Adaptive mitigation of DDoS attacks using BGP Flowspec

How to utilize BGP extension to fight with volumetric DOS attacks and other anomalies

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Driving Network Visibility

Agenda

- What is Flowspec
- Prerequisites
  - Support in devices and softwares
  - Flow export
- How does it work
- Future possibilities
- Live demonstration

What is Flowspec

- Extension of BGP defined in RFC 5575[1], updated at RFC 7674[2]
- Handles distribution of traffic filtering rules
- Supported fields
  - Source and destination address
  - IP protocol
  - Source and destination port
  - ICMP type and code
  - TCP flags
  - Packet length, DSCP, Fragments, interface
- Actions are redirect to IP or VRF, marking and traffic rating
- Support also for IPv6

Advantages of using Flowspec

- “Surgical diversion” with option to redirect to VRF and mark
  - Allows to redirect only a subset of the traffic to the victim
  - Less overhead for the mitigation process
- No changes in global routing table
  - Diversion performed by Flowspec NLRI
  - Flowspec filter action configured to “Redirect to VRF”
- No need for tunneling design for reinjection/on-ramping

Support in devices and software

- Cisco (ASR - 3.15, IOS 15.5(1)S, NCS XR 5.2.4)
- Juniper (MX 15.1F5, PTX 17.1R1, T 10.0R1, SRX 10.3R2 basic since 7.3)
- Alcatel-Lucent (Nokia) 7750 SROS 9.0R1
- Huawei
- GoBGP
- ExaBGP
- Bird 2.0

