Washington International Exchange (WIX) as a Software Defined Exchange (SDX)

GEC 23

SDX Panel

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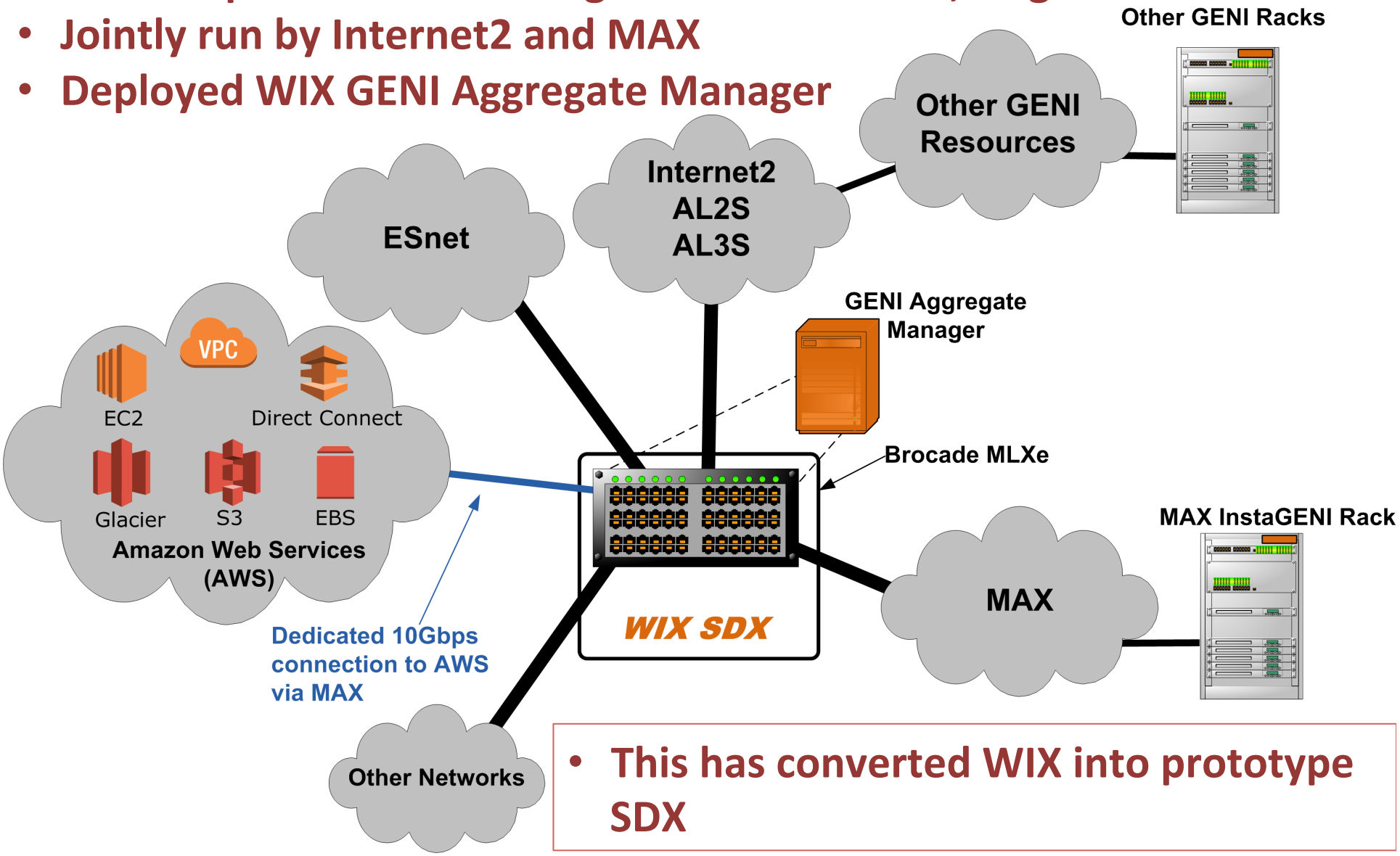
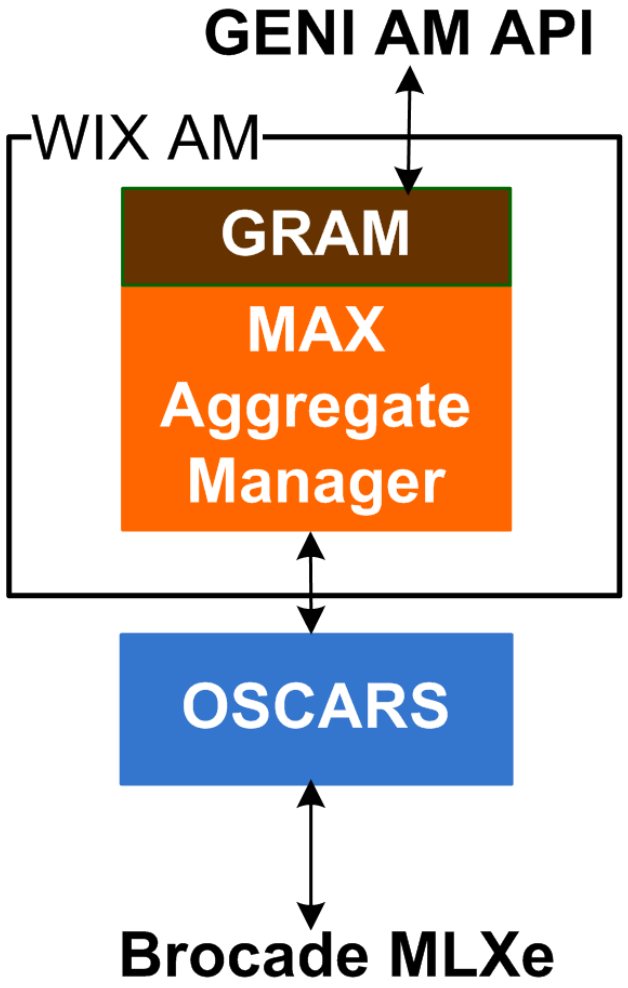
WIX

