VIRTUAL NETWORK MIGRATION

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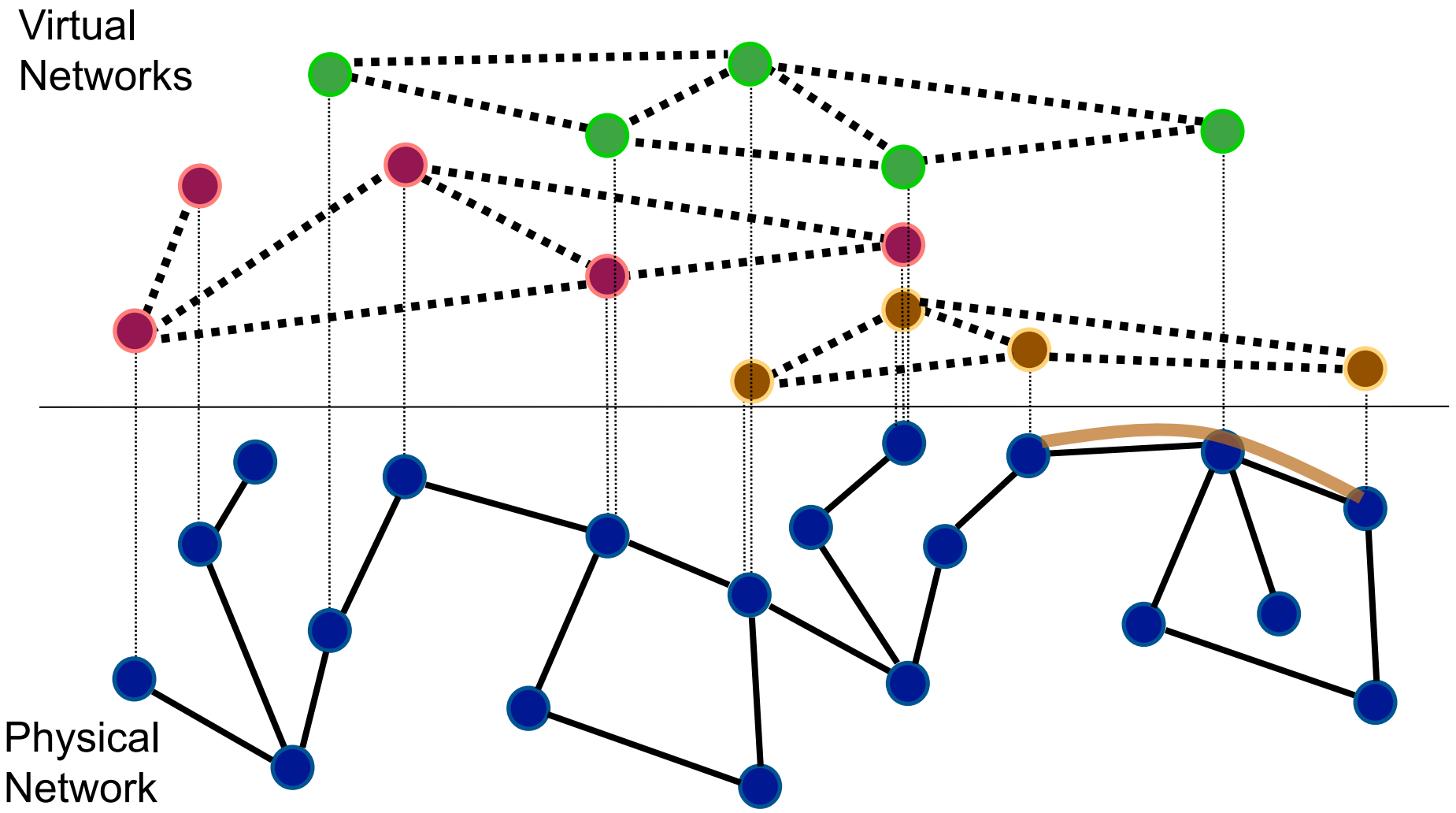
Why Virtual Networks (VNs)?

