

Filip Kolář
F5 Networks
f.kolar@f5.com
+420 720 704 746

Martin Oravec
F5 Networks
m.oravec@f5.com
+421 908 747 633

CEE Peering Days
Budapest 2016



Loadbalancing

LTM

Web FW

ASM

Network FW

AFM

DNS

DNS

Traffic shaping

PEM

Cloud scrubbing

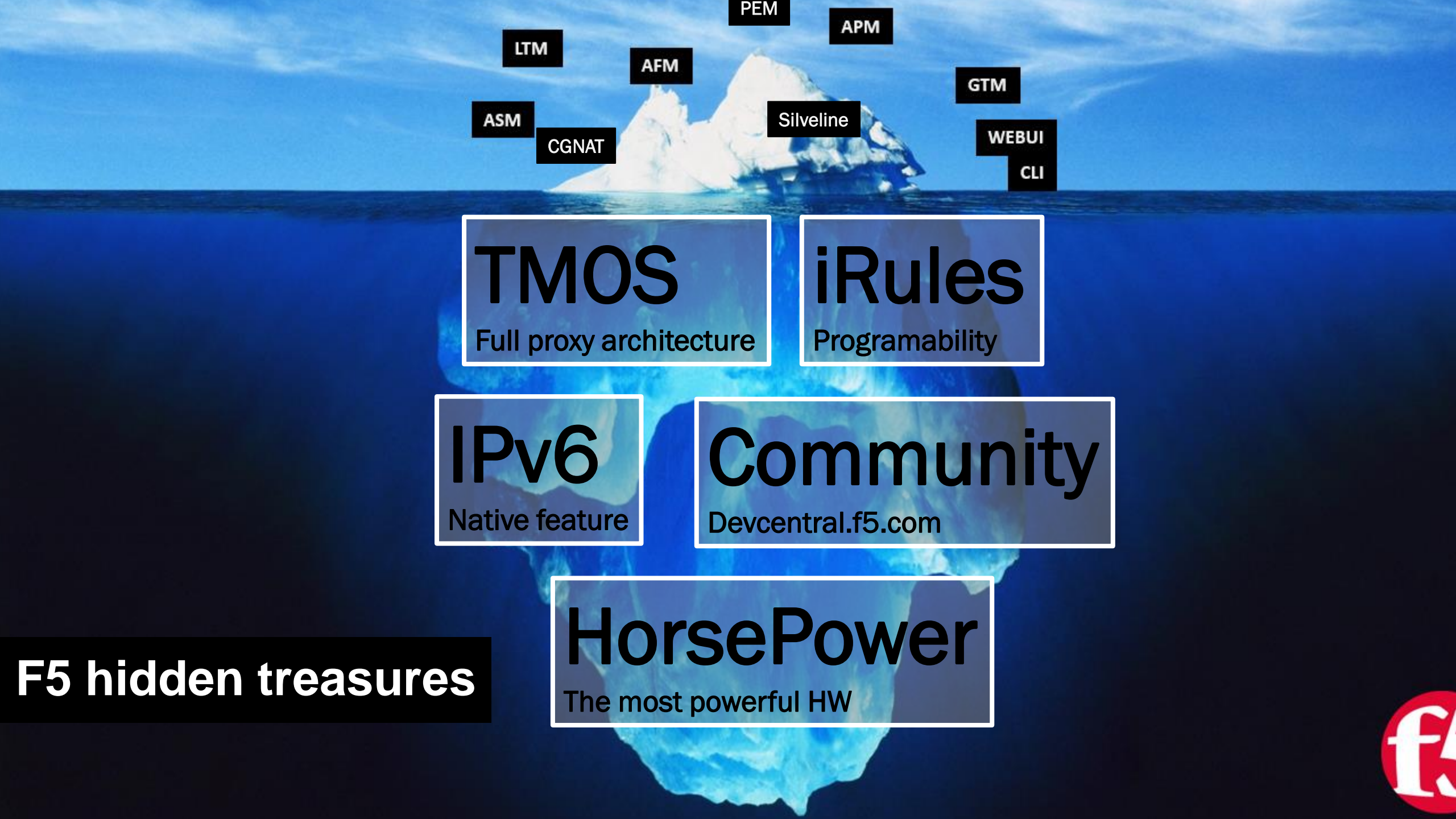
Silverline

Signalling proxy

DxA SIP

What the F5 does?