- WIX is a production Exchange Point in McLean, Virginia
- Jointly run by Internet2 and MAX
- Deployed WIX GENI Aggregate Manager



- This has converted WIX into prototype SDX

WIX GENI AM



- Recently replaced SFA with GRAM
- Adds AM APIv3 and Policy Features
- MAX AM interacts with OSCARS for southbound network control
- DOE OSCARS dynamic provisioning system deployed on multiple networks including ESnet, I2 AL2S, MAX, others

Why Do We Want WIX to be an SDX?

- Would like be able control Exchange Point resource utilization, in an automated fashion:
  - at the Federation (Clearinghouse) level, Virtual Organization (Project) Level, Slice Level, and User Level
  - also need to be able to adjust authorizations and access polices in near-real time
- Example use case: MAX AWS Direct Connect Access
  - MAX AWS Direct Connect is available by stitching to a specific WIX Interface/VLAN combination
  - Would like to make this available to GENI Users, but need to be able to control that access in flexible ways

SDX Functionality

Current SDX Functionality

- Establish resource quotas on a Clearinghouse, Slice, or User basis
- Resource types are total bandwidth, number of VLANs in use

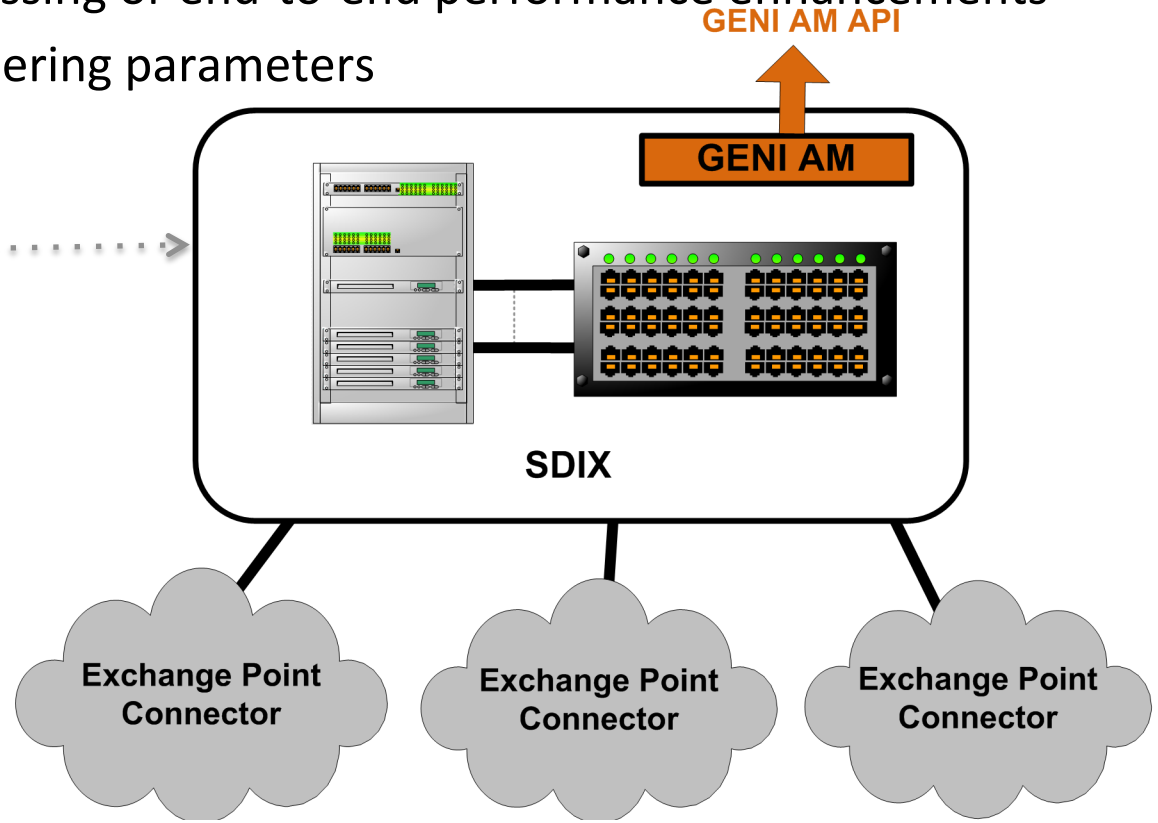
Future Capabilities Desired

- Additional parameters available for resource access
  - Interfaces, VLAN Ranges
  - at the Federation (Clearinghouse) level, Virtual Organization (Project) Level, Slice Level, and User Level
- Ability for real-time resource utilization adjustments based on user priority and preemption
- SDXs with compute and storage embedded

