and how well they operate on a network, with the goal of providing recommendations into the best protocols to use with performance in mind.

2. Aim & objectives

The aim of this project was to answer the question **‘to what extent the combination of both layer 2 and 3 redundancy protocols effects a networks overall performance’** to achieve this the following objectives where used.

- Research the protocols to be tested
- Develop robust procedures to help deliver reliable testing and analysis
- Design a simulated network to conduct the testing
- Analyse and compare the results of testing with previous research.

3. Research

Many papers have also looked at this question but many of these only focus on either layer 2 or 3, furthermore the testing environment is inconsistent, using differing topologies and testing methods. [2, 5]

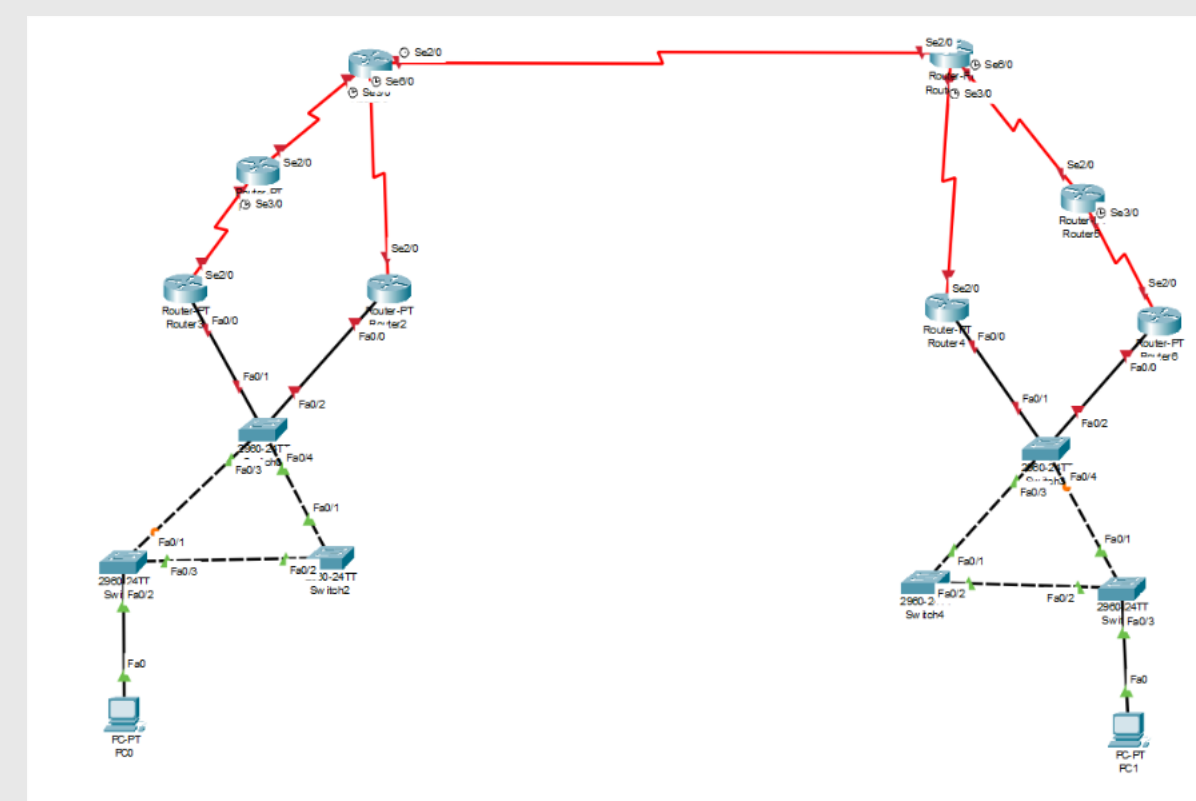
4. Methodology, Design & implementation

This project follows an experimental approach with the design focused on creating easily repeatable tests and results. This was done under the guide of the Saunders research onion methodology.

The testing determines performance by analysing various network metrics such as Jitter, Delay and throughput. The protocol will be ranked based on their effects on these network metrics.

