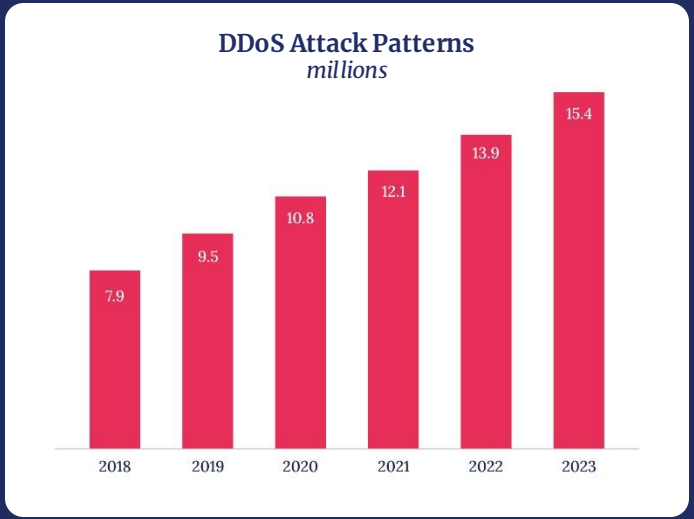
Network Infrastructure Attacks

Simon Kuhn
Head of engineering
NaWas

www.nbip.nl/nawas

Fun Facts about DDoS



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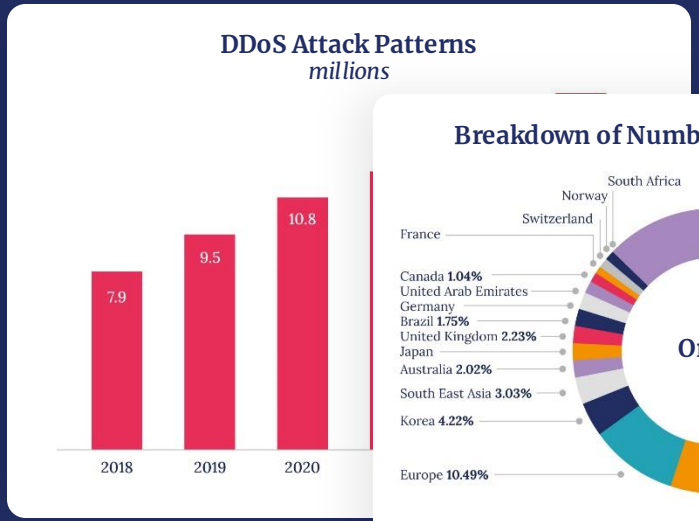

