



ESnet

ENERGY SCIENCES NETWORK

Learning to trust is one of life's most difficult tasks.

- *Isaac Watts*

Inder Monga

SARnet presentation

@ Global Summit, April 2015

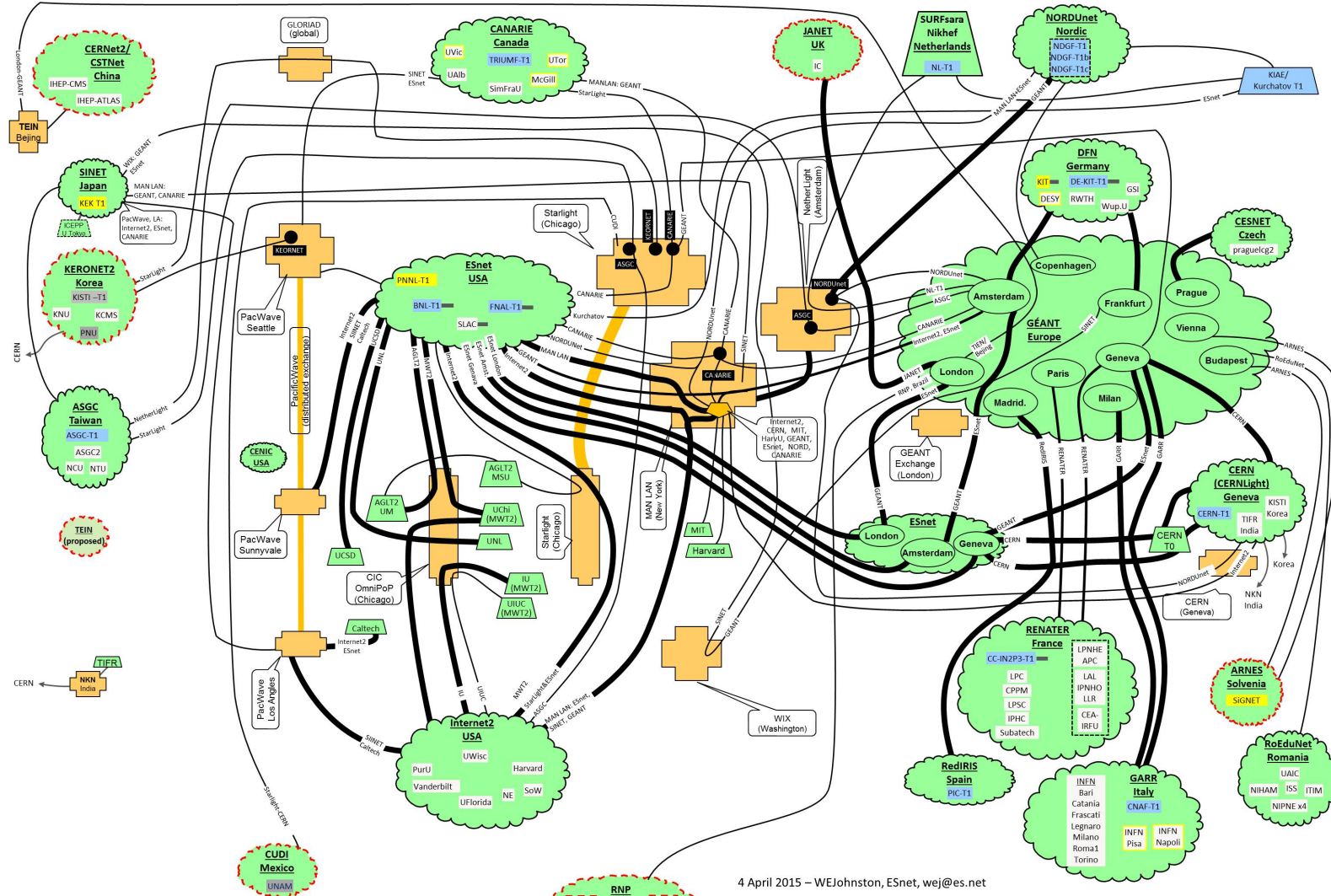


U.S. DEPARTMENT OF
ENERGY
Office of Science



Multi-domain is our DNA

LHCONE: A global infrastructure for the High Energy Physics (LHC and Belle II) data management



LHCONE network
 Drawn by Bill Johnston

4 April 2015 – WJJohnston, ESnet, wej@es.net

- LHCONE VRF domain/aggregator
- Network provider / exchange point router
- Cross-border router
- Regional R&E communication nexus w/ switch providing VLAN connections
- Distributed site
- Pending LHCONE connection
- Sites connected at 40G-100G
- Broadcast VLAN
- Uchi LHC Tier 1/2/3 ATLAS and CMS
- Belle II Tier 1/2
- PNL ALICE or LHCb
- Sites that are standalone VRFs,
- Sites that are standalone VRFs,
- Communication links: 1/10, 20/30/40, and 100G/s
- yellow outline indicates LHC/Belle II site



Also see <http://lhcone.net> for details.



