DSCP and the Evil Bit

Runa Barik (UiO), Michael Welzl (UiO),   Ahmed Elmokashfi (SRL)

maprg @96th IETF Meeting
Berlin, Germany
18th July 2015

Motivation

- The Internet could ideally use the IP header for special treatment to the packet; but, which bits in the header can be used?
- Middleboxes in private networks also modify/drop the packets limiting the protocol innovations.
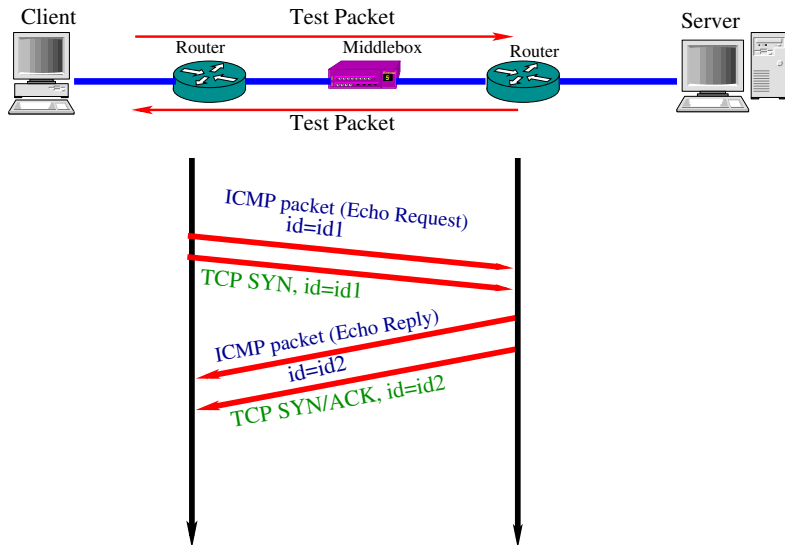- This work complements to our paper in ANRW'16 [1].

In this context, we focus on:

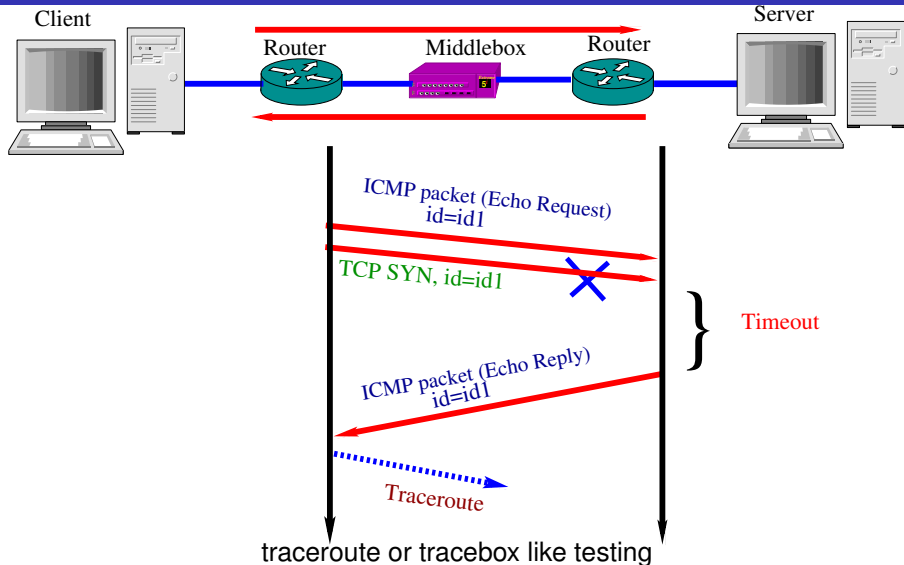- How middleboxes react to packets with different DSCP values, and Evil bit.

---

[1] Runa Barik, Michael Welzl, Ahmed Elmokashfi, " *How to say that you're special: Can we use bits in the IPv4 header?* ", in ANRW'16
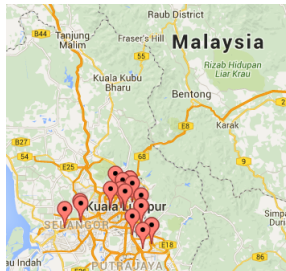
Test methodology