- Solution to network ossification [Turner & Taylor, 2005, Anderson et al., 2005, Bavier et al., 2006]
  - Without major changes on the existing network architecture
  - Provide realistic environment for deploying new architectures and applications
  - A path to experiment with deployments
- Provide isolation
- Network agility
  - Can be set-up, taken down, changed and moved quickly

What is a VN?



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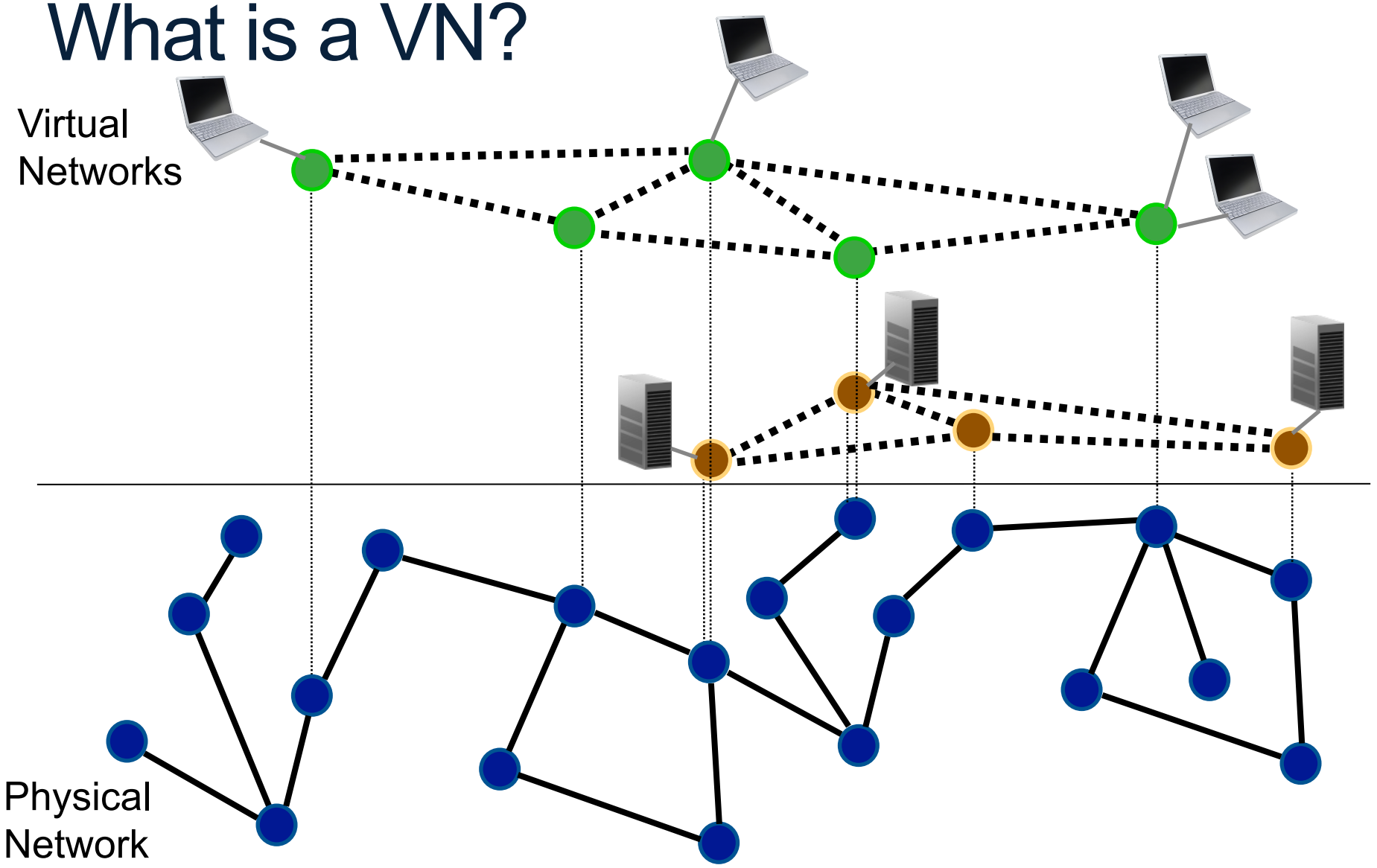
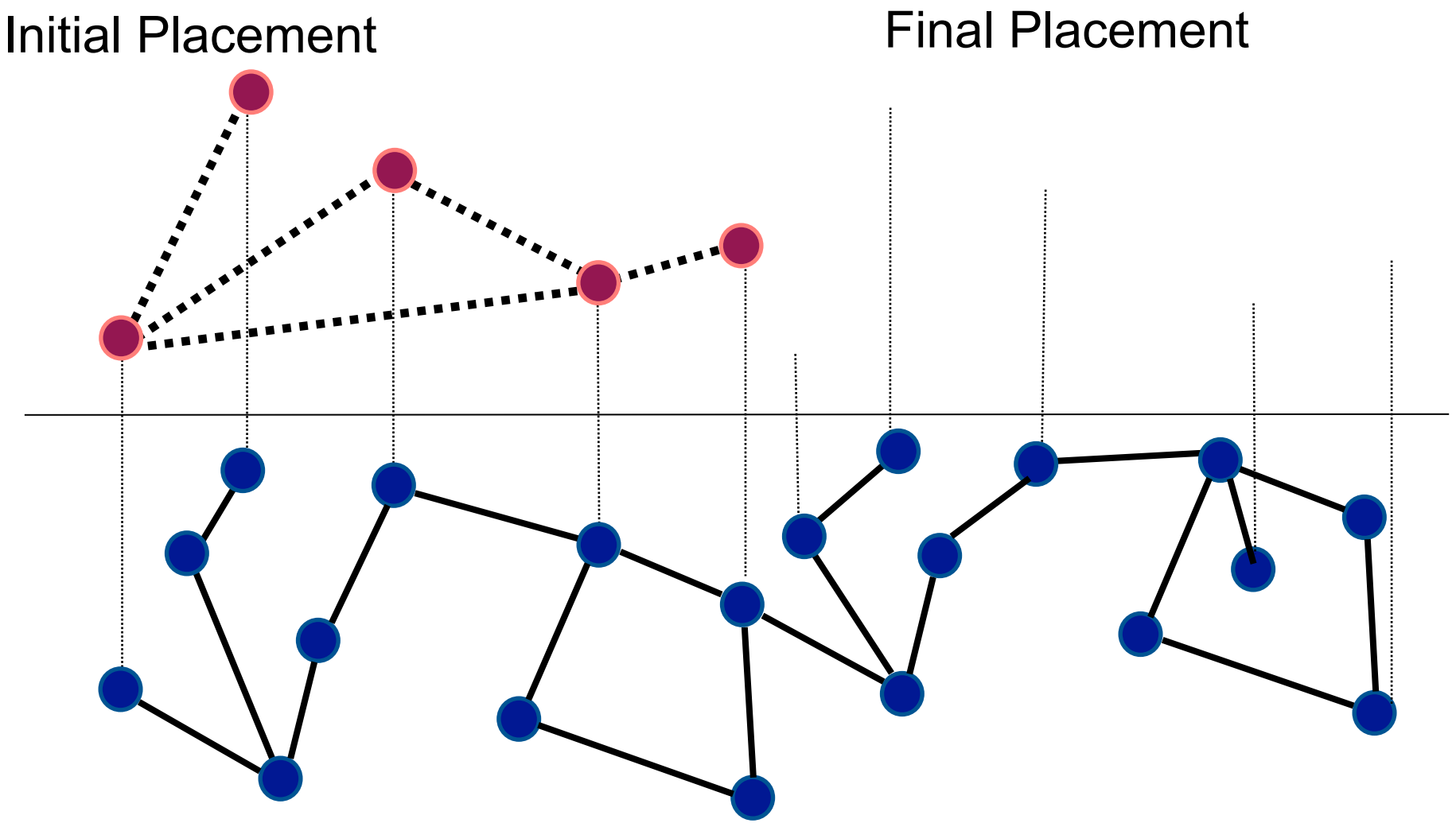
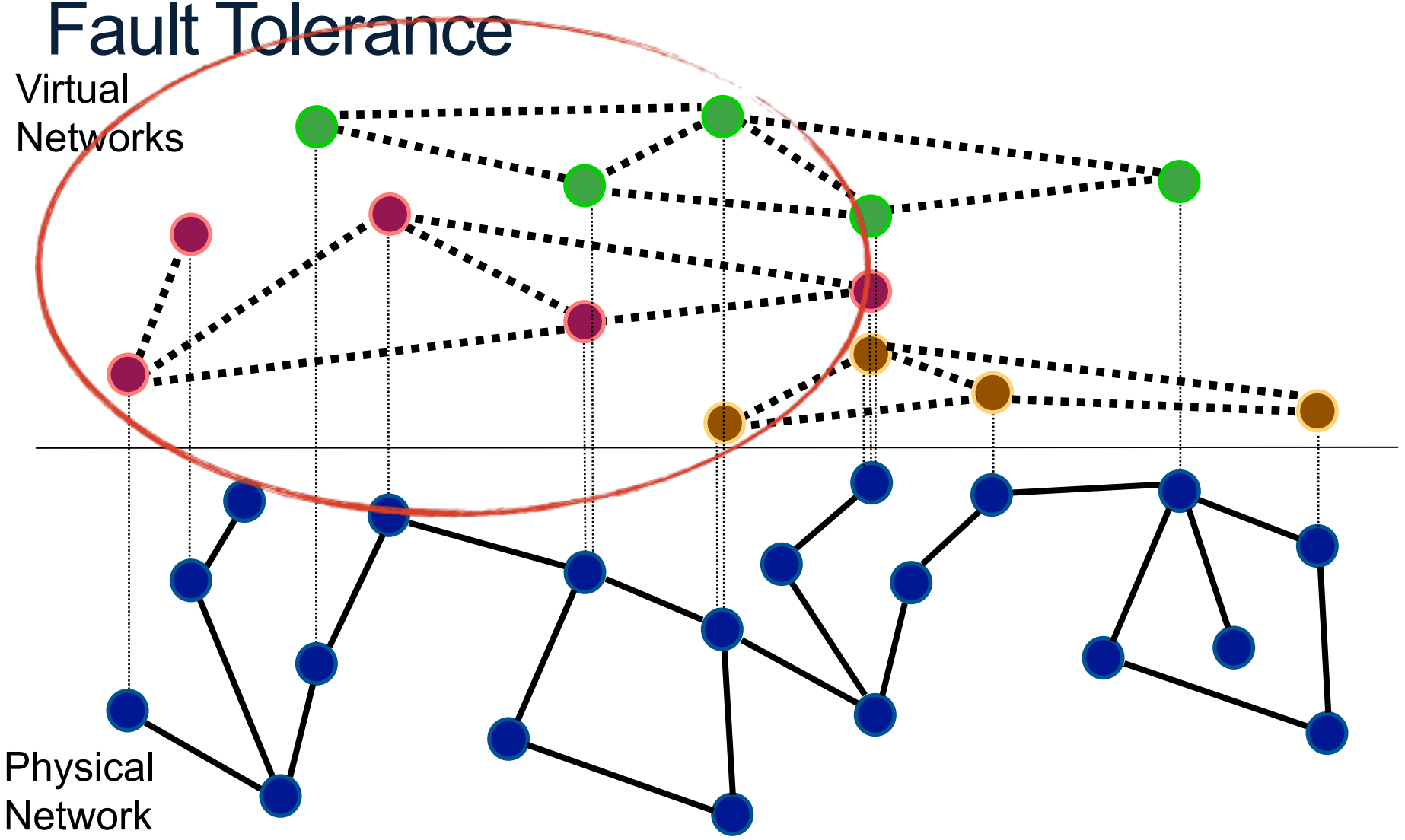


