F5 for Service Providers

Jak čelit skutečným výzvám této doby v Telco/ISP prostředí?

Martin Oravec, F5

m.oravec@f5.com

Impact of COVID-19

HEALTH AND SCIENCE

Italy to close all schools and universities through March 15 as coronavirus death toll rises

PUBLISHED WED, MAR 4 2020•5:09 AM EST | UPDATED 2 HOURS AGO

Holly Ellyatt
@HOLLYELLYATT

SHARE

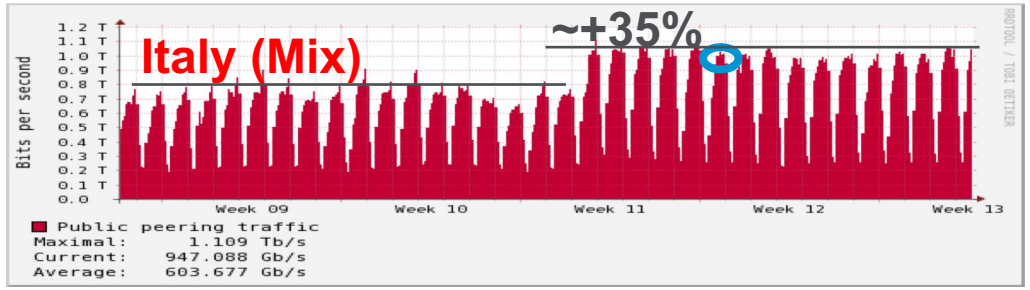
KEY POINTS

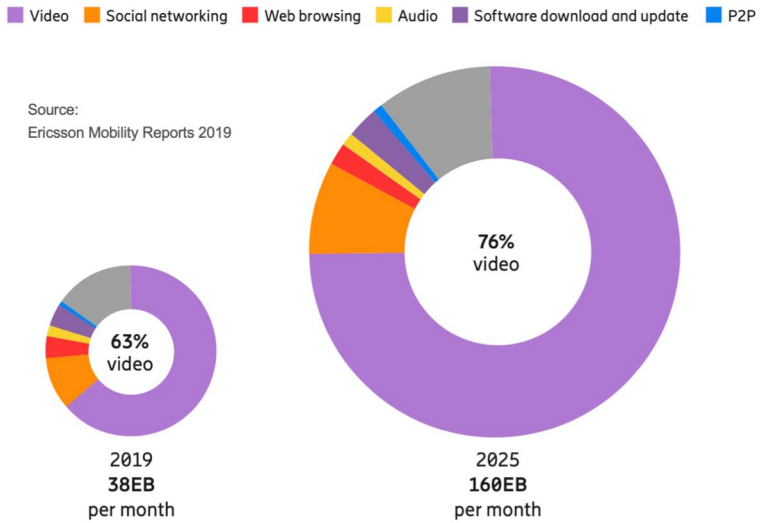
- Italy was the worst-affected country from the coronavirus outside Asia earlier Wednesday, temporarily overtaking Iran in terms of the number of deaths and infections from the virus.
- The death toll in Italy, Europe's worst-affected country, jumped to 79 on Tuesday from 52. As of Wednesday morning, there are 2,502 cases of the virus in Italy.

TRENDI

Vodafone reports 50% rise in internet use as more people work from home

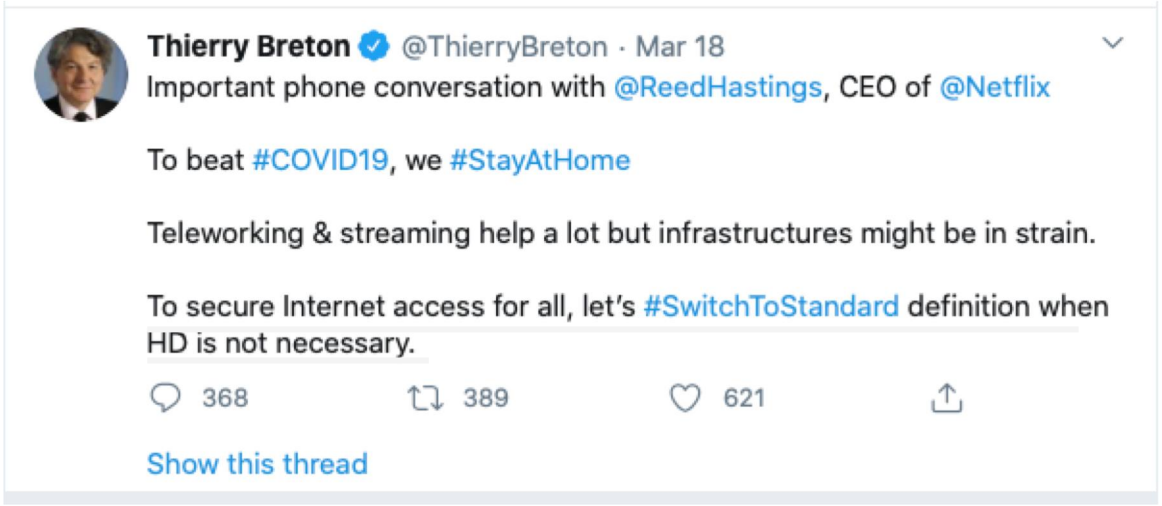
Coronavirus places greater demand on network in Europe as families stay indoors





[1] Traffic from embedded video in web browsing and social media is included in the application category "Video"

What Has Been Done by EU to Save Bandwidth



Technology

Netflix to cut streaming quality in Europe for 30 days

19 March 2020 | 76 Share

US & WORLD | TECH | CORONAVIRUS

YouTube joins Netflix in reducing video quality in Europe

Streams now set to standard definition by default

By Jon Porter | @JonPorty | Mar 20, 2020, 6:17am EDT

TECH | AMAZON | NETFLIX

Amazon and Apple are reducing streaming quality to lessen broadband strain in Europe

Following in Netflix and YouTube's footsteps

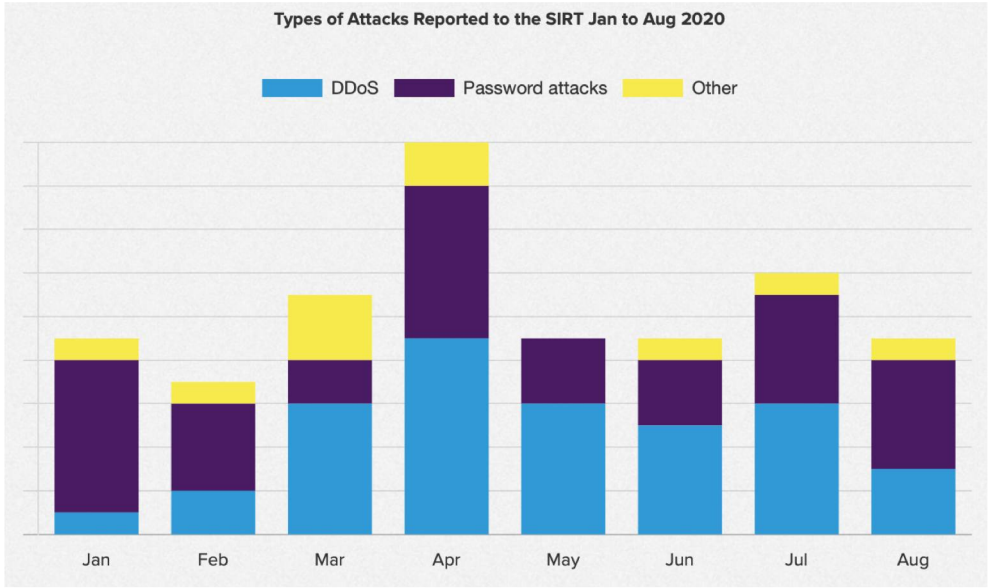
DDoS attacks increase

542 %

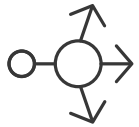
quarter-over-quarter amid COVID-19 pandemic (*)

(*) Nexusguard Q1 2020 Threat Report

e.g. article to read - https://www.f5.com/labs/articles/threat-intelligence/how-cyber-attacks-changed-during-the-pandemic



