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Modeling and Performance Evaluation of an OpenFlow Architecture

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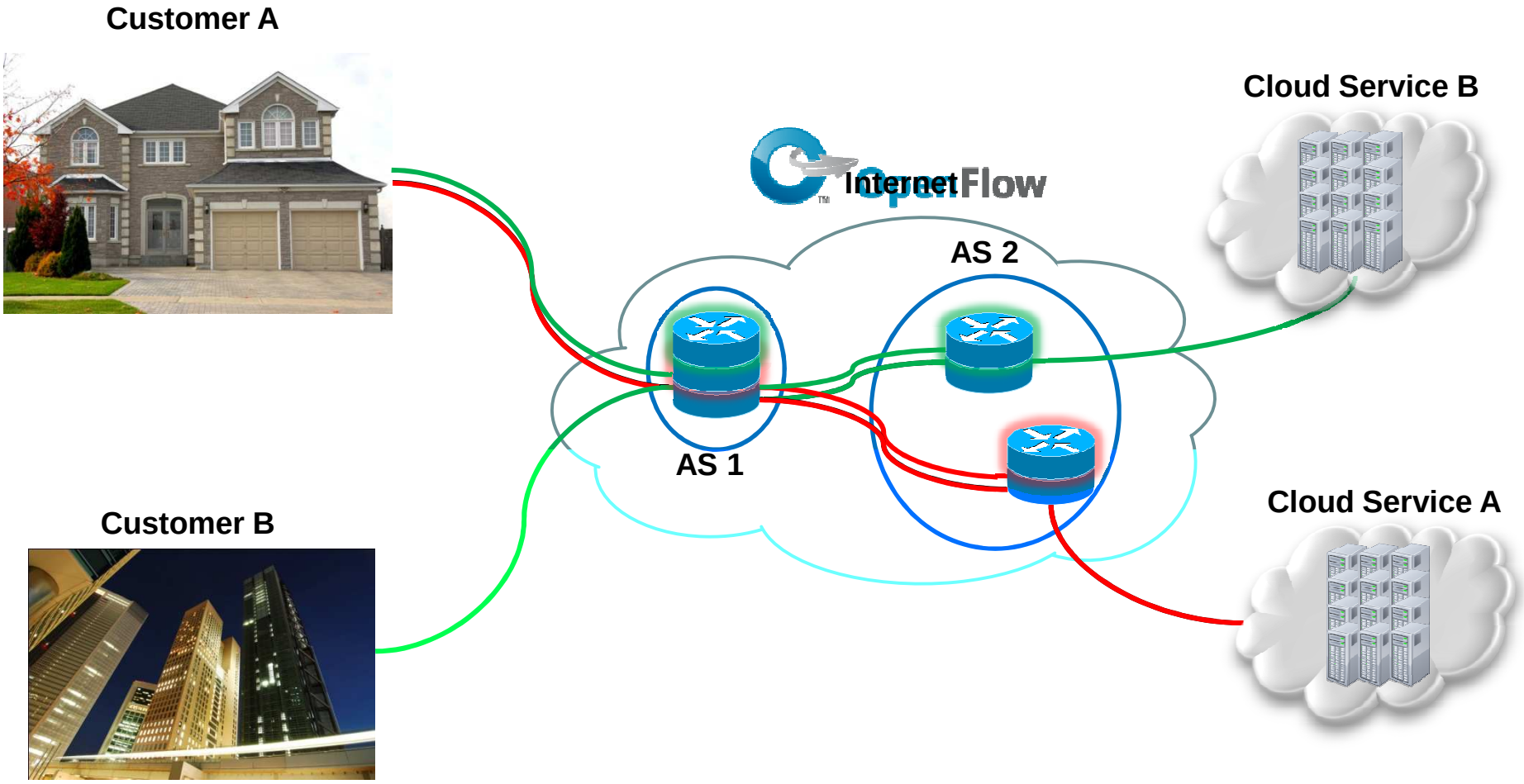
Virtualization of Services in Cloud Networks



But: We need to be sure about its performance before deployment!

Agenda

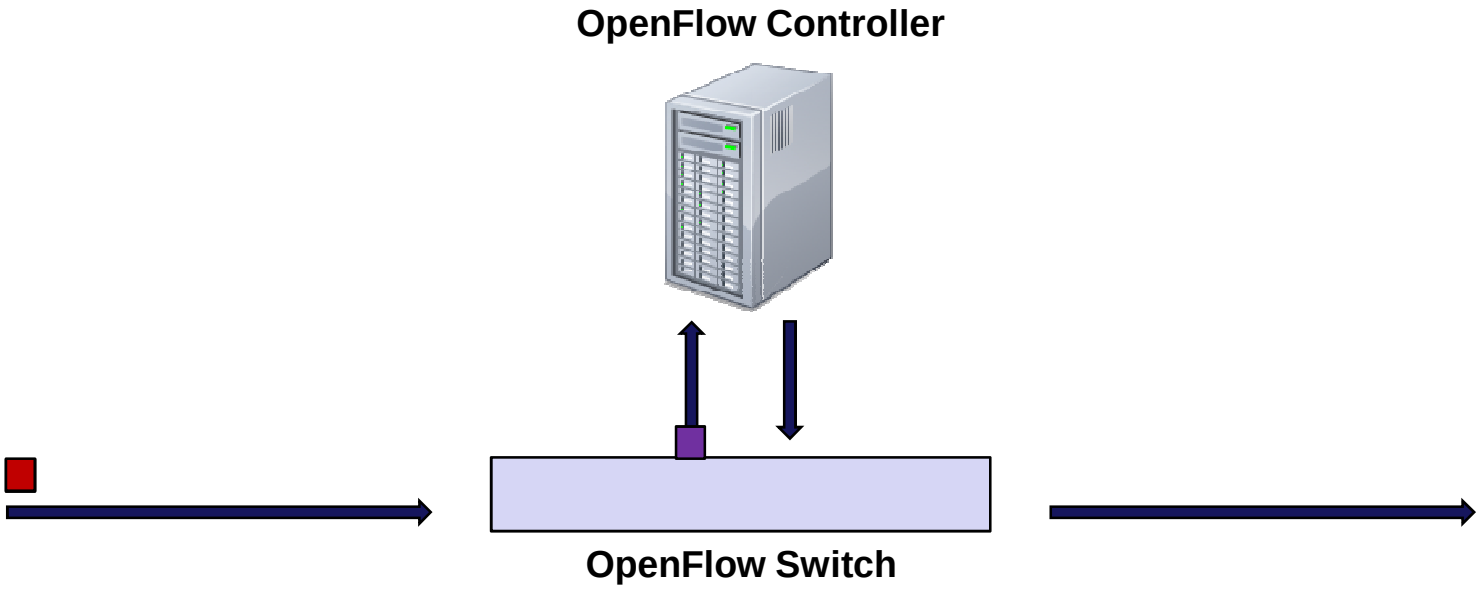
- Introduction to OpenFlow
- Modeling OpenFlow
- Performance Measurements
- Results
- Outlook

