Tunnel Establishment

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Purpose:
To propose the procedure of the tunnel establishment

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Tunnel

• What is Tunnel?

• Advantage (vs. Path)
  – When the MS moves from one access RS to another,
  – For path, every associated nodes change its own routing table.
  – For tunnel, the MR-BS and access RS change its own routing table.

• Scope
  – Suitable for the fixed RS
  – We will extend to the mobile RS, if it is completed to define operations related to RS movement.
Tunnel Establishment – I
Initial ranging of 1-hop RS

Initial ranging of 1-hop RS

1. Ranging Code
2. RNG-REQ
3. RNG-REQ (CID=0x0001)
4. Allocate BCID&PCID to RS and add it to tunnel table
5. RNG-RSP (CID=0x0001) with RS BCID&PCID

BCID: Basic CID
PCID: Primary CID
Tunnel Establishment – II
Initial ranging of multi-hop RS

1. RS_n
2. BS

3. RNG-REQ (CID=0x0001)

4. Encapsulate RNG-REQ with RS_n own BCID

5. En. RNG-REQ (CID=RS_n, BCID)

6. Check whether RS_n-1 BCID exists in look-up table

7. En. RNG-REQ (CID=RS_n-1, BCID)

8. Allocate BCID & PCID to RS_n, add it to tunnel table and encapsulate RNG-RSP with RS_n-1 BCID

9. En. RNG-RSP (CID=RS_n, BCID) with RS_n BCID & PCID

10. If RS_n BCID exists in look-up table, add RS_n BCID & PCID to look-up table and relay En. RNG-REQ

11. En. RNG-RSP (CID=RS_n, BCID) with RS_n BCID & PCID

12. Decapsulate RNG-RSP

13. RNG-RSP (CID=0x0001) with RS_n BCID & PCID

En. : Encapsulated
BCID : Basic CID
PCID : Primary CID
Tunnel Establishment – III
Deregistration of RS

1. \(RS_{n+1}\) → \(RS_n\) → \(RS_{n-1}\) → \(\ldots\) → \(RS_1\) → BS

2. Encapsulate DREG-REQ with \(RS_n\)'s own BCID

3. En. DREG-REQ (\(RS_n\), BCID)

4. Remove all CID related to \(RS_{n+1}\) from look-up table

5. En. DREG-REQ (\(RS_n\), BCID)

6. Eliminate all CID related to \(RS_{n+1}\), BCID, and remove it to tunnel table

En. : Encapsulated
BCID : Basic CID
TCID : Transport CID
Tunnel Establishment – IV
Service Flow Addition of MS

1. **Encapsulate DSA-REQ with RSₙ, own BCID**

2. **Check whether RSₙ BCID exists in look up table**

3. **Allocate TCID to MS, add it to tunnel table and encapsulate DSA-RSP with RSₙ BCID**

4. **If RSₙ BCID exists in look up table, and relay Enc. DSA-REQ**

5. **Decapsulate DSA-RSP**

6. **Encapsulate DSA-REQ (MS PCID)**

7. **Encapsulate DSA-RSP with TCID, SFID (RSₙ BCID)**

8. **En. DSA-REQ (RSₙ BCID)**

9. **En. DSA RSP with TCID, SFID (RSₙ BCID)**

10. **En. : Encapsulated**

11. **BCID : Basic CID**

12. **TCID : Transport CID**

13. **SFID : Service Flow ID**
Tunnel Establishment – V
Service Flow Deletion of MS

1. MS → RS_n: DSD-REQ (MS. PCID) with SFID
2. Encapsulate DSD-REQ with RS_n own BCID
3. En. DSD-REQ (RS_n, BCID) with SFID
4. Check whether RS_n BCID exists in look-up table
5. En. DSA-REQ (RS_n, BCID) with SFID
6. Eliminate TCID related to SFID, remove it to tunnel table and encapsulate DSD-RSP with RS_n BCID
7. En. DSD-RSP (RS_n, BCID)
8. If RS_n BCID exists in look-up table, and relay En. DSD-REQ
9. DSD-RSP (MS. PCID)
10. Decapsulate DSD-RSP
11. En.: Encapsulated
BCID : Basic CID
TCID : Transport CID
SFID : Service Flow ID