Service Provider Targeted F5's Solution Portfolio



Data Traffic Management

- SGi / Edge Network Simplification
- Intelligent Traffic Mgmt
- Dynamic Service Function Chaining
- Policy Enforcement
- TCP Optimization
- Video/ABR Optimization
- Deep Packet Inspection
- Content Filtering
- Traffic Detection Function

Signaling Traffic Management

- Domain Name System (DNS)
- SIP Traffic Management
- Diameter Solutions
- Radius, GTP and other Telco specific LB/Proxy
- Log's load-balancing, replication, …

Security

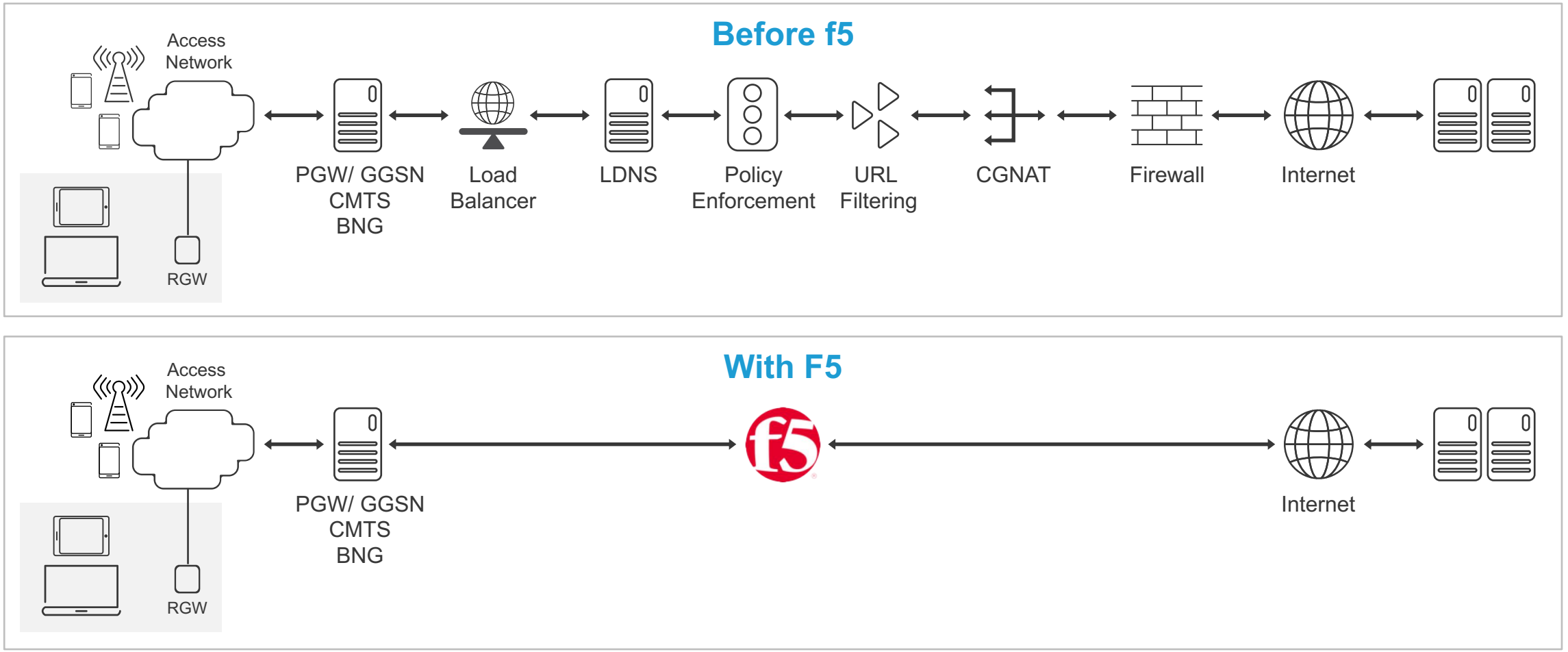
- End-2-End Multi-Layered Dynamic Security
- Device Security
- Network Firewall
- Application Firewall
- Application Security
- DDoS Protection
- GTP Firewall
- VoLTE Firewall

Virtualization / NFV / Edge / MultiCloud

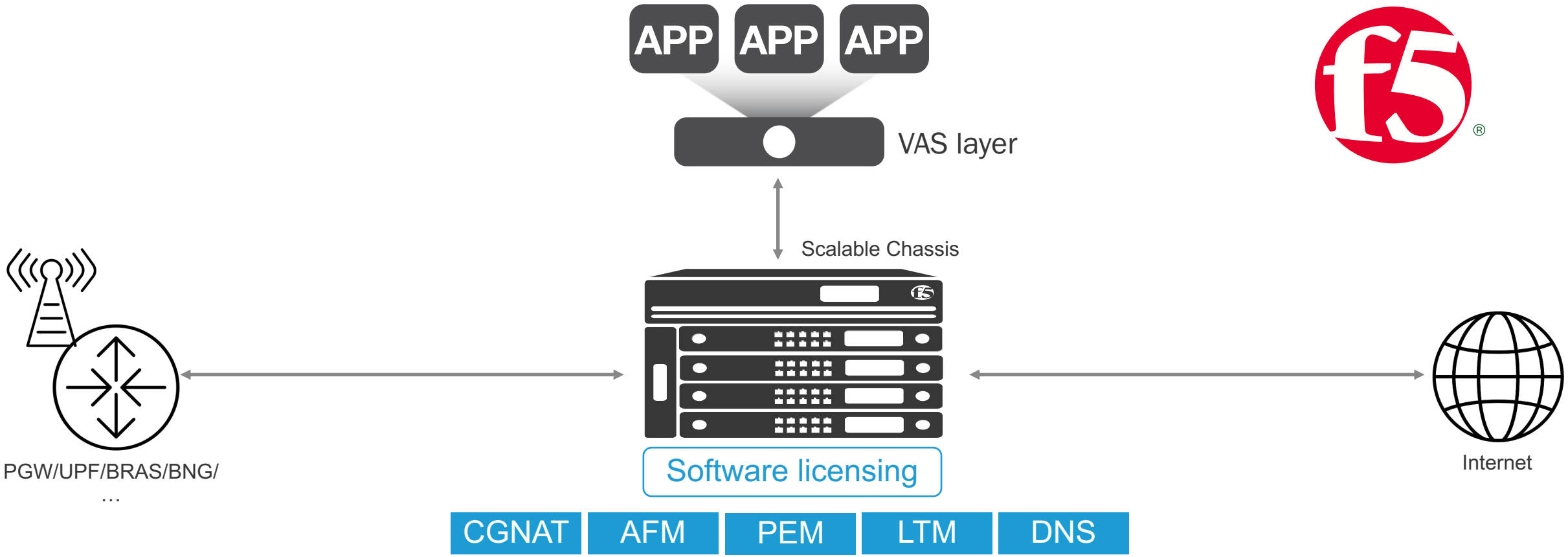
- Based on Virtual Edition
- Packaged NFV solutions
- Standalone VNF management and orchestration for custom solution
- Orchestrated Containerized Telco Edge
- TOSCA and ONAP aligned