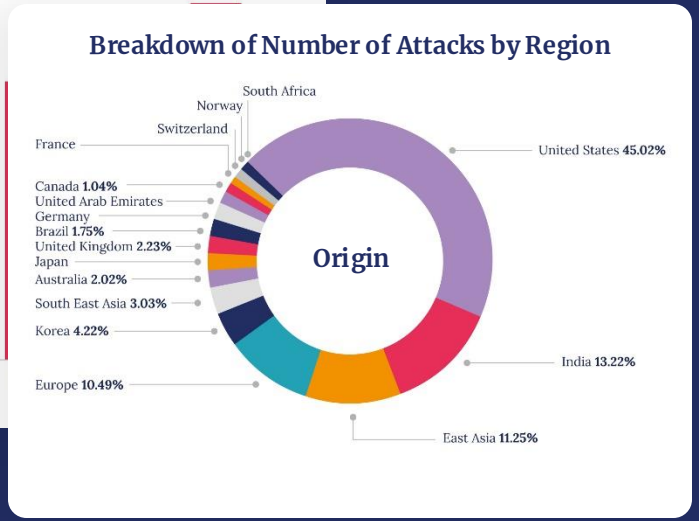

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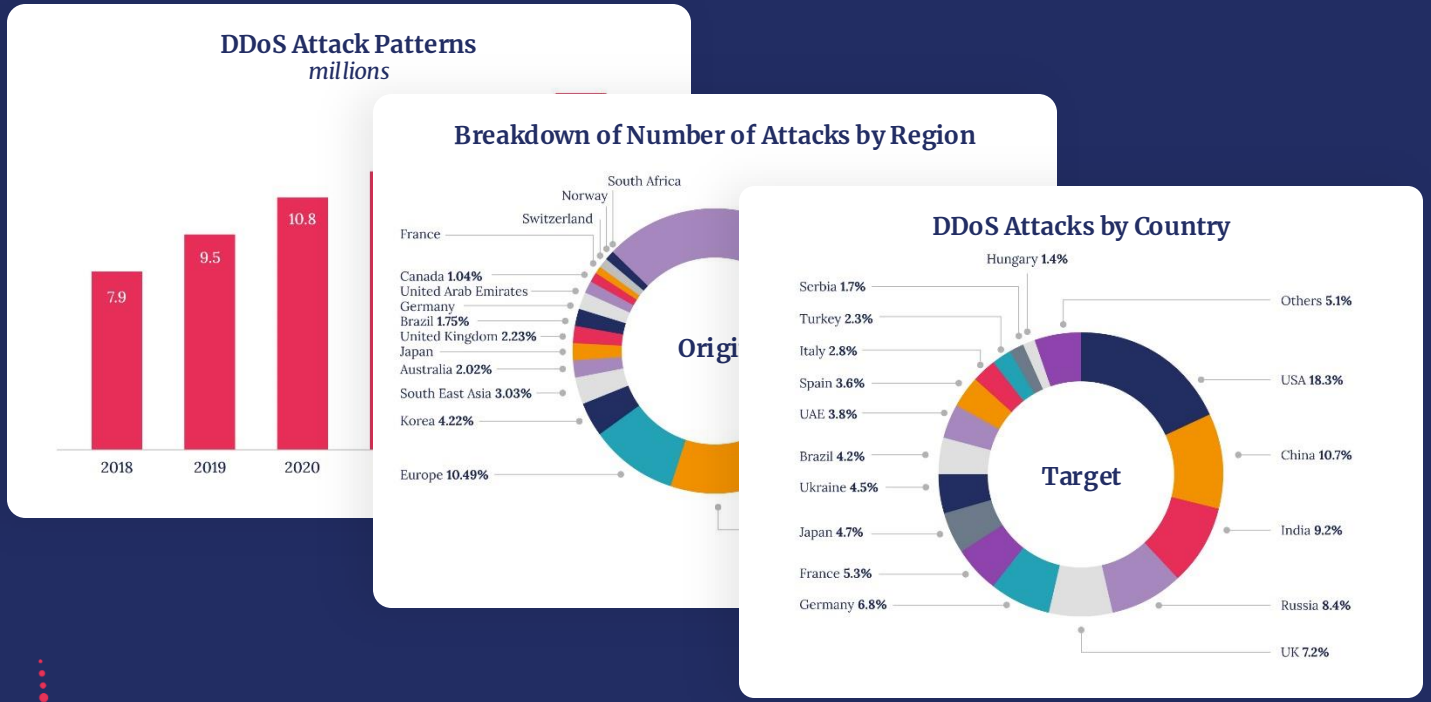

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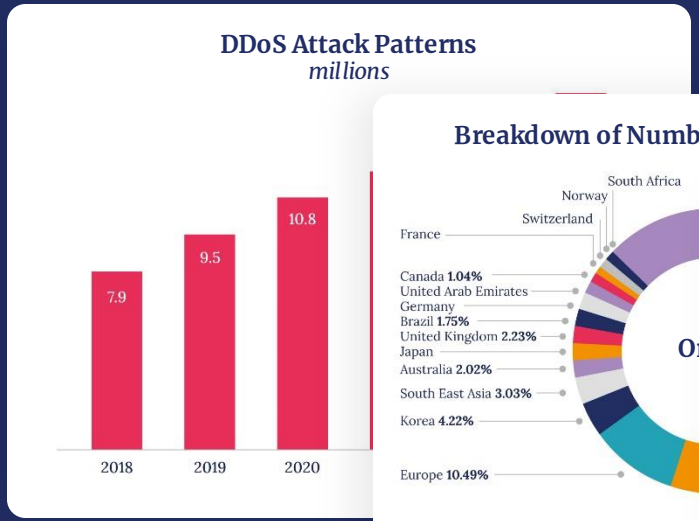