traceroute or tracebox like testing
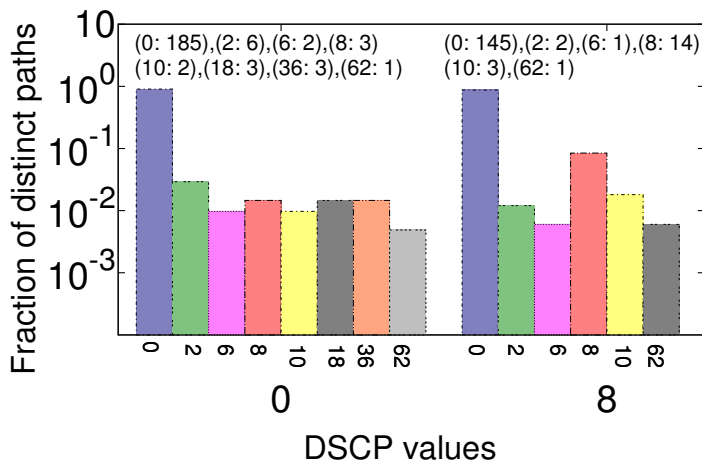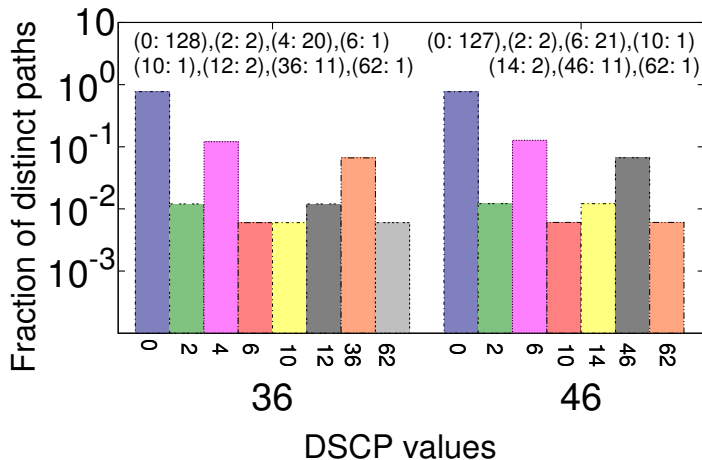
Test Locations

(a) Travel to India

(b) Malaysia

Change of DSCP values

x-axis: the lower (larger) number is the original DSCP value, the upper (smaller) number is the changed value. The brackets on the top show the absolute number of paths (IP address pairs).
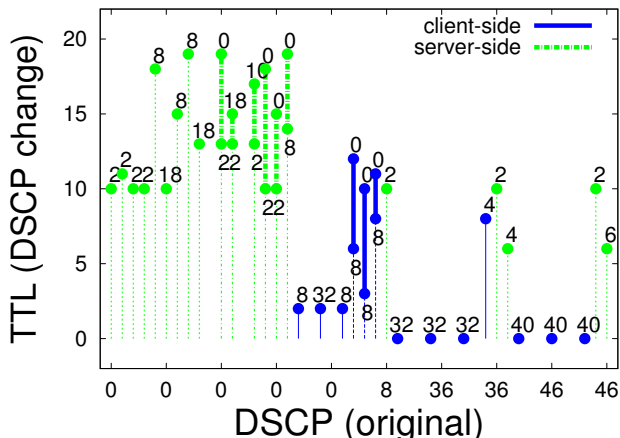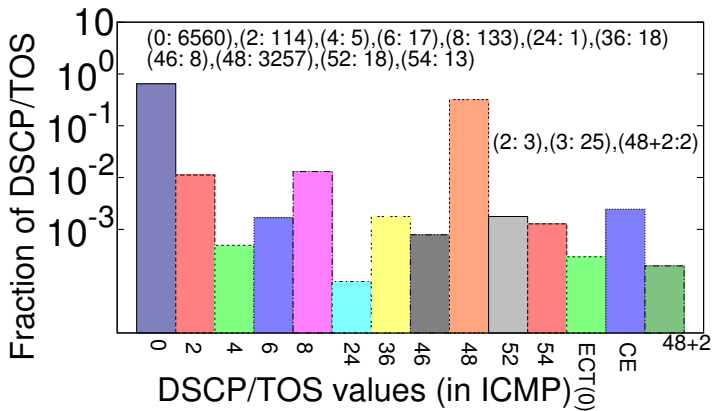
Change of DSCP values

