SENSE
(Orchestration, Visualization, Workflow Services)

TNC21 BoF “Orchestration, Automation and Virtualisation: Focusing on the user”

Tom Lehman (ESnet)
June 25, 2021

SENSE Team

Advanced Scientific Computing Research (ASCR)
SENSE - Filling in the Gaps

SENSE operates between the automation layer controlling the individual networks/end-site resources, and science workflow agents/middleware.

- Science Workflow
- Specific Topology and Services
Workflows can "coordinate" with End-to-End Networked Cyberinfrastructure

- Intent Based APIs
- Resource Discovery
- Service Life Cycle Monitoring/Troubleshooting
- Deterministic Networking

Types of Interactions
- What is possible?
- What is recommended?
- Requests with negotiation
- Scheduling

- SDN Layer
- Regional
- WAN
- SDX
- Regional

- End Site
- SDMZ
- Instruments
- Storage
- Compute
- DTNs

- SDMZ
- Instruments
- Storage
- Compute
- DTNs
SENSE Architecture

Intent Based APIs with Resource Discovery, Negotiation, Service Lifecycle Monitoring/Troubleshooting

Real-time system based on Resource Manager developed infrastructure and service models

Application Workflow Agent

Model Driven SDN Control with Orchestration

Datafication of cyberinfrastructure to enable intelligent services

SENSE End-to-End Model

SENSE Architecture

SENSE Resource Manager
SENSE Enabled DTNs

• SENSE DTNs can be deployed next to production DTNs
• No impact to standard DTN operations
• Just adds a “priority flow” feature

• Scheduled and guaranteed resources, network and end system
• Can be included as part of application workflow planning
Superfacility Automation Ideas/Options

Application Workflow

Requests, Credentials

Confirmation, Status

Resource Orchestrator

Requests, Credentials

Instantiation of a Superfacility

SENSE is part of ESnet's collaboration with NERSC as part of their Superfacility project
Thanks