6top Protocol (6P)
draft-ietf-6tisch-6top-protocol-01

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Status

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The draft was adopted as Working Group draft after IETF95. draft-ietf-6tisch-6top-protocol-00

This draft is renamed from draft-wang-6tisch-6top-sublayer-04, which was presented at the IETF94.

New in this version:
• Clarification of Concurrent 6P Transaction
Discussion

Derived from the plugtest experimentation. Several points to be improved:

- **6P Count → 6P Status:**
  - Need to know A→B cells and B→A cells.

- **Pagination in 6P List command**
  - Need to be able to limit the count and paginate
  - Need to List A→B and B→A cells

- **Consistency of the schedule**
  - Mechanism to assert consistency between A and B schedule.
  - Used to trigger correction actions at the SF (e.g. CLEAR)
6P Count

Current 6P Count only returns the number of TX cells that a node has allocated to a neighbor.

Current response format: (where Other Fields = Count AB)

- Convert it to a Status retrieval:
  - Rename: 6P Count → 6P Status
  - GAB and GBA: generation of the schedule (A→B and B→A)
  - IANA_6TOP_CMD_COUNT → IANA_6TOP_CMD_STATUS
6P List Pagination

Current 6P List request message format

```
0 1 2 3 4 5 6 7 8 9 0 1 1 2 3 4 5 6 7 8 9 0 1
+-----------------------------------------------
| Version | Code | SFID       | SeqNum | Metadata |
+-----------------------------------------------
| Metadata |     |            |
+-----------------------------------------------
```

Proposed improvement to support pagination

1 CMD (List) → 2 CMD (List AB and List BA)

```
0 1 2 3 4 5 6 7 8 9 0 1 1 2 3 4 5 6 7 8 9 0 1
+-----------------------------------------------
| Version | Code | SFID | SeqNum | GAB | GBA | Metadata |
+-----------------------------------------------
| Metadata | Offset | Number of |
| Cells    |        |
+-----------------------------------------------
```
6P List Pagination

Proposed improvement to support pagination

<table>
<thead>
<tr>
<th>Offset (2B): the offset of the first requested cell in the schedule.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cells (2B): the number of cells requested starting at Offset.</td>
</tr>
</tbody>
</table>

Error Codes:

- IANA_6TOP_RC_NO_RESOURCES: When the list does not fit in the packet.
Consistency

Mission: Be able to detect inconsistencies in the schedule
- Need to know whether the two sides have the same information in the schedule.
- Modify general 6P Header. Split Seqnum field. Use 4bit for SeqNum and 4bit to keep track of the *generation* of the schedule.
- Lollipop counter. Wraps from 10b to 01b. 00b only on clear.
- **In the packet**: Generation Number per side (A→B and B→A).
- 2 bit counter: {0=clean, 1-2: counter, 3 = reserved}
- GAB and GBA fields in the header.
- **In the node**: Local Generation Number (A→B and B→A).
- 2 bit counter: {0=clean, 1-2: counter, 3 = reserved}
- GTx and GRx in the
Consistency

- Generation Counter per side (A→B and B→A).
- 2 bit counter: {0=clean, 1-2: counter, 3 = reserved}

Rules (Assume 2 node A and B)
- When a node has never scheduled anything to the neighbor
  \[ \text{GAB} = \text{GBA} = \text{GT}_x = \text{GR}_x = 0 \]
- After 6P CLEAR → \[ \text{GAB} = \text{GBA} = \text{GT}_x = \text{GR}_x = 0 \]
- After 6P ADD or DELETE (A→B) :
  Node A  → GTx++
  Node B  → GRx++

1. ADD (1 cell, \( \text{GAB} = \text{GT}_x\_A \))
2. SUCCESS
3. ACK
4. GTx ++
4. GRx ++
Inconsistency detection

At each 6P Packet.
- GAB and GBA are part of the header
- Inconsistency detection does not apply to 6P CLEAR cmd.
- If detected Return IANA_6TOP_RC_GEN_ERR

1. STATUS (1 cell, GAB = GTx_A, GBA = GRx_A)
   2. Check
      GAB == GRx_B
      GBA == GTx_B
      If not
      IANA_6TOP_RC_GEN_ERR

2. RESPONSE
Thanks!

• Q&A