Tunnelling of Explicit Congestion Notification

draft-briscoe-tsvwg-ecn-tunnel-08.txt

PCN-specific highlights

Bob Briscoe, BT

IETF-77 pcn Mar 2010

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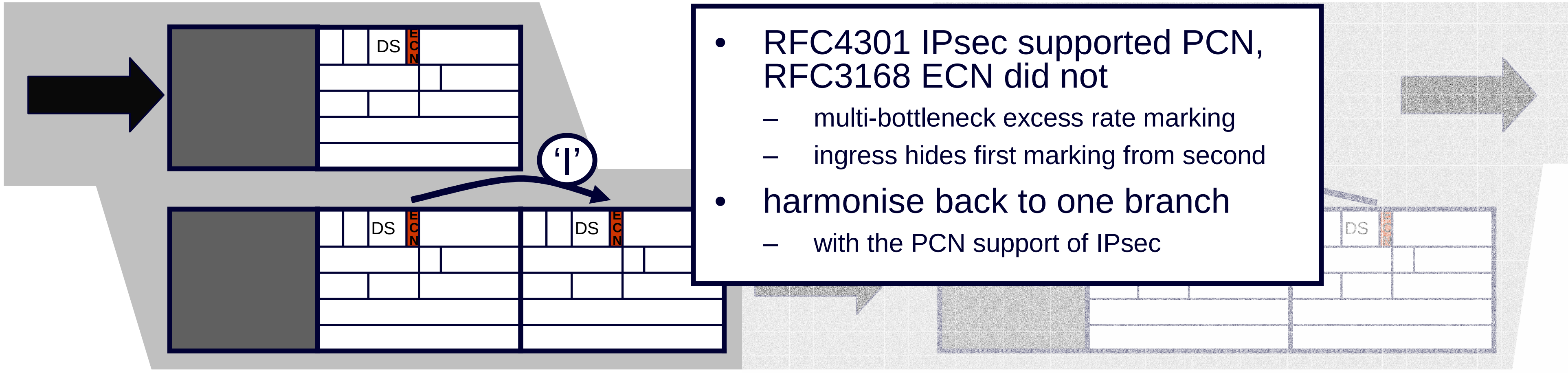
status

- Tunnelling of Explicit Congestion Notification
  - **revised WG draft:** draft-ietf-tsvwg-ecn-tunnel-08.txt 03 Mar ‘10
  - **intended status:** standards track
  - **updates:** 3168, 4301 (if approved)
  - **RFC pub target:** Dec ‘09
  - **immediate intent:** in WG last call & Security Directorate review
  - **w-gs & r-gs affected:** TSVWG, PCN, ICCRG, IPsecME, Int Area?
- revised four times since last IETF, 04 - 08:
  - consensus on functional changes & alarms
  - additions for PCN support remain intact
  - tightening up of normative words
  - PCN-specific appendices marked for deletion – added summaries in main body
  - re-reviews: Gorry Fairhurst, David Black
  - new reviews: Michael Menth, Teco Boot
- minutiae are important – these are changes to IP

recap of the tunnel ingress issue



- RFC4301 IPsec supported PCN, RFC3168 ECN did not
  - multi-bottleneck excess rate marking
  - ingress hides first marking from second
- harmonise back to one branch
  - with the PCN support of IPsec

encapsulation at tunnel ingress

decapsulation at tunnel egress

'I'

incoming header (also = outgoing inner)	outgoing outer		
	RFC3168 ECN limited functionality	~~RFC3168 ECN full functionality~~	RFC4301 IPsec
Not-ECT	Not-ECT	~~Not-ECT~~	Not-ECT
ECT(0)	Not-ECT	~~ECT(0)~~	ECT(0)
ECT(1)	Not-ECT	~~ECT(1)~~	ECT(1)
CE	Not-ECT	~~**ECT(0)**~~	**CE**
ecn-tunnel	unchanged **compatibility mode** for legacy	**'reset' CE no longer used**	becomes **normal mode** for all IP in IP