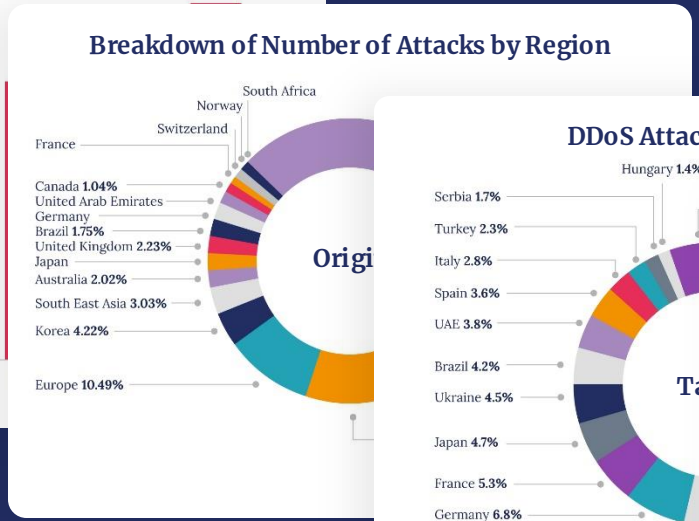

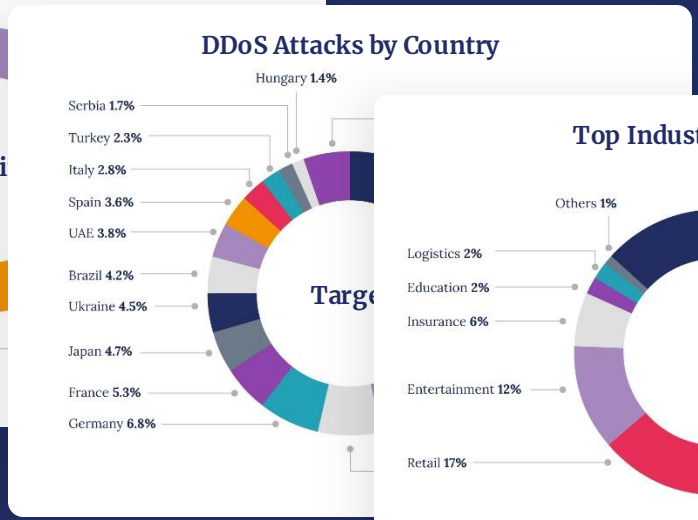

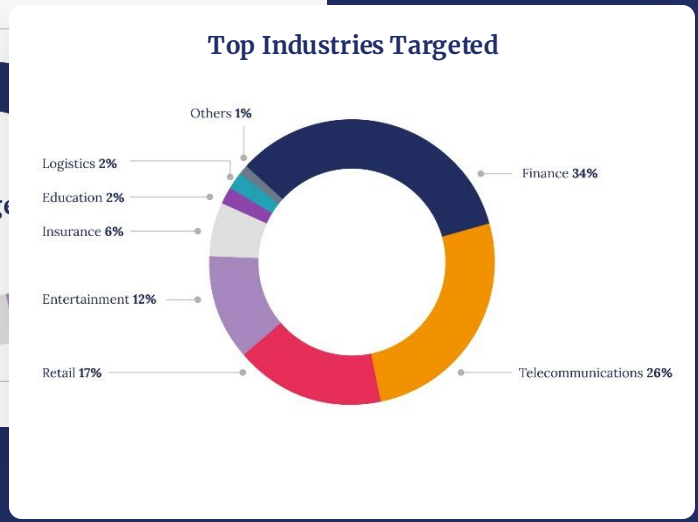

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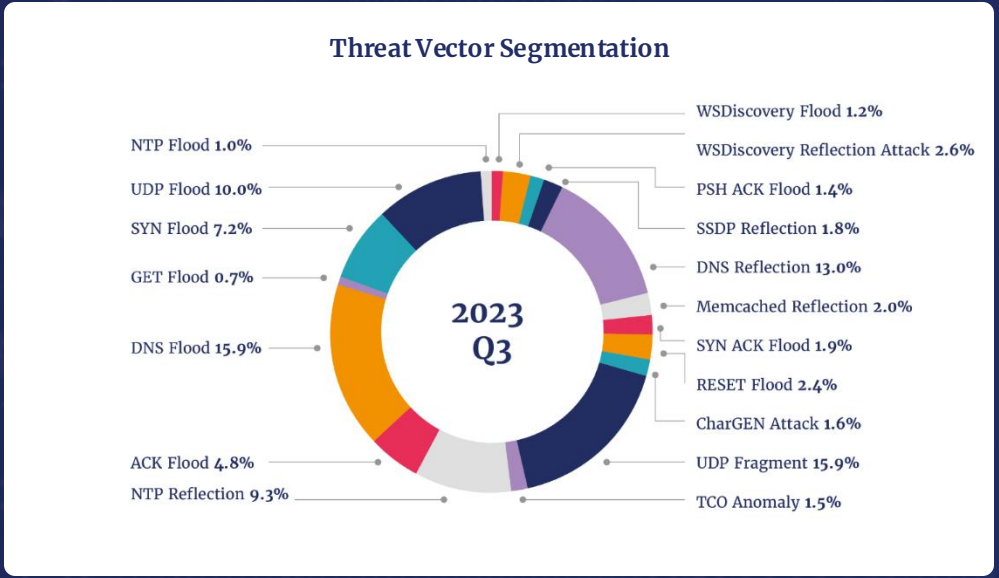
DDoS Reporting – most common vectors



