

Network Automation - Different Paths, Similar Results

Internet2, ESnet

Karl Newell - Internet2

Marc Körner - ESnet

TNC 2024

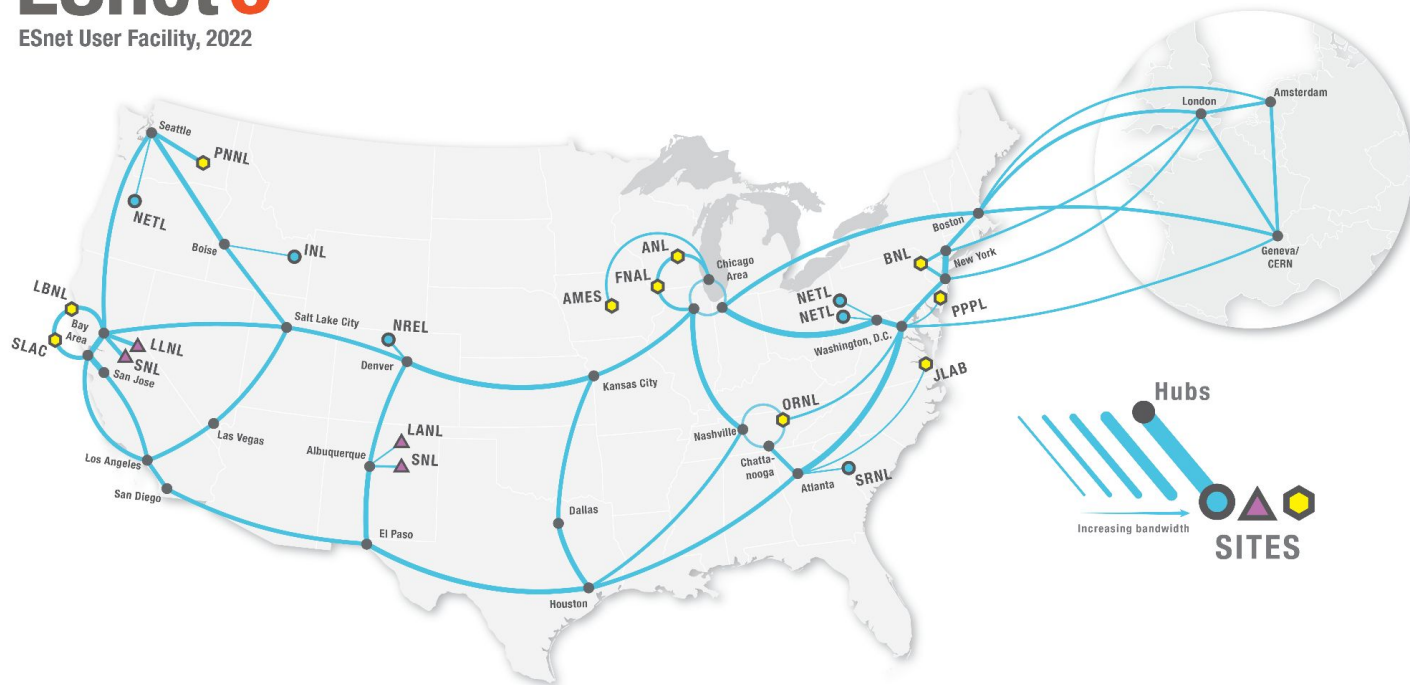
Rennes, France

June 2024



ESnet6

ESnet User Facility, 2022



Office of Science National Laboratories

AMES Ames Laboratory (Ames, IA)
ANL Argonne National Laboratory (Argonne, IL)
BNL Brookhaven National Laboratory (Upton, NY)
FNAL Fermi National Accelerator Laboratory (Batavia, IL)
JLAB Thomas Jefferson National Accelerator Facility (Newport News, VA)

LBL Lawrence Berkeley National Laboratory (Berkeley, CA)
ORNL Oak Ridge National Laboratory (Oak Ridge, TN)
PNNL Pacific Northwest National Laboratory (Richland, WA)
PPPL Princeton Plasma Physics Laboratory (Princeton, NJ)
SLAC SLAC National Accelerator Laboratory (Menlo Park, CA)



NNSA Laboratories

LANL Los Alamos National Laboratory (Los Alamos, NM)
LLNL Lawrence Livermore National Laboratory (Livermore, CA)
SNL Sandia National Laboratory (Albuquerque, NM; Livermore, CA)



