GEC7 Intra-cluster-D demo

Participating projects

ORCA-BEN, ViSE and iGENI

Purpose

Demonstrate an intra-cluster, multi-site experiment involving heterogeneous resources, national network fabric, experiment tools. Demonstrate the use of NDL+ substrate description for purposes of path computation and stitching.

Overview

This demo will connect a ViSE or DOME experiment to the demo floor at GEC7 using a private dynamically established network consisting of a mix of dynamic and static VLAN segments from different providers (multi-layered BEN, NLR, NOX, campus networks). VLAN segment mapping between dynamic and static segments will be performed under ORCA control.

Figure 1: GEC7 Demo Connectivity

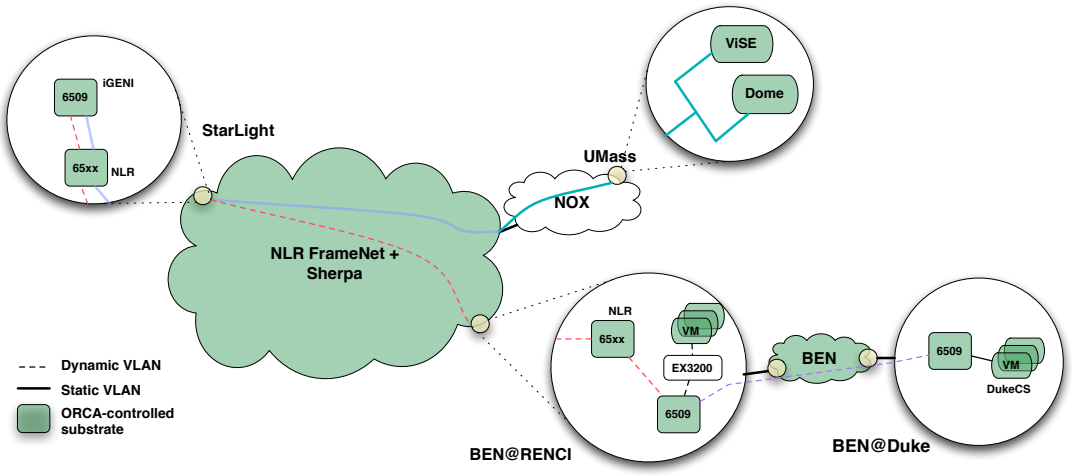

Figure 1 shows the connectivity diagram for the demo. Static and dynamic VLAN segments are distinguished pictorially. Segments using different VLAN tags are depicted using different colors.

During the demo we

a. dynamically provision the connections between RENCI and iGENI (across NLR using Sherpa) as well as across BEN
b. provision VMs at one or more of BEN sites
c. provision an experiment at ViSE
d. dynamically stitch all segments together in the proper order to provide an experiment 'slice' at Layer 2.

e. allow user access to demo portal via a statically provisioned switch at the demo floor on the private network that we created

The slice contains the following VLAN segments:

- Duke CS84 cluster to BEN@Duke 6509 (static pool of 10 vlans)
- BEN@Duke 6509 to BEN@RENCI 6509 (Dynamic, multi-layer)
- BEN@RENCI 6509 to iGENI 6509 via FrameNet (Dynamic, Sherpa)
- iGENI 6509 to BBNs FrameNet port (Static, VLAN 533)
- BBNs FrameNet port to BBN via NOX (Static)
- BBN to UMass existing VLAN via NOX (Static)

The three 6509s utilize VLAN translation capabilities to achieve the stitching of segments together under ORCA control.

Slice Dataplane details

1. VLAN global address space is 10.100.0.0/16; RENCI Euca site draws addresses from 10.100.1.0/24; Duke Euca site draws addresses from 10.100.2.0/24; ViSE + DOME is 10.100.3.0/24; Demo floor 10.100.4.0/24
2. UMass vlan 533 is statically routed to 6509@iGENI on port 1/37
3. NLR dynamic vlans come into 6509@iGENI on 1/25 from port 9/10 on NLR switch
4. Duke CS Euca will have a VLAN range of 11-20
5. BEN vlan range is 100-200

Controller GUI

ORCA presents its traditional provisioning portal with a Google Maps GUI that will process individual site NDLs to enable it to graphically show available substrate at different sites and selected the desired substrate configuration using point/click. The GUI produces a slice request in NDL form to be processed by the new controller.