LTM

PEM

APM

AFM

GTM

ASM

Silverline

CGNAT

WEBUI

CLI

TMOS

Full proxy architecture

iRules

Programability

IPv6

Native feature

Community

Devcentral.f5.com

HorsePower

The most powerful HW

F5 hidden treasures



Do you (still) remember 1989?

Berlin Wall demolition

Sir Tim Berners-Lee basically invented the Internet

Iron Curtain wa



The World Wide Web project

WORLD WIDE WEB

The WorldWideWeb (W3) is a wide-area hypermedia[1] information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary[2] of the project, Mailing lists[3] , Policy[4] , November's W3 news[5] , Frequently Asked Questions[6] .

What's out there? Pointers to the world's online information, subjects[8] , W3 servers[9], etc.

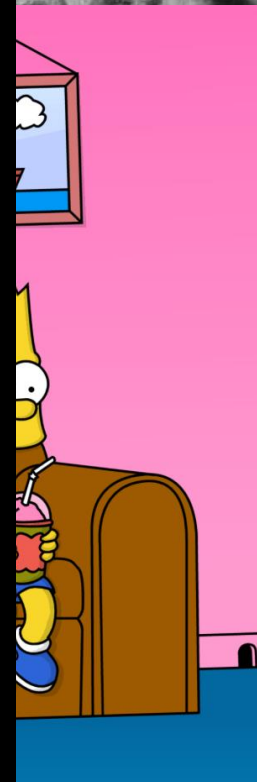
Help[10] on the browser you are using

Software Products[11] A list of W3 project components and their current state. (e.g. Line Mode[12] ,X11 Viola[13] , NeXTStep[14] , Servers[15] , Tools[16] , Mail robot[17] , Library[18])

Technical[19] Details of protocols, formats, program internals etc

<ref.number>, Back, <RETURN> for more, or Help: | █

d



W

...as p

IBM Home News Products Services Solutions About IBM ShopIBM Support Download

Search microsoft.com

Jobs@F5 Online Ordering Sales Contacts Search Feedback

Breaking News

Solutions F5 Services Partners Press Room About F5

We keep .com on™

BIGip DNS SITE seeIT

FORE SIGHT 99 See the Future - View our Webcast

f5 Professional Services - We Ensure Success

Year 2000 Compliant

Investor Relations

Search GO

INTERNETWEEK APPROVED

Home News Product Catalog Sales Contacts Search Feedback

Copyright © 1999, F5 Networks, Inc. All rights reserved.

IBM Newsletters International About Our Site

Join the Microsoft Office 2000 Preview Program

Unveils Complete Software Platform and for Cable Industry

Thinking Globally: How Microsoft Localizes for the Web

Schools: Tune in to Y2K Interactive Teleconference on Dec. 7

Read About the Microsoft Trial

Microsoft and the freedom to Innovate.

What's your opinion?

Monday, November 30, 1998

Microsoft Corporation. All rights reserved. Terms of Use Privacy Policy

Machine geared toward the enterprise, the WorkPad change synchronization.

Media 2.0. The second release of the plug-in-free Java use clicks.



DNS

Na zlepšenie našich služieb používame cookies. O ich používaní a možnostiach nastavenia sa môžete informovať bližšie [tu](#).