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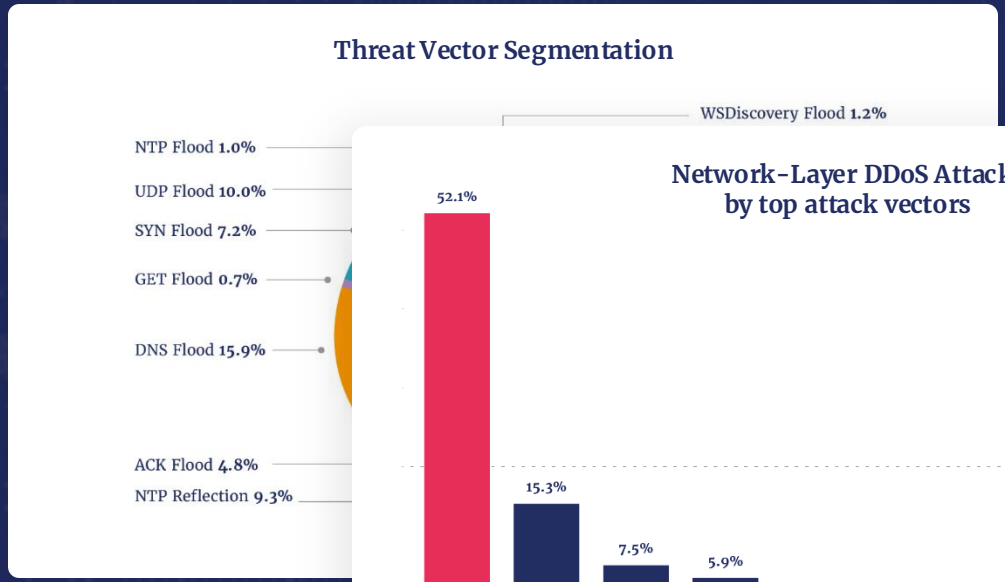

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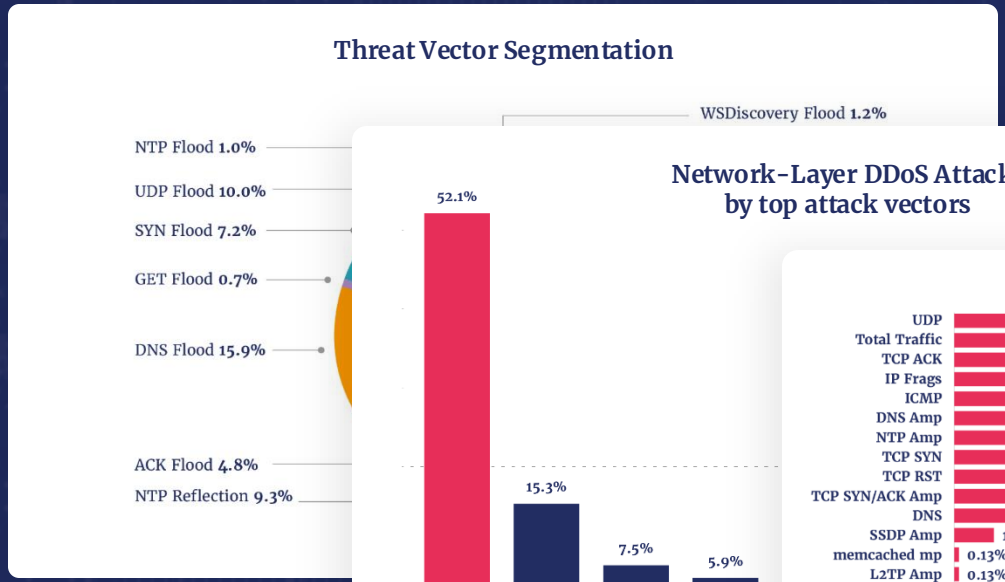

