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This project demonstrated the long term effects of a queuing system for different values of ρ . When λ is much less than μ , the system is able to keep up, and produces minimal delays. As λ approaches μ , the queue will increase in length; however, as long as $\lambda < \mu$, the system will still be stable. Once $\lambda = \mu$, the system becomes unstable, and will have a system delay and queue length that will grow indefinitely.

Another interesting outcome of this experiment was seeing the effects of the propagation delay. One would expect the two queues to have identical times in the long run; however, they were slightly different for all simulations. Because of these variations, using the average queue times and average lifetime to calculate the propagation delay produced a slightly different value than the constant specified in the simulation, as shown in Table #??. This shows the inherent complexity of a system of queues, even when the queues have the same parameters for expected arrival rates and service rates.

Appendix A: Figures

Appendix B: Simulation Files

Simulation Initialization File - omnetpp.ini

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