OK



iOS aplikácia SME.sk pre všetky zariadenia



Zoznamujte sa zadarmo na dvaja.sme.sk

28. marec 2016, meniny má Soňa

SME.SK TERAZ DOMOV REGIÓNY EKONOMIKA SVET KOMENTÁRE SME+ KULTÚRA ŠPORT TV AUTO TECH ŽENA ZDRAVIE BLOG

HLADAJ

DNS stats

[Výsledky volieb 2016](#)
[Rokovania o vytvorení vlády](#)
[Útoky v Bruseli](#)
[Utečenecká kríza](#)
[Prezidentské voľby v USA](#)

POST.sk

Topic / Item	Count
▼ Total Packets	314
▼ rcode	314
No error	314
▼ opcodes	314
Standard query	314
▼ Query/Response	314
Response	157
Query	157
▼ Query Type	314
A (Host Address)	314
▼ Class	314
IN	314
▼ Response Stats	0
no. of questions	157
no. of authorities	157
no. of answers	157
no. of additional	157

SVET	EKONOMIKA	ŠPORT
Čínsky prezident pricestoval na štátnu návštevu Česka	Pozrite si vtipné reklamné videá so známymi pretekármi	Slovákov čaká kľúčový zápas, chcú využiť všetky zbrane. Aj provokácie
Britániu a Francúzsko zasiahla búrka Katie, Londýn rušil lety	Počet cudzincov pracujúcich na Slovensku rastie	Neviem, či mi volal Zidane. Neznáme čísla neberiem, tvrdí Hamšík

4 hod 24 hod 7 dní SME+ EN

1. Belgický cyklista zomrel po páde v pretekoch, ktoré vyhral Sagan 14 873
2. Slovensko má najlepšiu vládu v strednej Európe 12 972

Všetchní správny na Sme.sk >

0 Ukázať ^

Debugger	Style Editor	Performance	Network																																																																																										
			<table border="1"> <thead> <tr> <th>Domain</th> <th>Type</th> <th>Transferred</th> <th>Size</th> <th>0 ms</th> <th>5.12 s</th> <th>10.24 s</th> <th>15.36 s</th> <th>20.48 s</th> <th>25.60 s</th> </tr> </thead> <tbody> <tr> <td>ic.tynt.com</td> <td>gif</td> <td>0.03 KB</td> <td>0.05 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 370 ms</td> <td></td> </tr> <tr> <td>sc.tynt.com</td> <td>js</td> <td>0.09 KB</td> <td>0.07 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 119 ms</td> <td></td> </tr> <tr> <td>de.tynt.com</td> <td>js</td> <td>0.00 KB</td> <td>0.00 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 371 ms</td> <td></td> </tr> <tr> <td>track.deepattention.com</td> <td>html</td> <td>—</td> <td>0 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 1458 ms</td> <td></td> </tr> <tr> <td>track.deepattention.com</td> <td>plain</td> <td>—</td> <td>0 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 366 ms</td> <td></td> </tr> <tr> <td>track.deepattention.com</td> <td>html</td> <td>—</td> <td>0 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 168 ms</td> <td></td> </tr> <tr> <td>track.deepattention.com</td> <td>plain</td> <td>—</td> <td>0 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 94 ms</td> <td></td> </tr> <tr> <td>track.deepattention.com</td> <td>html</td> <td>—</td> <td>0 KB</td> <td></td> <td></td> <td></td> <td></td> <td>→ 155 ms</td> <td></td> </tr> </tbody> </table>	Domain	Type	Transferred	Size	0 ms	5.12 s	10.24 s	15.36 s	20.48 s	25.60 s	ic.tynt.com	gif	0.03 KB	0.05 KB					→ 370 ms		sc.tynt.com	js	0.09 KB	0.07 KB					→ 119 ms		de.tynt.com	js	0.00 KB	0.00 KB					→ 371 ms		track.deepattention.com	html	—	0 KB					→ 1458 ms		track.deepattention.com	plain	—	0 KB					→ 366 ms		track.deepattention.com	html	—	0 KB					→ 168 ms		track.deepattention.com	plain	—	0 KB					→ 94 ms		track.deepattention.com	html	—	0 KB					→ 155 ms	
Domain	Type	Transferred	Size	0 ms	5.12 s	10.24 s	15.36 s	20.48 s	25.60 s																																																																																				
ic.tynt.com	gif	0.03 KB	0.05 KB					→ 370 ms																																																																																					
sc.tynt.com	js	0.09 KB	0.07 KB					→ 119 ms																																																																																					
de.tynt.com	js	0.00 KB	0.00 KB					→ 371 ms																																																																																					
track.deepattention.com	html	—	0 KB					→ 1458 ms																																																																																					
track.deepattention.com	plain	—	0 KB					→ 366 ms																																																																																					
track.deepattention.com	html	—	0 KB					→ 168 ms																																																																																					
track.deepattention.com	plain	—	0 KB					→ 94 ms																																																																																					
track.deepattention.com	html	—	0 KB					→ 155 ms																																																																																					
			<p>233 requests, 5,285.81 KB 27.73 s Clear</p>																																																																																										

