Application-aware IPv6 Networking (APN6)

draft-li-apn6-problem-statement-usecases-01
draft-li-apn6-framework-00

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Motivations – Why APN6?

- Differentiated application-level fine-granularity SLA guarantee is desired
  - 5G and industry verticals
  - Revenue-producing apps: online gaming, live video streaming, video conferencing
- Network operators are unaware of applications traversing their network
  - Losing opportunities of revenue increases
- **Bring application characteristics to the network layer**
- Taking advantage of the programmability provided by IPv6/SRv6 encapsulations

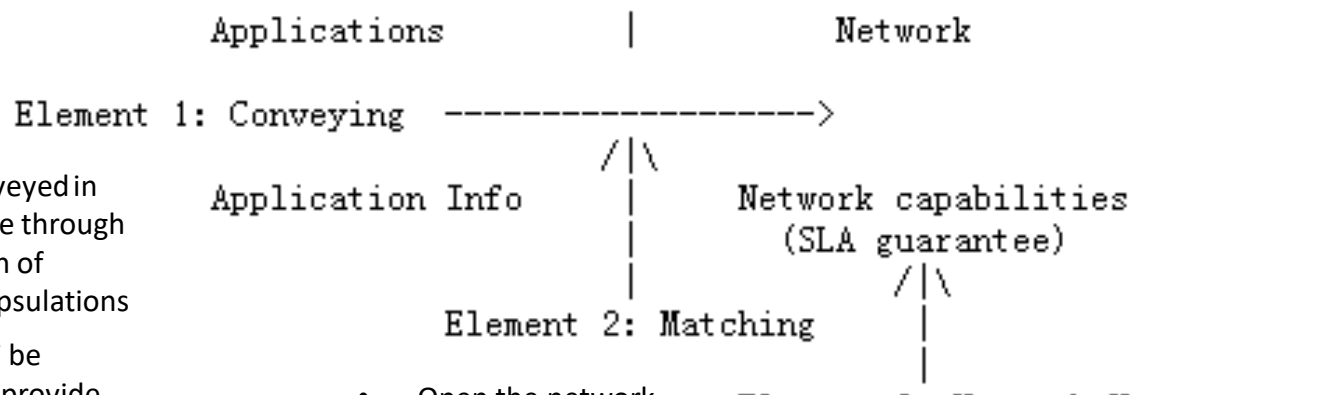
How APN can help?

- APN6 aims to
  - satisfy the application-awareness/visibility requirements
  - provide differentiated service treatment and fine-grained traffic operations

- APN6 uses IPv6/SRv6 network programmability to convey app info in the data plane allowing finer grained requirements from apps to be specified to the network

- APN6
  - conveys the application information into the network infrastructure
    - ✓ E.g. application identification, SLA/service requirements
  - allows the network to quickly adapt and perform the necessary actions for SLA guarantees
    - ✓ E.g. steer into an SRv6 path with SLA guarantee

