Exploring New Principals and Use-Cases in Linux XIA

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Motivation
Discover new XIA functionality and a killer XIA application

Expose interesting new principals, use cases, and DAG addressing techniques

Fast Packet Processing
Recent work (netmap [1], DPDK [2], ...) moves packet I/O to user space

**Advantage:** better performance

**Disadvantage:** kernel bypass limits routing, filtering, flow reconstruction, ...

**Balanced solution:** an XIA principal could enable kernel processing and more performant delivery to user space using techniques in literature (mmap'd buffers)

Improving communication between the XIA stack in the kernel and applications could reduce latency and increase throughput


Information-Centric Networking
XIA can allow more choice in ICN:

- **Network core:** NDN-style, CID-style, ...
- **Network core and edge:** meta-information [3]
- **Network edge:** content selectors (version, pub.)

DAG fallbacks can flexibly, evolvably mix and match these various choices:


Random Intermediate Forwarding
Idea for principal type: before forwarding to the intended destination, packets visit a random intermediate node

Using a “random intermediate” could:
- **Anonymize** the source of a packet
- **Load balance** traffic in the network
- Help identify/stop DoS attacks

Centralized DAG Generation
Potential solution to “where do DAGs come from?” problem; makes XIA more application friendly

Is SDN applicable here?

Could provide a centralized way to:
- Map user choices to DAGs “facebook.com” →
- Insert network policies into DAGs

Enhanced Service Chaining
Recent work [4] has explored the benefits of using service identifiers in service chaining

XIA uses service identifiers (SIDs and others) and generalizes service chaining to more flexible combinations using DAGs

XIA service chaining could be scalable, generalizable, dynamic