DDoS Against DNS – types of attacks

- DNS Floods
- Amplification attacks
- DNS Cache Poisoning
- NX Domain
- DNS Tunneling

Case study 1



The Real Story Behind the Kate Upton Nude DDoS Attack

By David Holmes on January 07, 2015

<http://www.securityweek.com/real-story-behind-kate-upton-nude-ddos-attack>

Amplified attack - Bring Your Own Modem

FTDnews

Case study 2

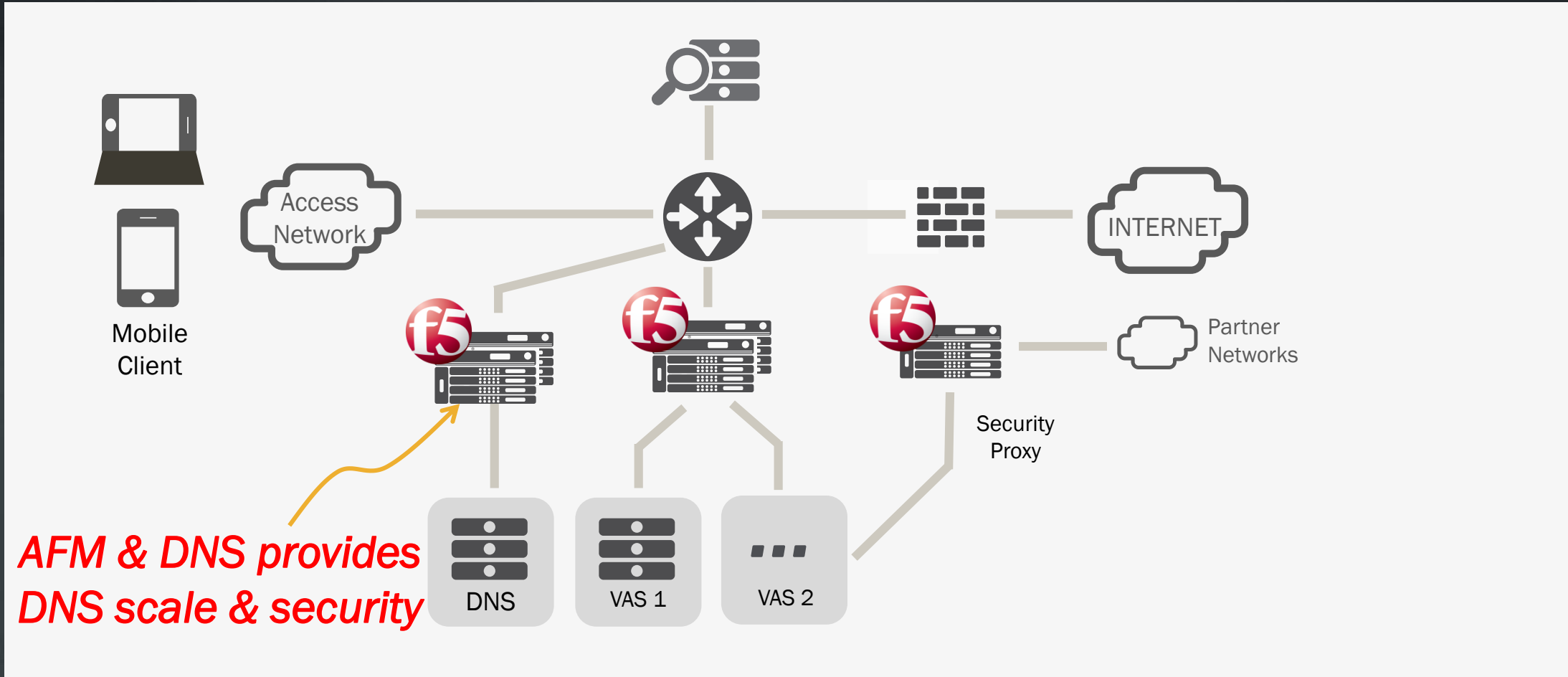
NXDOMAIN DDoS: DMARC

- Domain-based message authentication, reporting, and conformance (DMARC) is a mechanism for improving mail handling by mail-receiving organizations.
- The _dmarc DDoS attack vector is interesting in that it makes use of Google's and Yahoo's legitimate DNS servers to launch a DDoS attack on another entity's DNS infrastructure

Protocol	Lenç ▲	Info
DNS	128	Standard query 0x66ad TXT _dmarc.v575.bqy0d73.v575.ixn3v.2p0wr3.tgov575.myds.s██████████.net
DNS	128	Standard query 0xa98b TXT _dmarc.v575.bqy0d73.v575.ixn3v.2p0wr3.tgov575.myds.s██████████.net
DNS	123	Standard query 0x90b0 TXT _dmarc.3ka0.of3hogn.3ka0.s6vgk.xu7ii2.dmo3ka0.██████████.net
DNS	123	Standard query 0xbd40 TXT _dmarc.3ka0.of3hogn.3ka0.s6vgk.xu7ii2.dmo3ka0.██████████.net
DNS	120	Standard query 0x287f TXT _dmarc.itja.6j8dfm9.itja.wsikr.1h3aep.7qtitja.██████████.com
