

TVR (Time-Variant Routing) Requirements

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Intention of this 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”
- Contribution is the requirements are derived from the Use Case I-D and other contributions to provide input into the TVR Information Model and Data Model, Internet-Drafts.

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TVR (Time-Variant Routing) Requirements

Abstract

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. This means that, all things being equal, a TVR computation might produce different results depending on the time that the computation is performed without other detectable changes to the network topology or other cost functions associated with the route

This document introduces requirements where TVR computations could improve message exchange in a network.

Expectation 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
- Fundamentally, loss of links or nodes is expected

Progress from 03 to 04

- Constraint Factors:
 - **Predicted Traffic Demand:** Network usage patterns fluctuate throughout the day, with peak times typically occurring during business hours and in the evening.
 - **Energy Efficiency:** The energy consumption of network equipment can be optimized based on the current and planned load
 - **Weather Conditions:** Weather can impact network performance, especially for wireless and satellite communications.
 - **Network Maintenance and Upgrades:** Scheduled maintenance or unexpected faults can introduce temporary constraints. By planning maintenance activities during off-peak hours and having real-time monitoring systems to quickly detect and address faults, network downtime can be minimized.
- Security Requirements:
 - **Denial-of-Service (DoS) Attack**
 - **Traffic Analysis and Path Prediction**
 - **Activity Identification and Privacy**
 - **Spoofing and Manipulation of Time Information**
 - **Replay Attacks on Time-Sensitive Data**
 - **Compromised Time Sources**

Mission Accomplished?

- Document is stable
- No open issues in GitHub
 - <https://github.com/danielkinguk/tvr-requirements/issues>
- Have we met the objectives?
 - Yes, but...
 - Charter states:
 - *This document should include definitions, requirements, notes, rationales, and **examples***

Next Steps

- Request WG Last Call
 - Seek final reviews, questions and clarifications
 - Complete document