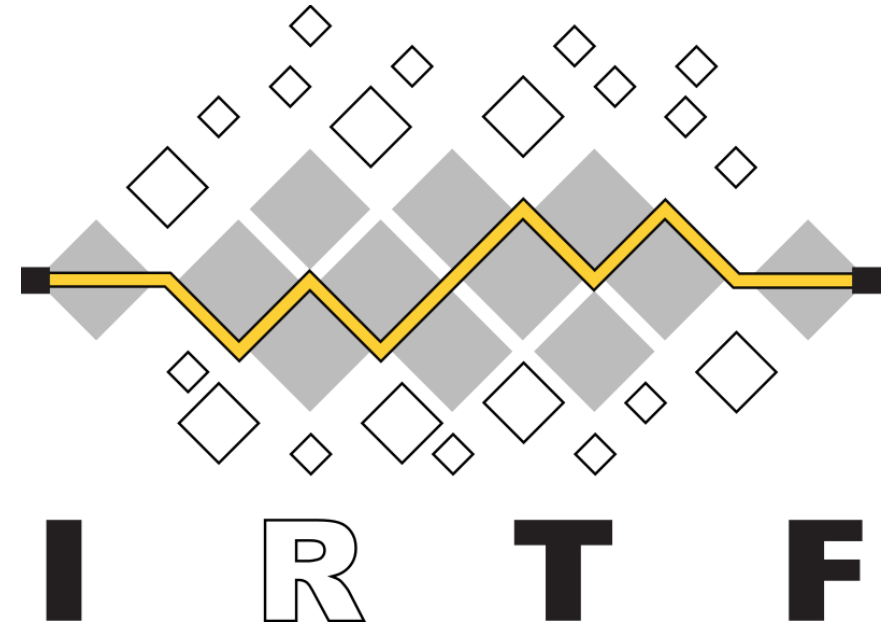


Path Energy Traffic Ratio API (PETRA)

draft-petra-path-energy-
api-02

A. Rodríguez-Natal (Cisco), L.M. Contreras (Telefonica), A. Muñiz (Telefonica), M. Palmero (Cisco), F. Muñoz (Cisco), J. Linblad (Cisco)

PANRG, Vancouver, July 2024



Motivation

- Provide visibility about energy consumption in a path
 - Metrics such as power consumption between source and destination, potentially related with throughput
- Define an API that can provide such information
 - Using well-known architectures (e.g. REST) and schemas (e.g. OpenAPI/YANG)
- This information can be consumed externally (e.g., SD-WAN customers) or internally (e.g., for operator optimization purposes)
- Draft already presented (v -00) during IETF 118

