# Propagating ECN across IP tunnel Headers Separated by a Shim

draft-ietf-tsvwg-rfc6040update-shim-05
(posted this morning, sorry)

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Problem #1

- RFC6040 "Tunnelling of ECN";
  scope was all IP-in-IP tunnels

- rfc6040update-shim clarifies that scope of
  RFC6040 includes cases with shim

  - most feasible to propagate ECN if shim 'tightly coupled'
    (added in same step as IP outer)

IPv4 or v6
shim
IPv4 or v6

IPv4 or v6
L2
shim
IPv4 or v6

?
L2
shim
IPv4 or v6

outer
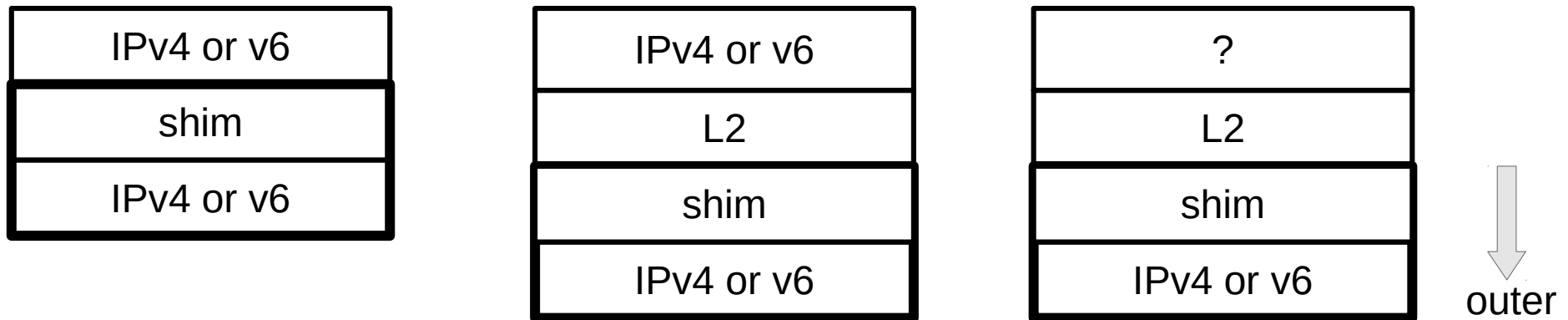
- Standards track, so it can update standards track
  RFC6040 and shim tunnel RFCs

Problem #2: unique to ECN

- Both Diffserv (traffic class) and ECN have to propagate across layers
  - DS propagates 'requirements' down
  - ECN propagates...
    - ECN field down (copy)
    - congestion experienced (CE) up
- forwarded ECN constructed from inner and outer on decap [RFC6040]
- If ECN decap behaviour absent, encap MUST zero ECN outer
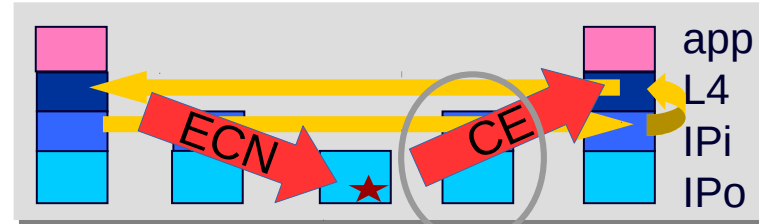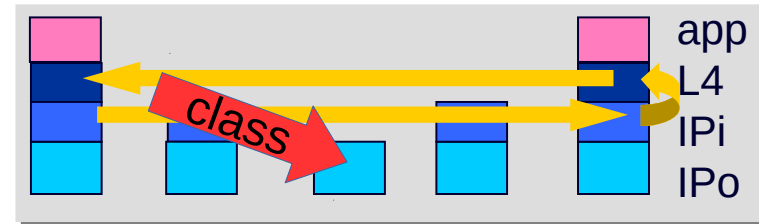
incoming inner	incoming outer			
	Not-ECT	ECT(0)	ECT(1)	CE
Not-ECT	Not-ECT	Not-ECT	Not-ECT	drop
ECT(0)	ECT(0)	ECT(0)	ECT(1)	CE
ECT(1)	ECT(1)	ECT(1)	ECT(1)	CE
CE	CE	CE	CE	CE
	Outgoing header			
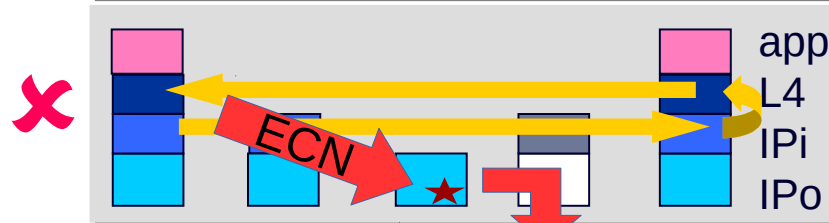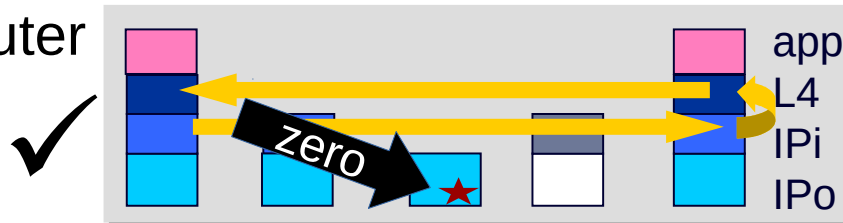
Survey of IP-shim-(L2)-IP encaps