Table: DSCP packet-drop noticed in Countries

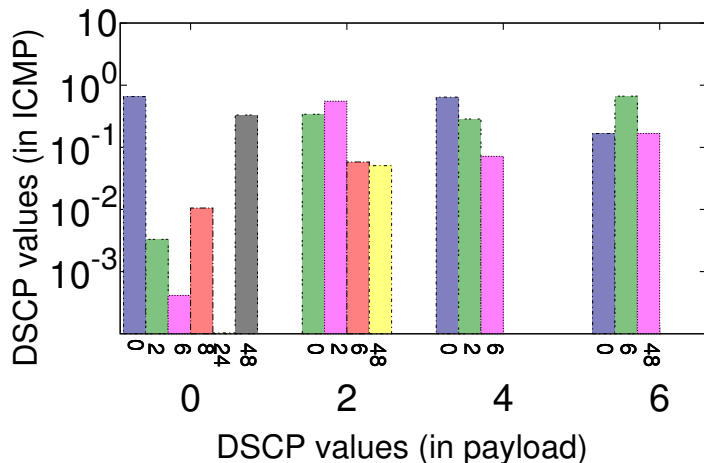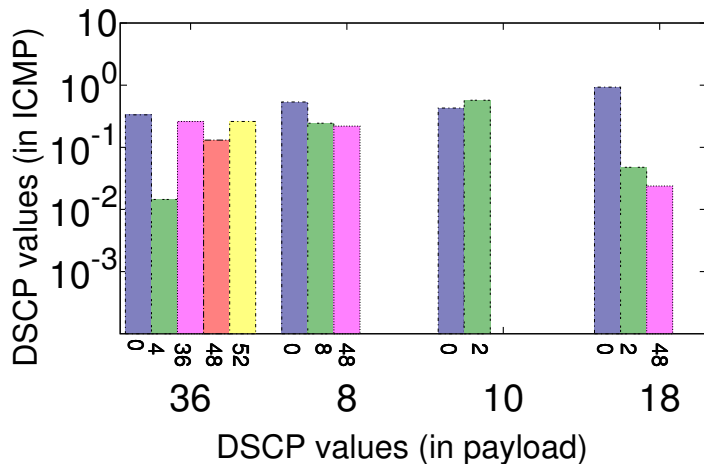| Src. Countries	Dst. Countries	DSCP initial	Change Location	Drop Location
Oregon	Kuala Lumpur, Malaysia	CS1		Amazon Tech. Inc.
Norway (ISP2)	Kuala Lumpur, Malaysia	AF42	TELIANET (4)	TMNet Telekom Malaysia
		EF	TELIANET (6)	TMNet Telekom Malaysia

DSCP/TOS values in ICMP time-exceeded Message

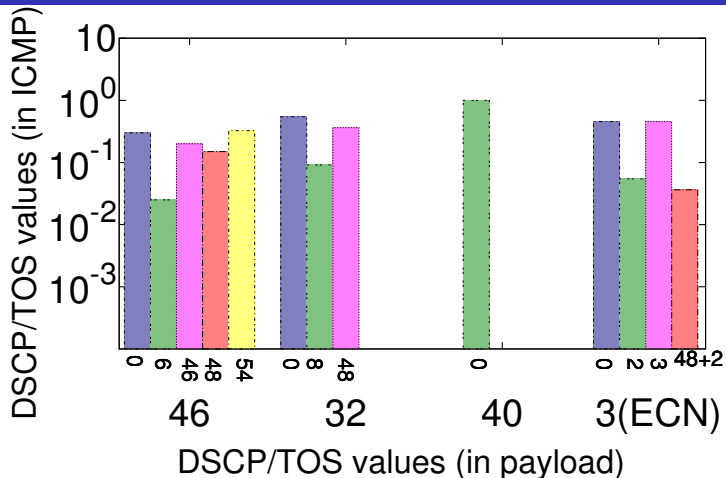The brackets on the top show (DSCP value in ICMP: number of packets)

Y-axis: Fraction of different DSCP values in IP header of ICMP messages,
while the payload IP header contains DSCP values of 0, 2, 4, or 6

Y-axis: Fraction of different DSCP values in IP header of ICMP messages, while the payload IP header contains DSCP values of 8, 10, 18, or 36

Contd.

Y-axis: Fraction of different DSCP/TOS values in IP header of ICMP messages, while the payload IP header contains DSCP/TOS values of 32, 40, 46, or 3 (CE)

Evil bit

- In 169 out of 205 paths, packets with Evil bit set passed successfully.
- However, DSCP values are stripped or remain unchanged in around 165 paths.
- No modification to Evil bit on successful paths.

Thank you!