Asynchronous Management Architecture (AMA)
...Next Steps to Standardization
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DTN Management Architecture (DTNMA)
Asynchronous Management Architecture (AMA) renamed to DTN Management Architecture (DTNMA)


- But...motivation, design principles, and architecture remain the same

- A network management solution designed strictly for management of “Challenged Networks” as defined in RFC7228 (https://datatracker.ietf.org/doc/rfc7228/)
Challenged Network Management

Services Needed

- Configuration
- Reporting
- Autonomous parameterized procedure calls
- Authorized Administration, Accounting, and Error Control

Desirable Properties

- Asynchronous, Dynamic, and Highly Logical Architecture
- Model-derived and Hierarchically Organized Definition of Information
- Intelligent push of information
- Minimized message size Not Node Processing
- Absolute data identification
- Custom data definition
- Autonomous operation
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Updates and Additions
Updates and Additions: Services Needed

- Authorized Administration, Accounting, and Error Control:
  - Requirement to provide authorization and restriction of controls and reporting between agents and managers
  - Automated error handling to:
    - Protect faulty execution and interpretation of network management commands and messages
    - Avoid circular references or nesting in complex statements
    - Ensure consistency with data model and apply any defined constraints on objects
Updates and Additions: Desirable Properties

- Asynchronous, Dynamic, and Highly Logical Architecture
  - Agnostic of physical topology, transport protocols, security solutions, and supporting infrastructure
  - No prescribed association between manager and agent
  - No limitation to the number of managers that can control an agent
Updates and Additions: Desirable Properties

- Model-derived and Hierarchically Organized Definition of Information
  - Architecture based on a shared model serving as a contract between agent and manager
  - Concise representation of information through hierarchical organization
  - Enables automated error handling
Agent and Manager Roles and Responsibilities

Agent Responsibilities
- Manager Mapping
- Application Support
- Local Data Collection
- Autonomous Control
- Autonomous Reporting
- Custom Data Definition
- Consolidate Messages
- Error Checking and State Control
- Authorized Administration and Accounting

Manager Responsibilities
- Agent Capabilities Mapping
- Agent Messaging
- Data Collection
- Custom Data Definition
- Data Fusion
- Error Checking and State Control
- Authorized Administration and Accounting

Minor updates for additional clarity
Challenged, DTN Management

- Just because a synchronous links cannot be formed, does NOT mean the messages are lost

- A collection of reports from Agent B delivered to manager at step (4) when link returns
Consolidated Messages Management

- Agents should attempt where possible to combine messages to limit network utilization

- Report for EDD1 and EDD2 combined and delivered together in step (4)
Multiplexed Management

- Clarifying combined manager and agent roles on single actor
- Agents receive controls
- Managers receive reports

Figure 6
Questions to WG

- What is needed to finish this informative DTN Network Management Architecture
- Does it need any accompanying documents (ADM, ARI, etc.)
AMM Resource Identifier (ARI)
Asynchronous Management Model (AMM) Resource Identifier (ARI)

- The Asynchronous Management Model (AMM)
  - Data types and structures needed to manage applications in DTNMA
  - Defined in the DTNMA Application Data Model (https://datatracker.ietf.org/doc/draft-birrane-dtn-adm/)

- AMM Resource Identifier (ARI), v00: https://datatracker.ietf.org/doc/draft-birrane-dtn-ari/
  - Defines structure, format, and features of naming scheme of AMM objects
  - Defines new URI scheme “ari”

- Version 00 posted now, new rev coming soon...
Scheme Utility

- Need for an efficient syntax for encoding and decoding the external DTNMA schema (AMMs, ADMs)

- Support for the following
  - Parameterization
  - Compressibility
  - Patterning

Moderation and hierarchy to come later, the ARI doc only defines the URI syntax
ARI Components

- Namespace → Issuer/path
- Objects
- Parameters
- Tags

URI = scheme:/namespace/path/ammObjectType.objectName(([object_param1],[object_param2], [])#tag

Namespace types:
- Moderated/Informal: ari:/namespace/path/
- Anonymous: ari:path/

scheme | path | Object-type | Object-name | Object-parameters | Issuer-tag
Existing Examples of ARIs

Note:

The structure and syntax defined today is being reworked to better align with implementation and benefit from CBOR encoding diagnostic notation.
Questions

- Does the ARI deserve its own document?
- Is the IETF DTN WG ready to adopt this within its new charter?
- What features and requirements are desired for ARIs?
Thank you