APN6 Key Elements

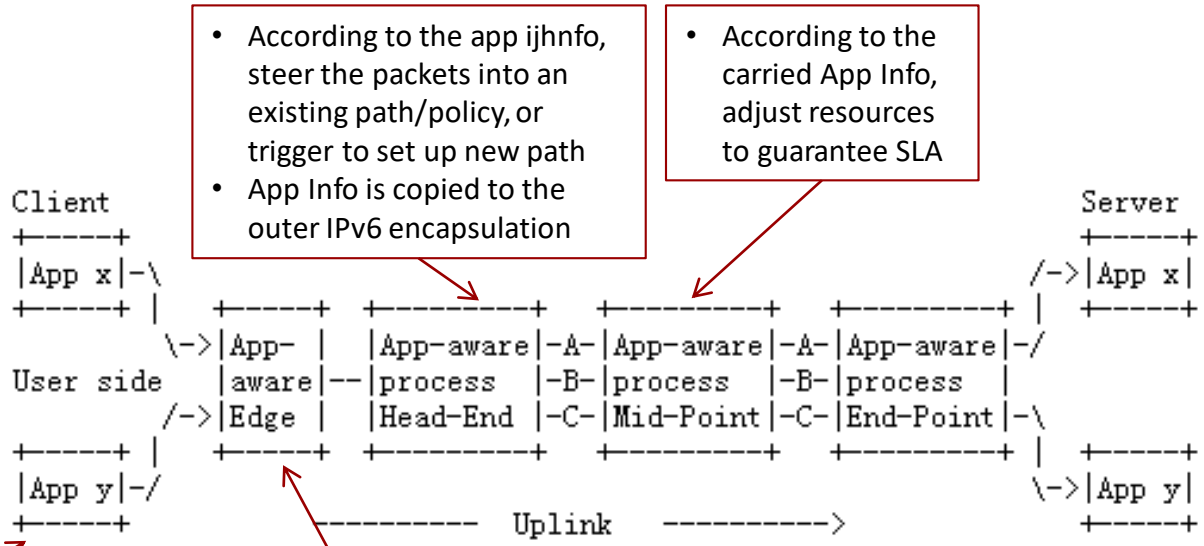


- App info conveyed in the data plane through augmentation of existing encapsulations
- SHOULD NOT be enforced but provide an **open option**

- Open the network capabilities to apps
- According to the app info, appropriate network services are selected, provisioned, and provided to the demanding applications

- To update the match between the app and corresponding network capabilities

APN6 Framework



- According to the app ijhnfo, steer the packets into an existing path/policy, or trigger to set up new path
- App Info is copied to the outer IPv6 encapsulation

- According to the carried App Info, adjust resources to guarantee SLA

Optionally add the app information in IPv6 encapsulation

- Optionally add the app information in IPv6 encapsulation on behalf of app
- Derived from e.g. L2 QinQ Info
- Local policies

- The flow-driven method enables fast service provisioning

APN6 Use Cases

- The use cases that can benefit from the application awareness introduced by APN6
  - **Application-aware SLA Guarantee**
    - ✓ enable to provide differentiated services for various apps and increase revenue accordingly
    - ✓ enable network operators to provide fine-granularity SLA guarantees
  - **Application-aware network slicing**
    - ✓ have customized network transport to support some app's specific requirements
    - ✓ serve diverse services and fulfill various requirements of different apps at the same time
  - **Application-aware Deterministic Networking**
    - ✓ Match to a demanding app flow into a specific deterministic path
  - **Application-aware Service Function Chaining**
    - ✓ Match to an app flow into a specific SFC and subsequent steering without the need of DPIs
  - **Application-aware Network Measurement**

IETF 105 & Next Steps

APN6 Side Meeting @ IETF105

- Thursday Morning @Notre Dame
- Attendee: 50+

Agenda

1. **Admin** (Chairs) [5 : 5/75]
2. **Problem Statement and Requirements** (Zhenbin Li) [10 : 15/75]
3. **Application-aware Information Conveying**
   a) Framework of App-aware IPv6 Networking (Shuping Peng) [10 : 25/75]
   b) Firewall and Service Tickets (Tom Herbert) [10 : 35/75]
   c) SRH Metadata for Simplified Firewall (Jim Guichard) [5 : 40/75]
4. **App-aware Services**
   a) IPv6-based DetNet (Yongqing Zhu) [5 : 45/75]
   b) SRv6 Path Segment (Fengwei Qin) [5 : 50/75]
   c) IPv6-based IFIT (In-situ Flow Information Telemetry) (Haoyu Song) [5 : 55/75]
5. **Shaping Our Discussion** (Chairs and Room) [15 : 70/75]
6. **Wrap Up** (Chairs) [5 : 75/75]

Operators, Vendors, Universities, OTTs, Enterprises

https://github.com/shupingpeng/IETF105-Side-Meeting-APN6

- Next Steps:
  - Apply for Mailing list to continue discussions
  - BoF @IETF107

Looking for suggestions how to move forward.

Area	Topic	Draft
APN6	Problem statement and use cases	draft-li-apn6-problem-statement-usecases
	Application-aware IPv6 Networking	draft-li-apn6-app-aware-ipv6-network