ORCA Controller

The controller is based on the existing BEN controller with the following modifications:

a. Google Maps GUI instead of forms producing NDL-formatted slice request
b. Dynamic site NDL aggregation to nodes
c. Dynamic inter-domain path computation based on NDL
d. Dynamic stitching dependency computation based on inter-domain path

ORCA Actors

Actor	Host	Substrate	Notes
Site Authorities			
iGENI	geni-test.renci.org	iGENI 6509	Responsible for remapping static VLAN 533 from UMass onto dynamic Sherpa VLAN from RENCI. 6509 is reachable from icar-051.nwu.icair.org machine at

			192.168.201.38/24 Node agent runs on icair-051.nwu.icair.org
DukeEuca	orca.cod.cs.duke.edu	Duke CS84 Euca cluster VMs	Controls VM allocation. Management address range is 192.168.206.x/24, gateway is .1, start with .10
RenciEuca	euca-m.renci.ben	RENCI Euca cluster VMs	Controls VM allocation. Management address range is 192.168.201.x/24, gateway is .1
DukeNet	geni-test.renci.org	None	Allocates VLANs to Duke Euca from allowed range (11-20)
BEN	geni-test.renci.org	BEN	Configures all BEN NEs. Triggers EX3200 at Duke on demo floor.
NLR	geni-test.renci.org	NLR Sherpa	Configures Sherpa VLANs dynamically
ViSE	geni.cs.umass.edu.	ViSE testbed	Allocates ViSE testbed. Vise: 10.100.3.10; Dome 10.100.3.11
Brokers			
VM/VLAN broker	geni-test.renci.org		VLAN tags and various vms (duke Eucalyptus, RENCI Eucalyptus, Vise testbed type)
SM			
GEC7 SM	geni-ben.renci.org		NDL-OWL inter-domain controller with Google Maps GUI

Miscellaneous diagrams

Figure 2: setup at StarLight

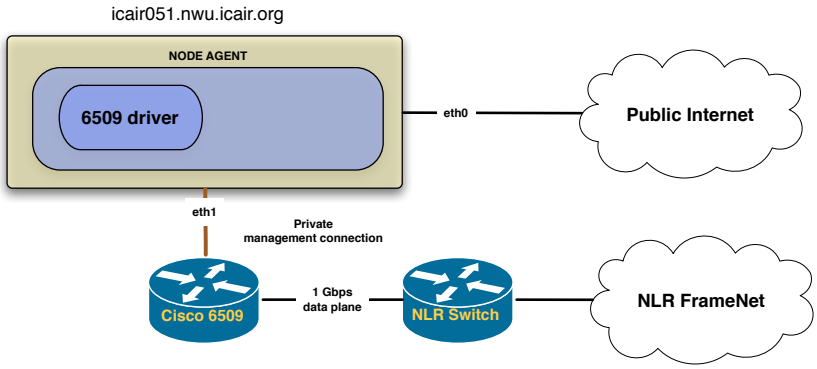

Figure 3: Euca CS84 setup

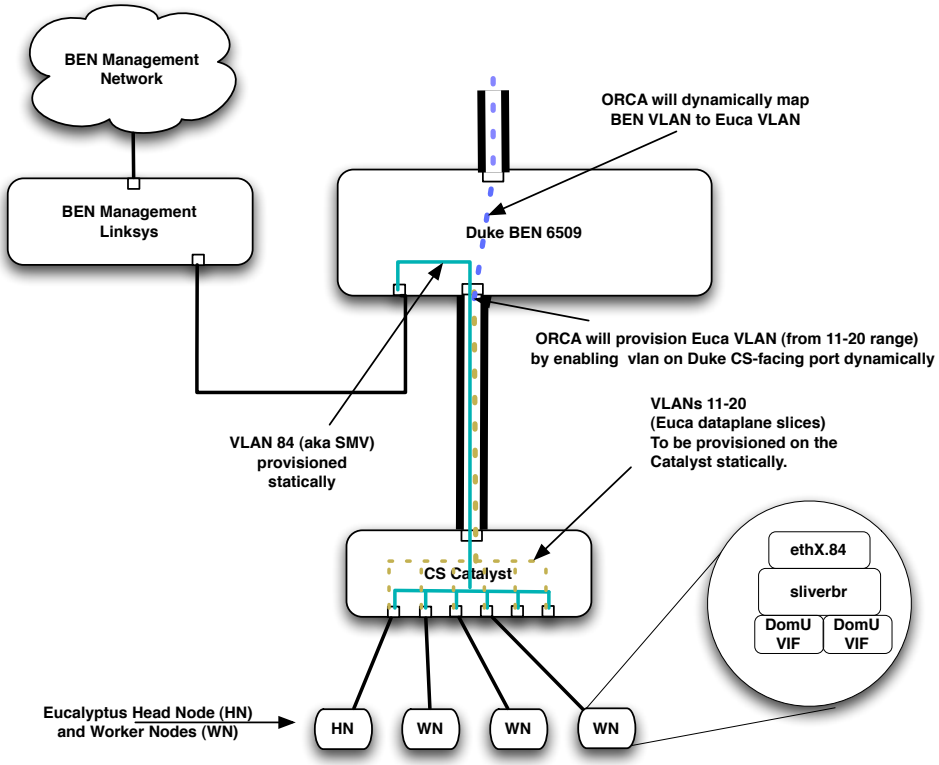

Figure 4: Euca at RENCI setup