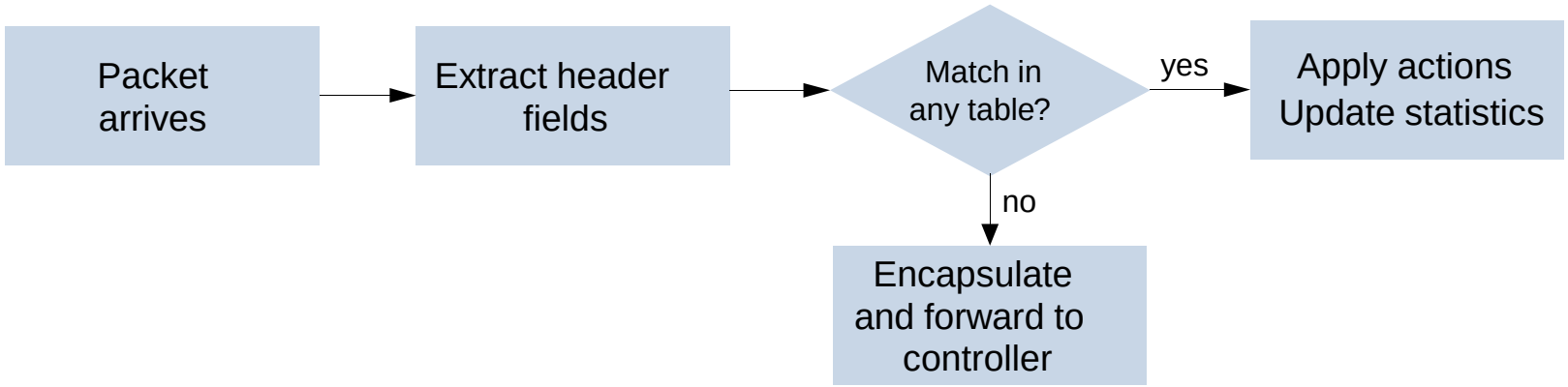
Introduction to OpenFlow

- OpenFlow is a specification/open standard

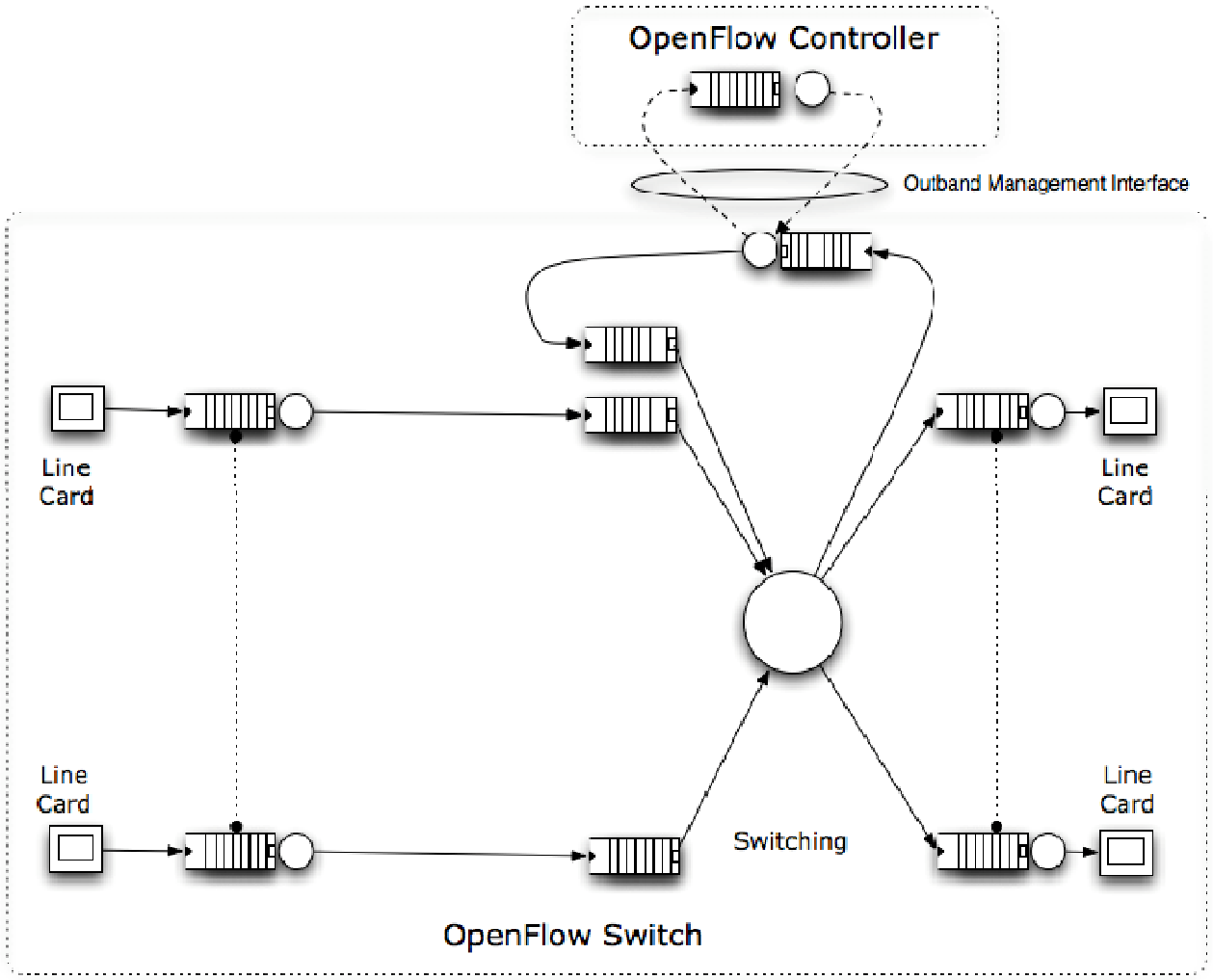
- Test of new ideas in real networks
- Version 1.1 released in March 2011
- Integration available in commercial switches, wireless access points and routers NEC …
- Opens access to the control plane of switching components
  → separation of hardware and control plane
- Supported by the