Other DOE Laboratories

INL Idaho National Laboratory (Idaho Falls, ID)
NETL National Energy Technology Laboratory (Morgantown, WV; Pittsburgh, PA; Albany, OR)
NREL National Renewable Energy Laboratory (Golden, CO)
SRNL Savannah River National Laboratory (Aiken, SC)

ESnet in numbers:

Thousands of miles of fiber cables, including transatlantic cables

380 locations with racks and equipment to track

346 Core links between routers

300 Customer facing Interfaces, 123 of which are 100G

Multi Platform environment with lots of interoperability needs



ESnet
ENERGY SCIENCES NETWORK



U.S. DEPARTMENT OF
ENERGY

Office of
Science



ESnet
ENERGY SCIENCES NETWORK

ESnet

Circuits

ESnet Circuit ID	Endpoint A/Z	Orchestrator ID	Provider / ID
ESNET-1-00027	In-service	tomorrow-mpt-ga-0040	DOE-NNISA-FORR-Site.com
ESNET-200330	In-service	ATLA-Ciena-Shaft2-ETH10G-2-7-1	Internet2 ESNET-ATLA-ATLM-10GE-02437
ESNET-200349	In-service	ATLA-Ciena-Shaft2-ETH10G-2-7-4	Internet2 ESNET-ATLA-ATLM-10GE-02440
ESNET-200355	In-service	ATLA-Ciena-Shaft2-ETH10G-2-7-3	Internet2 ESNET-ATLA-ATLM-10GE-02439

Orchestrator

Engine is Running

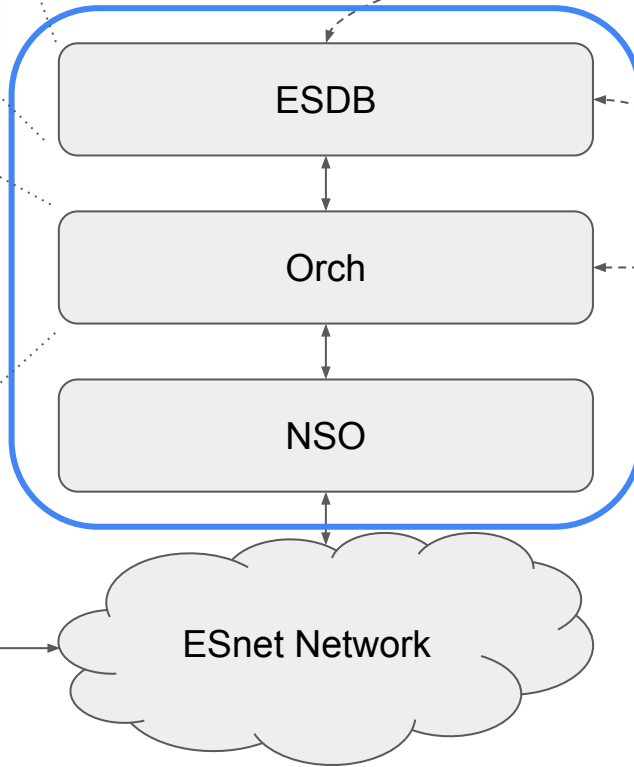
Active Processes

Assignee	Status	Workflow	Target	Alert	Subscription(s)	Started	Modified
SYSTEM	Failed	create_prefix_set	CREATE	ESNET	AS3443 - ESNET - Energy Sciences Network - ip	10-7-2023	24-9-2023
SYSTEM	Failed	create_prefix_set	CREATE	ESNET	AS45152 - ESNET - Energy Sciences Network - ip	2-6-2023	9-6-2023
SYSTEM	Failed	create_service	CREATE	ESNET	L3-transit for 65512 - base - [Red]Sp-core-esnet-10-485	8-5-2023	2-6-2023

Completed Processes

Workflow	Target	Customer	Product(s)	Tag(s)	Subscription(s)	Modified
create_physical_connection	CREATE	FABRIC-FABRIC Testbed	Physical Connection	PCS	FABRIC.com-alc-star-mpt-ga-01042-10	12-18 CET
provision_node_enrollment_ip	MODIFY	ESNET-Energy Sciences Network	Enrol Transponder	NESTPDR	Node esp43-1p45 Provisioned	08-43 CET
provision_node_enrollment_ip	MODIFY	ESNET-Energy Sciences Network	Enrol Transponder	NESTPDR	Node east-1p4-4 Provisioned	08-35 CET
modify_hostzone_ip_member_state	MODIFY	ESNET-Energy Sciences Network	ECMP Group	BEL	go-crk to star-crk	6-9-2023

