

Traffic Engineering for a VoIP network using Erlang B model

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Introduction

- Voice over Internet protocol (VoIP), is a communication protocol existing over a network.
- However, IP protocol is not designed for transporting real-time applications, especially when supporting a mix of data and voice services creates major traffic engineering challenges [1]. As such, this project plans to design a VoIP network using Erlang B formula.

Aims & objectives

To estimate packet loss for VoIP using Erlang B model.

- provide a critical literature review of VoIP technology.
- Identify and analyse the different traffic models of VoIP.
- Design and develop a converged network.

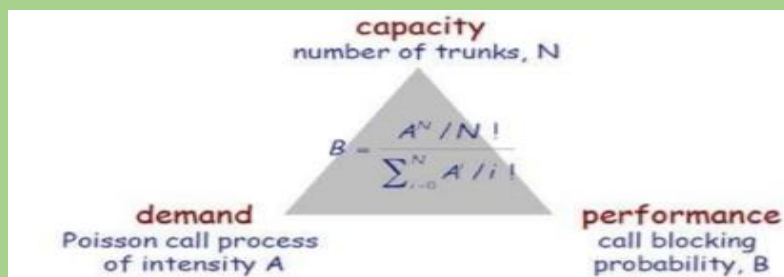


Fig 1 - Erlang B model[2].

Methods and materials

- Conducting a literature review on Erlang B model and VoIP technology.
- Creating a network design on NetSim simulator.
- Capture VoIP traffic using Wireshark.
- Calculate packet loss ratio for VoIP packets.
- Compare the calculated with the simulated results.

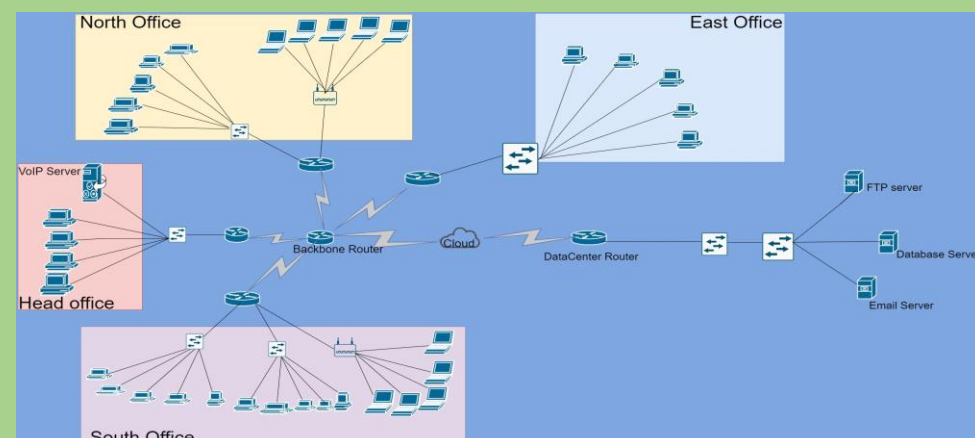


Fig 2 - Proposed system Design.

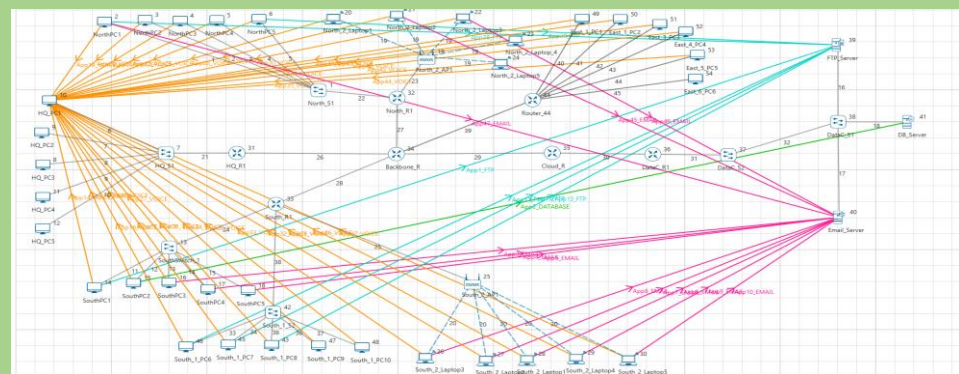


Fig 3 – The proposed design on NetSim

Results and findings

- The results show that bandwidth and buffer size have major effect on the performance of VoIP.
- The simulation and calculated results have showed close similarity when the traffic load is less than 24 Erl.
- we concluded that Erlang B can be applied when the traffic load is relatively small.

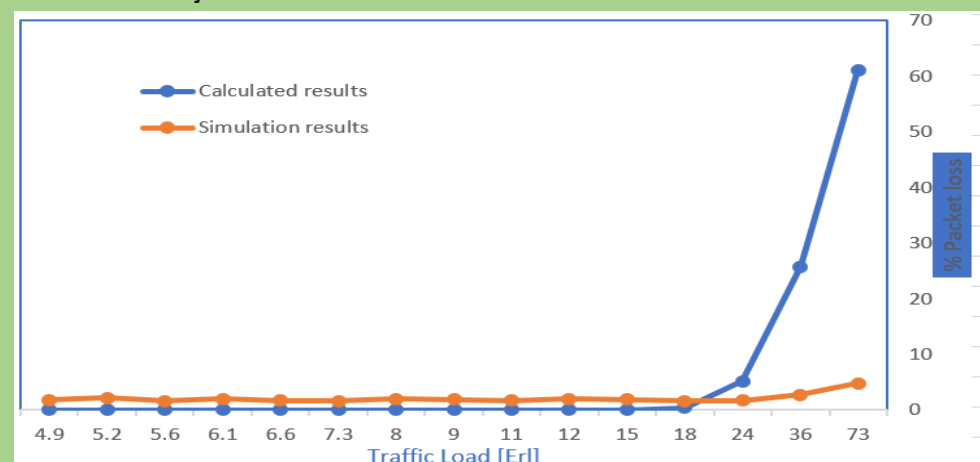


Fig 4 - Calculated vs simulated results.

Conclusion

- Erlang B can be used to estimate packet loss for VoIP network when the traffic load is comparatively small.
- We concluded that Erlang B can be used in a worst-case scenario to provide the upper limit of packet loss in a VoIP system.

References

- [1] J. Yu and I. Ajarmeh, "Design and Traffic Engineering of VoIP for Enterprise and Carrier Networks," in *IEEE*, 2009.
- [2] S. Mirtchev, "Internet Erlang formula: survey on relation between demand, capacity and performance in IP network," *Electrotechnica & Eletronica (E+E)*, vol. 51, no. 1-2, pp. 7-16, 2016