Protocol	RFC	STDs or widely deployed	AOK	NOK: 6040shim updates		NOK: non-IETF: update recom'n'd
				Safe config	protocol	
Geneve	nvo3-geneve	✓	✓			
GUE	intarea-gue	✓	✓			
SFC	7665	✓	N/A?			
VXLAN	7348	✓				✓
VXLAN-GPE	nvo3-vxlan-gpe	✗				
LISP	6830	✓	✓			
CAPWAP	5415	✓	✓			
Teredo	4380	✓		✓	✗	
GTP	v1, v1U,v2C	✓				✓
GRE	2784	✓		✓		
NVGRE	7637	✓		⇧		
MIP4	5944	✓		⇧	✗	
MIP6	6275	✓		⇧	✗	
PMIP	5845	✓		⇧	✗	
L2TPv3	3931	✓		✓	✓	
L2TPv2	2661	✓		✓	✓	
PPTP	2637	✗				
UDP	8085	✓	✓			
AMT	7450	✓		✓	✓	
TCP+IKE/IPsec	8229	✓	✓			

Why update some protocols but not others?

- In all cases, each base protocol RFC has been updated with an "operator safe configuration" clause
    - Places ref to ECN problem and solution in "Updated by" header

- Protocol Spec:

  if ((a maintainer of the protocol could be found)
       && (it seemed like code might get updated)
       && (I was confident I knew the implications of the update))
           {I proposed fix to the control plane protocol, iterated, done}
  else

Updates to standards track tunnel RFCs added this IETF cycle

- AMT (Automatic Multicast Tunnelling)
  - Updates to RFC 7450:
    - defined new flag on Request message for gateway to declare its ECN capability to the relay that will tunnel towards it (unidirectional)
    - Operator required to follow safe config in present spec
  - ACK: Jake Holland
- GRE (Generic Routing Encapsulation)
  - Update to RFC2784:
    - Operator required to follow safe config in present spec
  - Referred to (but not updated) 4 control protocols that are known to set up GRE tunnels
    - MIP4, MIP6, PMIP, IKEv2
  - ACK: Sri Gundavelli

Status and Next Steps
draft-ietf-tsvwg-rfc6040update-shim-05

- Rev posted this morning (sorry)

- Milestone: WGLC Sep 2017

- Been pushing to meet that,
  ready now - not so late

- Corridor chat this week might lead to updates to outstanding protocols (Teredo, (P)MIP)
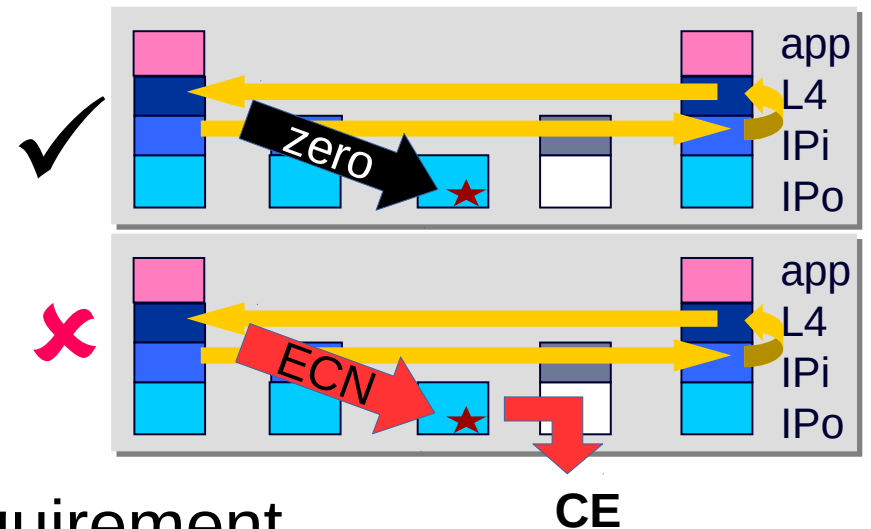 - Assume not

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Q&A

Compliance requirement for non-RFC6040 implementations!?

- Written as an operator config requirement
    - if decap does not, or might not, propagate ECN to RFC 6040 (or equiv), if possible, the operator MUST configure the ingress to zero the outer ECN field

- Prerequisite implementation requirement
    - Config of ECN encap MUST be independent from DSCP encap

- Added text updates RFC 6040, and shim tunnel RFCs