Reactive OpenFlow Switch-Controller System

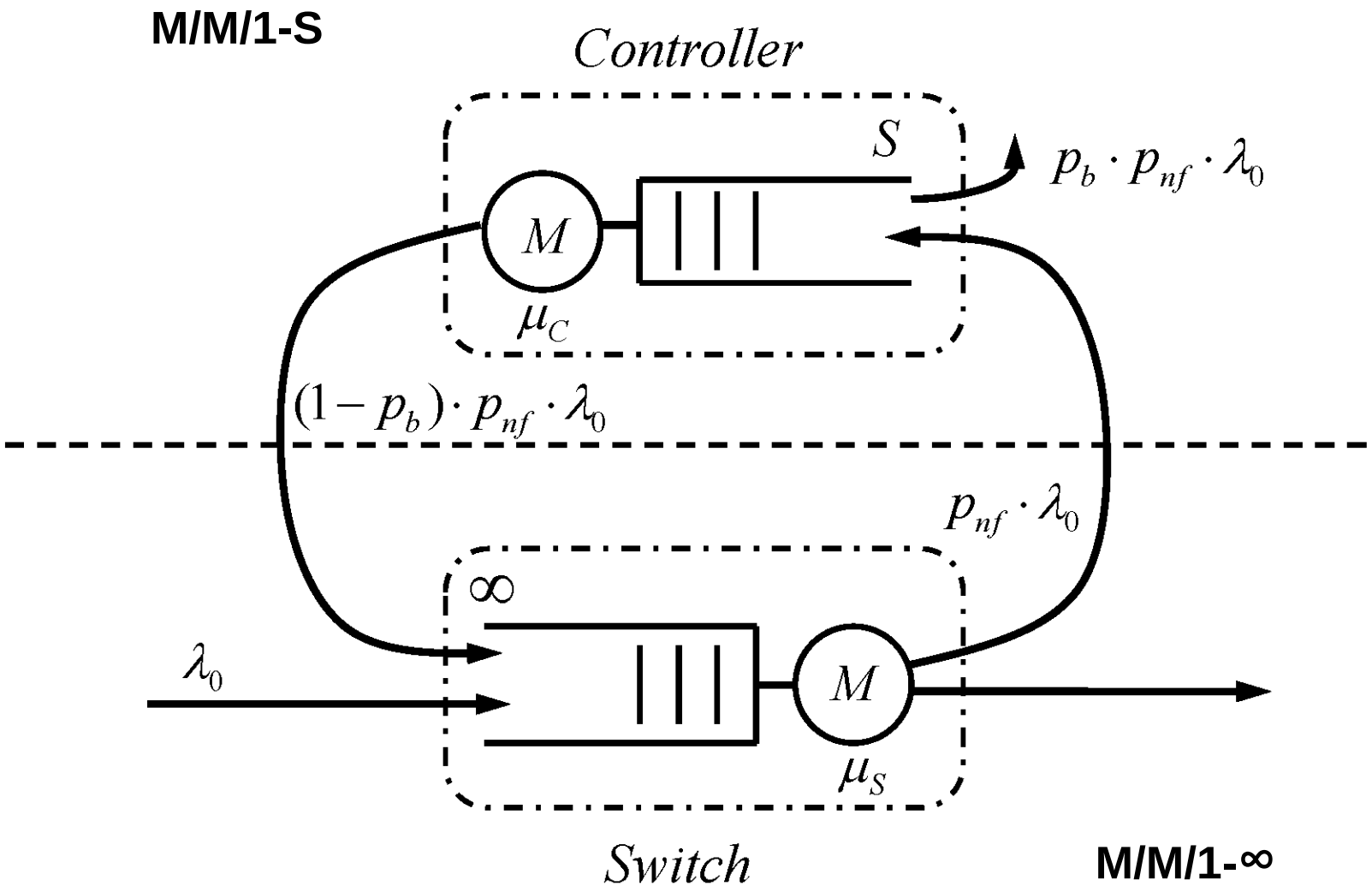




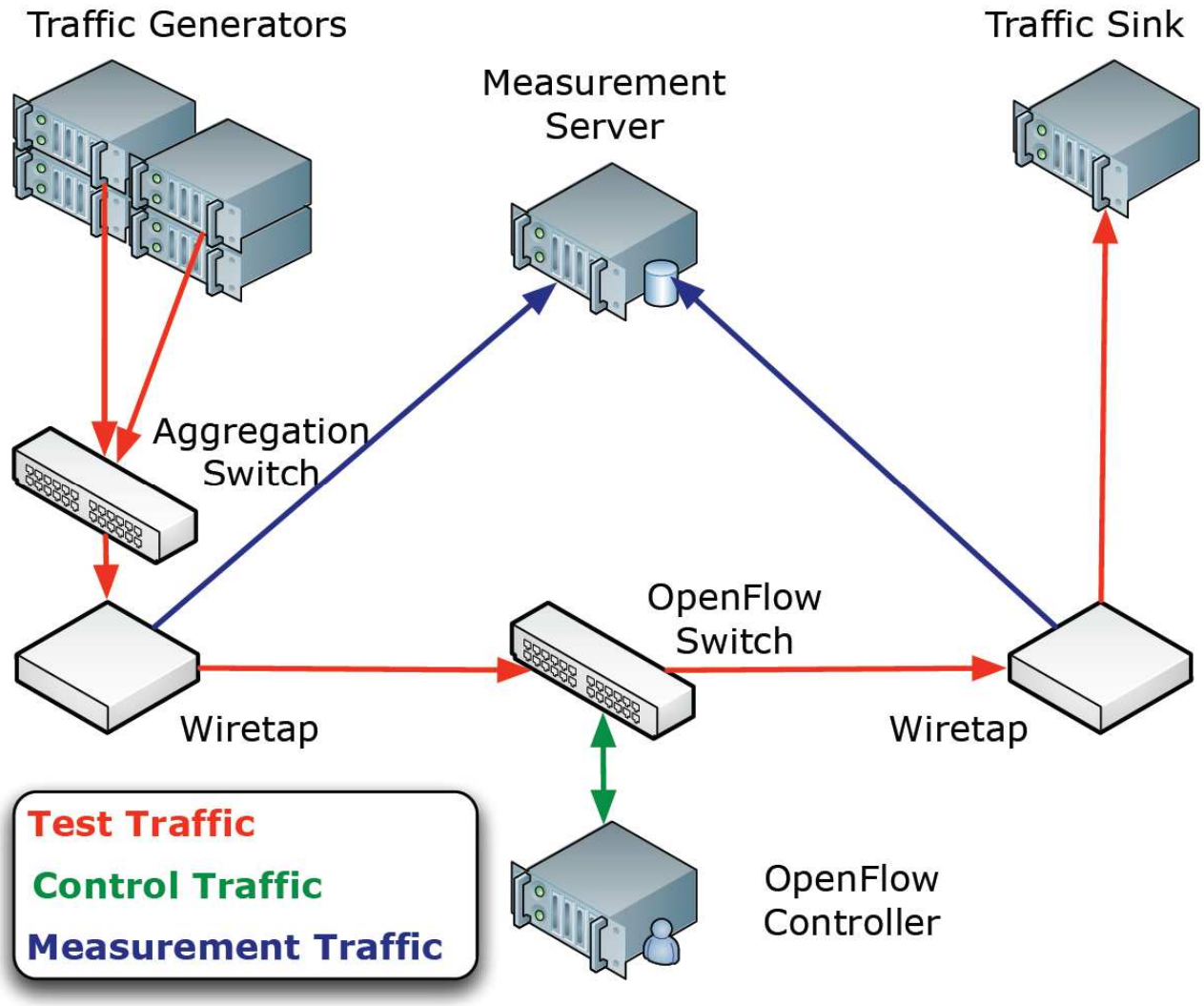
OpenFlow Node Model



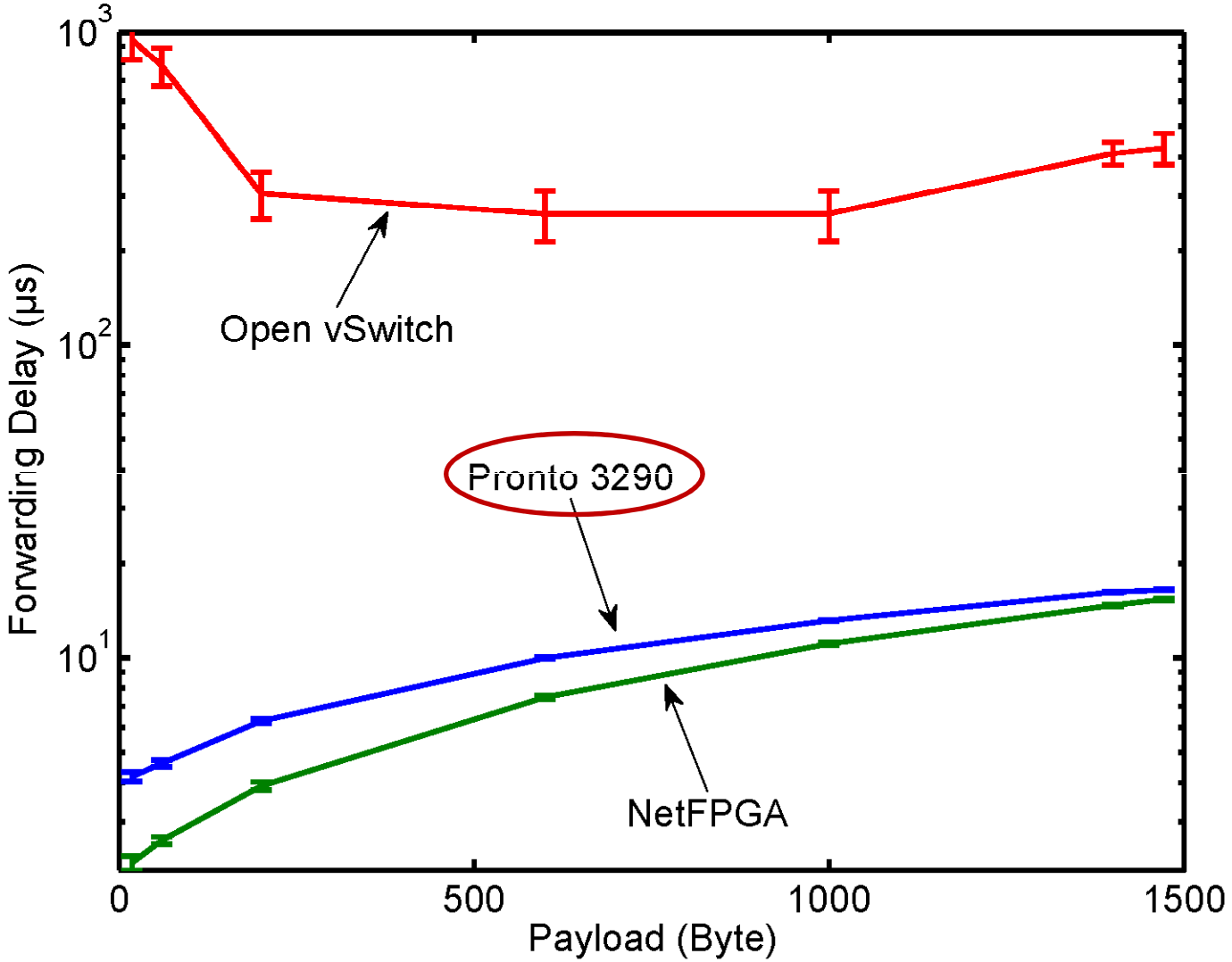
Simplified OpenFlow Switch-Controller Model