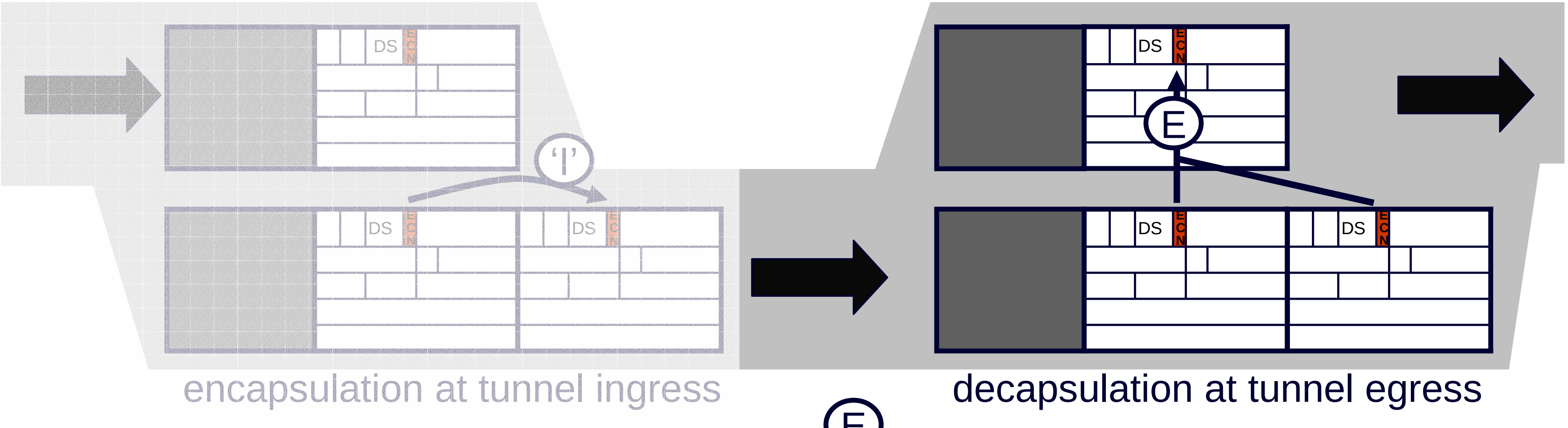
changes to standards actions
draft-04 → 08

- normal mode at ingress (§4.3)
  - distinction much clearer: "MUST implement" and "SHOULD use“
  - otherwise could be lazily interpreted as “SHOULD implement”
  - if only implement compatibility mode, wouldn’t add ECN/PCN support
  - closes “compliant if do nothing” loophole used in the past

Incoming Header	Outgoing Outer Header	
	Compatibility Mode	Normal Mode
Not-ECT	Not-ECT	Not-ECT
ECT(0)	Not-ECT	ECT(0)
ECT(1)	Not-ECT	ECT(1)
CE	Not-ECT	**CE**

recap of ingress modes

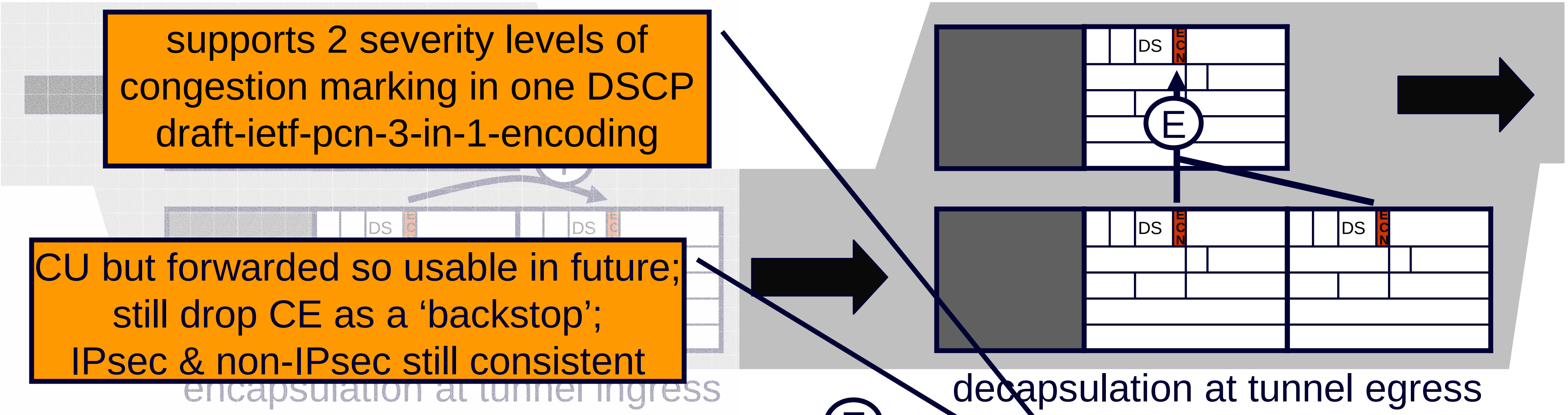
recap egress behaviour in existing RFCs


DS
ECN
'I'
DS
ECN
DS
ECN
encapsulation at tunnel ingress
DS
ECN
E
DS
ECN
DS
ECN
decapsulation at tunnel egress

