

## NSI & SDN

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## NSI v 2.0 Plugest



- Successful plugfest of NSI v2.0 yesterday
- 4 prototypes of NSI v2.0 shown interoperating
- Thanks to all who put in a big effort at short notice

From \ To	<b>OpenNSA</b>	OpenDRAC	AutoBAHN	OSCARS	GL/A	GL/K	DynamicKL
OpenNSA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
OpenDRAC	0.00%	0.00%	0.00%	0.00%	6.67%	6.67%	0.00%
AutoBAHN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
OSCARS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
G-lambda / AIST	0.00%	0.00%	73.33%	0.00%	93.33%	80.00%	0.00%
G-lambda / KDDILabs	0.00%	0.00%	33.33%	0.00%	93.33%	100.00%	0.00%
DynamicKL	0.00%	0.00%	<mark>0.00%</mark>	0.00%	0.00%	0.00%	0.00%

Look out for bigger and better demo at SC12!

#### **NSI & SDN workshop in OGF**



- Workshop on SDN held at OGF36
- 6 presentations:
  - Ping Pan (Infinera)
  - Jerry Sobieski (NORDUnet/NSI-WG)
  - Joan Garcia-Espin (I2CAT/GÉANT)
  - Takahiro Miyamoto (KDDI R&D Labs)
  - Jeroen van der Ham (UvA/NML-WG)
  - Chin Guok (Esnet/NSI-WG)
- Download slides at <u>www.ogf.org</u> OGF36 schedule

## Ping Pan, Infinera



- Ping Pan leads Infinera's SDN development and participates in ONF
- He sees need to extend OF to support transmission equipment & multi-domain challenge.
- Surprised to see how much OGF has been tackling the same issues as ONF is now facing – in particular topology, inter-domain challenge
- SDN architecture: Overlay of virtualized switches
- Infinera understands that the R&E community is driving SDN and would like to engage with community

## Jerry Sobieski, NSI



- Presented the NSI concepts and discussed compatibility with SDN
- NSI can provide some missing parts of SDN eg. Multi-domain
- Considered how NSI might be used to request flow spaces exchange of flow information over NSI?
- Extensions to NSI to support multi-point services?
- Presented architectural models for NSI/SDN... see later slides

## Joan A. Garcia-Espin, GEANT



- Joan presented on the GÉANT Network Factory
- 5 OpenFlow PoPs interconnected with a full mesh of L2VPNs
- Each PoP has: Open vSwitch and XEN hypervisor
- OpenFlow v1.0 -> VLAN-based slicing
- Controlled with OFELIA Control Framework (OCF)



## Takahiro Miyamoto, KDDI



- Presented use case: Use SDN to build virtual networks over multi-domain infrastructure
- Proposes to use NSI and SDN
- Use NSI to create network 'skeleton'
- Then use OpenFlow/SDN to control network behaviour – control flows over underlying NSI links
- Need is identified for NSI to support L2VPN service

## Jeroen van der Ham, NML



- Update on the current status of the NML working group
- Strong progress on NML in recent months
- NML is used for
  - measurements
  - provisioning
  - management
  - fault-detection
- Each of these are important pieces of the full service provision

## Chin Guok, ESnet



#### OpenFlow, observations on implications of:

- Separation of Control and Data Plane
- Direct Access to Forwarding Table

#### Applications in the WAN:

- Augmenting edge services
- Service virtualization

#### ScienceDMZ

• Fine grained mapping of science flows to guaranteed bandwidth circuits (NSI)

#### OpenFlow OS north-bound is yet to be determined

# OpenFlow: Solution looking for a problem?



- Multitude of potential uses:
  - Platform for innovation: Networking 'Apps'
  - Network virtualization
  - Forwarding to grades QoS based on applications
  - Programmable networks empowering users



A GLIF use-case to go to NSI-WG