NSI based multi-domain connection provisioning across OpenFlow domains

Alaitz Mendiola, Aitor Urtasun, Andere Leguina, Victor Fuentes, Eduardo Jacob, Jasone Astorga, University of the Basque Country
Michał Balcerkiewicz, Krzysztof Dombek, Artur Juszczyk, Łukasz Ogrodowczyk, Damian Parniewicz, Miłosz Przywecki, PSNC

Supercomputing 2014
JRA2T1

- JRA2T1 OpenFlow/SDN for Specialised Applications is a task in frames of the GÉANT project
- JRA2T1 focuses on number of SDN related issues:
  - Monitoring
  - Security
  - Cloud support
  - SDNapps
  - Multidomain SDN
- Multidomain SDN work focused on use of NSI to enable E2E circuit provisioning across multiple OpenFlow domains

| JRA1: Network Architectures for Horizon 2020 | SA1: Core Backbone Services |
| SA2: Testbeds as a Service | SA3: Network Service Delivery |
| SA4: Network Support Services | SA5: Application Services |
| JRA2: Technology Testing for Specific Service Applications | SA7: Support to Clouds |
| JRA3: Identity & Trust Technologies for GÉANT Services | |

SA6: Service Management & Operation

- NA1: Management
- NA2: Communications & Promotion
- NA3: Status & Trends
- NA4: International & Business Devpt

Partners
- AMRES, CESNET, DANTE, DFN/FAU, GRNET, GRNET/ICCS, NORDUnet, PSNC, RedIRIS/EHU, RedIRIS/i2cat, RENATER, SURFnet, SWITCH,
Multidomain – SDN Demo

Demonstrate...

NSI based connection establishment through multiple OpenFlow domains.

3 Domains

EHU OEF  
Spain

GTS
Geographically distributed across the Géant Testbed

PSNC  
Poland
Multidomain topology

e2e connection through three OpenFlow domains
The NSI module implements the standardized Network Service Interface v2 by OGF and was built by PSNC as a part of the GéantOpenCall NSI-CONTEST project. Additionally, it features topology exchange mechanism and exposes interfaces towards Network Resource Managers.

OpenFlow control with the DynPaC framework (ODL based), build by EHU as part of the Géant OpenCall DynPaC project,

- Setup E2E paths inside an OpenFlow domain
- Fast failover and resiliency mechanisms.
- Service scheduling
```python
import json
import httplib

request_config = {
    'endpoint': 'http://172.16.0.2:9090/nsicontest/ConnectionProvider',
    'provider_nsa': 'urn:ogf:network:psnc:2013:nsa',
    'reply_to': 'http://172.16.0.2:9090/nsicontest/ConnectionRequester',
    'requester_nsa': 'urn:ogf:network:psnc:2013:nsa',
    'reservation_id': 'grid1',
    'description': 'default reservation',
    'start_time': '60',
    'end_time': '2000',
    'version': '0',
    'service_type': 'http://services.ogf.org/nsi/2013/07/descriptions/EVTS.A-GOLE',
    'ero': '',
    'capacity': '100',
    'bidirectional': 'true',
    'symmetric_path': 'true',
}

conn = httplib.HTTPConnection('150.254.185.235:8989')
conn.request(method = 'POST',
    url = '/nsi/service',
    headers = {'Content-Type': 'application/json'},
    body = json.dumps(request_config)
)
Demo setup

Multidomain testbed

GÉANT’s booth at SC2014
Thank you!