

**GENI-VIOLIN:
In-Network Snapshotting for GENI
Experiments**
Experiences with GENI

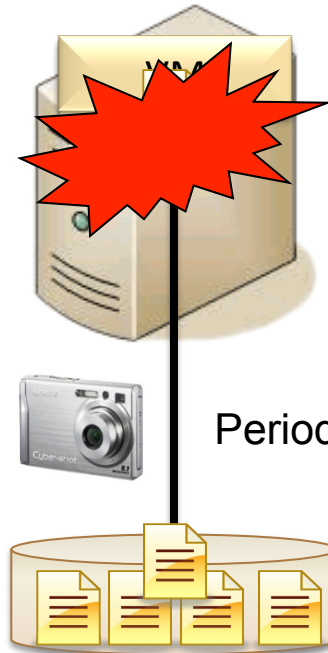
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What is Snapshotting?

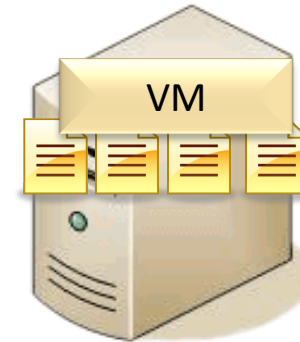
Data Center Node #1



Reliable Storage



Data Center Node #2

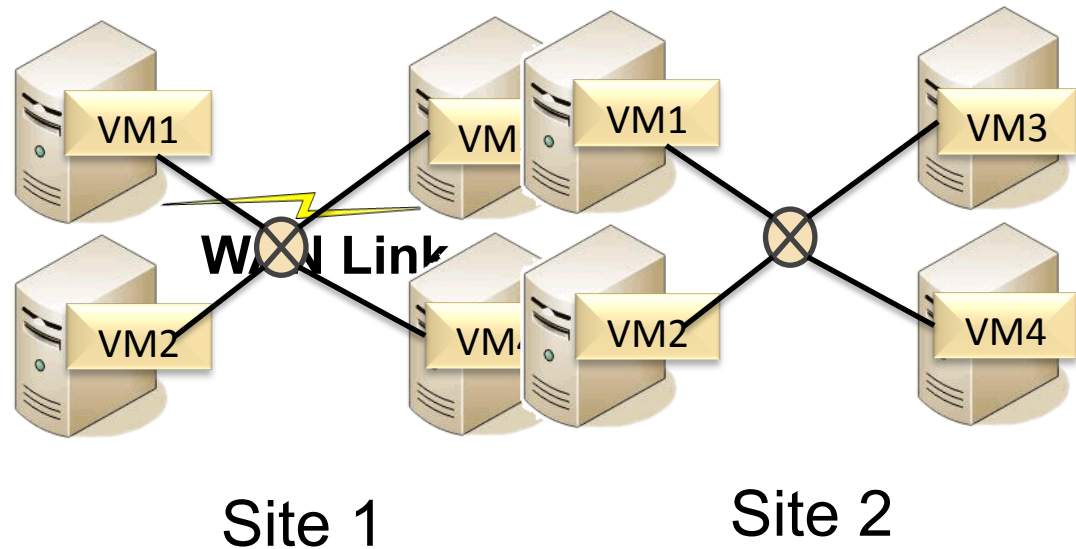


Snapshotting allows recovery from failures

What is GENI-VIOLIN?

Snapshotting one VM is easy

How can we snapshot multiple VMs talking to each other?



How can we snapshot slices spanning multiple sites?

GENI-VIOLIN

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Live Snapshotting of Distributed Slices

Plenary session demonstration

GENI Resources used

- Two Emulab/ProtoGENI sites
 - U. Utah (8 nodes)
 - GPO (6 nodes)
- Two Openflow switches
- Internet2 WAN link

What works?

- GENI has the “unique” infrastructure
 - Large-scale federated testbed
 - Wide-area network
 - Deep programmability of Openflow
- GENI has “awesome” people
 - testbed-ops, U.Utah
 - GPO-dev
 - Internet2 folks

GENI infrastructure is **ready!**

What needs improvement?

- Setting up a slice across multiple sites is manual
- The tools were not mature enough for experimenters to use
 - No single interface to create slices
 - No easy way of monitoring resources
 - Creating a slice with heterogeneous resources (ex. PlanetLab and ProtoGENI) is complex
- Requesting Openflow resources is complicated and manual
- APIs need better documentation

GENI needs **better tools**

Emulab gotchas

```
*** Giving up on pc446 (BOOTING) - it's been 7 minute(s).
Tail of pc446 console:
pc446: .Partition type: 83
pc446: .Filesystem type: ext2
pc446: .Filesystem label: /
pc446: .Filesystem UUID: ce0e003c-fdfa-4147-92d9-4146c7c5b850
pc446: .Kernel command line:
pc446: .
pc446: .OS installed on hd0,2 is Linux
pc446: .Booting Linux on (hd0,2)...
pc446: .No kernel specified. Falling back to chain boot...
pc446: .
*** WARNING: os_setup:
***   pc446 may be down. This has been reported to testbed-ops.
```

Need **better/faster** OS image creation/setup/
loading

My Suggestions

- GENI has to be usable by non-systems-researchers
- A single interface/GUI to control all GENI resources
- A single API to access both CPU and network resources
- GENI Openflow slicing needs to be standardized
- Tools for monitoring resources

One “unifying” toolset for **all** GENI resources