The VN Migration Problem



Why do we need to move?
Fault Tolerance



VN Migration Problem – Mechanism

- Focus of this work: How to migrate
  - Virtualization technology
  - Scheduling
- Limited work:
  - Migrating single virtual router
    - [Wang et al., 2008]
  - Scheduling migration
    - [Lo et al., 2013]
  - Network migration on PlanetLab
    - [Lo et al., 2014]

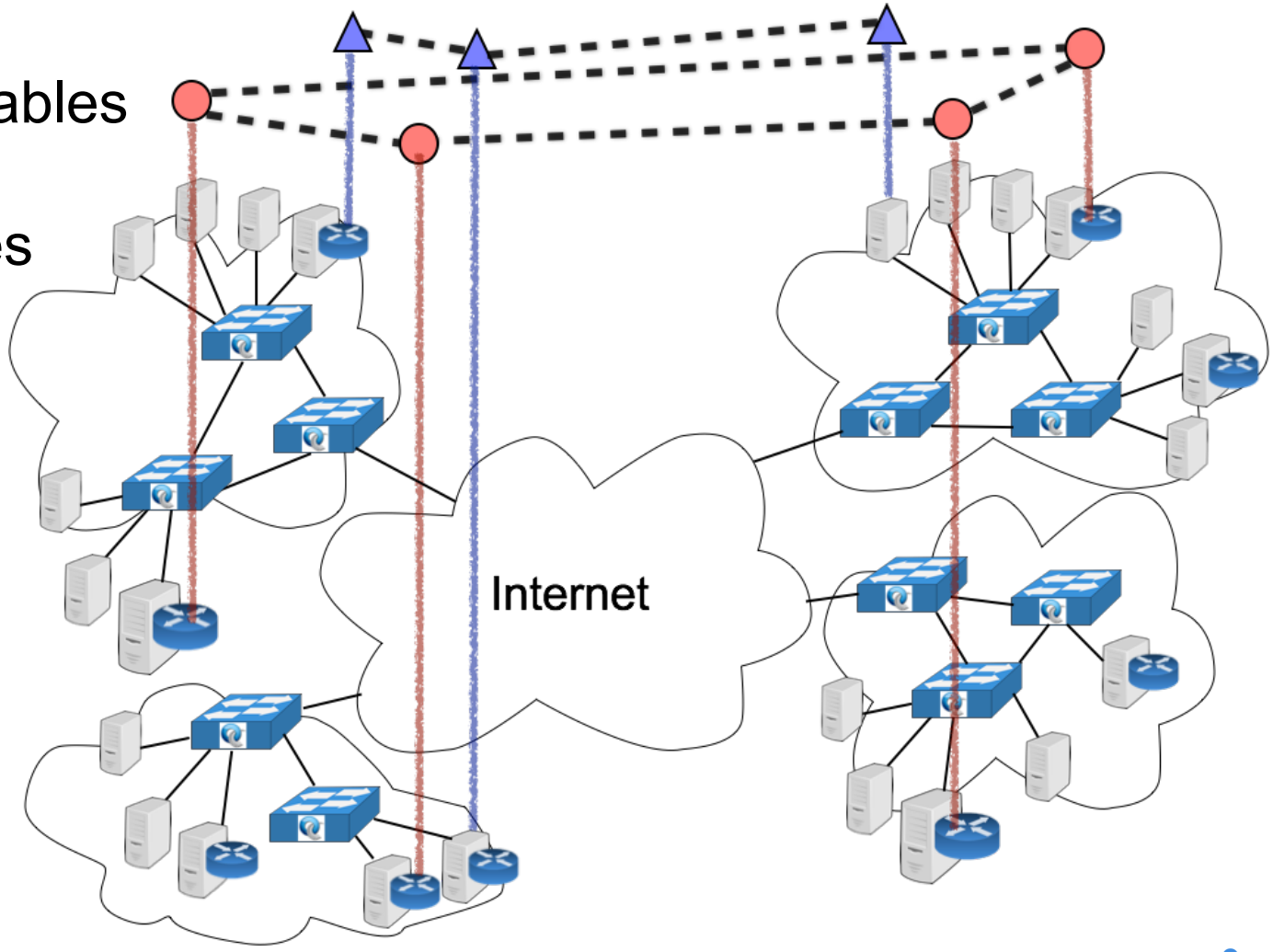
VN Migration on PlanetLab

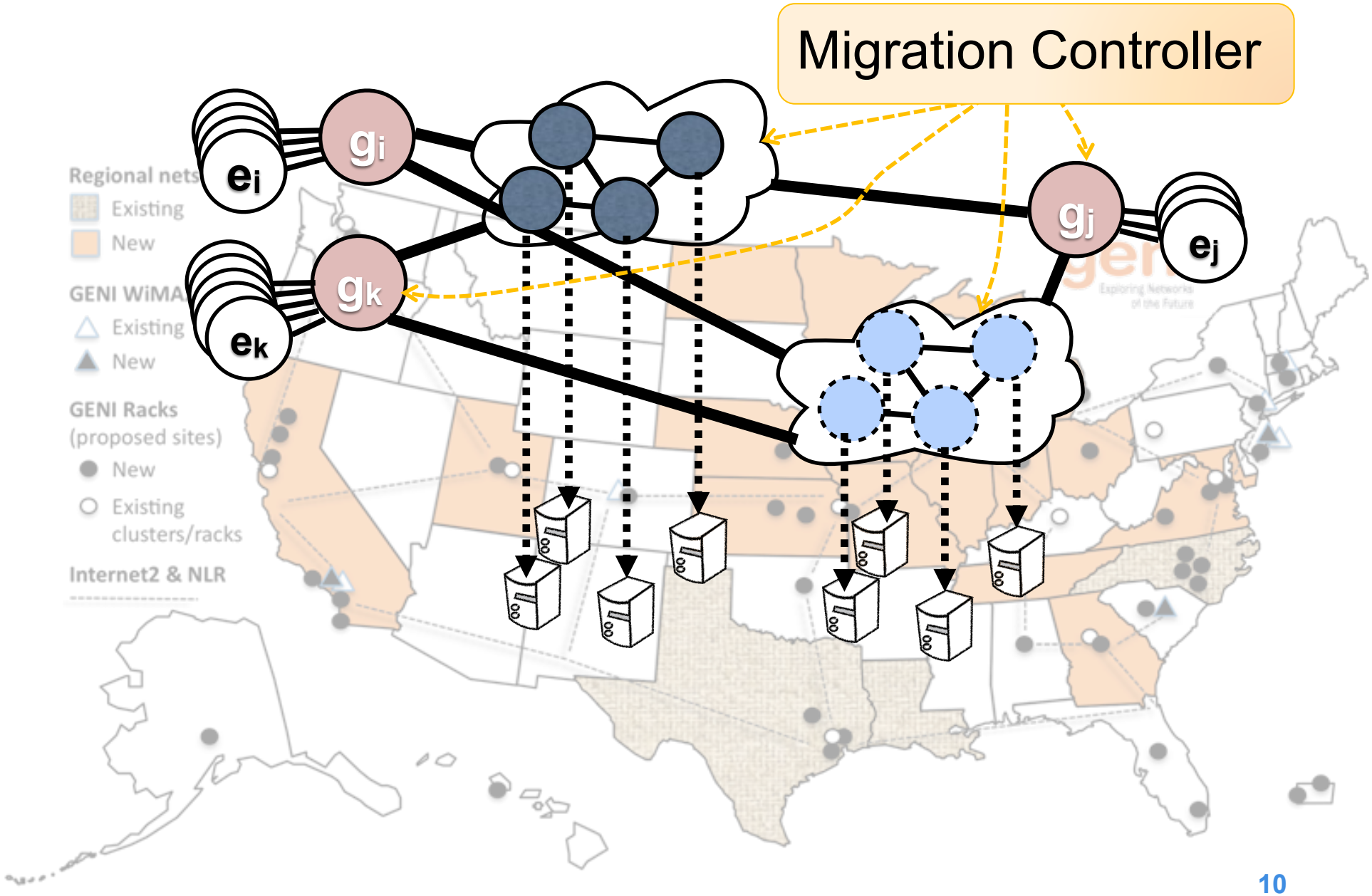
(Published in IFIP Networking 2014)