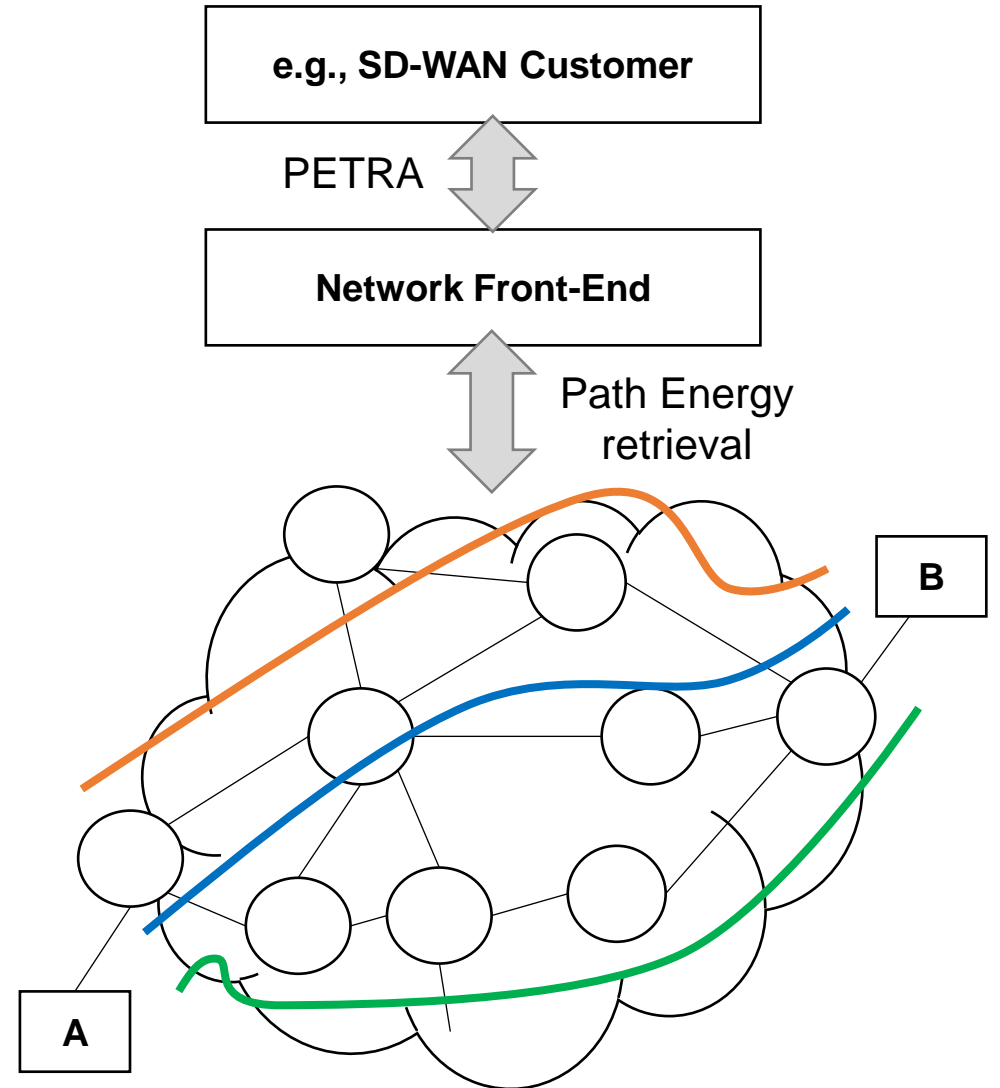
Rationale

- Assumption-1: energy consumption in devices has a baseline component independent of traffic plus another one dependent of traffic [1].
 - E.g., in an IP device, baseline component is due to processors, fans, cards, etc, while the component due to traffic volume follows some function (lineal, exponential, etc)
- Assumption-2: while in short term actions could maybe affect the component dependent of traffic volume, in the future it might be possible to influence also the baseline component.
 - E.g., by switching-off or moving to sleep mode some of the components such as cards

[1] A. Vishwanath, K. Hinton, R. W. A. Ayre and R. S. Tucker, "Modeling Energy Consumption in High-Capacity Routers and Switches," in IEEE Journal on Selected Areas in Communications, vol. 32, no. 8, pp. 1524-1532, Aug. 2014, doi: 10.1109/JSAC.2014.2335312.

Path Energy Traffic Ratio API (PETRA)

- There can be multiple paths between origin and destination
- Energy consumption dependent on device characteristics and architecture, transceiver bit rate, number of hops, etc
- REST API (e.g. using OpenAPI/YANG)
 - Query: <src-IP, dst-IP, throughput>
 - Response: e.g., <watts-per-gigabit>



Changes from -00 (now in v -02)

- API refinement, adding new parameters
 - Currently, “Watts per Gigabit”, “Carbon Intensity” and “Renewable Percentage”
- Sub-section for recursive usage of the API
- Initial description of a YANG module
- IANA considerations reported
- Added Jan Lindblad as co-author

Next steps

- Collect feedback from the RG and checking interest
- Position this work in proper home: PANRG, GREEN, other?
- Report on implementation status
- Prepare new version for IETF 121