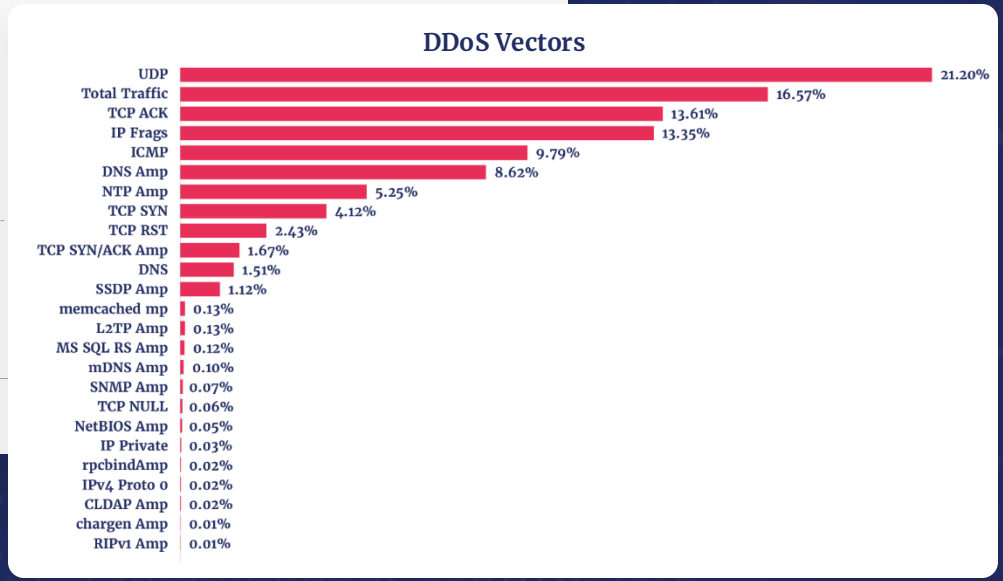

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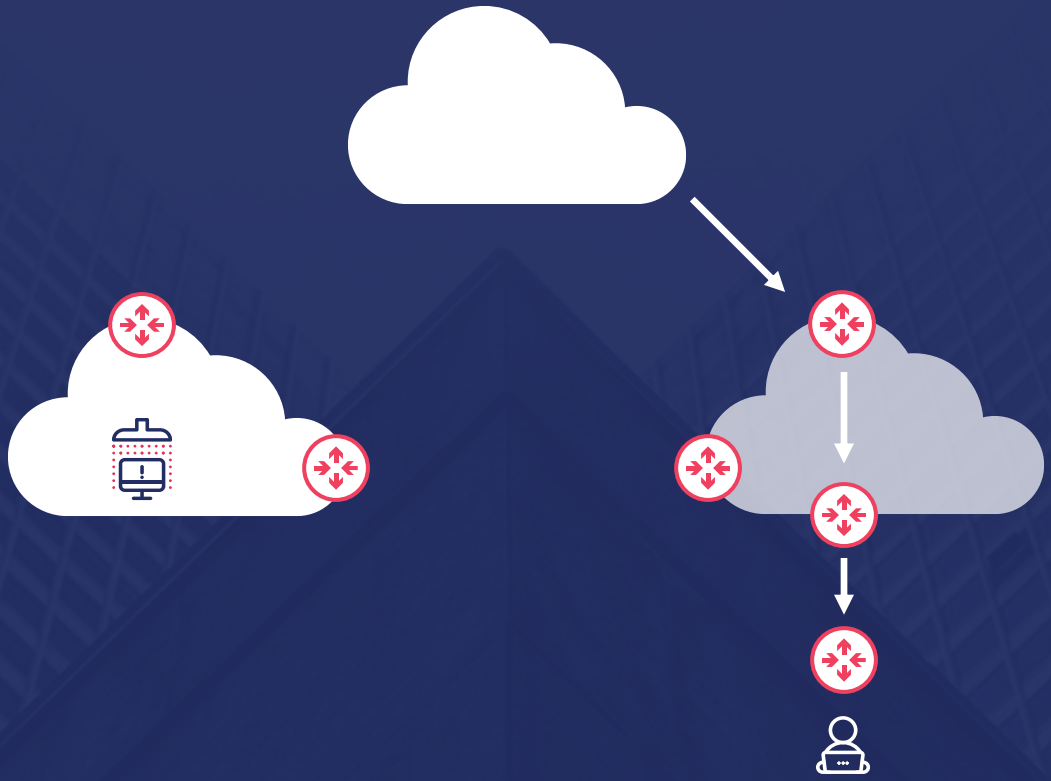
NaWas Architecture



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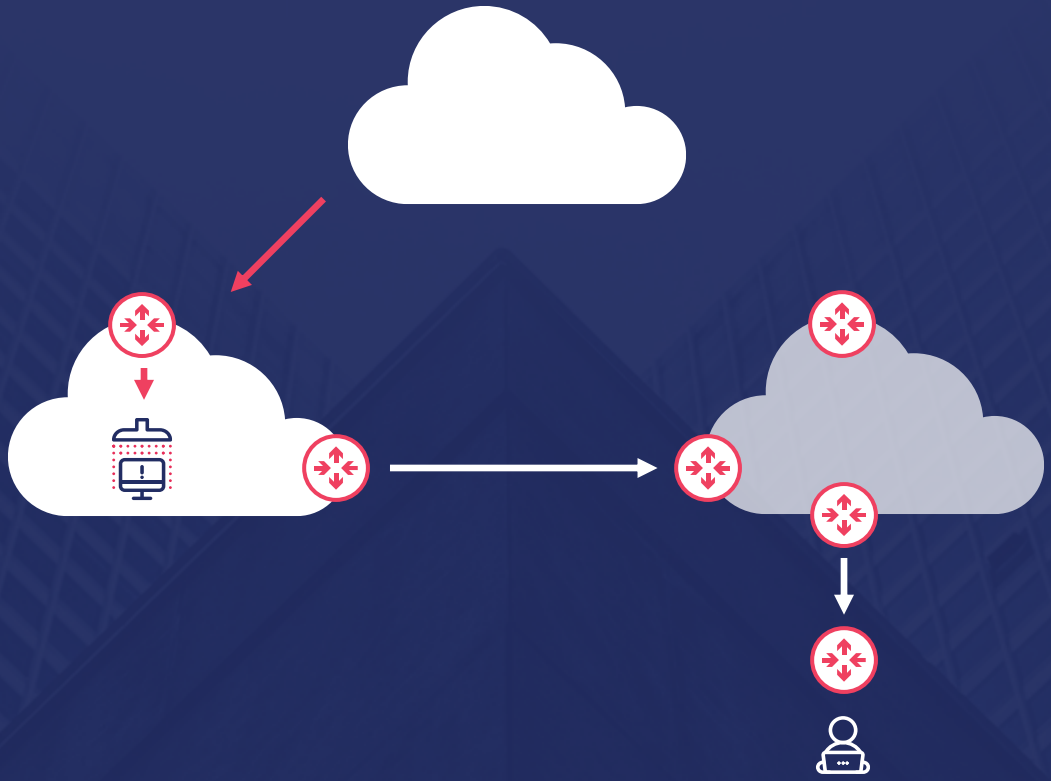
NaWas Architecture