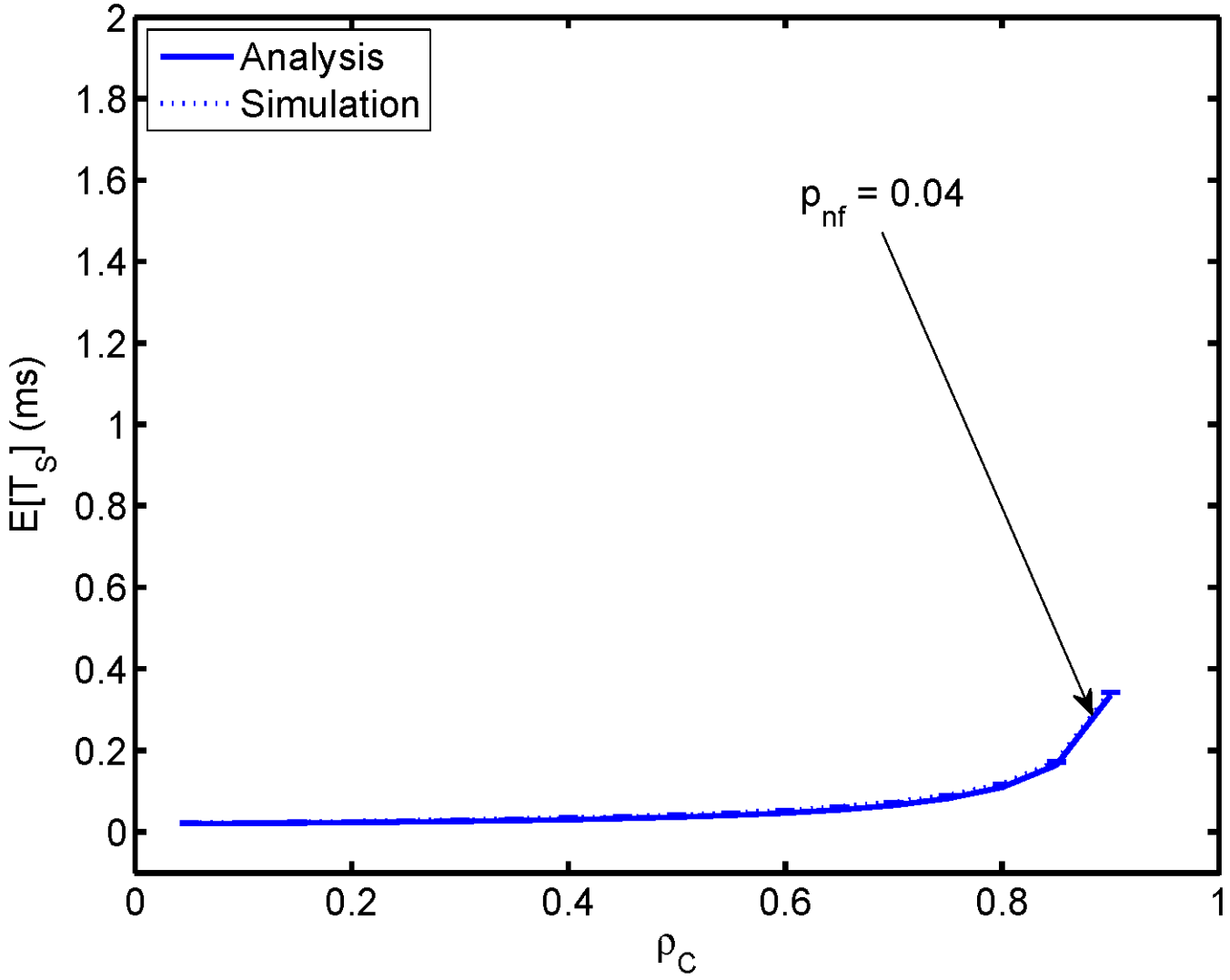
Measurements – Testbed Setup



Measurements – Switch Delay



Mean Sojourn Time for E[B_C]=240 µs



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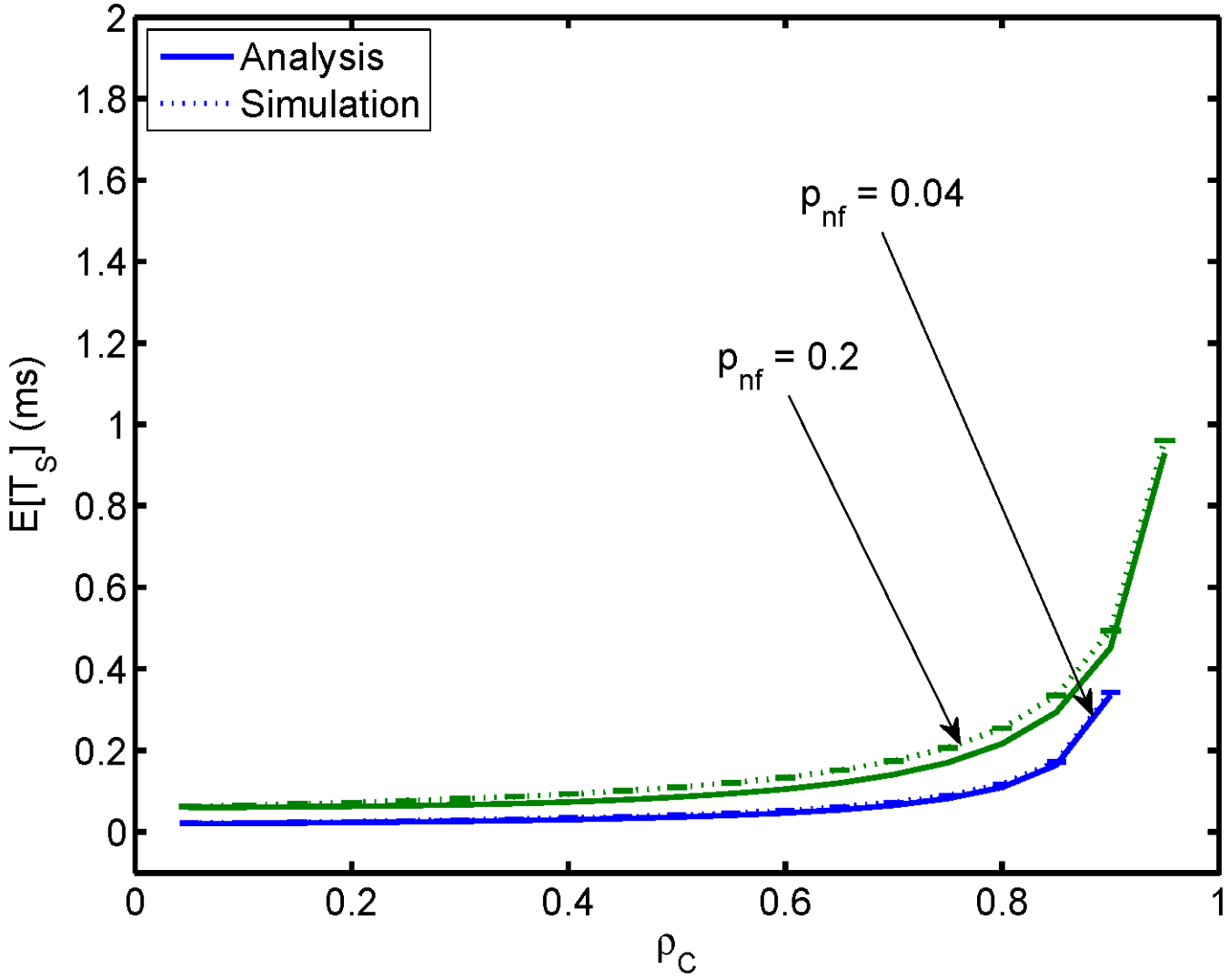