A Different Approach with F5

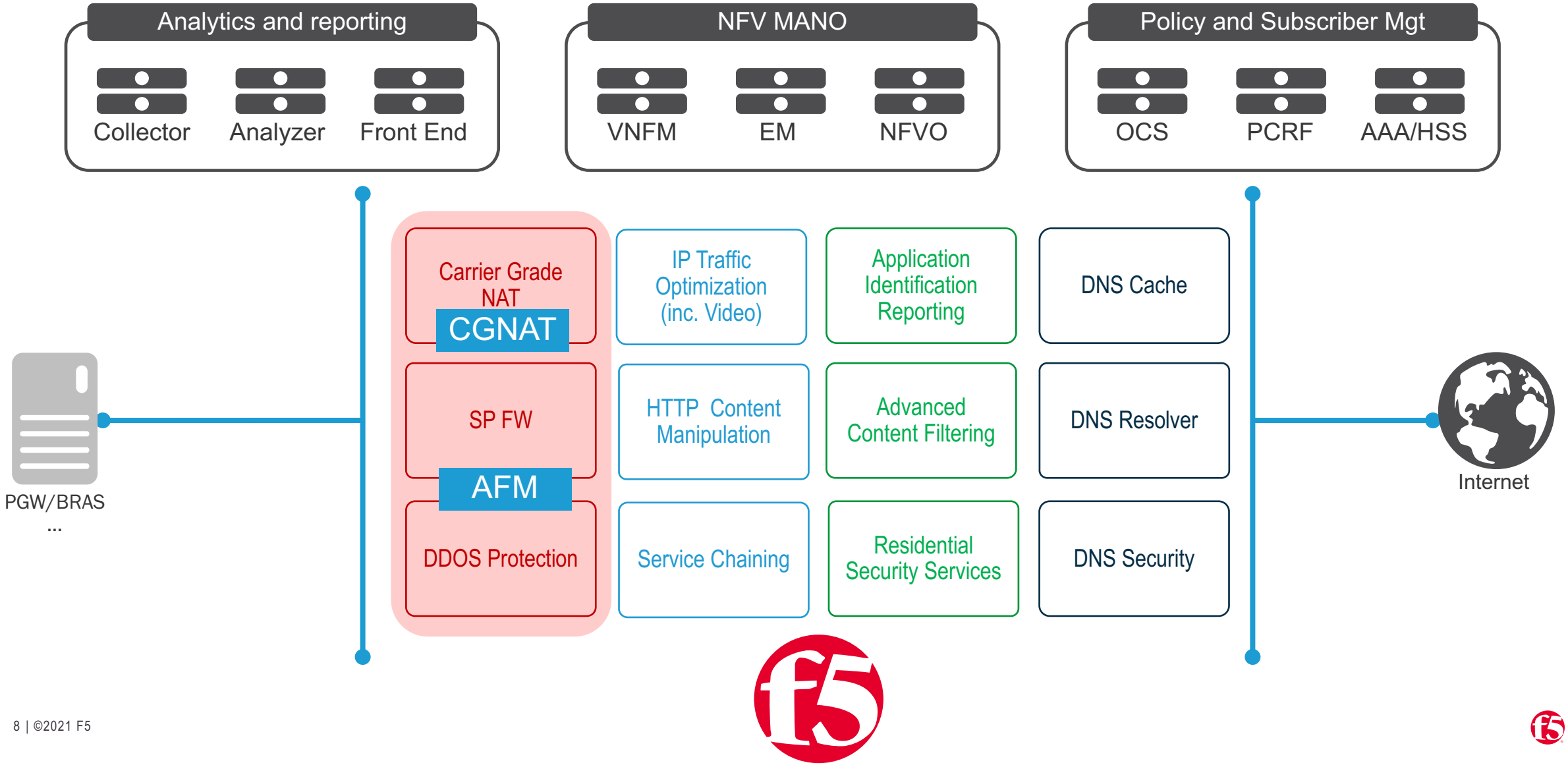
A UNIFIED PLATFORM SIMPLIFIES DELIVERY OF NETWORK SERVICES



How the scalability and consolidation works



F5 Solution SP Data Traffic Mgmt Solution summary



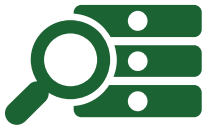
Carrier Grade NAT Overview

Translation Methods

- Network Address & Port Translation (NAPT)
- Port Block Allocation (PBA)
- Deterministic NAT (DNAT)
- NAT44
- NAT64 & DNS64
- Endpoint Independent Mapping
- Endpoint Independent Filtering
- Port Control Protocol (PCP)

Tunneling Methods

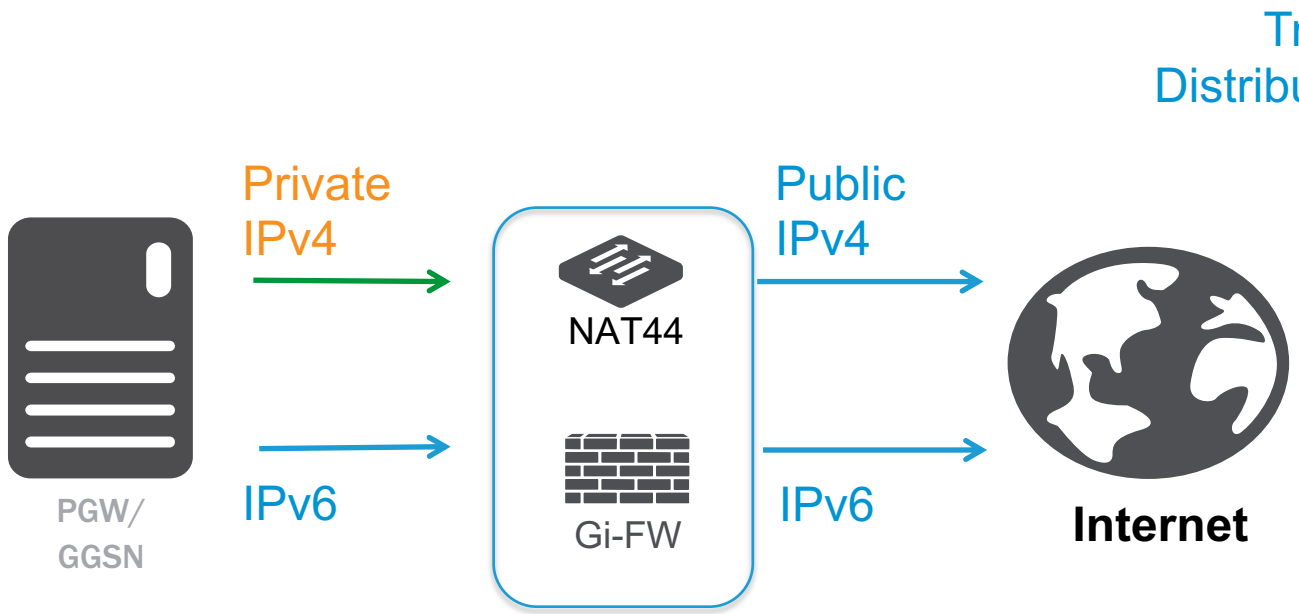
- DS-Lite support with AFTR
- 464XLAT
- 6RD
- MAP-E/MAP-T
- lw4o6

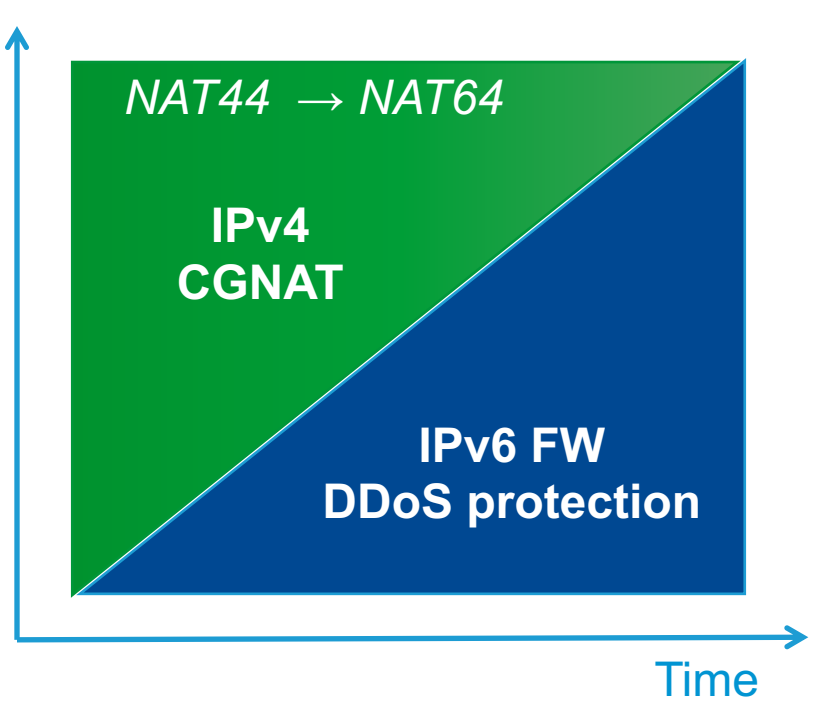


Logging Options

- High-speed logging – syslog based
- Customizable logging options
- IPFIX / Netflow Reporting
- Subscriber identity log enrichment
- Data Retention Compliances