DNS	120	Standard query 0x0b48 TXT _dmarc.itja.6j8dfm9.itja.wsikr.1h3aep.7qtitja.██████████.com
DNS	120	Standard query 0xb3ed TXT _dmarc.cs8o.b7n8q8m.cs8o.gmq2s.h7hccu.xdrCs8o.██████████.com
DNS	120	Standard query 0x96e7 TXT _dmarc.fwz3.c52hhq7.fwz3.g531g.kiwkrf.uaqfwz3.██████████.com
DNS	120	Standard query 0x38e1 TXT _dmarc.fwz3.c52hhq7.fwz3.g531g.kiwkrf.uaqfwz3.██████████.com
DNS	120	Standard query 0x200b TXT _dmarc.cs8o.b7n8q8m.cs8o.gmq2s.h7hccu.xdrCs8o.██████████.com
DNS	116	Standard query 0x2a0d TXT _dmarc.rochelle.washington310.dgsbit.██████████.net
DNS	116	Standard query 0x51fa TXT _dmarc.rochelle.washington310.dgsbit.██████████.net
DNS	113	Standard query 0x3970 TXT _dmarc.q70azizs32.tacy.██████████.link
DNS	113	Standard query 0x7bdd TXT _dmarc.a587z2e9pg.tacy.h██████████.link
DNS	113	Standard query 0x1d3c TXT _dmarc.6g7gflp8k8.tacy.██████████.link
DNS	113	Standard query 0xe803 TXT _dmarc.q70azizs32.tacy.h██████████.link
DNS	113	Standard query 0xa300 TXT _dmarc.ozqta7439y.tacy.h██████████.link
DNS	113	Standard query 0xa14c TXT _dmarc.6g7gflp8k8.tacy.██████████.link
DNS	113	Standard query 0x4048 TXT _dmarc.r3k8o16zct.tacy.██████████.link
DNS	112	Standard query 0xb658 TXT _dmarc.jc8duqih7.toffes.██████████.net