We have been trusting...so far

With Network Services Interface (NSI)

a community-consensus protocol for reserving bandwidth
multi-domain



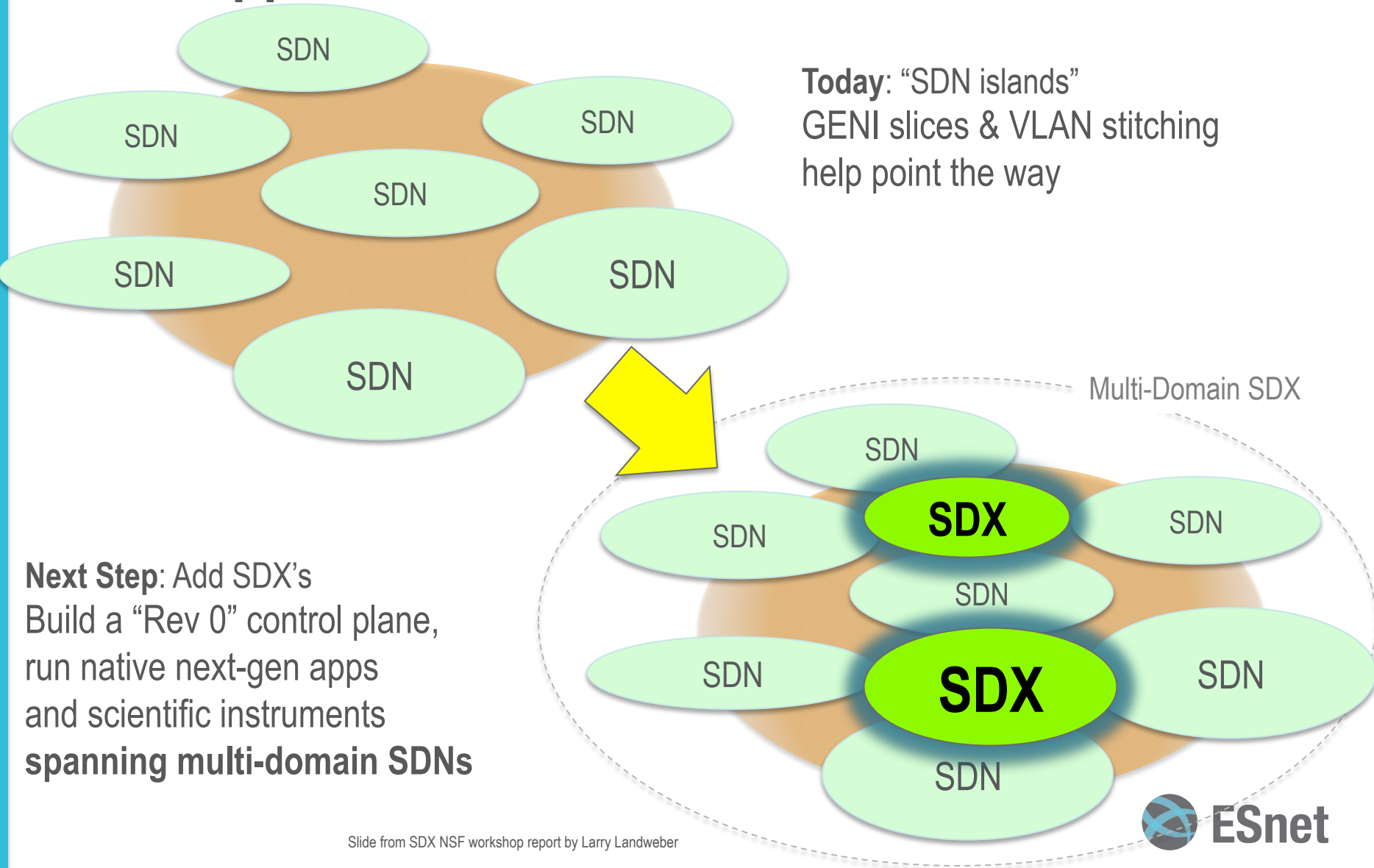
We can do multi-domain performance...



1300+ hosts running perfSONAR

New Opportunities: Multi-domain SDXs*

Today: “SDN islands”
GENI slices & VLAN stitching
help point the way



Next Step: Add SDX's
Build a “Rev 0” control plane,
run native next-gen apps
and scientific instruments
spanning multi-domain SDNs

SDX equivalent to a 'bazaar'



3 A's of the programmable network

- Automation
- Analytics
- Assurance