AFM as Edge FW – CGNAT, IPv4/6 FW and anti DoS





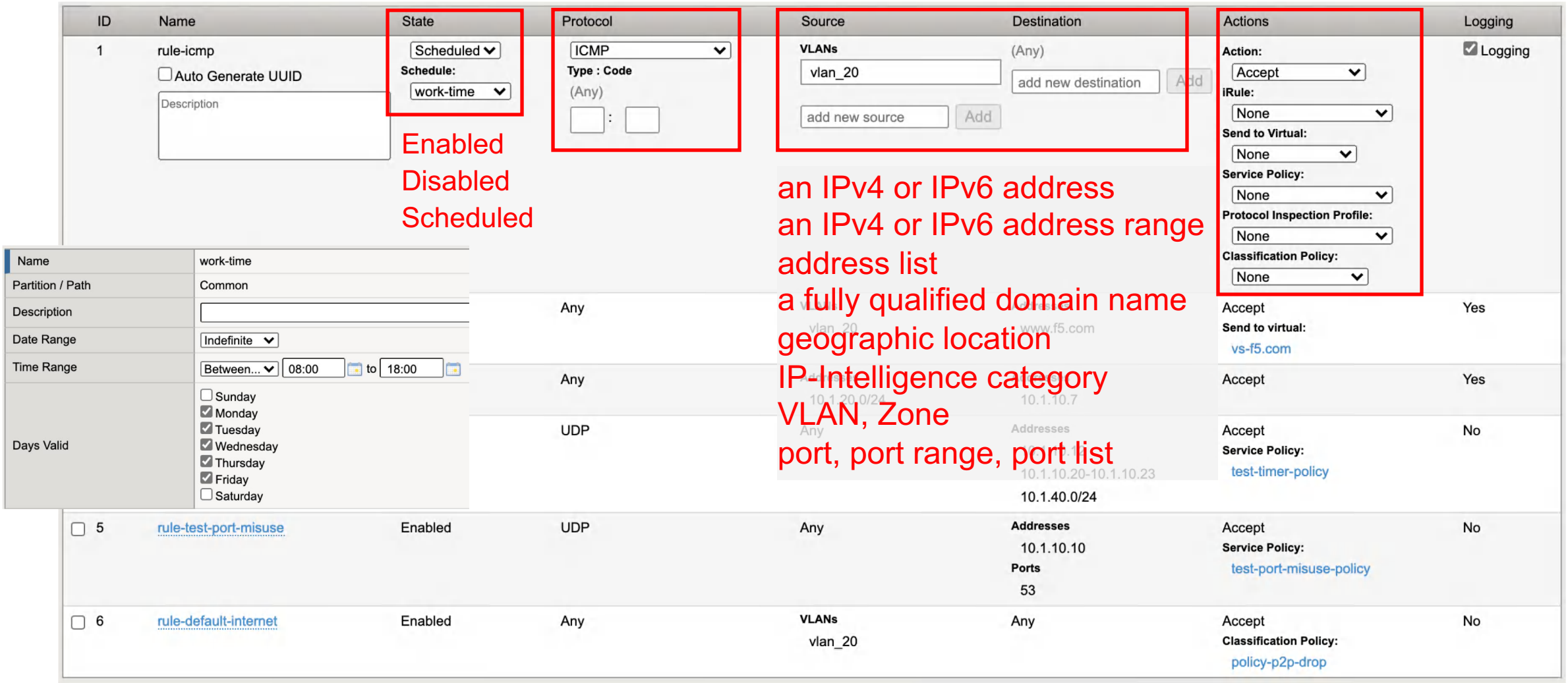
UNPRECEDENTED SCALE & PERFORMANCE

GRADUAL TRANSITION FROM IPV4 CGNAT TO IPV6 FW AND DDOS

INVESTMENT PROTECTION

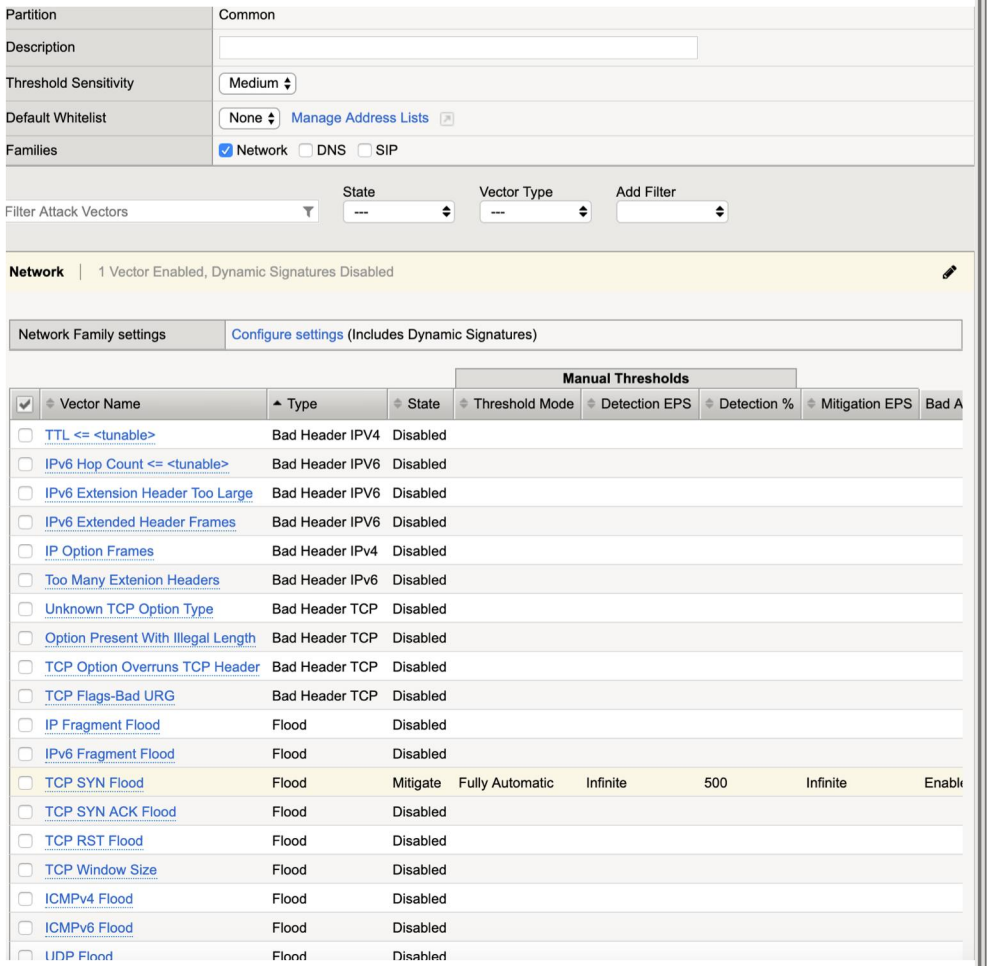
+ add Policy Enforcement, Optimisation Services, DNS and more