- PlanetLab
  - Experimenters often experience node failure or insufficient resources for their experiments
- Architecture of VN migration on PlanetLab
  - Migration controller – PL-VNM
  - Migration process
  - Migration schemes
- Insights and lessons:
  - Constraints for VN migration on PlanetLab
  - Recommendations for future infrastructure to facilitate VN migration

VNs on GENI

- Layer 3: Routing tables
- Layer 2: Flowtables

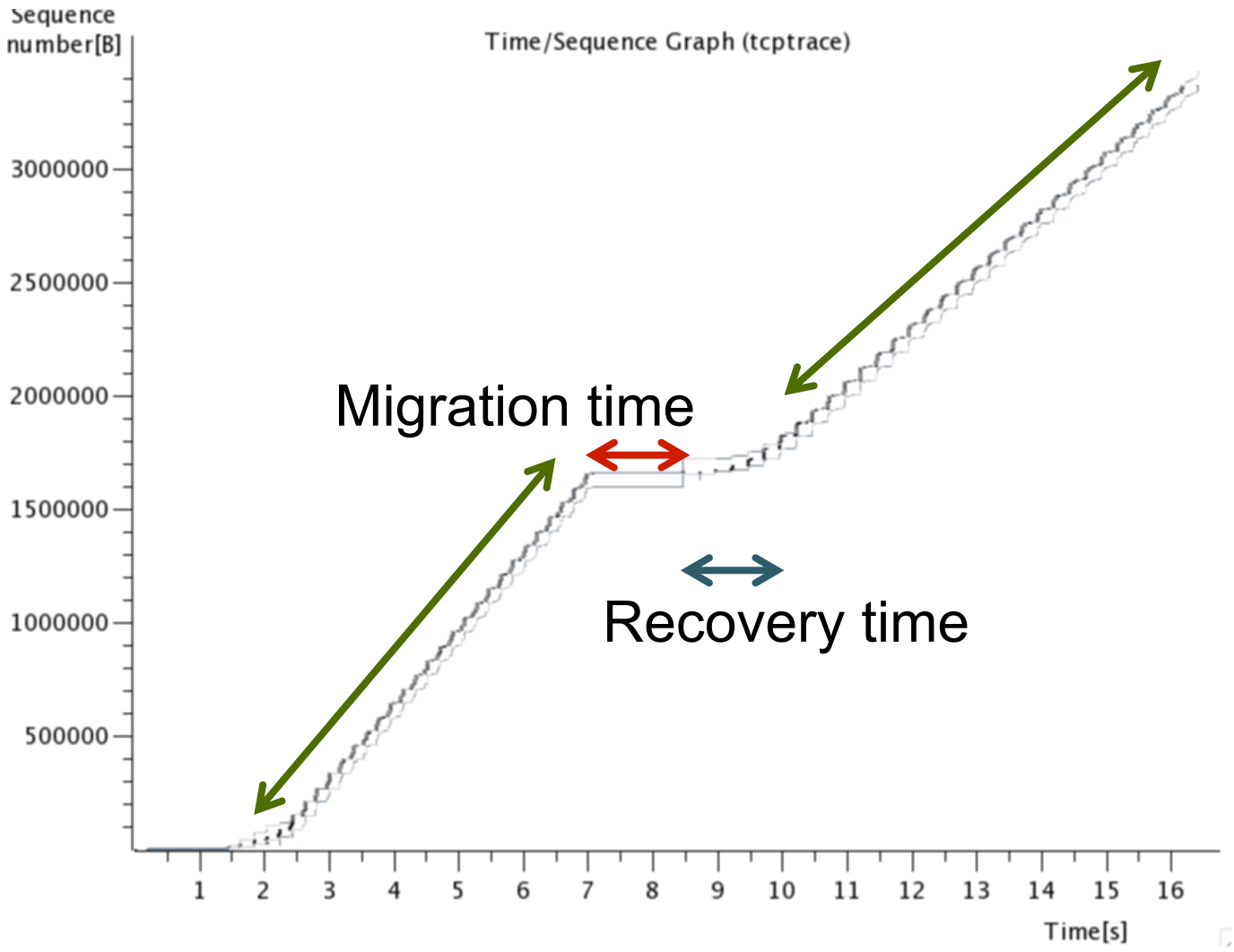



Migration Controller
gi
ei
gk
ek
gj
ej
Regional nets
Existing
New
GENI WiMAX
Existing
New
GENI Racks
(proposed sites)
New
Existing
clusters/racks
Internet2 & NLR

