

A Method for Routing-assisted Traffic Monitoring

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ABSTRACT

Researchers at the University of California, Davis in collaboration with Deutsche Telekom AG have developed a system and method for monitoring network traffic by dynamically routing traffic sub-populations over fixed monitoring locations without violating traffic engineering policies. This approach leverages existing routing flexibility to collect high-quality flow data without disrupting normal traffic engineering policies

FULL DESCRIPTION

This technology provides an apparatus, method, and system that facilitates routing-assisted traffic monitoring within communication networks. By assigning micro-flowsets (fine-grained traffic sub-populations of flows sharing ingress and egress routing devices) and routing them selectively through various network paths, the system enhances monitoring efficiency using existing monitoring infrastructure. A centralized controller computes optimal micro-flowset routings that maximize monitoring utility while ensuring compliance with network traffic engineering (TE) constraints, preserving the aggregate traffic placement and avoiding routing loops. The approach employs the OpenFlow protocol or similar mechanisms to program routing devices with customized flow tables, enabling precise and selective traffic sampling and measurement. It balances measurement accuracy with routing policy adherence, supporting optimized placement of monitoring resources such as Deep Packet Inspection units or intrusion detection systems.

APPLICATIONS

- ▶ Telecommunications networks requiring efficient traffic monitoring and quality of service assurance.
- ▶ Internet service providers employing Deep Packet Inspection and intrusion detection systems.
- ▶ Enterprise network management focused on traffic analytics and anomaly detection.
- ▶ Network equipment manufacturers implementing programmable routing protocols like OpenFlow.
- ▶ Data centers and cloud providers needing optimized monitoring of traffic flows to ensure security and performance.
- ▶ Developers of network monitoring software and analytics platforms leveraging fine-grained traffic statistics.

FEATURES/BENEFITS

- ▶ Enhances network monitoring precision by selectively routing specific traffic sub-populations through monitored links.
- ▶ Maintains compliance with existing traffic engineering policies and quality of service constraints.

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OTHER INFORMATION

KEYWORDS

deep packet inspection,
flow routing, micro-
flowset, network traffic
monitoring, OpenFlow,
sampling utility, traffic
engineering, traffic
measurement, traffic
sub-populations, unified
monitoring

CATEGORIZED AS

- ▶ **Communications**
 - ▶ Networking
- ▶ **Engineering**
 - ▶ Engineering
 - ▶ Other

RELATED CASES

- 2010-293-0
- ▶ Improves Deep Packet Inspection and intrusion detection capture quality using limited monitoring resources.
 - ▶ Enables scalable, flexible micro-flowset routing to balance computational overhead and monitoring performance.
 - ▶ Supports centralized, dynamic routing control with protocols like OpenFlow.
 - ▶ Prevents routing loops and preserves routing semantics through constraints and specialized algorithms.
 - ▶ Offers configurable tradeoffs between monitoring gains and adherence to traffic engineering policies.
 - ▶ Expands monitoring coverage, even with sparse deployment of dedicated monitoring equipment.
 - ▶ Enables fine-grained traffic flow measurement while maintaining aggregate traffic engineering constraints.
 - ▶ Adapts routing dynamically to optimize measurement without disrupting normal network operations.
 - ▶ Ensures loop-free, policy-compliant routing for traffic sub-populations with reduced complexity.
 - ▶ Prioritizes and handles measurement importance across diverse traffic sub-populations efficiently.
 - ▶ Minimizes flow state management overhead while maximizing monitoring effectiveness.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,817,629	08/26/2014	2010-293

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Automated Critical Congenital Heart Disease Screening Combining Non-Invasive Measurements of Oxygenation and Perfusion](#)

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