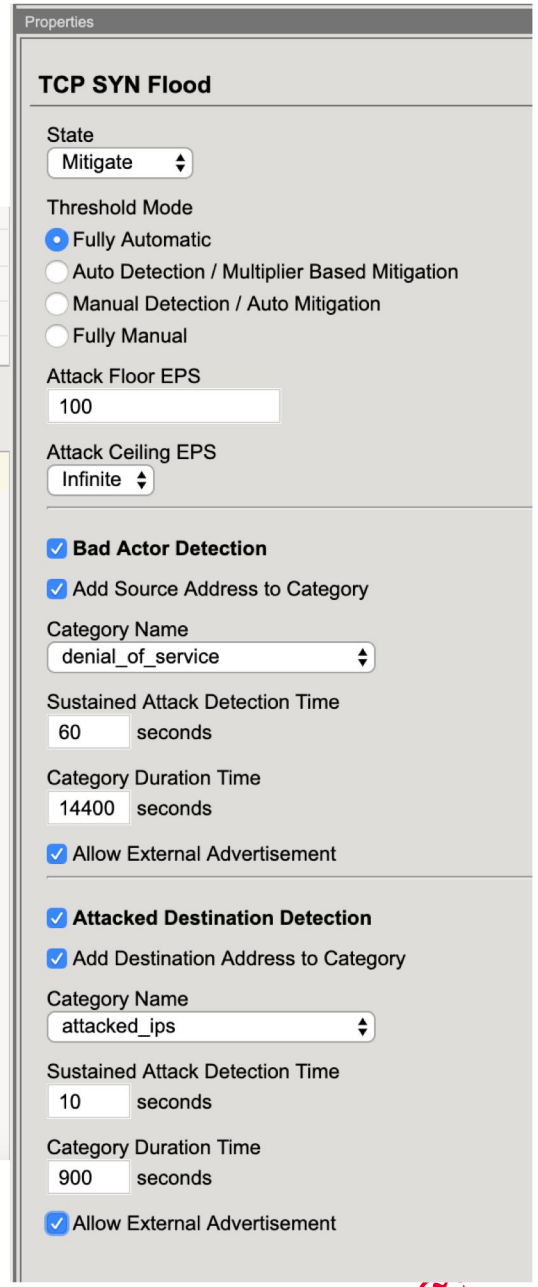
AFM - FW Policy Editor



AFM - (D)DoS Attack Vectors

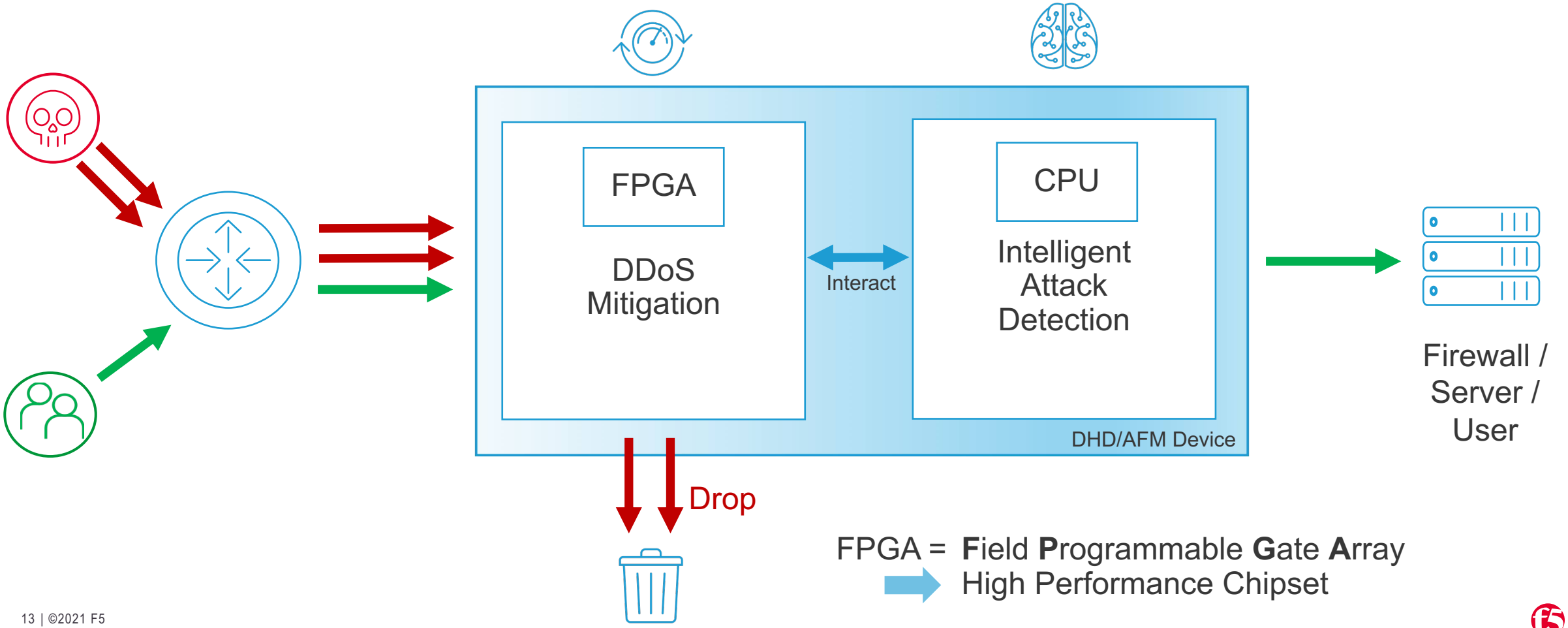
- Manual Configuration
- Detection / Reporting only
- Auto-Threshold (Learning)
- Dynamic Attack Signatures
- Bad Actor and Attacked Destination Detection
- Ability to initiate BGP Blackhole, Redirect, Flowspec





Logical separation of Mitigation and Compute Unit

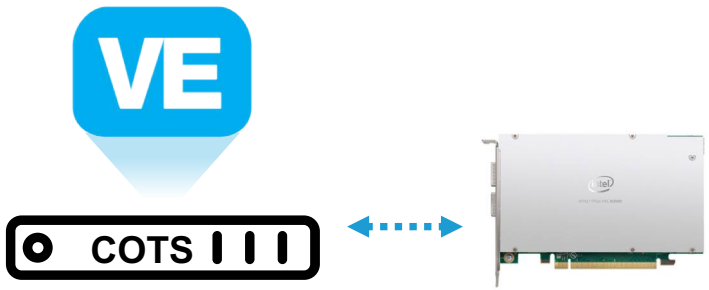
CPU FOR SMART DETECTION AND FPGA FOR EFFECTIVE MITIGATION



FPGA = **F**ield **P**rogrammable **G**ate **A**rray
High Performance Chipset

Augmented DDoS Protection for NFV Environments

MITIGATE LARGER ATTACKS WHILE LOWERING CPU UTILIZATION AND TCO



BIG-IP VE for SmartNICs – DDoS Mitigation

- Offload DDoS detection/mitigation to SmartNIC
- 100+ DoS vectors supported, as well as SYN cookies, allow-listing, BDoS
- 93% of all vectors handled in FPGA
- Packet inspection & drop both occur at line rate

20X greater DDoS mitigation capacity

67% reduction in required compute

70% lower VE CPU utilization

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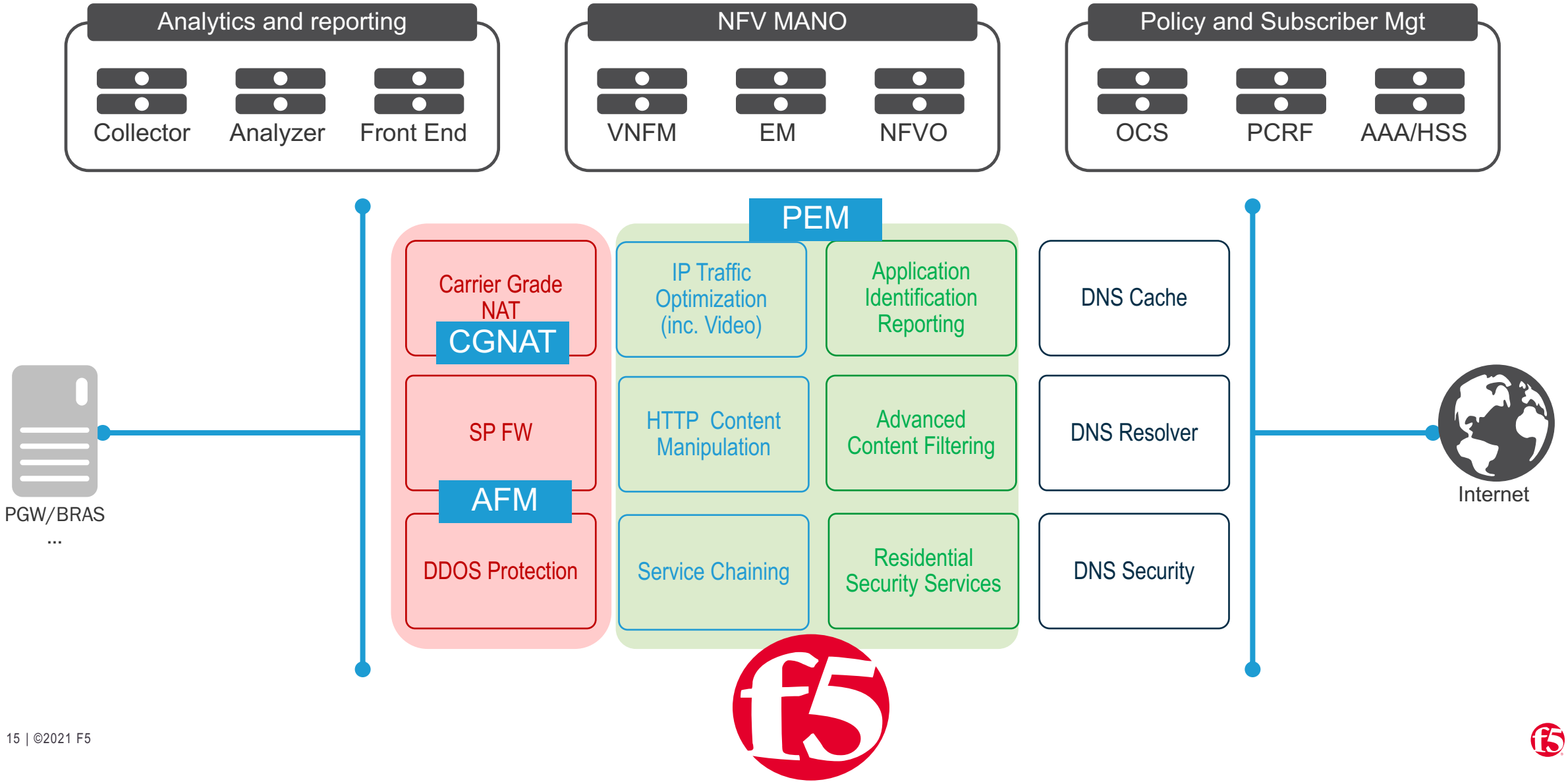