SDXs with Compute/Storage

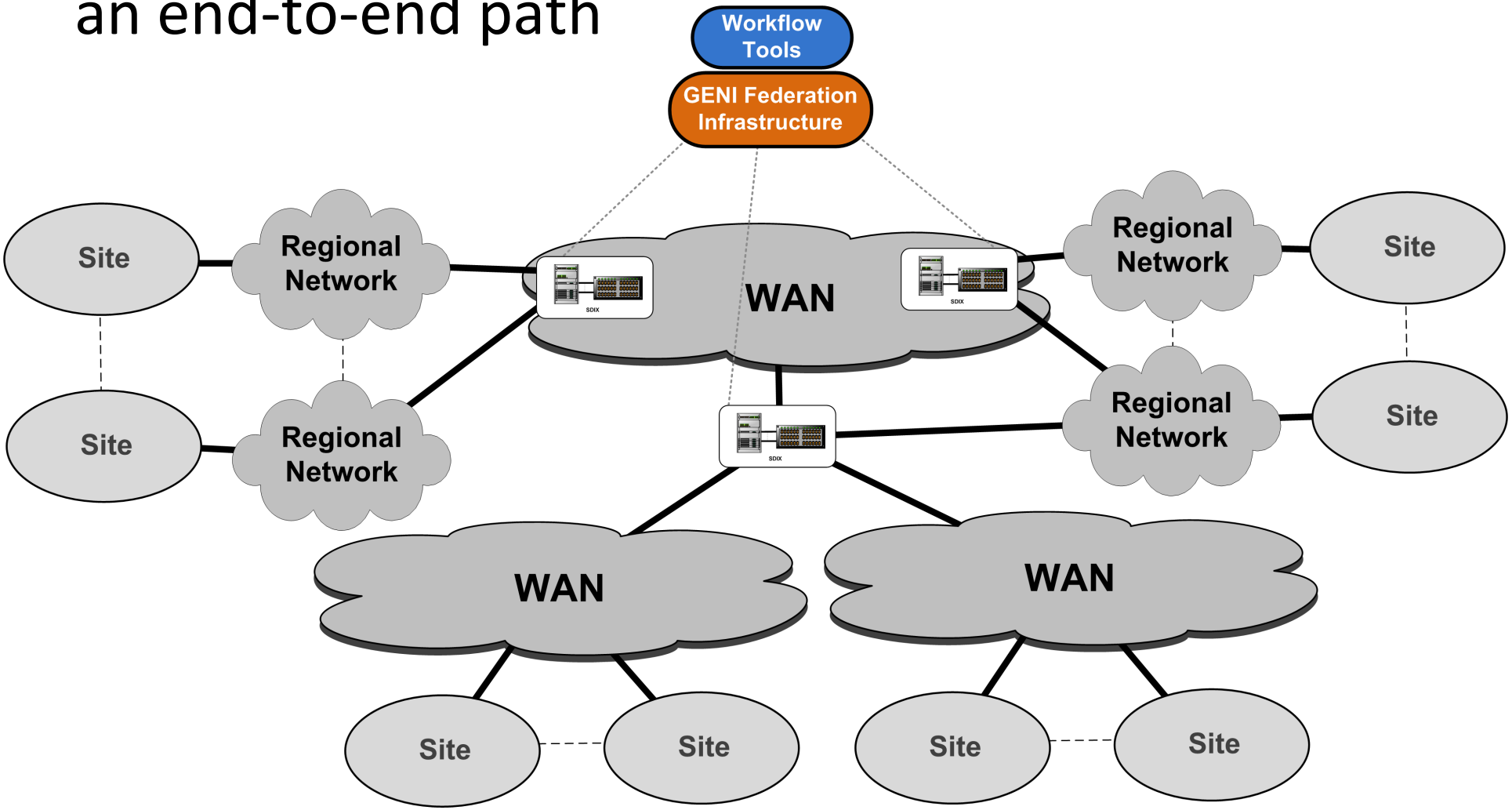
- Longer Term we imagine a distributed ecosystem of SDXs which can be orchestrated to add control end-to-end flows
- Enable options for new exchange point services using host/storage. Possible uses:
  - Hosting of services for common use by exchange point peers
  - Inline, per flow, data processing or end-to-end performance enhancements
  - Dynamic and adjustable peering parameters

