IX Services

A Common OAM Interface

IX

A place in network that allows for multi-party interconnect.

A common dataplane for any to any or selective subgroup communication.

IXP platform is seen as untouchable, providing just the basic connectivity service.

For all practical deployments IX is not a single node.

There is inherent complexity present in both IX fabric platform itself and in the interconnect mechanism between a peer and an IX fabric.

More than one IX interconnect is common.

A common application to network signalling interface at least for OAM functions seems to be needed. Additional services could be signalled over the same interface too.

IX services

- Fabric operations – OAM and manageability functions for the IX fabric itself.
- Peer connectivity – OAM and manageability functions for interconnection between peers and fabric.
- OTT services – manageability and control functions on behalf of IX peers.

Do we still continue to see IX as a standalone isolated component providing basic connectivity service and nothing more?

Should it become a platform for housing value added services that traditionally have been the realm of the IX peers?

Should it result in an approach that lies somewhere in the middle between those two extremes given the balance between IX stability and richness of IX services?

IX services – fabric operations

Fabric operational services (OAM and manageability functions for the IX fabric itself) – fabric data plane liveness, topology and capacity control, telemetry.

- Fabric element level liveness
- End to end fabric liveness
- ECMP flow mapping and control

Fabric operational services (typically) are for internal use, not exported directly to peers.

However a derivative information can be exported to peers to allow for influencing forwarding decisions on peer's side.

IX services – peer connectivity

Peer connectivity validation services (OAM and manageability functions for interconnection between peers and fabric) – interconnect data plane liveness, end to end liveness between peers, capacity control, telemetry of interconnects.

- Dataplane liveness between peer and fabric point of entry
- Dataplane liveness between a pair of peers
- Signalling between an IX and a peer.
- Signalling between two peers.
- Inband OAM and telemetry export.

IX services – OTT services

Validation of services on top of the IX (manageability and control functions on behalf of IX peers) – SLA validation, timing properties, DoS protection and mitigation, payload inspection and optimization.

- Dataplane SLAs.
- Timestamping – 1588 PTP for dataplane, BGP timestamping.
- Anycast hints.
- Filtering and protection/redirect routes injection.
- Performance measurement.
- Route server OAM (selective BMP).

Productizing IX services

Data collected from fabric and peer interconnect OAM can be exported externally and offered as a product for path/topology selection and control.

- OAM visibility.
- Telemetry data can be exported to peer and influence path selection on the peer side.
- Peer can signal path selection for differentiated services

Summary & discussion

- IX fabric must continue to work, introduction of additional services must not compromise it (within practical limits).
- IX connectivity service likely could benefit from more interworking between IX infrastructure and peers.
- End to end service validation in the programmability context is the main reason behind new developments in OAM domain.
- Security aspects (filtering, LI), SLA validation, and path control on behalf of a peer seem to be the starting services.