Context-Aware and Policy-Driven Traffic management

What is context?

Subscriber

Access type

2/3/4/5G

WiFi

DSL

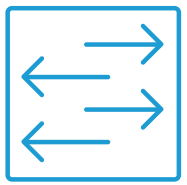
…

Device type

Application

Location

Congestion

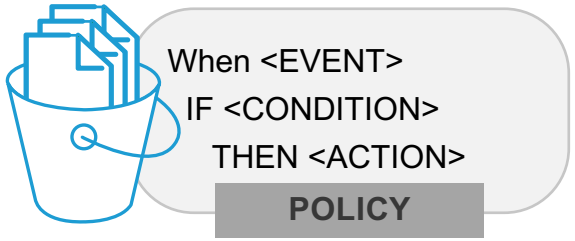


How does the platform learn about context ?

- PCRF/RADIUS/ OTHER
- GGSN/PGW/BNG
  RADIUS
- 3rd Party Tools
  Custom API
- Data Plane
  PEM Module

Policy is a set of rules.

A rule defines conditions that the traffic must meet (or not meet) for the rule to apply



A RULE

Condition

- Classification criteria – App / Category
- Flow information
- URL information
- Custom criteria

Action

- Allow / Drop traffic
- Traffic Optimization
- Forwarding traffic to a specific endpoint or series of endpoints for value-added services
- HTTP traffic redirection
- Headers Manipulation, Content Insertion
- Advanced Reporting
- Usage monitoring and reporting
- Traffic marking DSCP, L2 802.1p
- Enforcing rate control using a bandwidth control policy
- …

F5 Approach for Video traffic control

ABR Video Detection and Classification with F5 Policy Enforcement Manager (PEM)

Ability to detect and classify traffic by using heuristic and deep packet inspection signature

F5 provides the capability to control video from the network layer for TCP based video traffic

Ability to apply Bandwidth control policies (per subscriber/per app) to rate limit TCP video

F5 provides the capability to control video from the network layer for UDP based video traffic

Ability to apply Bandwidth control policies pacing Video traffic over QUIC over UDP

Video Control Use Case 1 - Just in Time Emulation

Bandwidth saved for videos not played completely

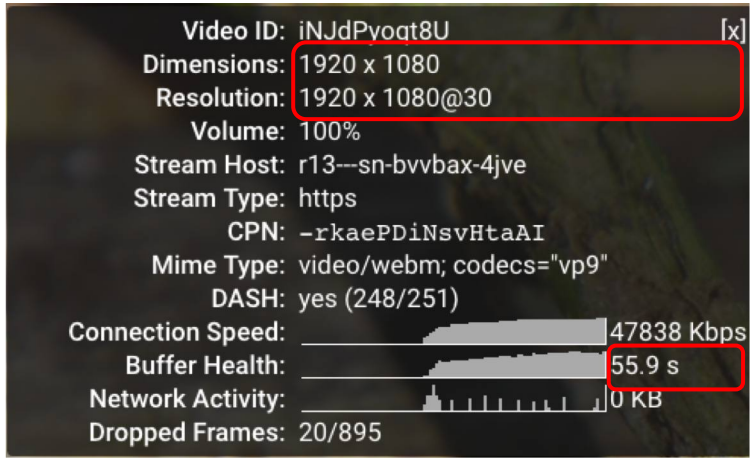
Saving Bandwidth while leaving the same Quality of Experience

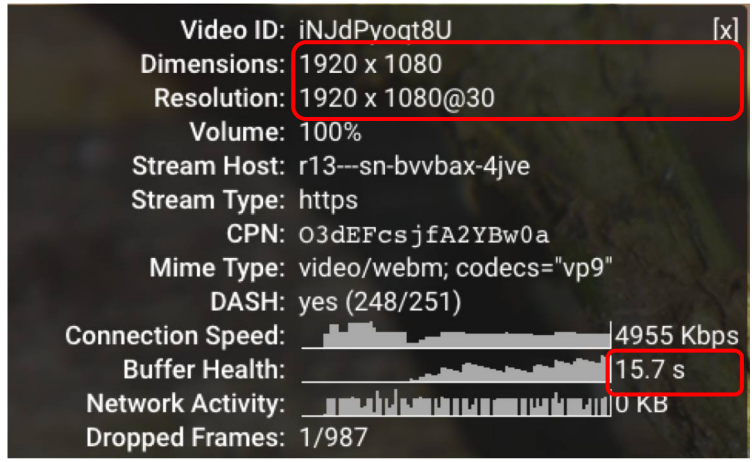
No impact on resolution

Possible implementations

- Device type dependent
- Subscriber dependent
- RAT-Type dependent
- Dynamic (bandwidth saving)