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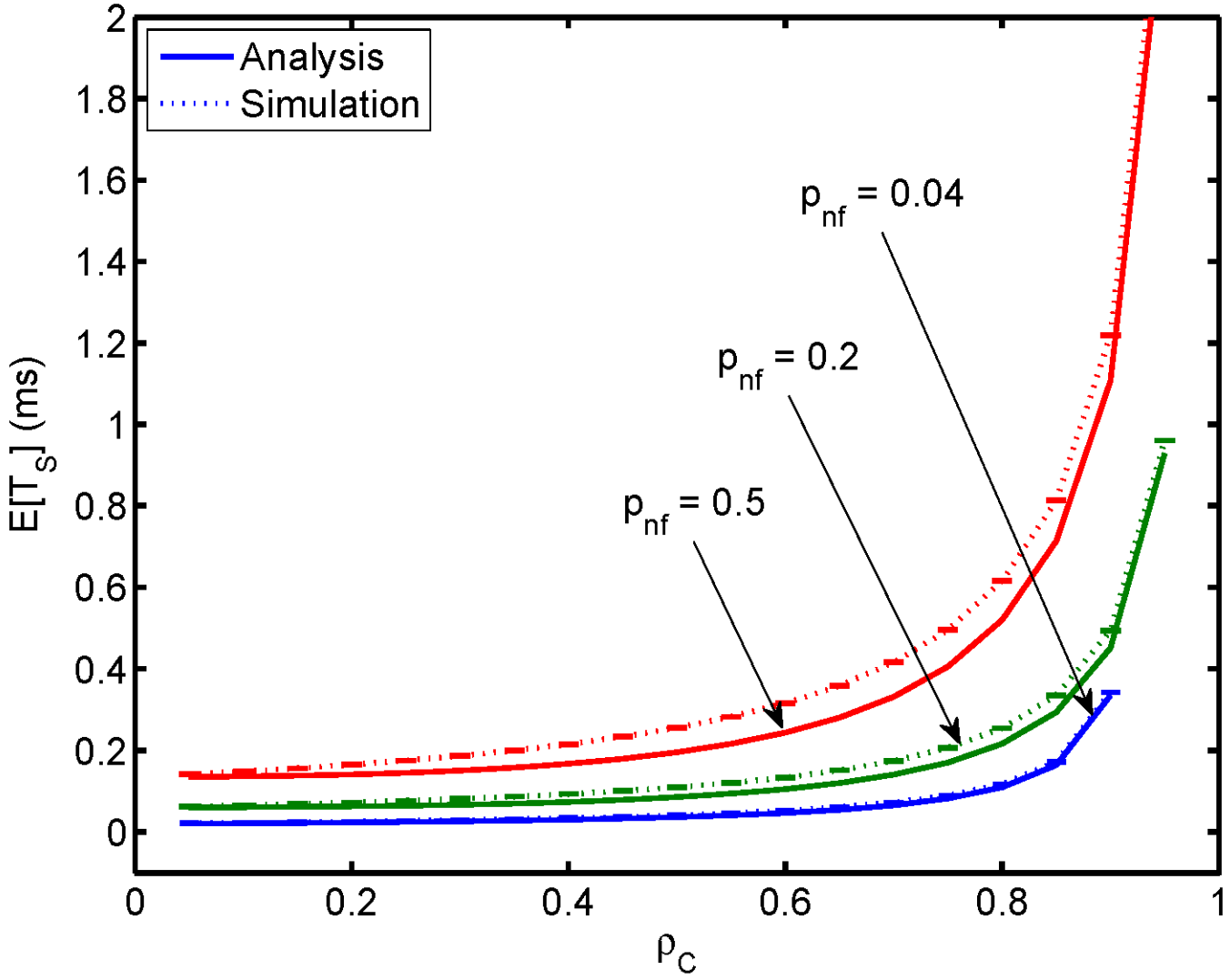

