Asynchronous Network Management System (ANMS)

Sarah Helble  
Senior Computer Scientist  
Johns Hopkins University Applied Physics Laboratory  
Sarah.Helble@jhuapl.edu
Asynchronous Network Management System (ANMS)

Tool for the monitoring and control of network nodes comprising a space-terrestrial internetwork.

- Enable missions operating over challenged networks, such as Delay/Disruption-Tolerant Networks.
- Enable organizations developing AMP implementations.
  - Will track with changes made to this approach through standardization.

Reduce the risk and learning curve for the testing and operational deployment of DTNs
System Objectives

1. Monitor/Control network nodes comprising space-terrestrial internetworks.
   • Support emerging NM approaches for challenged networks.

2. Interoperate with existing network management tools.
   • Convergence at the challenged/unchallenged network boundary.

   • Local autonomy
   • Common supporting protocols (BP, BPSeq, SABR, LTP)
   • Initial focus on ION; ION ships with a reference NM agent.

Provide a scalable capability to manage nodes over a challenged (DTN) network.
Layer 3 Decomposition
Environmental / Physical View

Modular, pluggable architecture to enable deployment in varying configurations
Current Activity: Spiral 1 Implementation Planning: Motivating Use Case

• Project decomposed into 5 spirals
  • Active development over next 2 years
  • Periodic capability drops
  • Spirals released open source

• Spiral 1 Driving Use Case
  • Configure AMA Agent local autonomy for report generation
  • Receive reports from multiple AMA Agents and provide them to visualization

• Implementation Details
  • Using ION AMA Agents (Release 4.1.0 from https://sourceforge.net/projects/ion-dtn/)
  • Containerize components for easy deployment/integration

• Expected Schedule
  • Release in early 2022
  • Looking for community feedback at that time
Spiral 1 Planning: Logical View of Components/Functionality

Legend
- **Yellow**: Logical Module partially developed in Phase 1
- **Light blue**: Logical Module not developed in Phase 1
- **Green**: ANMS Structural Component
- **Gray**: External to ANMS

User Interface
- Command Line
- Default Applications:
  - Agent Console
  - Visualizer
  - Administrative console
- User Generated Interface

Communicators
- Agents

Network Access
- Transmission
- Receipt
- Monitoring
- Packaging
- Persistence

Application Access
- Monitoring
- Proxy
- Context
- Gateway

Central Processing
- Autonomy
- Monitoring
- Notification
- Orchestration

Agent Clearinghouse
- Aggregation
- Inference
- Monitoring
- Addressing

Data Access
- Storage
- Maintenance
- Archival
- Retrieval
- Conditioning