YouTube Stats for Nerds





Video Control Use Case 2 - Resolution Control

Force ABR video to go to a lower resolution

Bandwidth saving

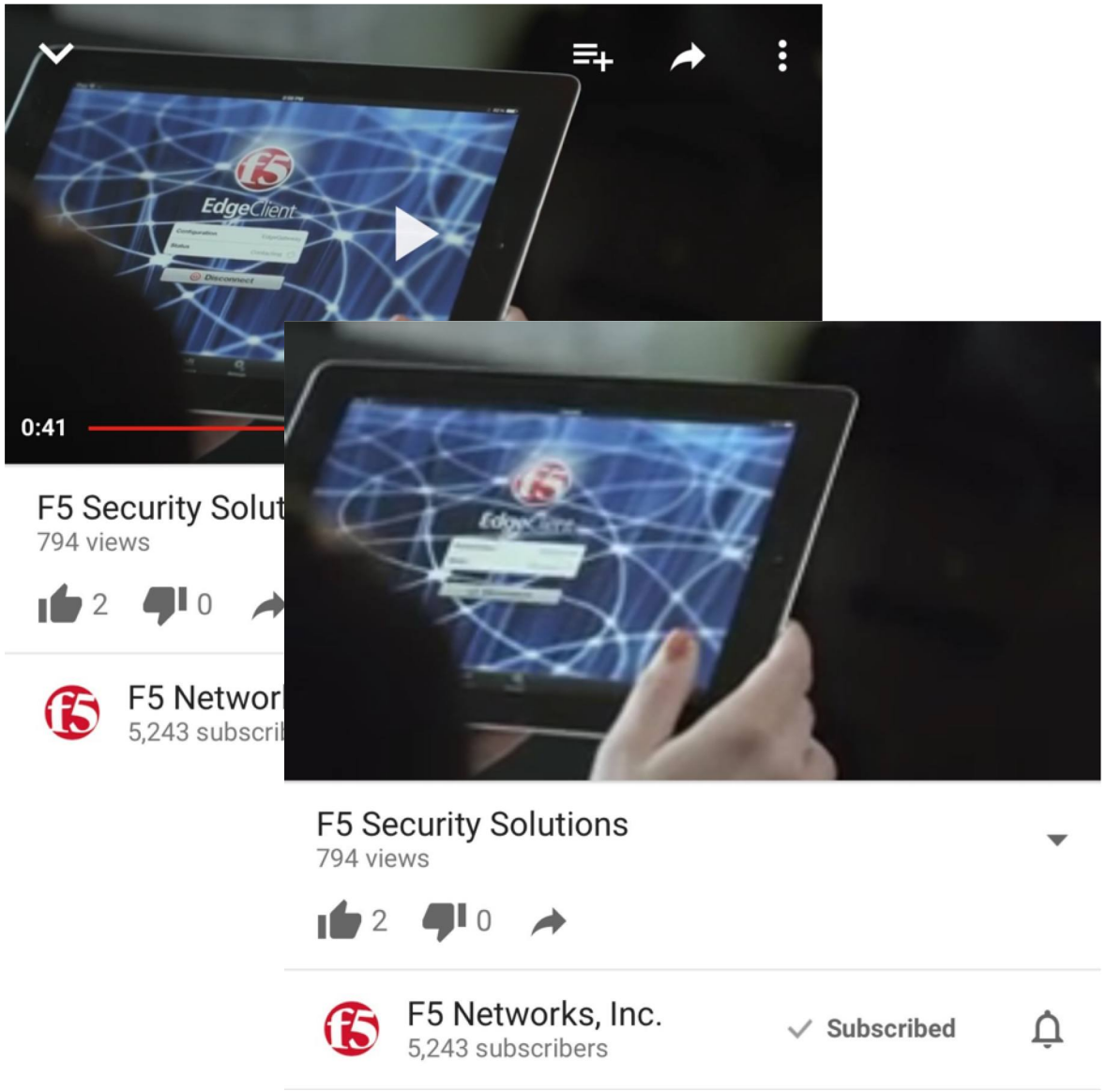
- Radio Network

Data Saving

- Subscriber Quality of Experience for some traffic plans

Can be applied on a subscriber basis

- Dynamic provisioning
- E.g. Small Screen vs Large Screen



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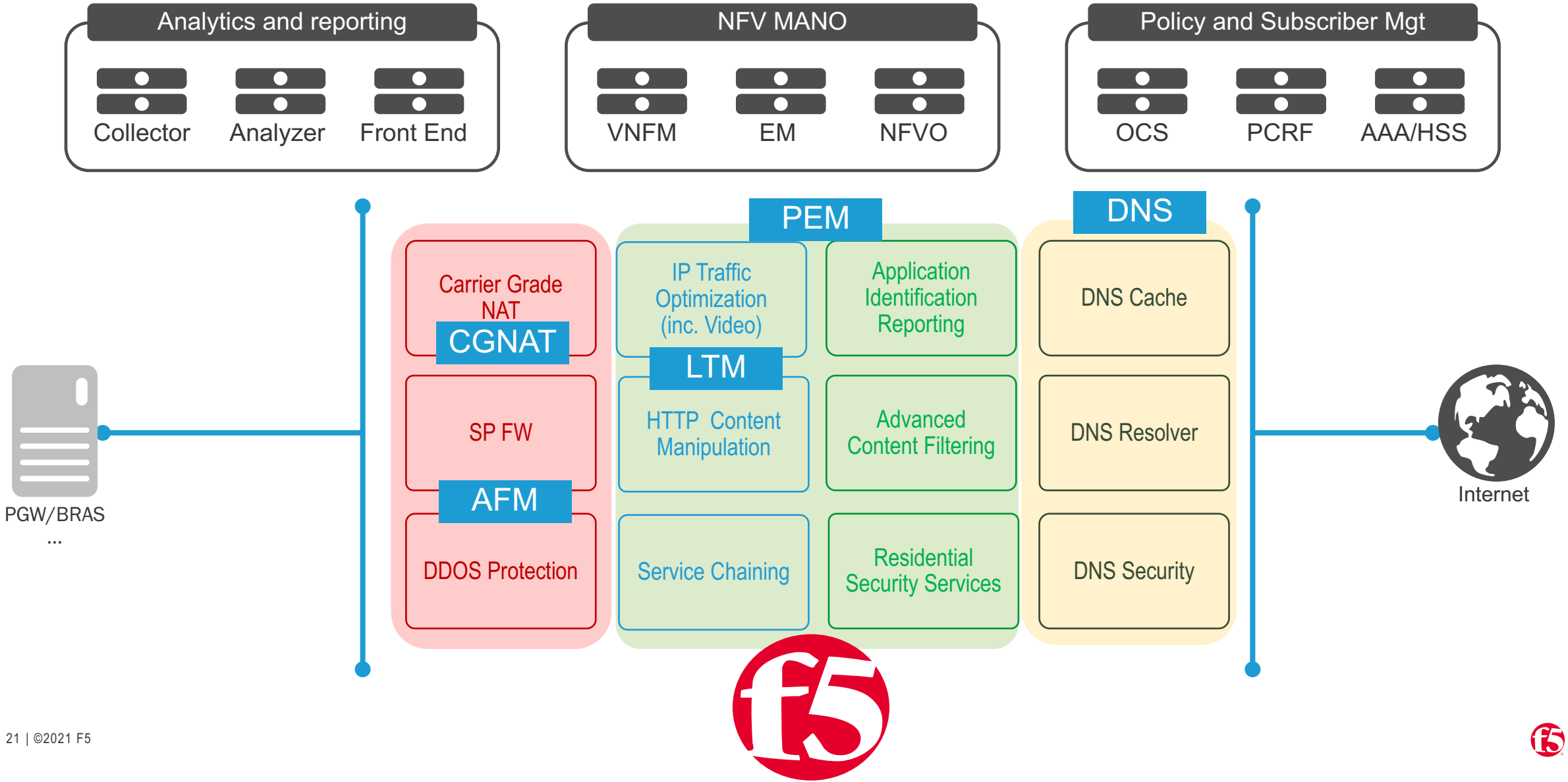


Encrypted DNS

Flavors of Encrypted DNS

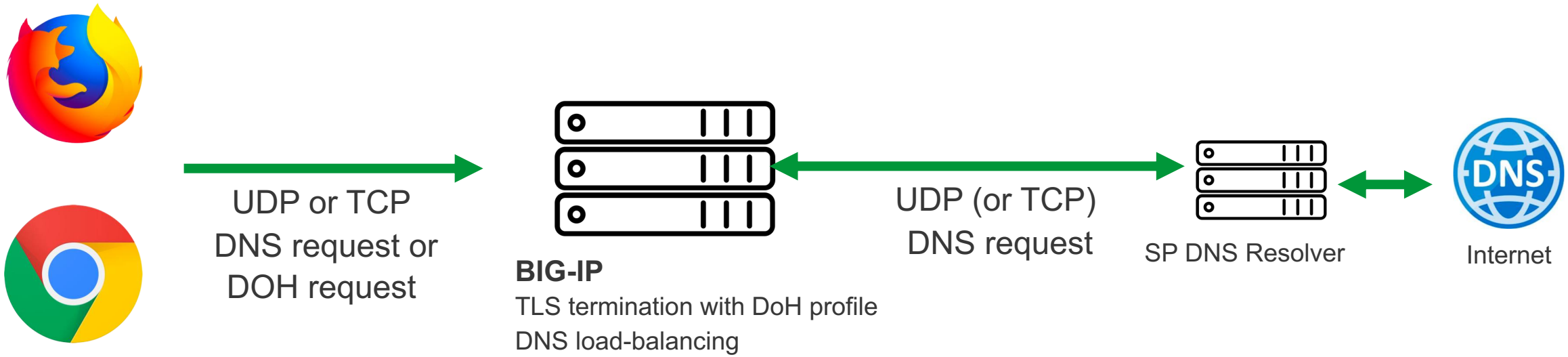
DNS-over-TLS (DOT)

- Adds privacy to DNS
- Impacts Visibility and Control of DNS

DNS-over-HTTPS (DOH)