- OK for current ECN
  - 1 severity level of congestion
- any outer changes betw ECT(0/1) lost
  - reason: to restrict covert channel
(but 2-bit now considered manageable)
  - effectively wastes ½ bit in IP header
- **prevents PCN using this transition**

incoming inner	E incoming outer			
	Not-ECT	ECT(0)	ECT(1)	CE
Not-ECT	Not-ECT	Not-ECT	Not-ECT	drop Not-ECT
ECT(0)	ECT(0)	ECT(0)	ECT(0)	CE
ECT(1)	ECT(1)	ECT(1)	ECT(1)	CE
CE	CE	CE	CE	CE
	Outgoing header (RFC4301 \ RFC3168)			

‘final’ egress rules (since -05)



DS
ECN
E
encapsulation at tunnel ingress
decapsulation at tunnel egress

supports 2 severity levels of congestion marking in one DSCP draft-ietf-pcn-3-in-1-encoding

CU but forwarded so usable in future; still drop CE as a ‘backstop’; IPsec & non-IPsec still consistent

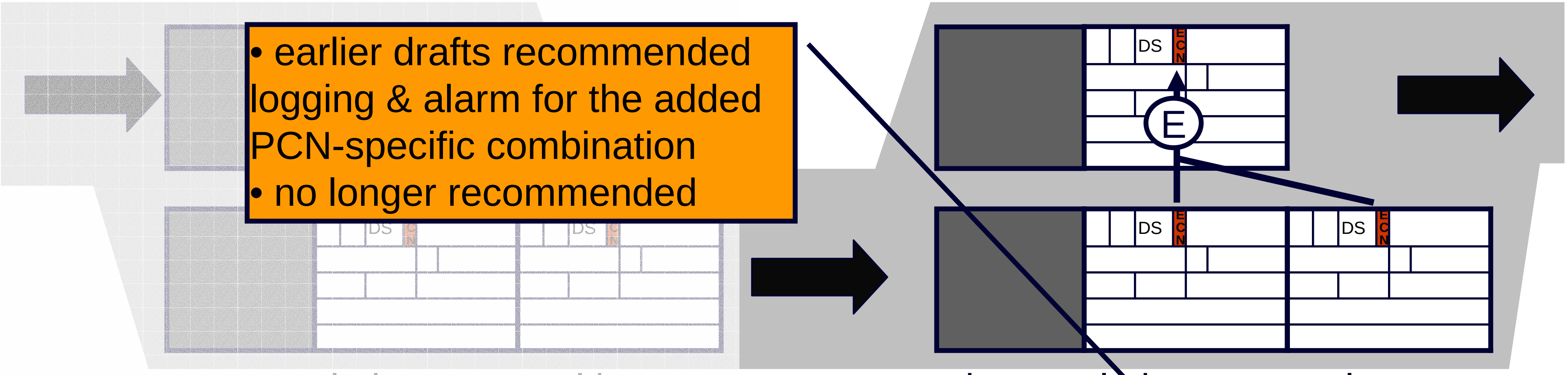
- cater for ECT(1) meaning either more severe or same severity as ECT(0)
  - for PCN or similar schemes that signal 2 severity levels
- drop potentially unsafe unused combination
  - where high severity congestion marked in outer but inner says transport won’t understand

E

incoming inner	incoming outer			
	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 (proposed update)
(bold = proposed change for all IP in IP)

‘final’ egress CU alarms (since -05)


DS
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decapsulation at tunnel egress

- earlier drafts recommended logging & alarm for the added PCN-specific combination
- no longer recommended

- cater for ECT(1) meaning either more severe or same severity as ECT(0)
  - for PCN or similar schemes that signal 2 severity levels
- drop potentially unsafe unused combination
  - where high severity congestion marked in outer but inner says transport won’t understand
- only changing currently unused combinations
  - optional alarms added to unused combinations
- only tunnels that need the new capability need to comply
  - an update, not a fork
  - no changes to combinations used by existing protocols (backward compatible)

incoming inner	incoming outer			
	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 (proposed update)
(bold = proposed change for all IP in IP)

3 types of currently unused (SHOULD log, MAY alarm)

1. (**!!!**) = always CU, always potentially dangerous
2. (!) = always CU, possibly dangerous
3. CU in this deployment (operator specific)

next steps

- In WG last call & Security Directorate review
- issues or messages of support to tsvwg list please

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Q&A