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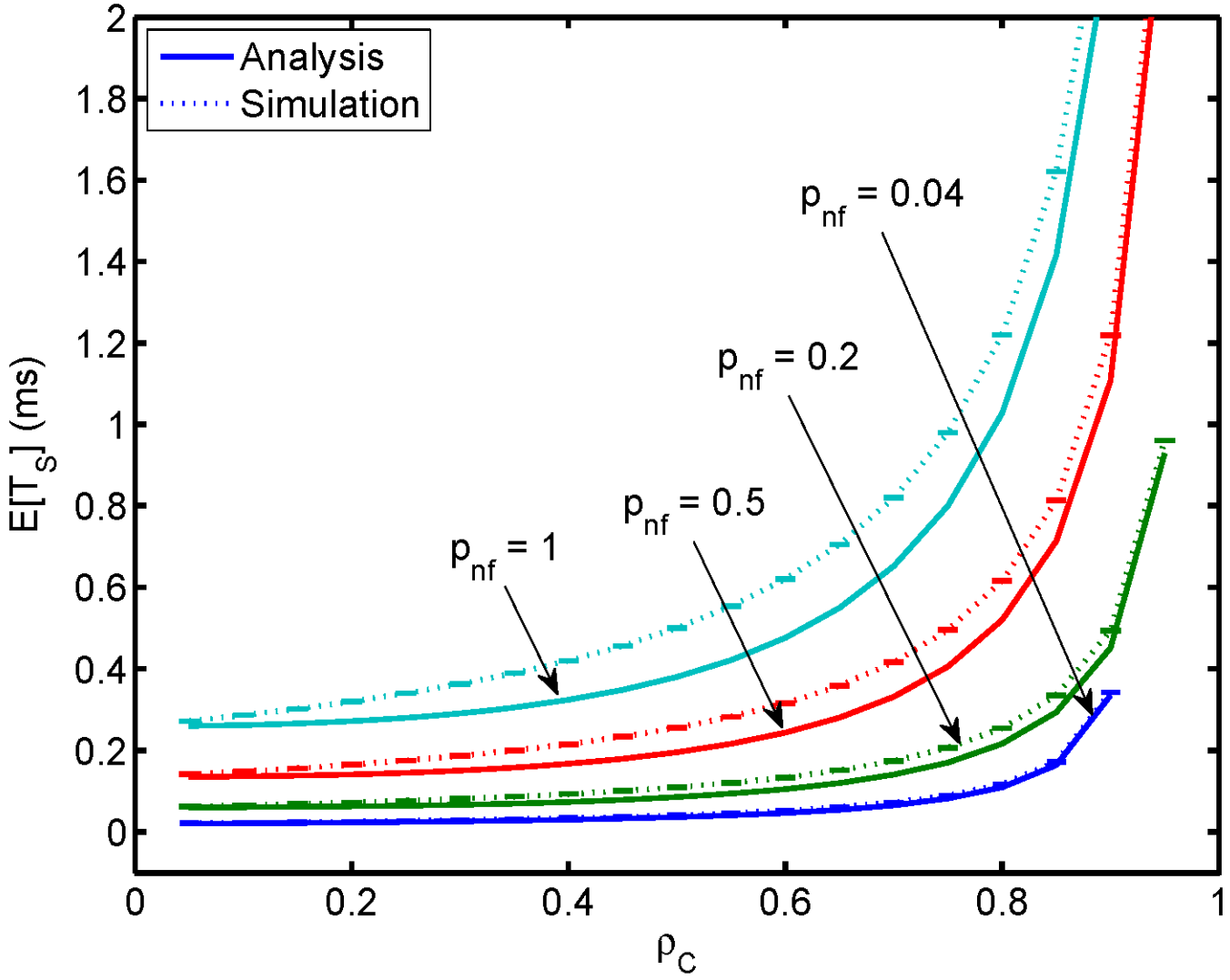
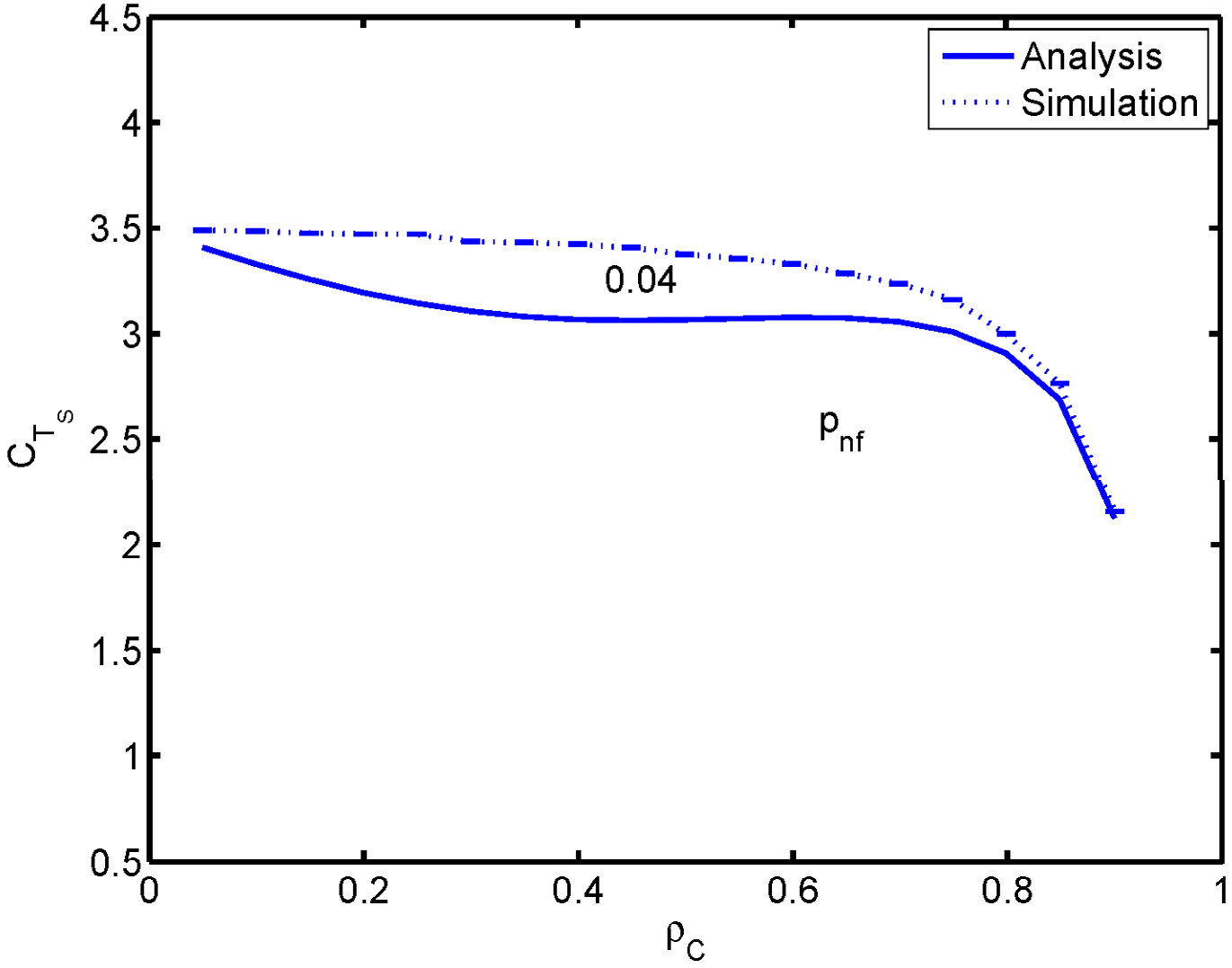


Coefficient of Variation (Sojourn Time)



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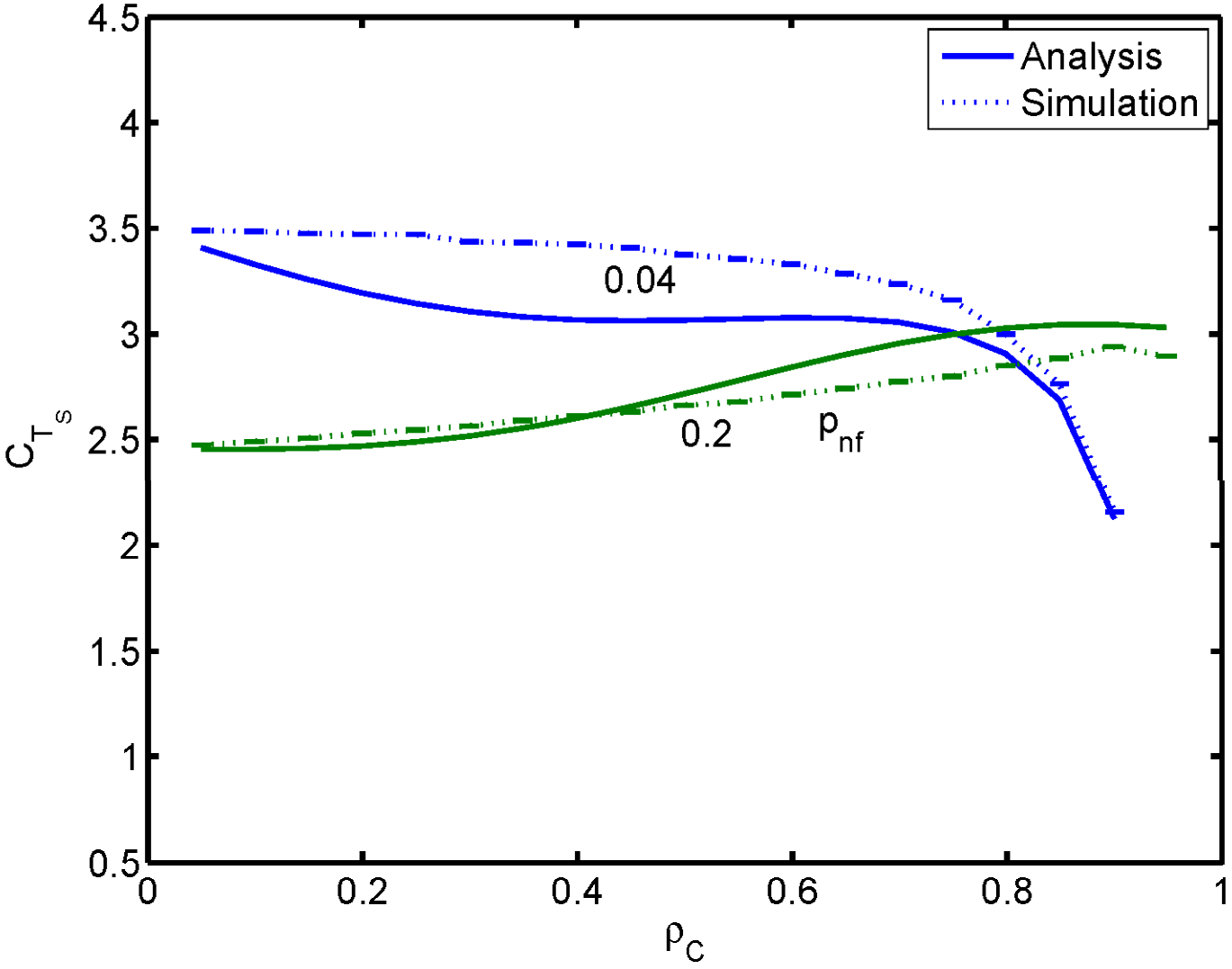