Stardust



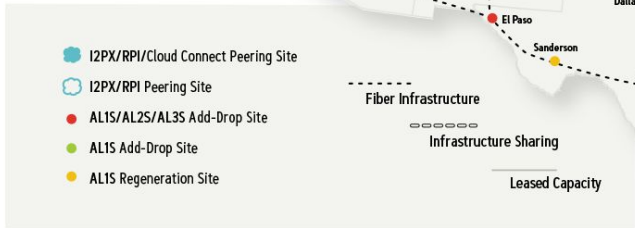
Joe the Planner



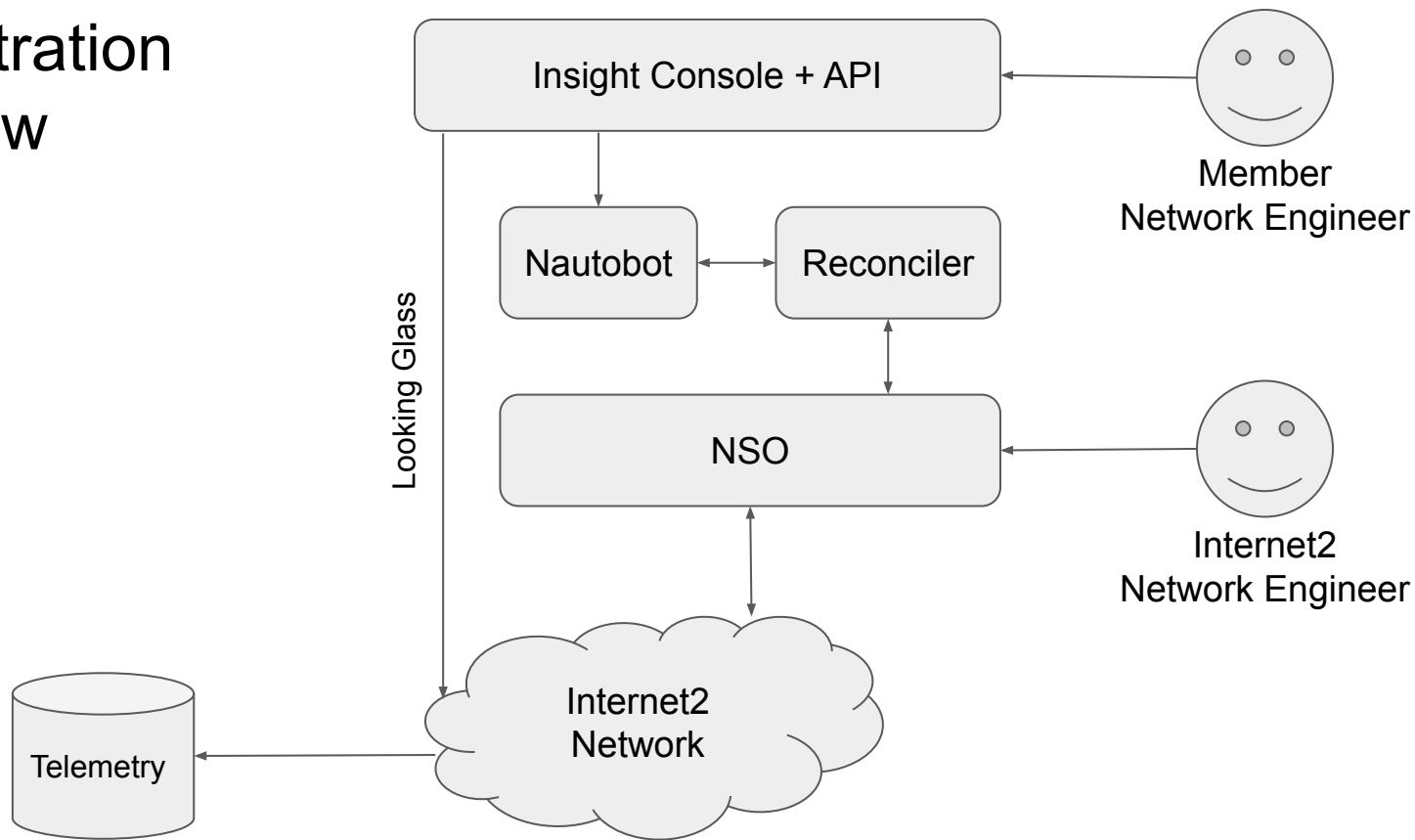
Eric the Engineer



March 2022



Orchestration Workflow



Discussion & Questions...