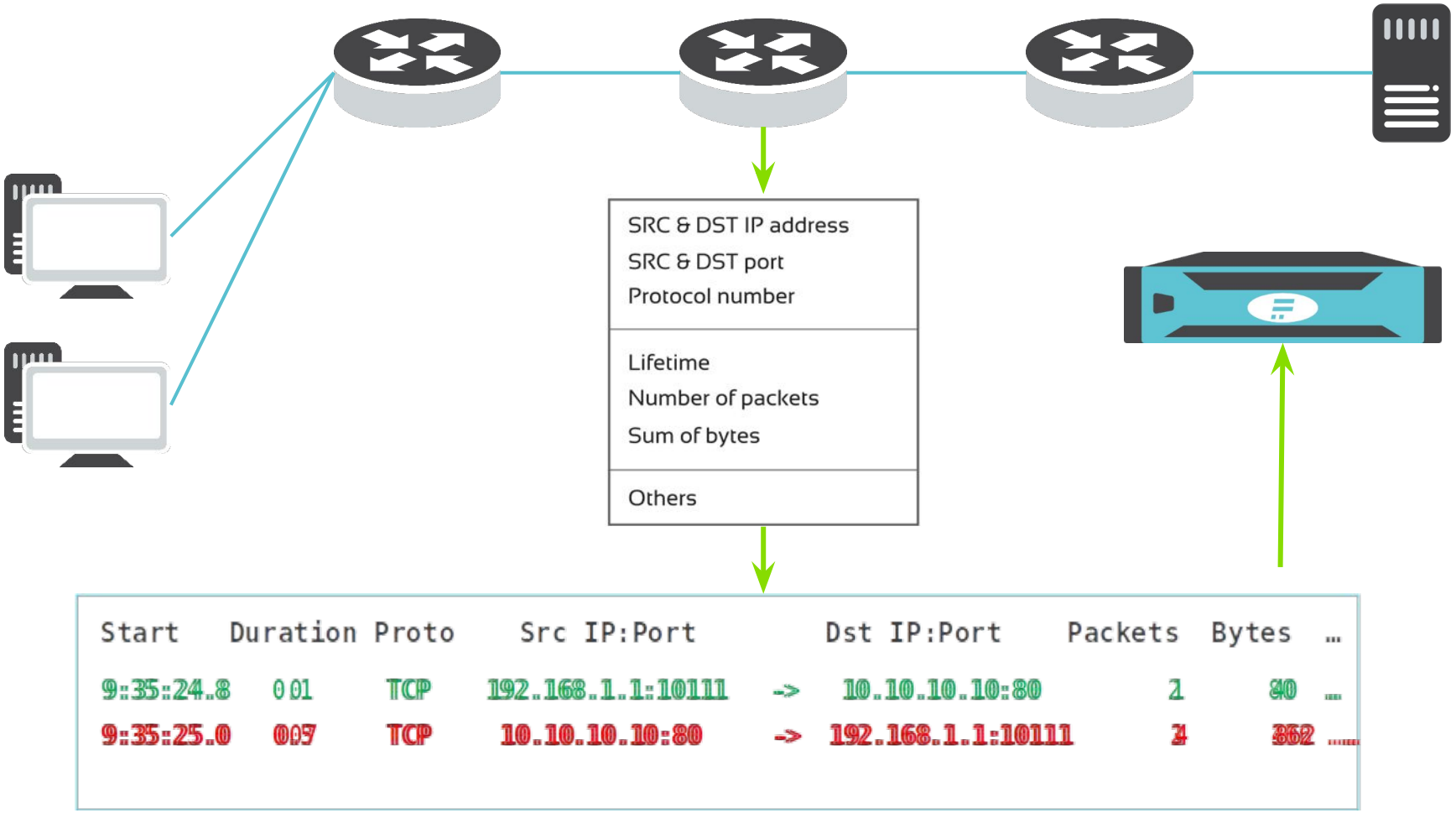
Flow export and collection

- Modern method for network monitoring – flow measurement
- NetFlow v5/v9, IPFIX, jFlow, sFlow,cflowd, NetStream, etc.
- Focused on L3/L4 information and volumetric parameters
- Flow statistics reduction ratio 500:1 and even more if sampling is configured

Flow export and collection

- Sampling is often needed but it does limit DDoS detection
- It’s important to have properly configured export timers
  - Shorter is better but also increasing a load on Flow exporter
- Number of devices with some flow export is growing
  - In carrier grade devices de facto standard
- Various use cases what can be done with exported data

Flow monitoring principle



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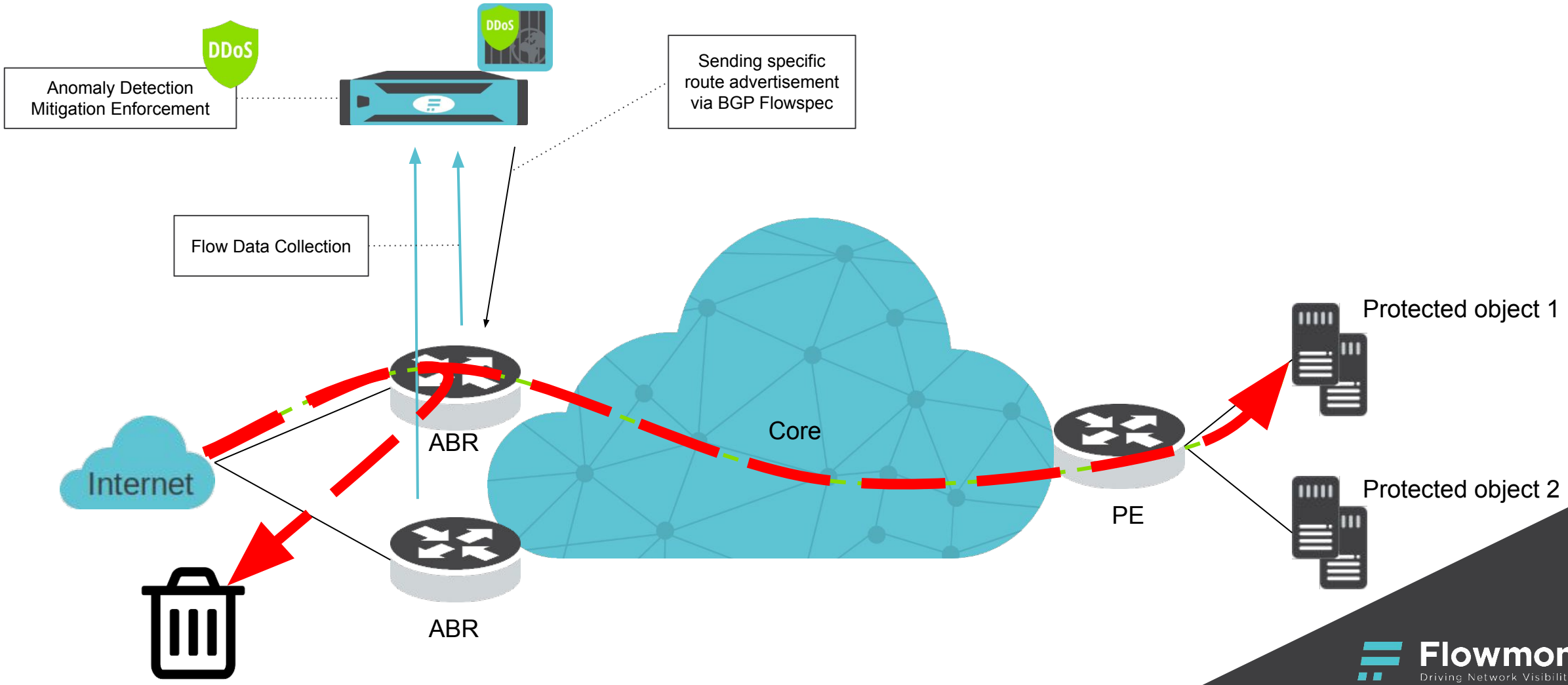
How does it work



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Live demonstration

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Thank you

Performance monitoring, visibility and security with a single solution

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References

[1] https://www.rfc-editor.org/info/rfc5575

[2] https://www.rfc-editor.org/info/rfc7674