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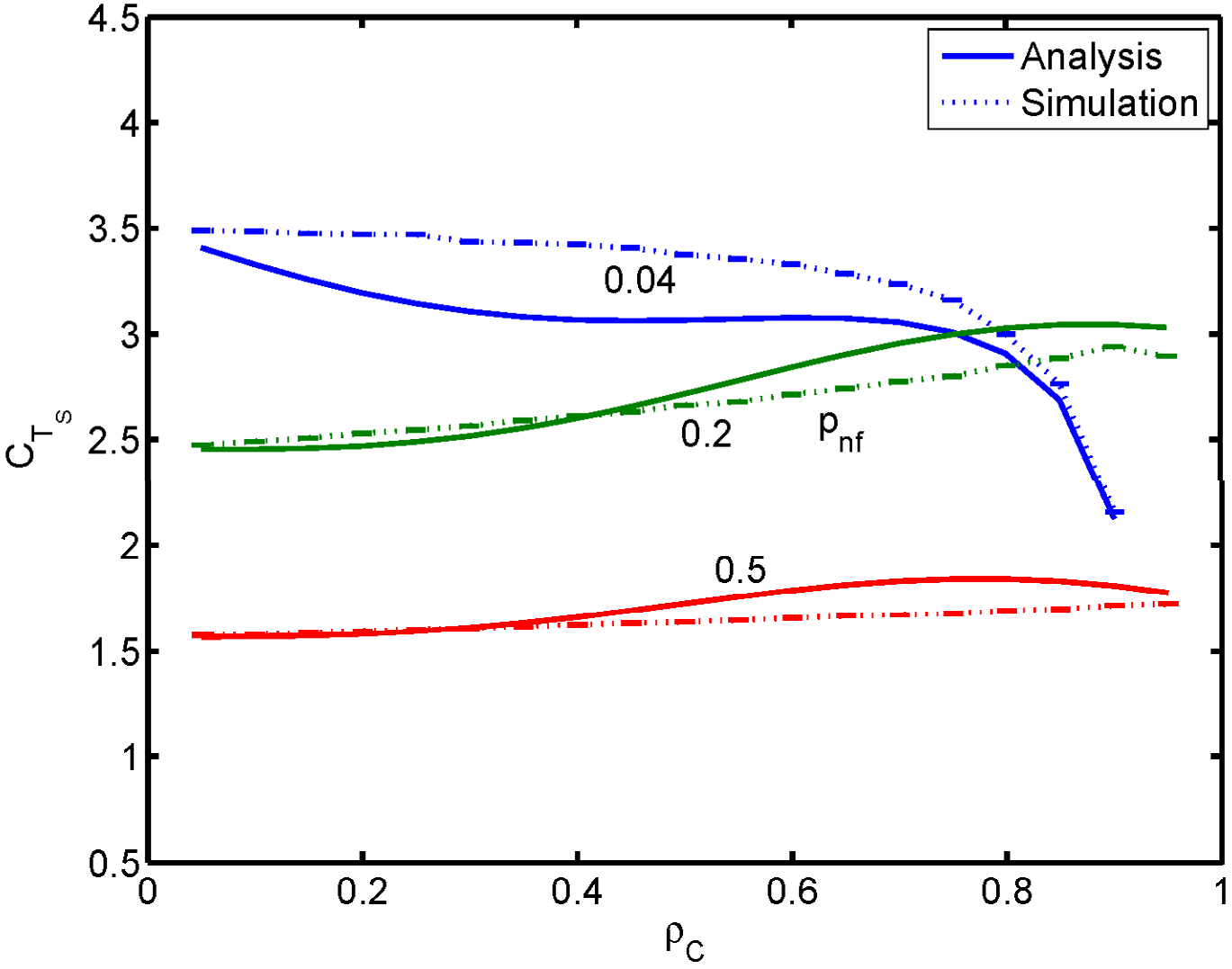

