

Polka attack simulations

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Baseline measurements

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Before we start attacking the network and comparing digests, we need to establish a baseline for correct operation.

For that, we will ping host `h10` from host `h1` and measure the packet through all controlled interfaces. Always using the hardcoded timestamp `0x61E8D6E7` unless said otherwise.

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- one digest for entrance edge + 10 core switches (11)
- two captures per switch (one for each interface) (22)
- two times that for the reply (44)
- two times that for the ping and reply the other way (88)

So in a trace, we expect the packets to appear in the following order:

A =

0x61E8D6E7 e1
0xAE91434C s1
0x08C97F5F s2
0xEFF1AAD2 s3
0x08040C89 s4
0xAA99AE2E s5
0x7669685E s6
0x03E1E388 s7
0x2138FFD3 s8
0x1EF2CBBE s9
0x99C5FE05 s10

B =

0x61E8D6E7 e10
0xCFFABC9F s10
0x69409E70 s9
0xF3E992E0 s8
0x8DDE192B s7
0x92B098FA s6
0x1115A62C s5
0x41E1B5E0 s4
0x227F0B72 s3
0x82FC6346 s2
0xD01E3E0F s1

Order = dup(A), dup(B), dup(B), dup(A)
dup([a, b, c]) = [a, a, b, b, c, c]

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0x61E8D6E7 e1
0xAE91434C s1
0x08C97F5F s2
0xEFF1AAD2 s3
0x08040C89 s4
0xAA99AE2E s5
0x7669685E s6
0x03E1E388 s7
0x2138FFD3 s8
0x1EF2CBBE s9
0x99C5FE05 s10

B =

0x61E8D6E7 e10
0xCFFABC9F s10
0x69409E70 s9
0xF3E992E0 s8
0x8DDE192B s7
0x92B098FA s6
0x1115A62C s5
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0x82FC6346 s2
0xD01E3E0F s1

Order = dup(A), dup(B), dup(B), dup(A)

dup([a, b, c]) = [a, a, b, b, c, c]

For brevity, dup will be omitted since it's information is irrelevant, but it will be checked regardless

Ping h1 \rightarrow h10

name	e1
digest	0x61E8D6E7
expected	0x61E8D6E7

name	s1
digest	0xAE91434C
expected	0xAE91434C

name	s2
digest	0x08C97F5F
expected	0x08C97F5F

name	s3
digest	0xEFF1AAD2
expected	0xEFF1AAD2

name	s4
digest	0x08040C89
expected	0x08040C89

name	s5
digest	0xAA99AE2E
expected	0xAA99AE2E

name	s6
digest	0x7669685E
expected	0x7669685E

name	s7
digest	0x03E1E388
expected	0x03E1E388

name	s8
digest	0x2138FFD3
expected	0x2138FFD3

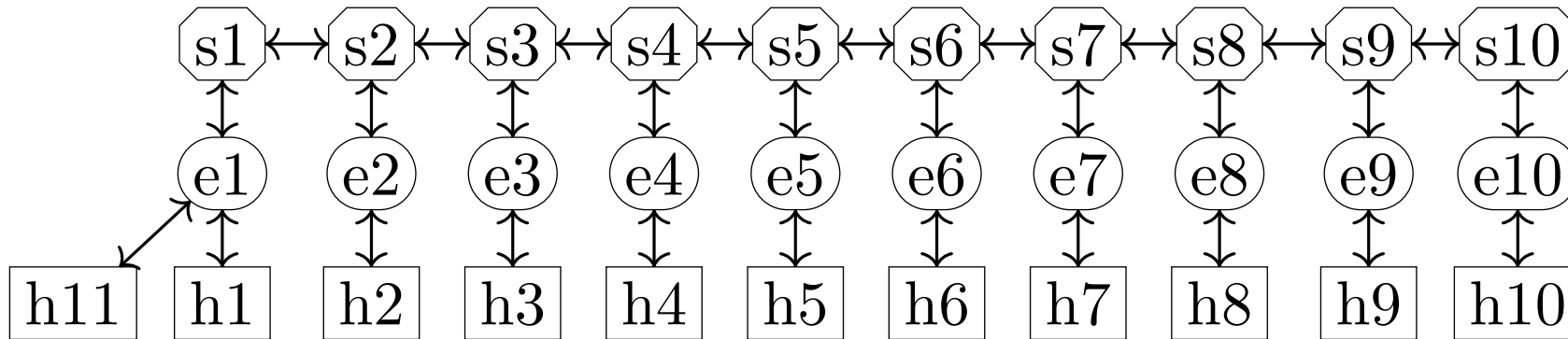
name	s9
digest	0x1EF2CBBE
expected	0x1EF2CBBE

