GENI-VIOLIN: In-Network Suspend and Resume for GENI Experiments
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Introduction
- GENI-VIOLIN provides a live snapshot capability to GENI experiments for:
  - Fault Tolerance
  - Debugging
  - Slice management
- Live, In-Network Snapshoting:
  - Does not interrupt experiment
  - Does not require modification to applications or OS
  - Preserves consistency and connection state using algorithm implemented in the network

How it works
- OpenFlow Switches and Controllers
  - Enforce delivery rules
  - Color packets
  - Buffer and reinject packets (for Mattern’s distributed snapshot algorithm)
- VM Servers use Xen’s live migration to copy VM state to Snapshot Servers while VMs continue to run
- Snapshot Servers act as migration destinations and store VM images
- A Transaction Manager coordinates tasks among VM Servers, Snapshot Servers and OpenFlow Controllers

GEC9 Demo Scenario
- We demonstrate live, in-network snapshot and restore for a distributed ray tracing application running in a ProtoGENI slice:
  1. Live snapshot on ProtoGENI Utah
  2. Snapshot is copied to ProtoGENI GPO
  3. Simulated hardware failure on Utah slice
  4. Snapshot is restored on ProtoGENI GPO
- The GENI-VIOLIN Dashboard (GUI) initiates each step and monitors progress
- The ProtoGENI Visualization System displays network activity and slice status in real time