IPv6 Network Monitoring Deployment Analysis

<draft-cao-v6ops-ipv6-monitoring-deployment-00>

<draft-pang-v6ops-usecases-IPv6-monitoring-00>

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IETF-121

IPv6 Deployment

- **The Genesis of IPv6**
  - The inception of IPv6 in the 1990s by IETF and its standardization in 2017.
- **A Global Perspective**
  - In 2023, statistics showing over 30% global coverage;
  - Leading countries are nearing 70% IPv6 coverage;
  - IPv6 mobile traffic has suppressed IPv4.
- **Drivers**
  - **Technological Advances:** Address expansion, header simplification, security features.
  - **Cost Reductions:** Rational address allocation, routing efficiency.
  - **Demand Incentives:** Network security, industry demand.
  - **Policy Facilitation:** Governmental actions and international standards.

IPv6 Support Status Monitoring Problem Statement

- **Limitations of Monitoring Coverage**
  - limited to regional or specialized networks.
  - Core nodes are prioritized, while edge nodes are neglected.
    - E.g., home terminals and router, the "last kilometer".
- **Insufficient Monitoring Depth**
  - There is a shortfall in the depth of IPv6 support status monitoring.
    - E.g., the IPv6 transformation in some private network applications is not thorough enough.
- **Limitations in the Perspective of Monitoring**
  - Monitoring methods are predominantly security-focused.
  - There is a need to consider a broader spectrum of network operation perspectives.

IPv6 Support Status Monitoring Problem Statement

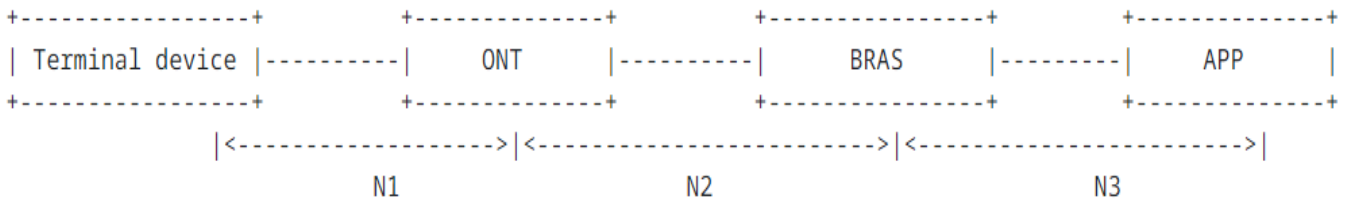
- **Lack of Integrated Analytical Methods**
  - Data silos exist across professional domains.
  - There is difficulty in conducting comprehensive analyses due to interoperability issues.
- **Lack of In-Depth Analytical Models**
  - Do not consider the impact of user behaviors, market dynamics, and policy changes on IPv6 support status.

[RFC9386], which focuses on statistics regarding the status of IPv6 deployments.

There is a need for in-depth technical research and standardization efforts on monitoring methods, integrated analytical methods, interface models, etc.

Case1: IPv6 Network End to End Quality Analysis

- **Scenario 1:** When User A experiences network congestion while playing cloud games at home, it greatly affects the gaming experience. It is necessary to identify the cause of the network congestion.However, each network domain is managed independently and cannot directly analyze the data association and influence between each domain.
- **Conclusion:** The latency and packet loss data for segments N1, N2, and N3 should be collected to achieve poor quality boundary positioning based on IPv6 network end to end monitoring method.



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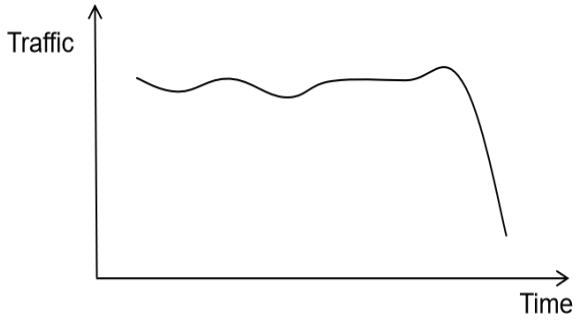
Case2: Home Broadband Network Traffic Analysis

- **Scenario 2:** A network operator detects a sudden drop in the proportion of IPv6 traffic in a certain area. There are many factors that can lead to such a drop, such as:
  - The addition or replacement of terminal devices by home users in the area;
  - An application vendor witching its services from a cloud resource pool that supports IPv6 to one that only supports IPv4;
  - In a dual-stack situation, the IPv6 network quality in the area has deteriorated, and the service automatically switches to IPv4 traffic to ensure the quality of service.
- **Conclusion:** It is necessary to collect relevant data(brand and model of the device 、 accessing applications, etc.) and find out the reasons for the sharp decrease in the proportion of IPv6 traffic based on the IPv6 network end to end monitoring method.



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Next Step

- **Seeking solutions:**
  - Platform for monitoring and analyzing IPv6 support status.
    - Potential for a platform providing visual data displays.
    - Addressing the challenges of traffic concentration analysis.
    - To enhance the quality and efficiency of IPv6 deployment.
  - Others?
- **Solicit comments and refine the draft.**

Thanks!