Case study 3

Tier1 operator in Western Europe – Telco Core architecture



A top-down view of a large, circular metal pan, likely made of aluminum or stainless steel, containing several sausages. The sausages are a vibrant orange-brown color, indicating they are being cooked in oil. The pan's surface shows some oil residue and small bits of food. The lighting is bright, highlighting the texture of the sausages and the metallic sheen of the pan.

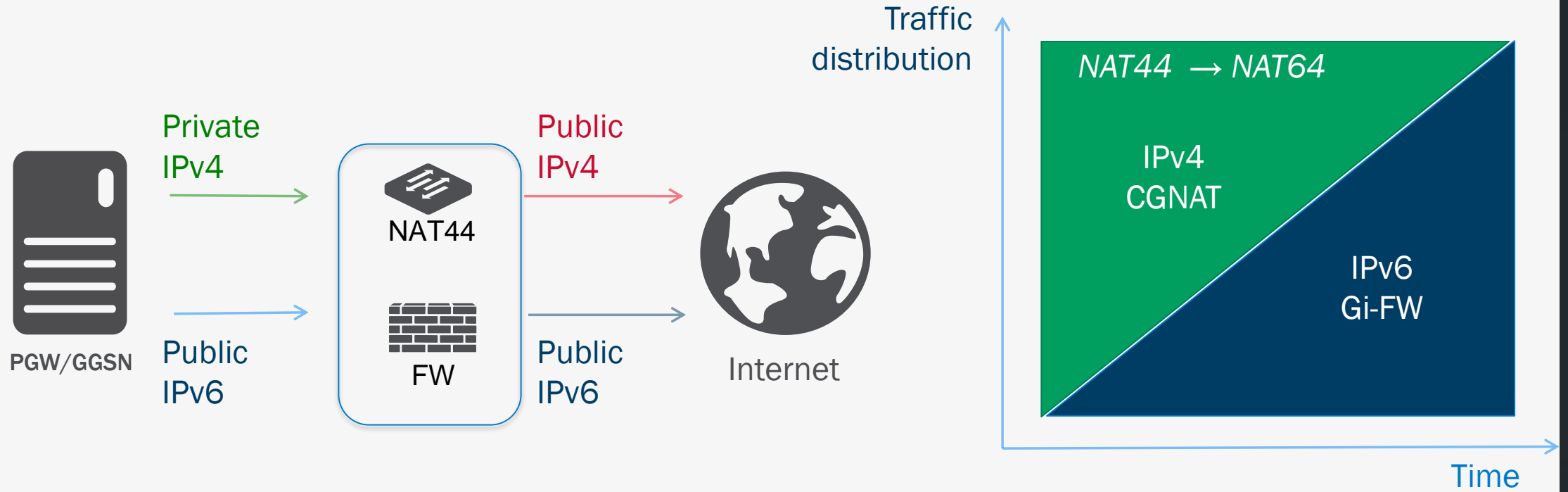
**Carrier-grade FW
&
CGNAT**

F5 Carrier Class Network Firewall

HIGH PERFORMANCE / SCALABLE / HIGH AVAILABILITY / PROGRAMMABLE / CONSOLIDATION OF NETWORK FUNCTIONS



Integrated Firewall + CGNAT



UNPRECEDENTED SCALE AND PERFORMANCE

GRADUAL TRANSITION FROM IPV4 CGNAT TO IPV6 GI-FW

INVESTMENT PROTECTION

Case study 1

Tier1 Operator in Western Europe – Carrier-Grade FW

Starting position

- More than 70% traffic growth YoY operator's needs
- Issues with existing supplier : Performance, Bugs, Concurrent sessions, Logs