name	s10
digest	0x99C5FE05
expected	0x99C5FE05

Ping h1 → h10 Reply

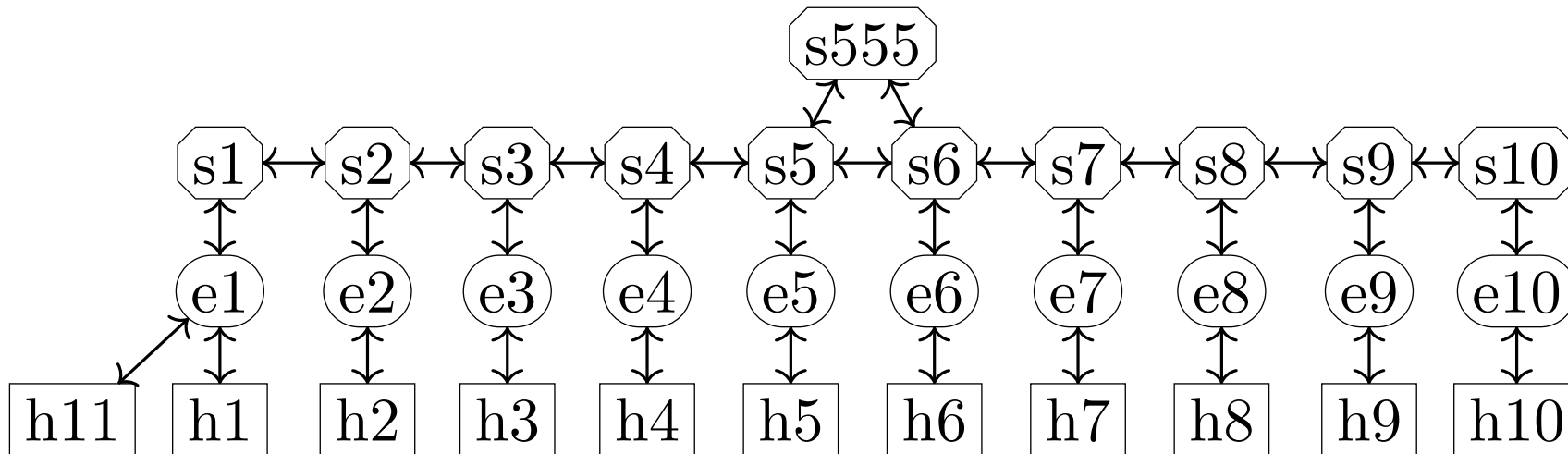
name	e10	name	s10	name	s9	name	s8
digest	0x61E8D6E7	digest	0xCFFABC9F	digest	0x69409E70	digest	0xF3E992E0
expected	0x61E8D6E7	expected	0xCFFABC9F	expected	0x69409E70	expected	0xF3E992E0
name	s7	name	s6	name	s5	name	s4
digest	0x8DDE192B	digest	0x92B098FA	digest	0x1115A62C	digest	0x41E1B5E0
expected	0x8DDE192B	expected	0x92B098FA	expected	0x1115A62C	expected	0x41E1B5E0
name	s3	name	s2	name	s1		
digest	0x227F0B72	digest	0x82FC6346	digest	0xD01E3E0F		
expected	0x227F0B72	expected	0x82FC6346	expected	0xD01E3E0F		