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Detection of target

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ICMP types to keep an eye on

TYPE 3

Destination Unreachable

0 Destination network unreachable
1 Destination host unreachable
2 Destination protocol unreachable
3 Destination port unreachable
4 Fragmentation needed and DF flag set
5 Source route failed

TYPE 5

Redirect Message

0 Redirect datagram for the Network
1 Redirect datagram for the host
2 Redirect datagram for the Type of Service and Network
3 Redirect datagram for the Service and Host

TYPE 11

Time Exceeded

0 Time to live exceeded in transit
1 Fragment reassembly time exceeded

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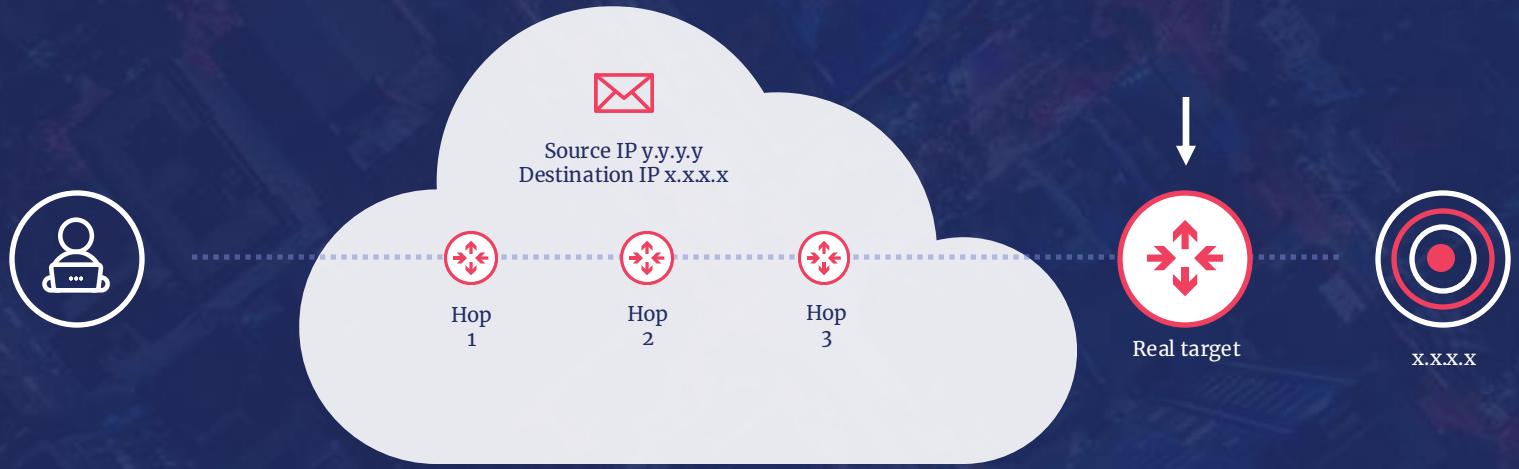

