

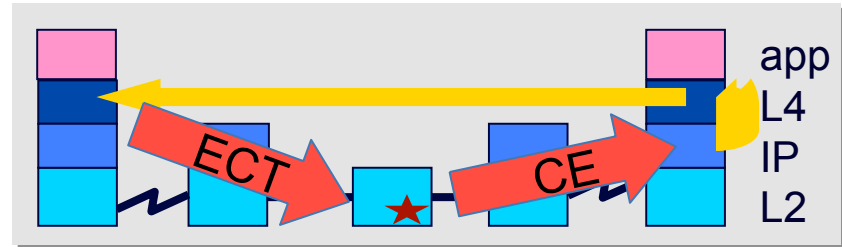
# TRILL ECN Support

draft-eastlake-trill-ecn-support-01.txt

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# ECN Background

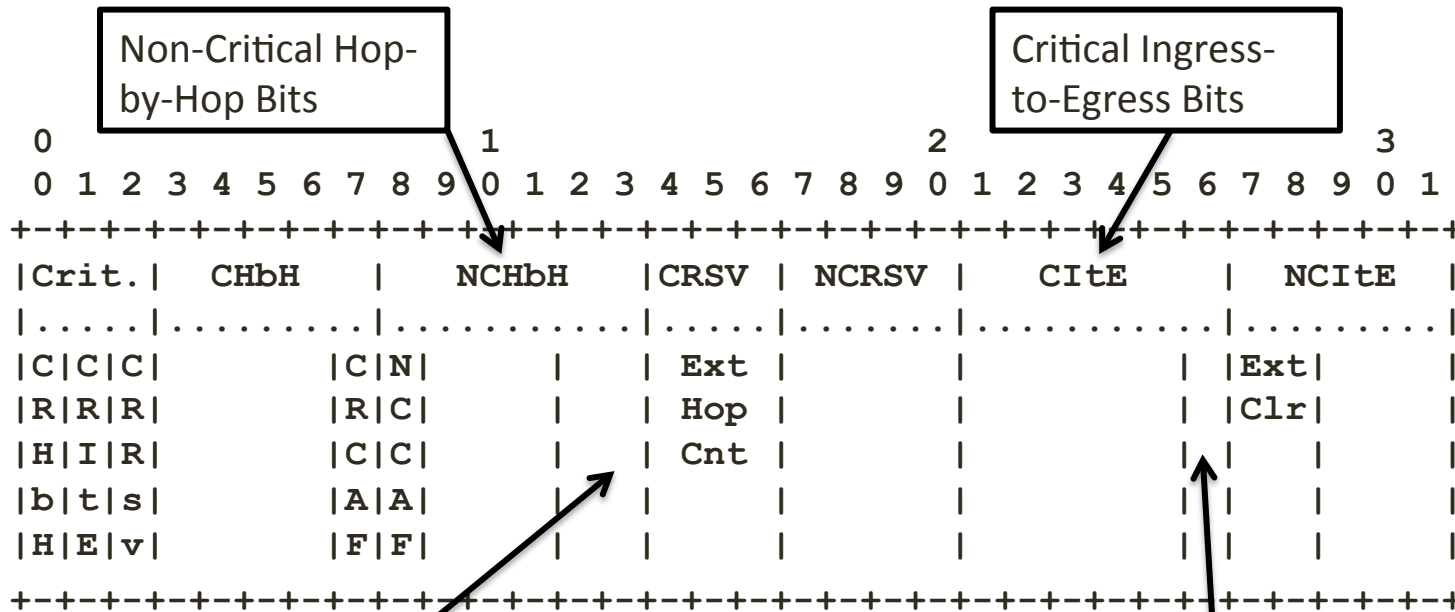


- ECN propagates
  - “ECN-capable transport” (ECT) down
  - Congestion Experienced (CE) up
- ECT is necessary for incremental deployment
  - See IP ECN codepoints table (right)

| IP-ECN codepoint | value | meaning                           |
|------------------|-------|-----------------------------------|
| Not-ECT          | 00    | Not ECN-capable transport         |
| ECT(0)           | 10    | ECN-Capable Transport             |
| ECT(1)           | 01    | ECN-Capable Transport             |
| CE               | 11    | Congestion Experienced ('marked') |

- Similar incremental deployment problem for TRILL
  - if legacy **egress** does not understand ECN
  - will not propagate upward to forwarded IP inner header
  - would black-hole congestion signals

