

LHC Multi-Resource, Multi-Domain Orchestration via AutoGOLE and SENSE

Gerben van Malenstein, SURF, gerben.vanmalenstein@surfnet.nl

Abstract

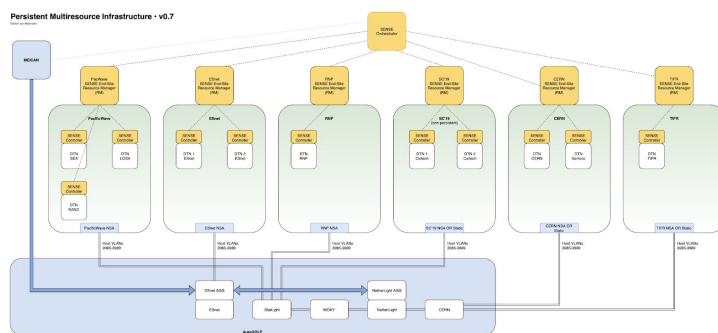
Since a couple of years network provisioning is standardized through the Network Service Interface¹ (NSI) within the Open Grid Forum (OGF). The AutoGOLE is a worldwide community of networks that actively supports NSI. Beyond the horizon of network standardisation, we envision multi-domain and multi-resource provisioning. For example; scheduling CPU cycles, storage or campus networks. At this stage we are using Data Transfer Nodes (DTNs), dedicated high-throughput servers, for an implementation of what multi-resource provisioning can be. In this demonstration we will show how the AutoGOLE facilitates multi-resource and multi-domain provisioning. The Software-defined network for End-to-end Networked Science at Exascale (SENSE) project has developed mechanisms for multi-resource service provisioning. This includes a model-based resource description system which is an extension on top of NSI: the Network Markup Language (NML). NML covers resource types beyond network elements such as DTNs. This common resource description language provides a strong starting point for the integration of AutoGOLE and SENSE provisioned services.

Goals

1. Prove the interaction in terms of provisioning between multi-domain networks and multi-resource components
2. Collaborate on a global scale using open standards
3. Driving innovation toward multi-resource provisioning for the advancement of science
4. Establish an initial persistent environment for the development of multi-resource and multi-domain service provisioning

Resources

This demonstration uses dynamic provisioning capabilities of the following networks and exchanges: CERN, NetherLight, ESnet, RNP, TIFR, MOXY, StarLight, PacificWave, Caltech and the SCinet 2019 network. Besides, DTN systems will be used at CERN, StarLight, RNP, ESnet, TIFR and on the SC'19 show floor. The DTN systems and network resources are integrally controlled by SENSE Resource Managers (SENSE-RMs) and a SENSE Orchestrator.



Involved Parties

- Gerben van Malenstein, SURF, [gerben.vanmalenstein@surfnet.nl]
- Tom Lehman, Virnao, [tom.w.lehman@gmail.com]
- Harvey Newman, Caltech, [newman@hep.caltech.edu]
- Justas Balcas, Caltech, [jbalcas@caltech.edu]
- Chin Guok, ESnet, chin@es.net
- John MacAuley, ESnet, [macauley@es.net]
- Alex Sim, LBL, [asim@lbl.gov]
- Xi Yang, UMD, [maxyang@umd.edu]
- Marcos Felipe Schwarz, RNP, [marcos.schwarz@rnp.br]
- Joe Mambretti, iCAIR Northwestern University, [j-mambretti@northwestern.edu]
- John Hess, CENIC/PacificWave, [jhess@cenic.org]
- Wenji Wu, Fermilab, [wenji@fnal.gov]
- Brij Kishor Jashal, TIFR,Mumbai [brij@cern.ch]

¹ NSI: <https://www.ogf.org/documents/GFD.212.pdf>