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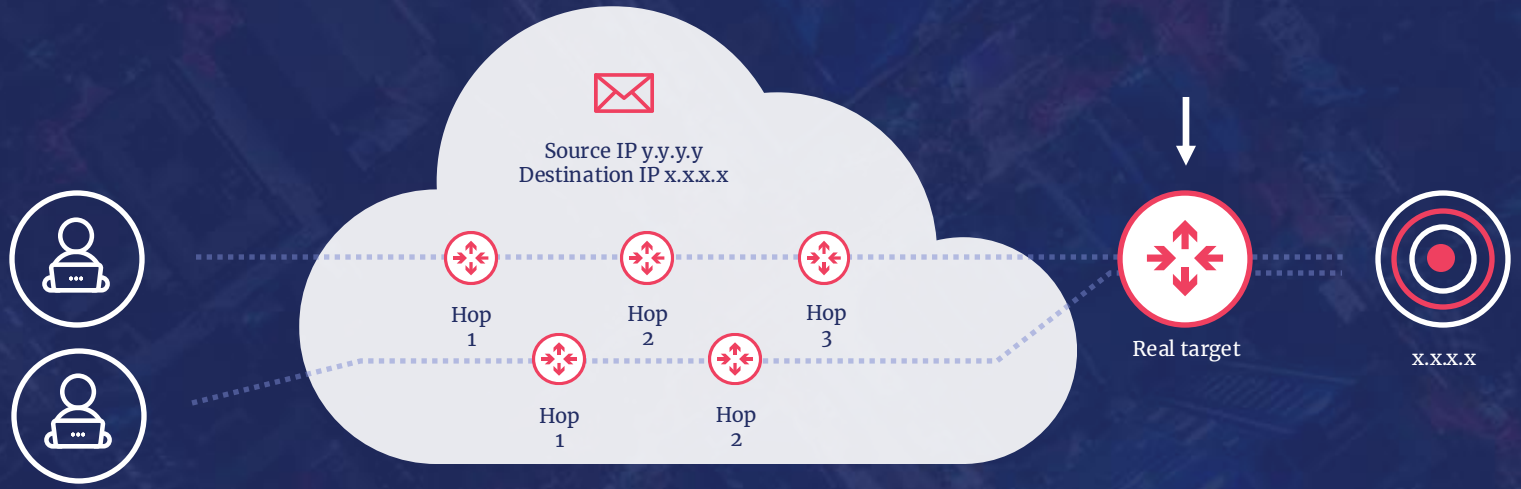

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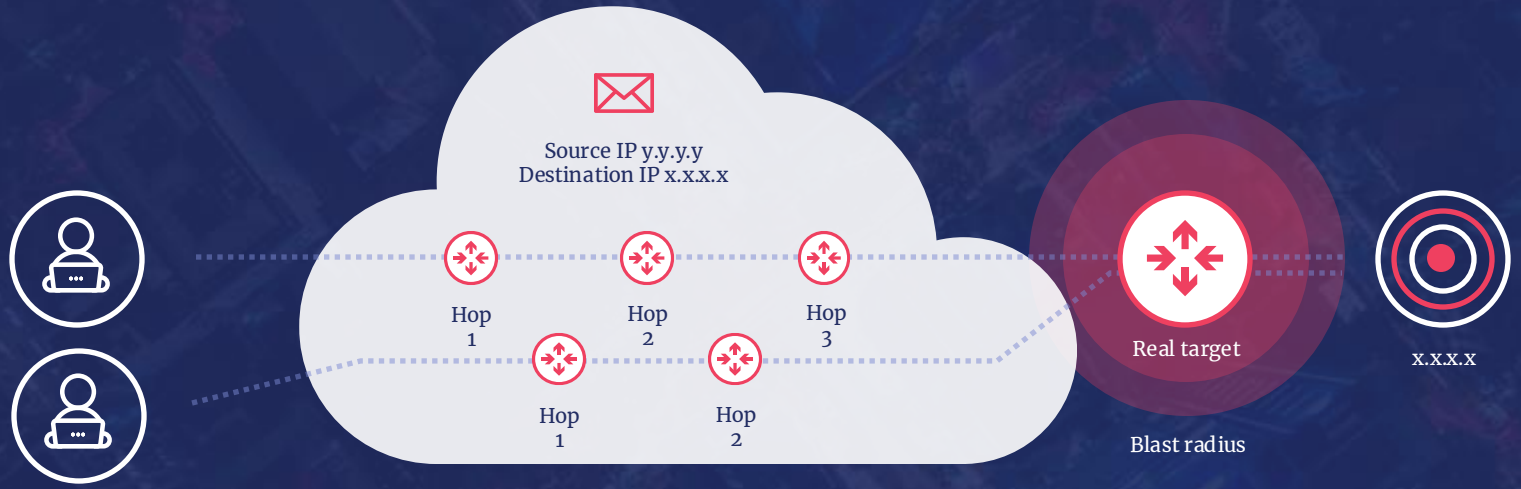