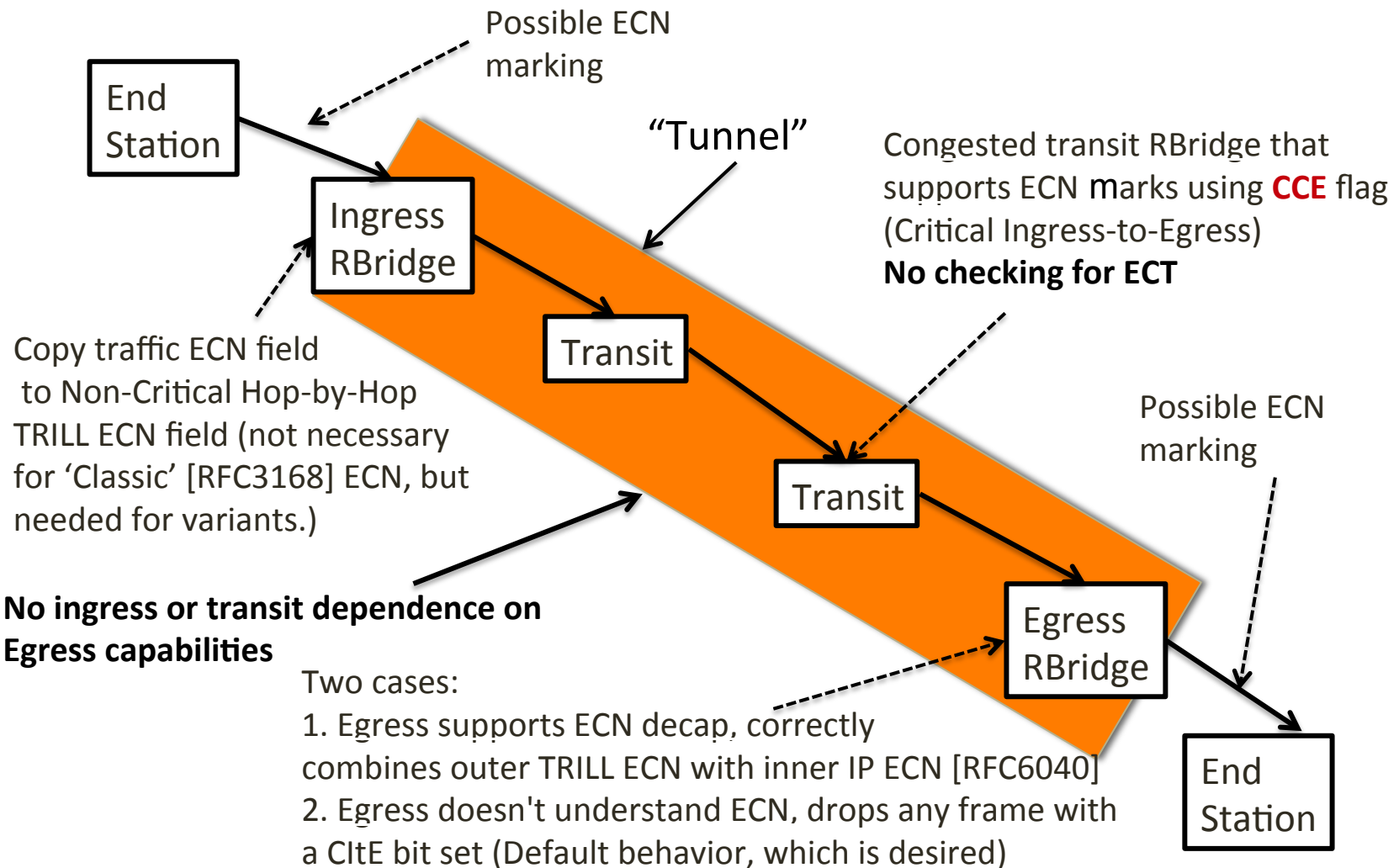
# Adding ECN Support to TRILL Header Extension Flags Word



| TRILL-ECN codepoint | value | meaning                             |
|---------------------|-------|-------------------------------------|
| Not-ECT             | 00    | Not ECN-capable transport           |
| ECT(0)              | 10    | ECN-Capable Transport               |
| ECT(1)              | 01    |                                     |
| NCCE                | 11    | Non-Critical Congestion Experienced |