Requirements

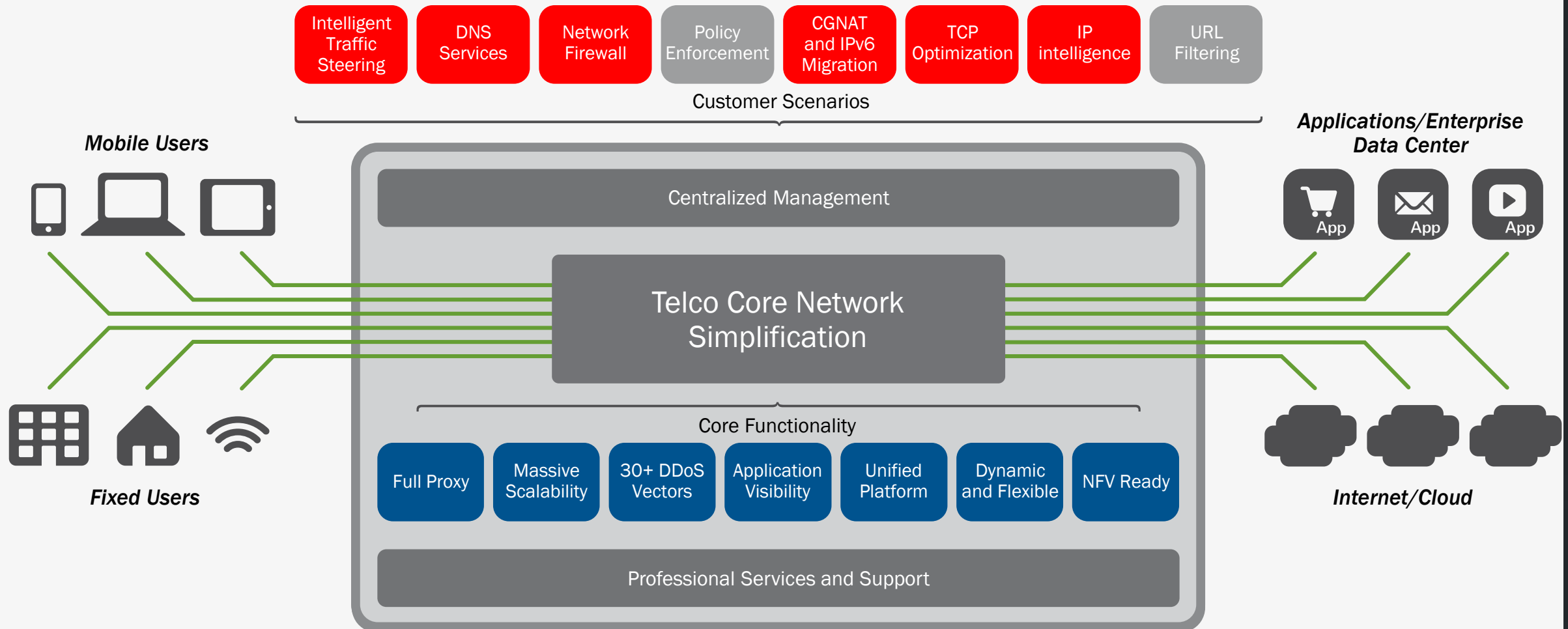
- FW and CGN for 60G of Traffic
- DDOS protection
- 15 millions pps
- 45 millions simultaneous flows
- 280k cps
- High speed Log