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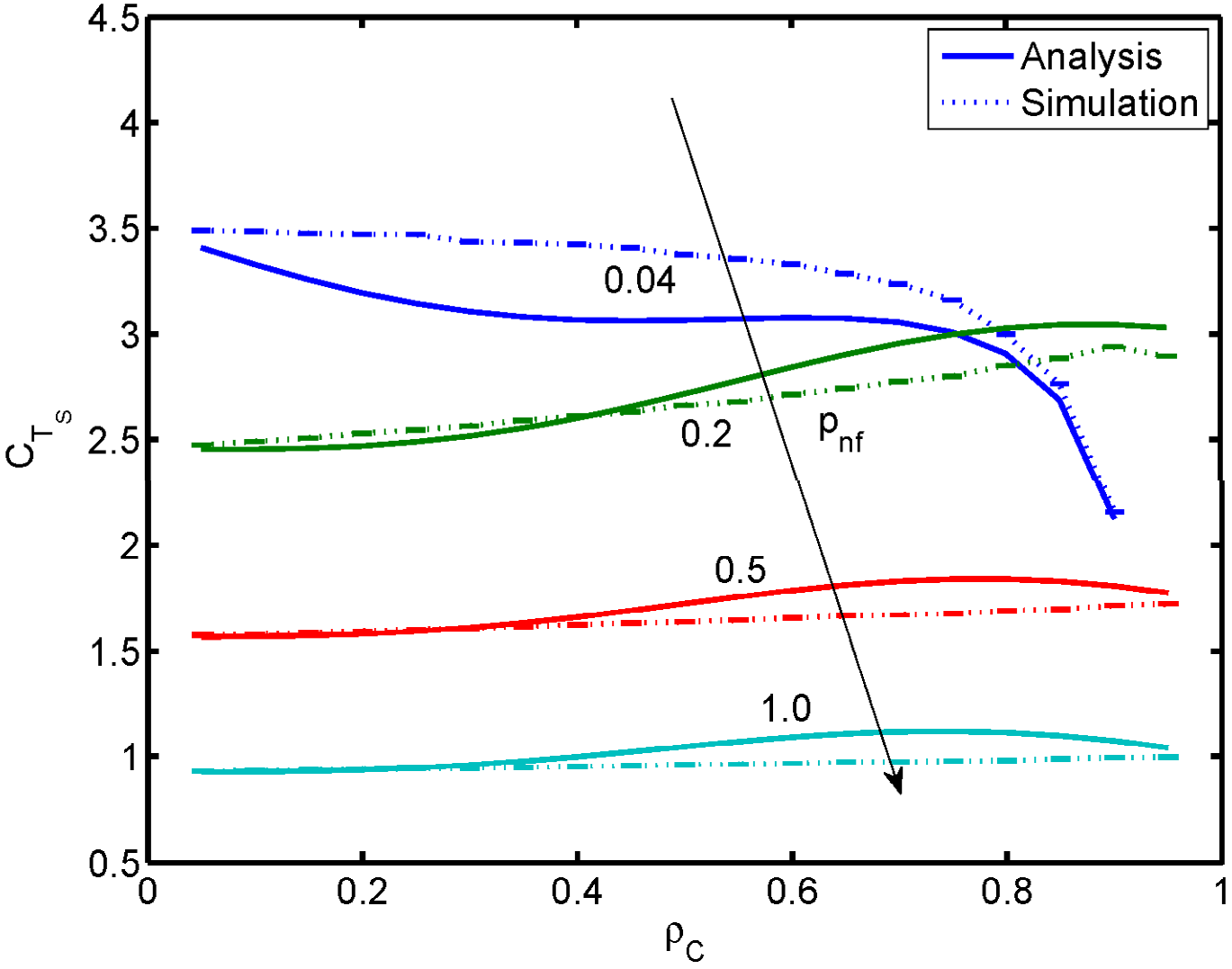
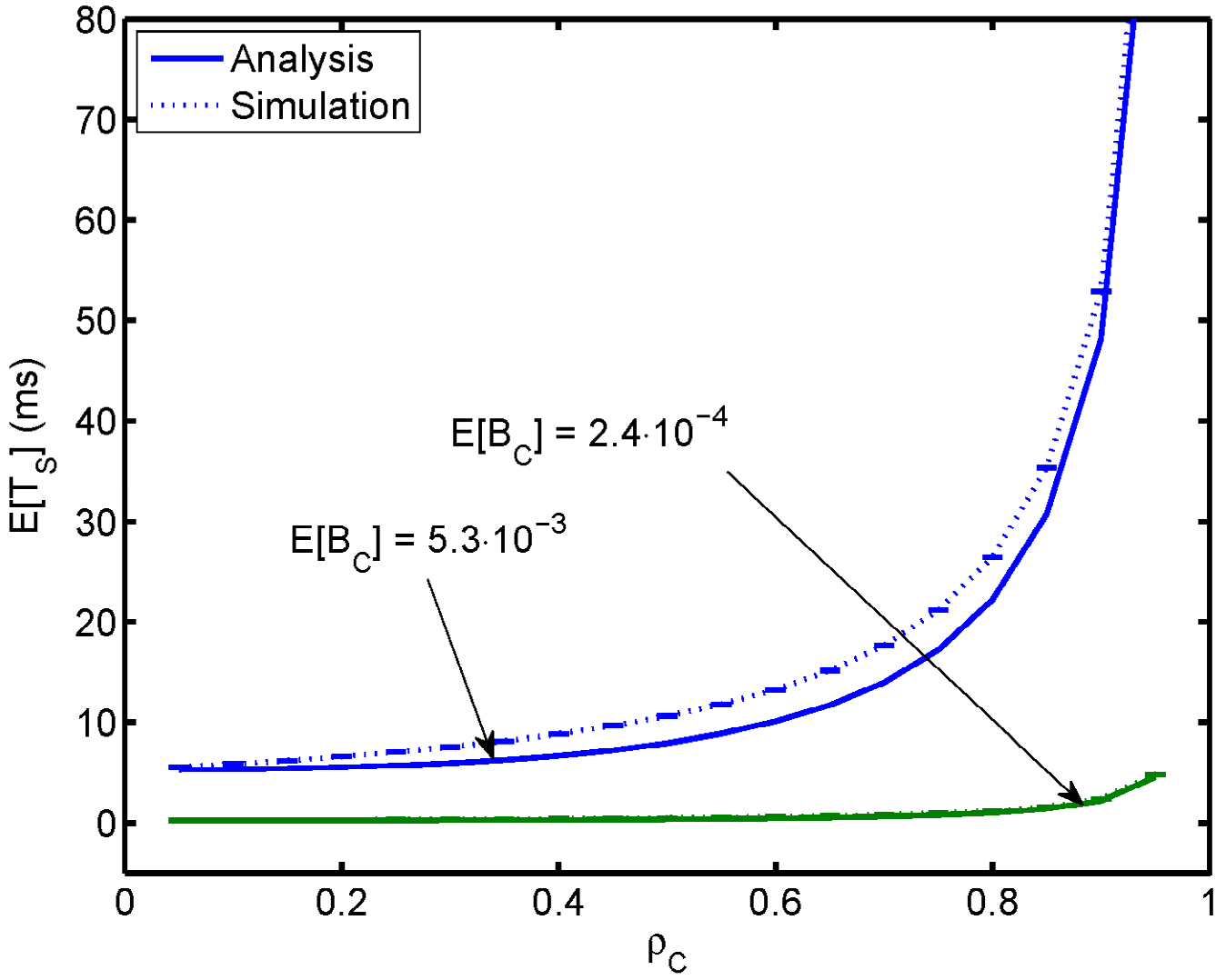
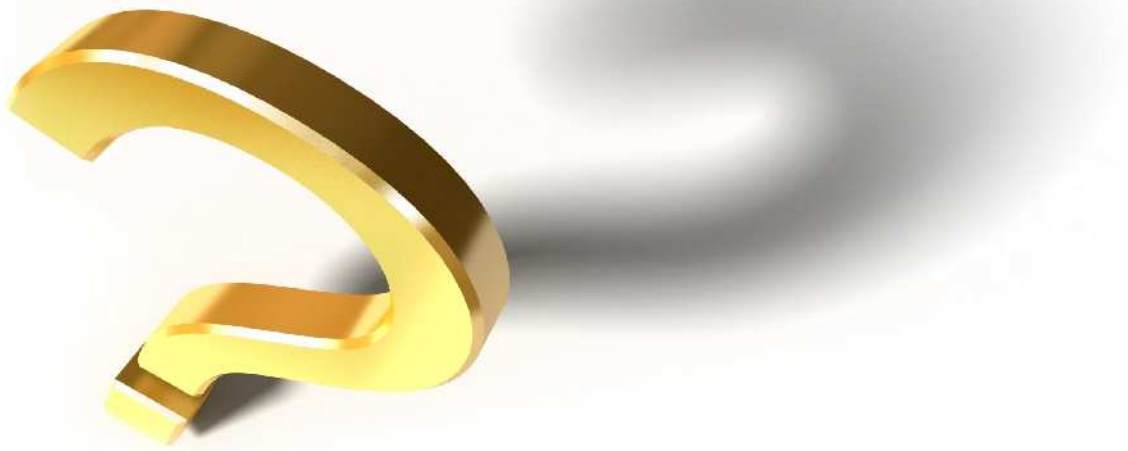


Influence of Controller Service Time for Pnf=0.04



Conclusion

- The complex OpenFlow system can be adequately modeled using our simple approach
- Results indicate that the OpenFlow approach is sound
- However: Negative performance impact is notable in conjunction with low-end hardware and/or high loads
- Current Work
  - Investigation of different controller behaviours
  - Introduction of a more detailed analytical model
  - Analysis of several systems interacting with each other

Questions and Comments ?