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Detection of target

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BGP

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.12.1	192.168.12.2	TCP	60	37019 > 179 [SYN] Seq=0 Win=16384 Len=0 MSS=1460
2	0.000819	192.168.12.2	192.168.12.1	TCP	58	179 → 37019 [SYN, ACK] Seq=0 Ack=1 Win=16384 Len=0 MSS=1460
3	0.009725	192.168.12.1	192.168.12.2	TCP	60	37019 → 179 [ACK] Seq=1 Ack=1 Win=16384 Len=0
4	0.020192	192.168.12.1	192.168.12.2	BGP	111	OPEN Message
5	0.028136	192.168.12.2	192.168.12.1	TCP	54	179 → 37019 [ACK] Seq=1 Ack=58 Win=16327 Len=0
6	0.032618	192.168.12.2	192.168.12.1	BGP	111	OPEN Message
7	0.035073	192.168.12.2	192.168.12.1	BGP	73	KEEPALIVE Message
8	0.038837	192.168.12.1	192.168.12.2	TCP	60	37019 → 179 [ACK] Seq=58 Ack=77 Win=16308 Len=0
9	0.042187	192.168.12.1	192.168.12.2	BGP	73	KEEPALIVE Message
10	0.049259	192.168.12.1	192.168.12.2	BGP	73	KEEPALIVE Message
11	0.051291	192.168.12.1	192.168.12.2	BGP	131	UPDATE Message, UPDATE Message

```
▸ Frame 7: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
▸ Ethernet II, Src: fa:16:3e:17:10:52 (fa:16:3e:17:10:52), Dst: fa:16:3e:34:1b:14 (fa:16:3e:34:1b:14)
▾ Internet Protocol Version 4, Src: 192.168.12.2, Dst: 192.168.12.1
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  ▸ Differentiated Services Field: 0xc0 (DSCP: CS6, ECN: Not-ECT)
    Total Length: 59
    Identification: 0xb489 (46217)
  ▸ Flags: 0x40, Don't fragment
    ...0 0000 0000 0000 = Fragment Offset: 0
  ▾ Time to Live: 1
      ▸ [Expert Info (Note/Sequence): "Time To Live" only 1]
    Protocol: ICMP (6)
    Header Checksum: 0x2b20 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.12.2
    Destination Address: 192.168.12.1
▸ Transmission Control Protocol, Src Port: 179, Dst Port: 37019, Seq: 58, Ack: 58, Len: 19
▸ Border Gateway Protocol - KEEPALIVE Message
```

```
0000  fa 16 3e 34 1b 14 fa 16  3e 17 10 52 08 00 45 c0   ..>4....>..R..E.
0010  00 3b b4 89 40 00 01 06  2b 20 c0 a8 0c 02 c0 a8   .;..@...+ ......
0020  0c 01 00 b3 90 9b 02 58  2b 5c dd 3a 49 45 50 18   .......X+\.:IEP.
0030  3f c7 ed 08 00 00 ff ff  ff ff ff ff ff ff ff ff   ?...............
0040  ff ff ff ff ff ff 00 13  04                       .........
```

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Unintended consequences

Host	Loss%	Snt	Last	Avg	Best	Worst	StDev
1. 62-3-100-30.dsl.in-addr.zen.co.uk	0.0%	74	0.4	0.5	0.4	0.8	0.1
2. ???							
3. lag-8.p2.thn-lon.zen.net.uk [MPLS: Lbl 24012 Exp 0 S 1 TTL 1]	0.0%	74	12.6	13.7	12.0	32.0	3.4
4. lag-2.br1.thn-lon.zen.net.uk	0.0%	74	17.7	14.2	11.8	35.4	4.4
5. bbr02.lon01.networklayer.com	0.0%	74	12.1	13.5	11.7	30.0	3.2
6. ae5.cbs01.tg01.lon01.networklayer.com [MPLS: Lbl 205039 Exp 0 S 1 TTL 1]	64.4%	74	12.8	15.1	12.6	21.3	2.9
7. ae0.cbs01.xn01.fra01.networklayer.com [MPLS: Lbl 126402 Exp 0 S 1 TTL 1]	41.1%	74	26.7	25.3	23.4	43.4	3.4
8. ae0.cbs02.ic01.mil02.networklayer.com [MPLS: Lbl 809963 Exp 0 S 1 TTL 1]	1.4%	74	32.5	35.7	32.5	61.2	5.4
9. ae7.cbs01.ic01.mil02.networklayer.com [MPLS: Lbl 288384 Exp 0 S 1 TTL 1]	21.9%	73	34.9	35.4	32.6	65.7	5.4
10. 61.13.2da9.ip4.static.sl-reverse.com [MPLS: Lbl 423005 Exp 0 S 1 TTL 1]	30.1%	73	242.4	244.3	242.3	254.7	2.6
11. af.13.2da9.ip4.static.sl-reverse.com [MPLS: Lbl 499542 Exp 0 S 1 TTL 1]	0.0%	73	242.3	244.1	241.8	257.6	3.7
12. cb.12.6132.ip4.static.sl-reverse.com	0.0%	73	242.8	244.1	242.5	254.5	2.5
13. po2.fcr01.sr03.sng01.networklayer.com	30.1%	73	261.2	277.6	260.8	547.7	52.5
14. sip3.nexmo.com	0.0%	73	242.4	243.4	242.1	258.0	2.5

Takeaways

Regularly review Infrastructure protection policies

Consider your architecture changes

Understand impact of throttling certain ICMP packets

ICMP is your Frenemy

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Together Smarter and Stronger

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