Work in Progress

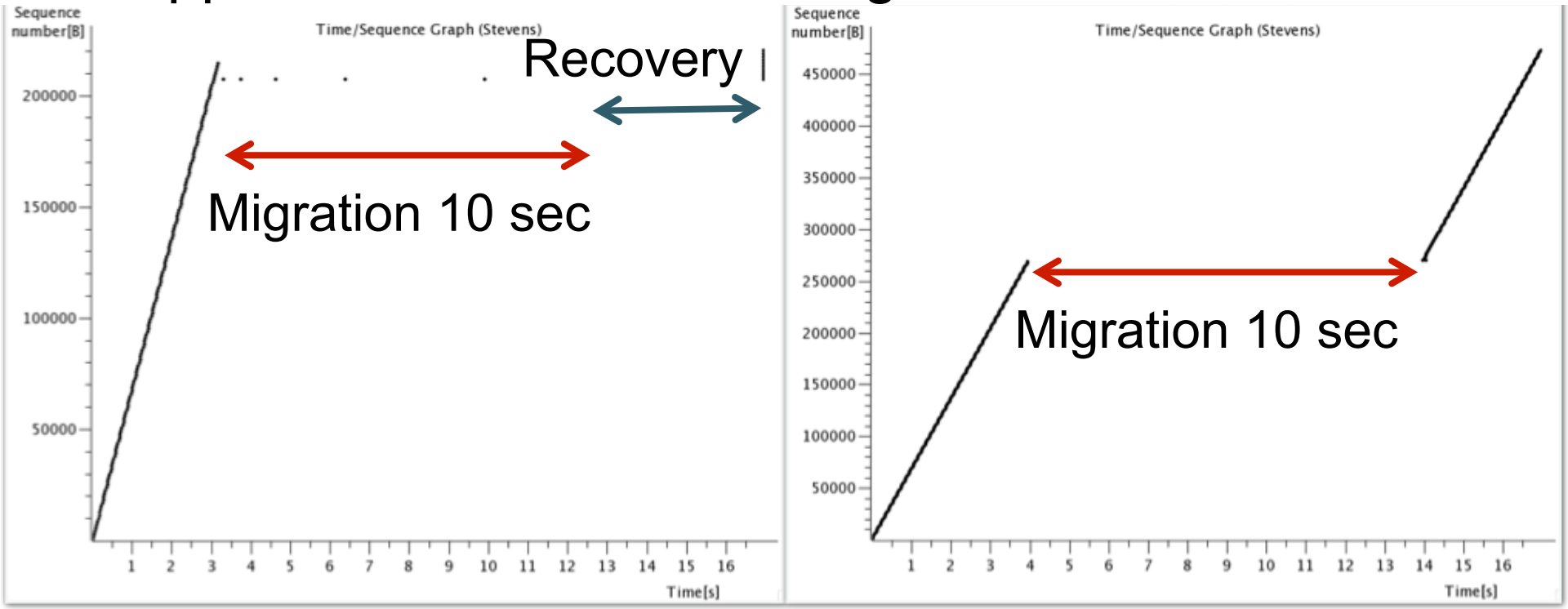
- Migration controller for GENI
- Effects on end-systems and applications
  - How to mitigate known disruptions

TCP Trace during Migration



Mitigate Scheduled Network Disruptions

- Centralized controller
- Notify end-systems and applications
- Application: Video streaming



Summary

- Migration controller for GENI
- Centralized controller to mitigate the effects on end-systems and applications

Thank you!

Q&A

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