Base topology



$s\{n\} \leftrightarrow s\{n + 1\}$ connects through port 2:1

Attacked topology



$s_5 \leftrightarrow s_{555}$ connects through port 2:0

$s_{555} \leftrightarrow s_6$ connects through port 1:2

$s_5 \leftrightarrow s_6$ connects through port 3:3

Ping h1 \rightarrow h10

name	e1	name	s1	name	s2	name	s3
digest	0x61E8D6E7	digest	0xAE91434C	digest	0x08C97F5F	digest	0xEFF1AAD2
expected	0x61E8D6E7	expected	0xAE91434C	expected	0x08C97F5F	expected	0xEFF1AAD2
name	s4	name	s5	name	attacer	name	s6
digest	0x08040C89	digest	0xAA99AE2E	digest	0xC450DD37	digest	0x5397C754
expected	0x08040C89	expected	0xAA99AE2E	expected	0x7669685E	expected	0x7669685E
name	s7	name	s8	name	s9	name	s10
digest	0xE21DAB66	digest	0x8C375948	digest	0x352F1CF8	digest	0x3a61c724
expected	0x03E1E388	expected	0x2138FFD3	expected	0x1EF2CBBE	expected	0x99C5FE05

Ping h1 → h10 Reply

name	e10	name	s10	name	s9	name	s8
digest	0x61E8D6E7	digest	0xCFFABC9F	digest	0x69409E70	digest	0xF3E992E0
expected	0x61E8D6E7	expected	0xCFFABC9F	expected	0x69409E70	expected	0xF3E992E0
name	s7	name	s6	name	s5	name	s4
digest	0x8DDE192B	digest	0x92B098FA	digest	0x1115A62C	digest	0x41E1B5E0
expected	0x8DDE192B	expected	0x92B098FA	expected	0x1115A62C	expected	0x41E1B5E0
name	s3	name	s2	name	s1		
digest	0x227F0B72	digest	0x82FC6346	digest	0xD01E3E0F		
expected	0x227F0B72	expected	0x82FC6346	expected	0xD01E3E0F		

Ping h10 \rightarrow h1

name	e10
digest	0x61E8D6E7
expected	0x61E8D6E7

name	s10
digest	0xCFFABC9F
expected	0xCFFABC9F

name	s9
digest	0x69409E70
expected	0x69409E70

name	s8
digest	0xF3E992E0
expected	0xF3E992E0

name	s7
digest	0x8DDE192B
expected	0x8DDE192B

name	s6
digest	0x92B098FA
expected	0x92B098FA

name	s5
digest	0x1115A62C
expected	0x1115A62C

name	s4
digest	0x41E1B5E0
expected	0x41E1B5E0

name	s3
digest	0x227F0B72
expected	0x227F0B72

name	s2
digest	0x82FC6346
expected	0x82FC6346

name	s1
digest	0xD01E3E0F
expected	0xD01E3E0F

Ping h10 → h1 Reply

name	e10	name	s10	name	s9	name	s8
digest	0x61E8D6E7	digest	0xAE91434C	digest	0x08C97F5F	digest	0xEFF1AAD2
expected	0x61E8D6E7	expected	0xAE91434C	expected	0x08C97F5F	expected	0xEFF1AAD2
name	s7	name	s6	name	attacker	name	s5
digest	0x08040C89	digest	0xAA99AE2E	digest	0xC450DD37	digest	0x5397C754
expected	0x08040C89	expected	0xAA99AE2E	expected	0x7669685E	expected	0x7669685E
name	s4	name	s3	name	s2	name	s1
digest	0xE21DAB66	digest	0x8C375948	digest	0x352F1CF8	digest	0x3A61C724
expected	0x03E1E388	expected	0x2138FFD3	expected	0x1EF2CBBE	expected	0x99C5FE05