Mobility-aware Floating Anchor (MFA)

(https://www.ietf.org/id/draft-gundavelli-dmm-mfa-00.txt)

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Goals for User-Plane Optimization

- Access-independent, shared user plane that can be used for multiple access technologies
- Use of a common transport controller that can potentially offer programmable interfaces to mobility controller and other access specific controllers
- Optimized Routing with transport awareness for mobile node’s IP flows
- Elimination of tunnels from the user-plane network
- Elimination of centralized mobility anchors and shift towards a distributed architecture
- Co-existence with control-plane and user-plane separated architecture
- Support for services including accounting, charging, lawful-interception and other user plane services
Goals for Mobile User–Plane Optimization

Control & User Plane Separation for elastic control plane scaling and a distributed User Plane. User–Plane Programmability

- Elimination of centralized anchors
- Optimized Routing
- No Tunnel Overhead

- Scale
- State Reduction
- Transport QoS Awareness

Diagram:

- Mobility Controller (MC)
- Transport Controller (TC)
- Policy
- Services
- internet

Scale
State Reduction
Transport QoS Awareness
MFA
MFA: Mobility-aware Floating Anchor

The MFA domain consists of a mobility controller (MC), transport controller (TC), transit routers (TR’s), access gateways (AG’s) and mobile nodes (MN’s).

1. IP Forwarding
2. SRv6 Functions
3. Interfaces to TC / MC
4. Maps to 3GPP UPF

HNP’s (Home Network Prefixes) are assigned at home link

LNP’s (Local Network Prefixes) are assigned at each access link.
MFA: Mobile Node’s Initial Attachment

After access authentication, the mobile node is assigned a set of home network and local network prefixes. These colored prefixes are hosted on AG-2’s access link.
MFA: Forwarding Path for IP Flows

MN initiates IP flows to CN-1 (MN to MN traffic) and to CN-2 (Internet destination). These flows take optimal routing path and there is no state in the network.
MFA: MN Roams and Changes its Point of Attachment

MN is assigned a set of new LNP’s from the AG-6 prefix block and also has the HNP’s from its initial attachment at AG-2.
MFA: Non-Optimal Flow Detection & Reporting

After handoff, the traffic will go through the previous anchor for a transient period of time. AG-2 reports flow meta-data for non-optimal flows.
MFA: Traffic Steering With SRv6

MC programs AG–2 & AG–6 with flow steering rules and also for Reporting IP flows that are going through non-optimal path. The policy for the SID and function association is pushed from the MC.

<table>
<thead>
<tr>
<th>Flow Direction</th>
<th>MN–Anchor (AG–6) (SRv6 Functions)</th>
<th>CN Anchor (AG–4) (SRv6 Functions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN to CN</td>
<td>Variant of T.Insert (Transit with insertion of SRv6 policy and a trigger to MC; such as Flow.Report)</td>
<td>Variant of End.X (Or, End.B6, instantiation of a binding SID); Or, End.T for internet traffic</td>
</tr>
<tr>
<td>CN to MN</td>
<td>Variant of End.X (Layer-3 Cross Connect) (Or, End.B6, instantiation of a binding SID)</td>
<td>Variant of T.Insert (Transit with insertion of SRv6 policy and a trigger to MC; such as Flow.Report)</td>
</tr>
</tbody>
</table>

![Diagram showing traffic steering with SRv6](image-url)
MFA: Optimal Routing after Path Stitching

MC has programmed the anchor nodes for CN-1 and CN-2 to steer all MN-1 IP traffic to AG-6 directly. AG-2 is no longer in path for those flows.
MFA: MN’s Traffic Flows after Prefix Renumbering

All MN’s traffic flows initiated at the new location will take the optimal routing path. There is no traffic steering state, or tunnels.
Summary

- Elimination of fixed anchors and shift towards distributed architecture
- Elimination of user-plane tunnels to avoid encapsulation overhead.
- Traffic steering with transport QoS awareness
- Access-agnostic user-plane with programmability
- Leveraging the innovation in the user-plane for traffic steering

Reference:
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Questions?