Gateway Initiated Dual-Stack lite
(draft-gundavelli-softwire-gateway-init-ds-lite-01)

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Gateway-initiated Dual-Stack lite

Objectives

- IPv4-exhaust / IPv6 transition solution for carriers that desire to continue to deliver IPv4 services (and leverage NAT44)
  - which use a tunnel-based access architecture (e.g. Mobile w/ MIP/PMIP, GTP; Broadband w/ PPP, Point-to-Point VLAN)
  - IPv4 core & Private-IPv4-Exhaust/Overlapping-IPv4/Non-Meaningful-IPv4
  - IPv6 core & minimal IPv4 support in SP infrastructure

- Additional Requirements
  - No changes to End-System/Host/Handset (continue to support installed base)
  - Minimal changes to existing access architectures
  - IPv4 and/or IPv6 SP transport networks support
Dual-Stack lite - Review
Application to Access Networks using Tunnels

- DS-lite requires changes to the End-Systems
- DS-lite results in softwire-tunneling ontop of access tunneling: Mobile Networks: Added overhead on airlink
- DS-lite defined for IPv6 transport only
- DS-lite requires per-Subscriber softwire termination on CGN
Gateway-initiated Dual-Stack lite Concept

- End-System/UE & Access Architecture remains unchanged; no impact on roaming operations
- Point-to-Point tunnel between UE and NAT44-box (CGN): IPv4 address on UE is not used for packet forwarding (allows all UEs to have the same address)
- SP network can be IPv4 or IPv6
Gateway-initiated Dual-Stack lite
EPC w/ GTP example

- Example uses same IP-address for both UEs
- PGW associates PDP-Contexts/EPC-bearers to Softwire-Tunnel (Softwire-ID identifies individual flows)
- CGN performs NAT44: Maps Softwire-ID/Port to public IP-address/Port
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Example: Session establishment (3GPP/EPC)

Create PDP Context Request (PDP-type=IPv4, ...)

Authentication & Authorization:
Authorization data indicates:
“enable GI-DS-lite for customer”

Create session (TEID identified);
Allocate (dummy IPv4 (e.g. 10.1.1.1 and SID/GRE-key)

Optional:
NAT Control Request/Answer:
Establish session for UE on DSLTC

Stitch access session (TEID) and softwire tunnel (SID)

Policy Authorization Request and Answer

Create PDP Context Response (IP-address=10.1.1.1)

Optional: Accounting data (incl. public IPv4)
## Advantages of Gateway-Initiated Dual-Stack lite

### Advantages

<table>
<thead>
<tr>
<th>Requirement</th>
<th>GI-DS-lite</th>
<th>DS-lite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes to UE/Handset</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Changes to the 3GPP architecture</td>
<td>minimal (PGW changes)</td>
<td>yes</td>
</tr>
<tr>
<td>Added overhead on airlink</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>SP network: IPv4</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>SP network: IPv6</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SP network: IPv4, IPv6</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>UE: private IPv4</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>UE: non-meaningful IPv4</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>UE: (any) IPv4, IPv6</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>UE: Evolution to IPv6 only</td>
<td>option</td>
<td>yes</td>
</tr>
<tr>
<td>Roaming</td>
<td>yes, no changes</td>
<td>v6 support in visited network (SGSN/SGW)</td>
</tr>
</tbody>
</table>
Next Steps

- Authors appreciate feedback from the WG
- Adopt as WG document?