Critical Congestion Experienced CCE flag

# Defer mark / drop decision to egress



# Recap: ECN tunnelling rules at egress [RFC6040]

| incoming inner | Arriving TRILL 3-bit ECN codepoint |         |         |      |
|----------------|------------------------------------|---------|---------|------|
|                | Not-ECT                            | ECT(0)  | ECT(1)  | CE   |
| Not-ECT        | Not-ECT                            | Not-ECT | Not-ECT | drop |
| ECT(0)         | ECT(0)                             | ECT(0)  | ECT(1)  | CE   |
| ECT(1)         | ECT(1)                             | ECT(1)  | ECT(1)  | CE   |
| CE             | CE                                 | CE      | CE      | CE   |
|                | Outgoing header                    |         |         |      |

TRILL egress same as [RFC6040] but 3 TRILL ECN bits. So map 3 bits to the 4 codepoints as shown in table:

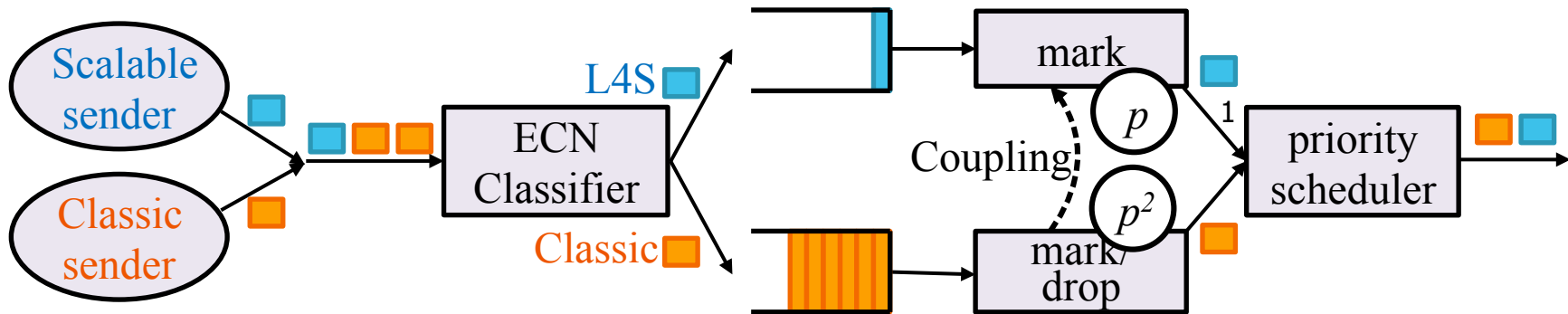
| NCHbH TRILL ECN | CitE CCE | Arriving TRILL 3-bit ECN |
|-----------------|----------|--------------------------|
| 00              | 0        | Not-ECT                  |
| 10              | 0        | ECT(0)                   |
| 01              | 0        | ECT(1)                   |
| 11              | 0        | CE                       |
| 00              | 1        | CE                       |
| 10              | 1        | CE                       |
| 01              | 1        | CE                       |
| 11              | 1        | CE                       |

# Changes in Draft -00 > -01

- Last IETF: presented 3 possible solutions
  - draft-00 wrote up solution #2
  - re-written to specify chosen solution: #3
- Renamed two CE fields to:
  - Non-Critical Congestion Experienced
  - Critical Congestion Experienced
- Added section on support for ECN variants
  - pre-congestion notification (PCN)
  - L4S (successful BoF on Tuesday)...

# Adding support to TRILL for Low Latency Low Loss Scalable throughput (L4S)

- for background on L4S see:
  - draft-briscoe-aqm-duaq-coupled, draft-briscoe-tsvwg-ecn-l4s-id



- On transit TRILL RBridge classify on TRILL-ECN field, then

```
Classic queue:
if (p > max(random(), random() ) {
    mark(frame, CCE  $p^2$ )
}
```

```
L4S queue:
if (p > random() ) {
    if (p' > random() ) mark(frame, CCE  $p^2$ )
    else mark(frame, NCCE )  $p-p^2$ 
}
```

- then deferring mark/drop decision to egress gives desired outcome
- without any L4S logic at the egress

# Next Steps

- Review the draft please
  - comprehensibility
  - Implementability
- WG adoption call



# End

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