SDX with host, compute, storage

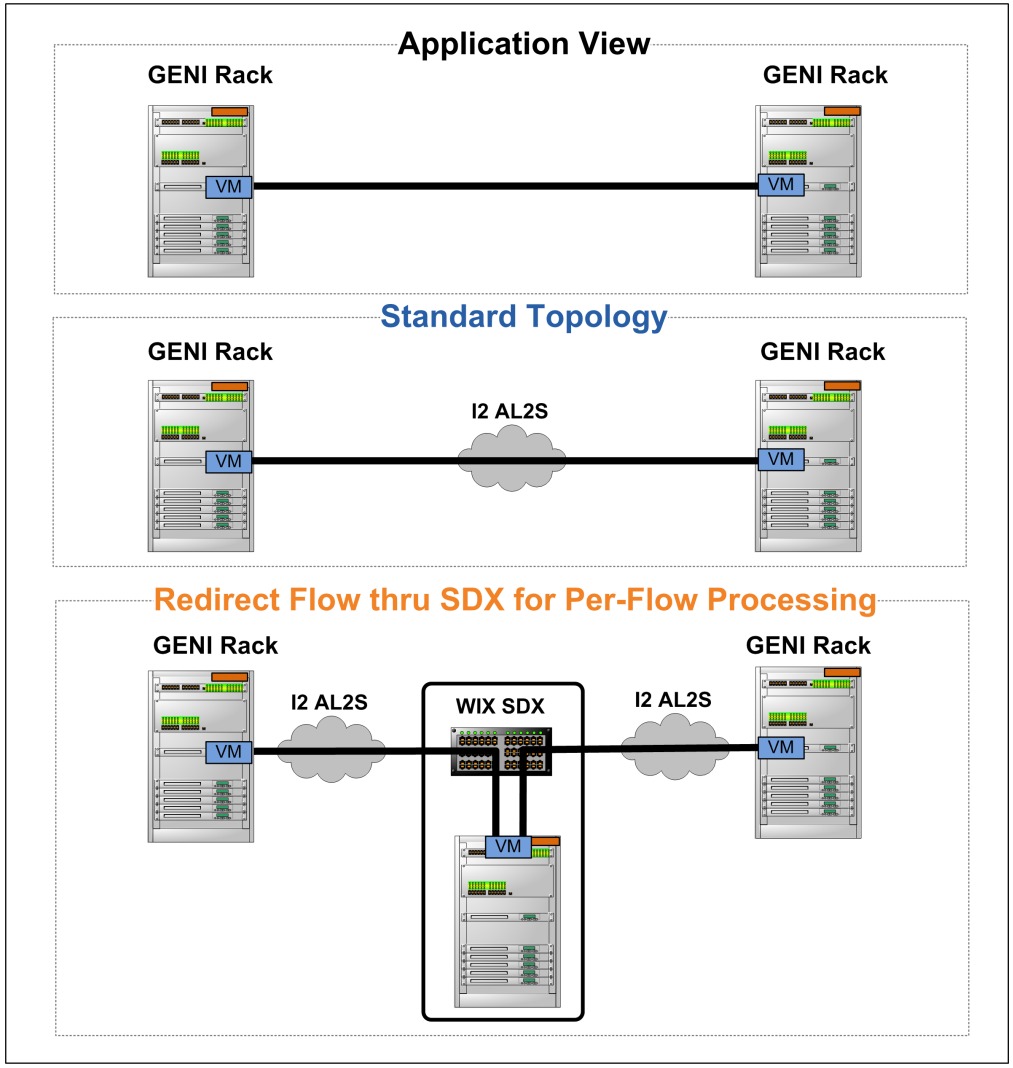


Ecosystem of Distributed SDXs

- Automated Policy Driven control of Exchange Points could be used to coordinate actions and flows along an end-to-end path



SDX Enabled Flow Based Services



- GENI mechanisms can be utilized to “redirect” flow thru an exchange point where “value added” processing can be accomplished
- With a distributed infrastructure of SDXs this can be done in much more dynamic and open manner then what is possible today.
- This type of capability can be used for single flow focus, or to build specialized service topologies

Summary Thoughts

- Viewing the SDXs as a distributed infrastructure which can be utilized on a per flow basis to engineer multi-domain “Software Defined Services” may be a more powerful vision than isolated SDX use cases
- Many different ideas about what SDX designs and functions should be
- SDX interoperability discussions should focus on “what we want to do” as opposed to “how” we make it happen
- That implies trying to get a consensus on functions and policy definitions

Thank-you