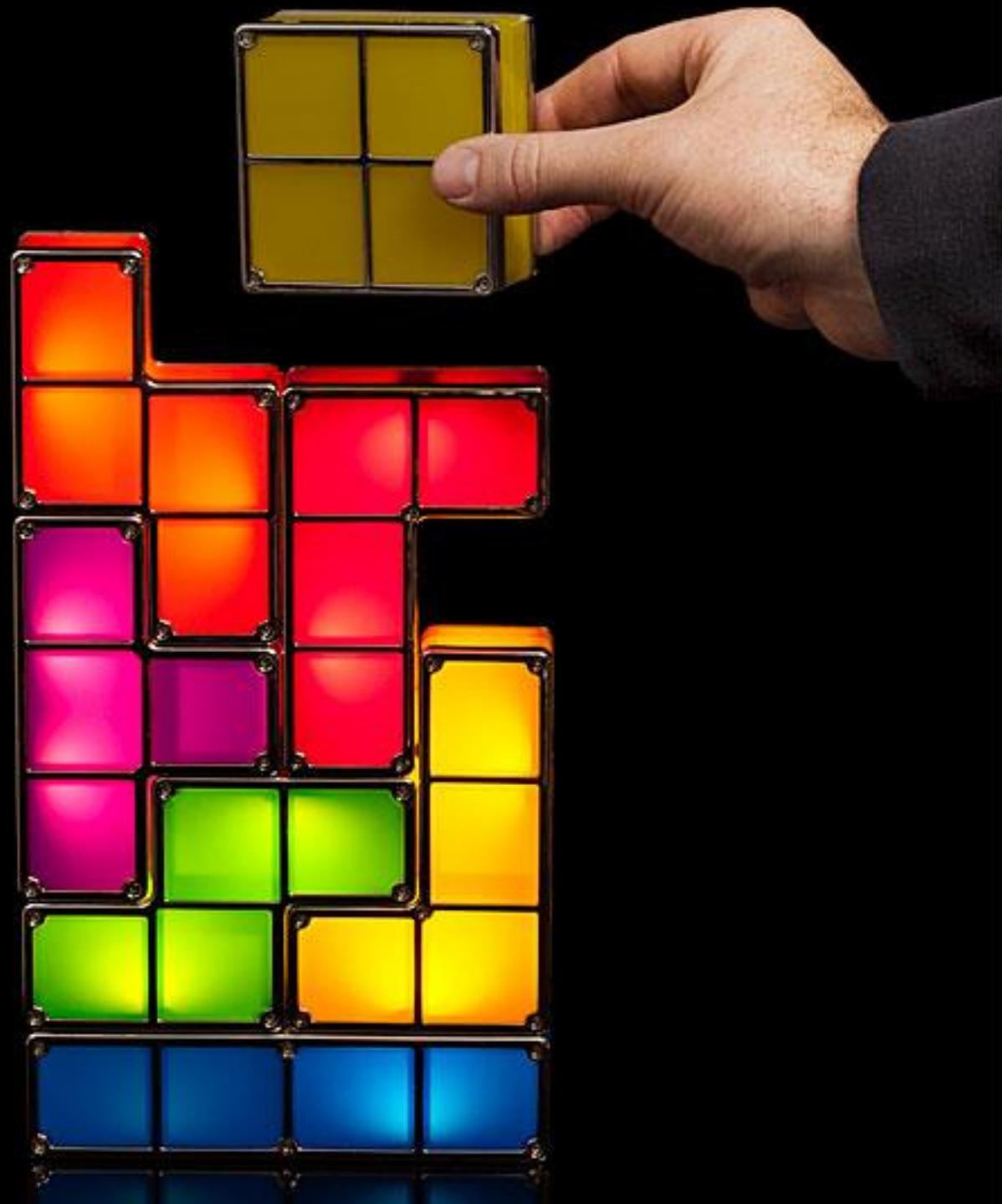


**F5 solution:
Blades B2250 + FW License**

Case study 1

Tier1 Operator in Western Europe – Carrier-Grade FW







Summary



Filip Kolář

f.kolar@f5.com

+420 720 704 746

Martin Oravec

m.oravec@f5.com

+421 908 747 633