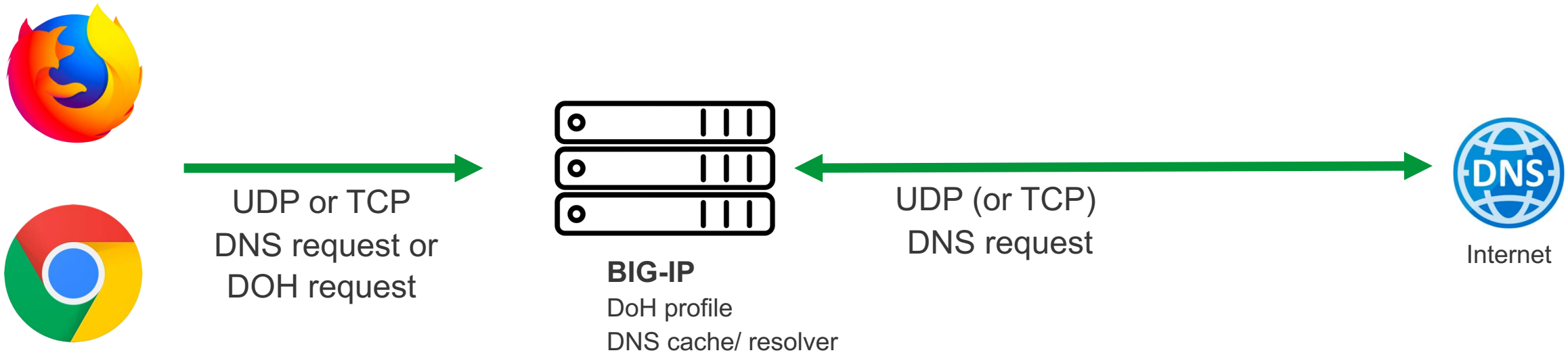
- Newer approach
- Impacts Visibility and Control of DNS
- Looks like web traffic – impossible to block
- Promoted by Browser vendors (Firefox, Chrome) and Over-the-Top DNS providers (Google, Cloudflare)

DoH/T TLS offload



- Customer wants to keep everything on the server-side the same way it was in the non-DoH previous slide
- Client IP preservation
- UDP or TCP server-side
- Protocol translation for Doh TCP to UDP or TCP options based on request size or can be forced to TCP if required

DoH/T (caching) Resolver



- Customer takes advantage of the DNS profile for security functionality
- UDP or TCP
- Protocol translation for Doh TCP to UDP or TCP options based on request size or can be forced to TCP if required

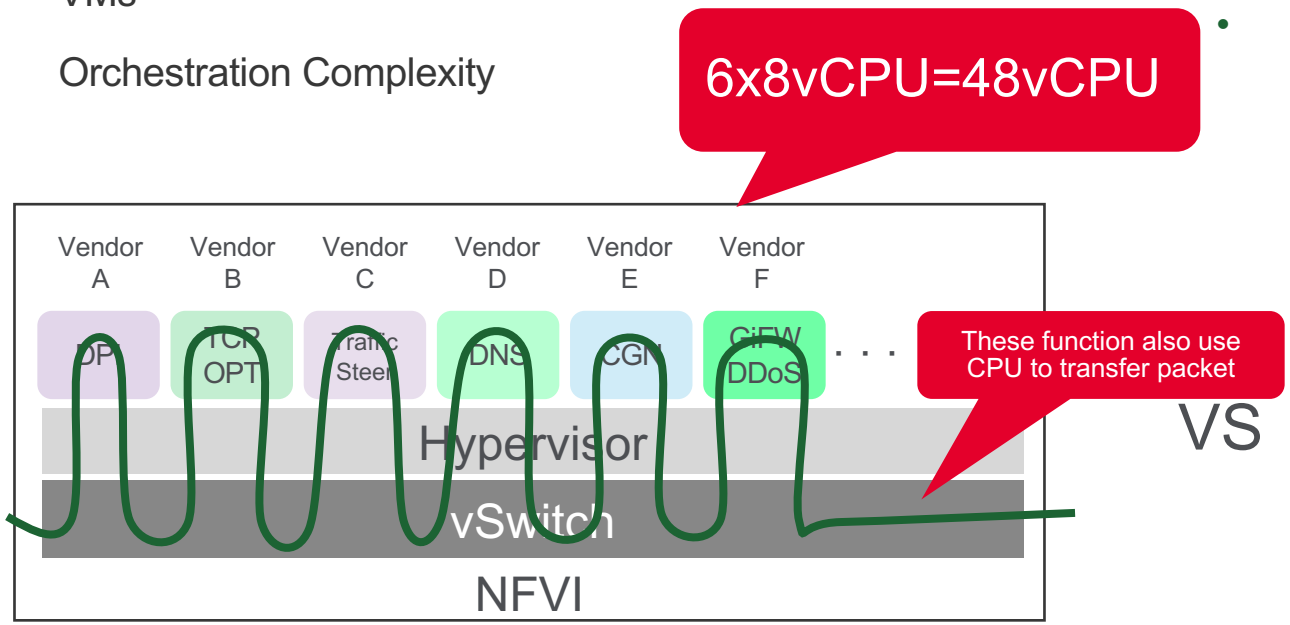
Going virtual? Serialized vs Consolidated

Serialized

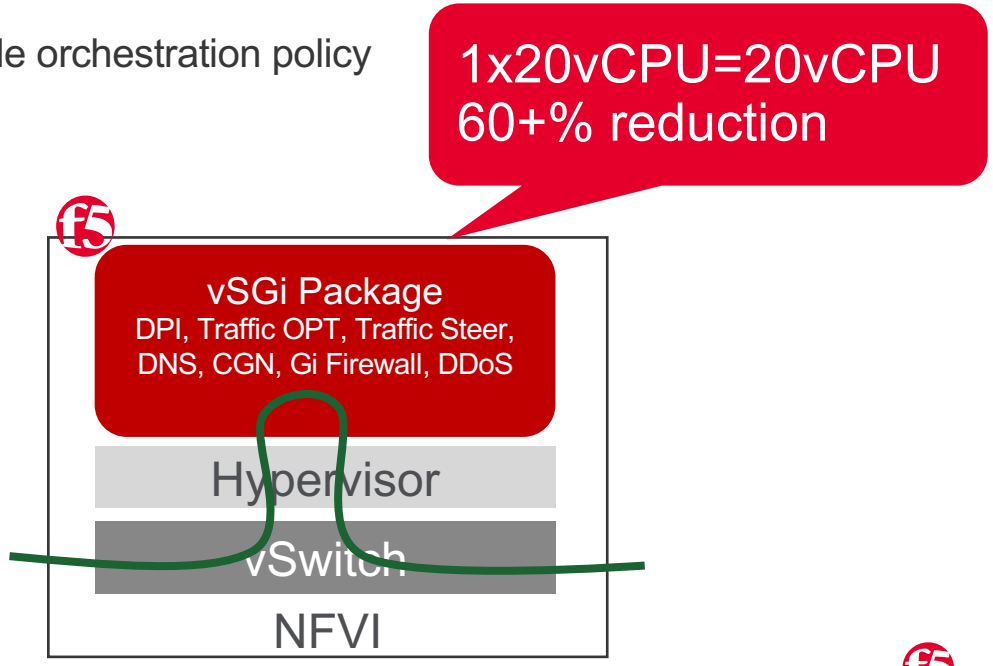
- Increase the number of VMs
- Higher CPU usage -> re-calculate L2/L3 header
- Decrease performance due to virtual switch latency
- Complex network structure
- Increase OPEX/CAPEX due to operate huge number of VMs
- Orchestration Complexity

Consolidated (Single Pass Architecture)

- Decrease the number of VMs
- Lower CPU usage
- Increase performance
- Simple network structure
- Decrease OPEX/CAPEX
- Simple orchestration policy



VS



F5 VNF deployment public rfference Rakuten

Single VNF Image for Full SGi-LAN Services

- ✓ Common OS for CGNAT, DPI, DDoS, FW, IPS, Service Chaining, Load Balancing, DNS, Parental Control, illegal site blocking, etc

- ➢ F5 minimizes Latency – Less CPU hops
- ➢ Optimized resource consumption
- ➢ Service Chaining (FMSS) Support for Consumer & Enterprise Managed Security Service Creation – “Secure Internet” Services

https://www.f5.com/company/news/press-releases/f5-partners-with-rakuten-mobile-to-support-new-cloud-native-mobi


ALEF


simac