TVR (Time-Variant Routing) Requirements

draft-kcs-tvr-requirements-00

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Intention of the Internet-Draft

• This document introduces requirements for TVR computations to improve network communication and resource efficiency
  • From the TVR Charter “This document should include TVR definitions, requirements, notes, rationales, and examples.”
• Our intention is the requirements are derived from the Use Case I-D and provide input into the TVR Information Model and Data Model, Internet-Drafts.
• An initial draft submitted shortly before IETF 117, review and comments are warmly welcome
  • https://datatracker.ietf.org/doc/html/draft-kcs-tvr-requirements-00
Overview of Time-Variant Networks

- Time-Variant Routing (TVR) refers to calculating a path or subpath through a network where the time of message transmission (or receipt) is part of the overall route computation
  - TVR-based network topologies may be either
    - Systems with intrinsic topological changes
    - Systems with occasional topological changes
  - Topology based on nodes with limited resources or connectivity, this could be based on design or environment
  - Identification of links and when they are available at specific times to help nodes preserve resources
  - Costs of a link may change over time and be dependent on financial or environmental costs
  - Mobility may be the root cause of link/adjacency connectivity, but cause is not significant to the representation or processing of the topology
- Overall, loss of links are expected and may be scheduled
Scope for the Requirements I-D

- A need to develop a data mode that defines time-variant information, derived from working group Use Cases (datatracker.ietf.org/doc/draft-ietf-tvr-use-cases)
  - Model types
  - States
  - Scheduling
- Provide a succinct description of TVR networking, including agreement and definitions for key TVR terms
  - Temporality
  - Time-Variability
  - Time Horizon
  - Time Precision
  - Periodicity
  - Continuity
  - Interpolation
- Define topology model components, reusing existing IETF data models where possible, and extended for TVR
  - Nodes & Links
  - Routing, Metrics & Constraints
Illustrative Examples

• Currently the draft uses the FAA/EUROCONTROL AIXM Temporality Model as an example of a highly complex and expressive model.

• There are various models from the DTN domain which are less complex but less expressive, can we choose one as an exemplar?

• Are there other TVR-like models to use as examples or references?
What is not in scope for Requirements I-D?

• Requirements for applying schedules to specific existing routing protocols or management models
  • Each specific protocol or model must tailor what and how schedules are applied to its data

• How TVR should be implemented, including
  • Collection methods of time variant information
  • Distribution techniques for link/adjacency schedules
    • Including routing algorithms, procedures and solutions
  • Execution procedures for link/adjacency schedules
Conclusion

• An initial draft submitted shortly before IETF 117, review and comments are warmly welcome
  • draft-kcs-tvr-requirements-00
• We are using GitHub to track open issues and current work in progress revisions
  • https://github.com/danielkinguk/tvr-requirements
• Is this I-D suitable for Working Group adoption?
• Any questions?