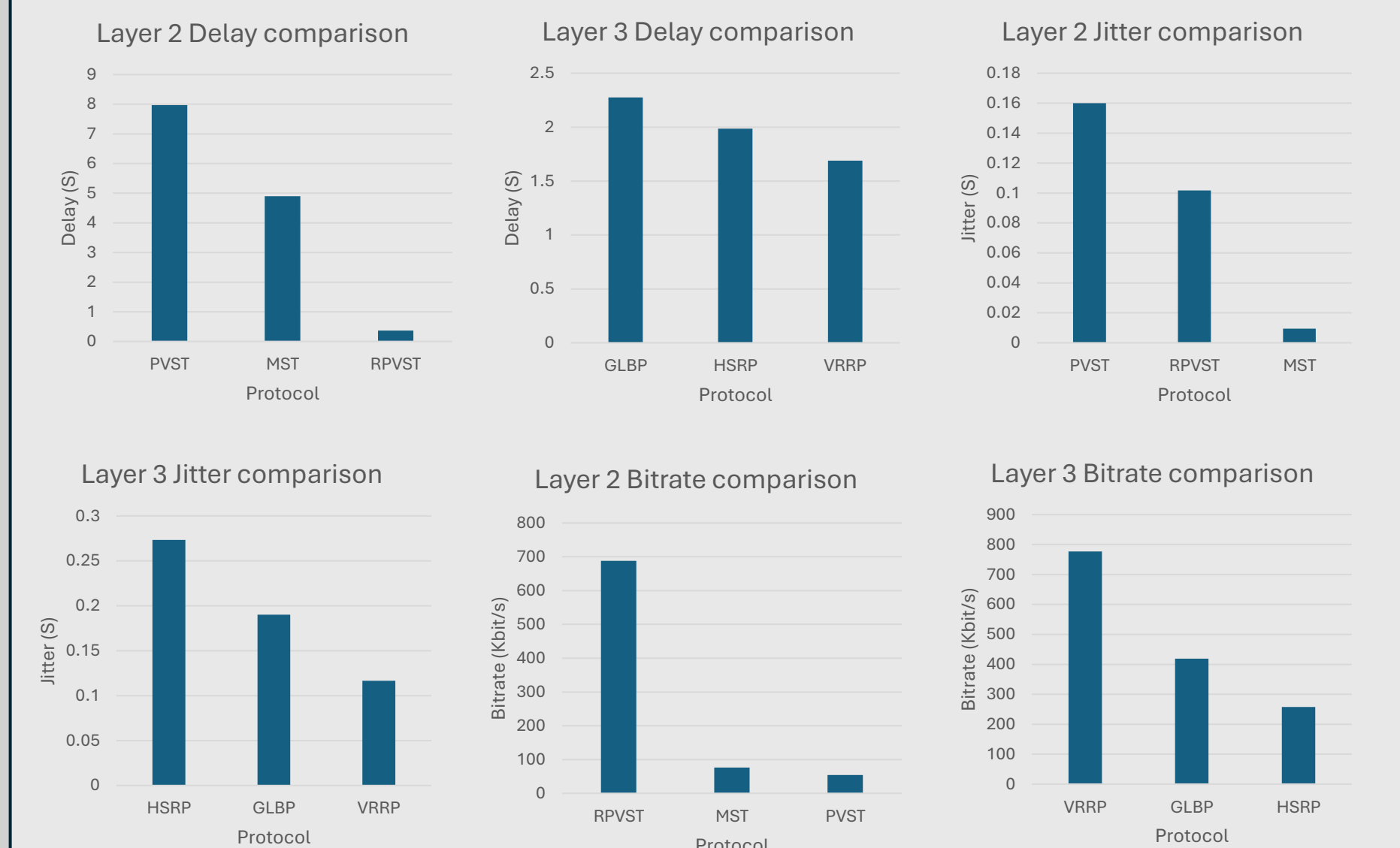
To collect these results a simulated network was created using the GNS3 software with ubuntu hosts, the protocols were configured on the network, and testing was conducted using the D-ITG, and Iperf3 software, with the results being recorded. Each protocol was tested using the aforementioned software.

Figure 1 – network topology



5. Results & Conclusion

The results showed that there is a significant difference between the performance impact of the protocols, with many categories showing a clear winner, this is broadly consistent with previous research and shows that the choice of protocol plays a key role in network design. The test results can be seen below where the mean average of the multiple tests have been graphed.



References

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