

Core Network Resilience for Sustainable Business Growth



A10

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A10

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Intel® Network Builders

PARTNER

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networkbuilders.intel.com

Dec 5, 8 a.m. PT

The logo for A10, consisting of the letters 'A10' in a bold, white, sans-serif font.

Always Secure. Always Available.

Core Network Resilience

For Sustainable Business Growth

A10 and Intel Partnership



White Paper intel.

Service Providers
Mobile/Wireless

**A10 Thunder® CFW Virtual Appliance
Delivers 100Gbps Throughput¹**

A10 Networks achieves 100Gbps throughput and 328,000 connections per second on tests of its A10 Thunder CFW virtual appliance using 3rd Gen Intel® Xeon® Scalable processor and Intel® Ethernet 800 Series Network Adapters

Intel XEON Communications service providers (CoSPs) face challenges in scaling networks to keep up with connectivity demands created by an explosion of Internet-connected devices, and expanding coverage into remote, rural geographies. Threat actors are quickly scaling their attacks to keep up with the tremendous growth in connectivity, and CoSPs must protect their expanding customer bases and coverage areas.

The A10 Thunder Convergent Firewall (CFW) provides critical core networking functions that enable CoSPs to help secure and scale their networks. A10 Networks has worked with Intel to benchmark performance of its integrated Thunder CFW virtual appliance (vThunder CFW) on servers based on 3rd Gen Intel® Xeon® Scalable processors, showing performance of 100Gbps throughput and 328,000 connections per second (CPS).

A10 **Security, Capacity and Coverage Challenges Converge**

CoSPs must build and manage high performance, resilient networks at a time of exploding Internet traffic, continued network expansion, and increasing operational costs.

Almost half of the world population is still offline. In the US, an estimated 25 million homes² do not have adequate broadband connectivity, mostly located in remote, rural areas that are more costly to provide service. Extending coverage to unserved or underserved areas will require use of multiple access technologies – mobile / 5G, fiber to the home (FTTH), fixed wireless, satellite and others. As more subscribers are connected, more traffic must be carried, and so the core network capacity must be expanded as well.

For mobile networks, global mobile data traffic reached 84 exabytes (EB) per month by the end of 2021 and is projected to reach 86.8EB by the end of 2022³. While video traffic is estimated to represent 60% of all mobile data traffic today, future growth is driven by the expanding adoption of high-bandwidth, next-generation apps such as augmented reality (AR) and virtual reality (VR). In addition, IDC forecasts the number of connected Internet of Things (IoT) devices will reach over 42 billion by 2025⁴.

Multiple technologies are being used to bridge the digital divide. While 55% of the world's population is using the mobile Internet, future growth of mobile Internet adoption will occur in low- and middle-income countries⁵. Fixed wireless access is expected to have a 73% CAGR between 2021 and 2026⁶ according to Mordor Intelligence. Wireline broadband access revenue from both CoSPs and cable operators will grow at 4.56% to total \$92.6 billion by 2027 according to GlobalData⁷.

IPv4 capacity continues to be a challenge as operators add subscribers to their networks. The number of available IPv4 addresses is dwindling and are expensive to acquire via third parties. Not many operators have made the costly transition to IPv6.

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1



More Challenging Times Expected... Yet Demand Remains Unrelenting

*“ New behaviors and expectations for how individuals learn, consume, work, and socialize have emerged...
The key enabler of this change has been the service provider networks... ”*

— IDC, [“Service Providers in the Age of Resiliency”](#)



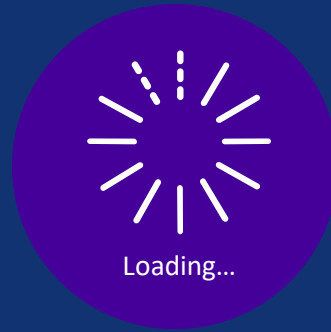
Speed and Price are Important, but Not Enough

Reliable?



Service Disruption
Inaccessible websites
or services

Fast?



Milliseconds Count
High latency or sluggish response
(QPS) = "slow" perception

Safe?



Suspicious Behavior
Malicious sites, malware, traffic
re-direction, ransomware

← After subscribers are acquired, how will you retain them? →

Disruptor or Disrupted?

The New Competitive Landscape

“...when it’s technically possible to disrupt a market, someone inevitably will disrupt it.”

— [Forbes, Telecommunications Council](#)

Will that be you?

“by 2026, 80% of G2000 companies will be interconnecting with 4+ hyperscale providers and 30+ SaaS providers and business partners, on average.”

— [Equinix GXO Report](#)



Amazon launches AWS Private 5G so companies can build their own 4G mobile networks

Paul Savers @psavers / 4:55 AM PDT • August 12, 2022



Exclusive: Google Fiber GM talks fiber expansion strategy, hurdles


By Diana Govaerts · Feb 23, 2023 11:50am

[google fiber](#) [fiber](#) [fiber deployment](#) [broadband deployment](#)



FORBES > LEADERSHIP

Service Providers: It's Time To Wake Up And Smell The Transformation

 Stephen Spellicy Forbes Councils Member
Forbes Communications Council
COUNCIL POST | Membership (Fee-Based)

May 18, 2023, 07:00am EDT

Security and Resilience are Required for Sustainable Business Growth

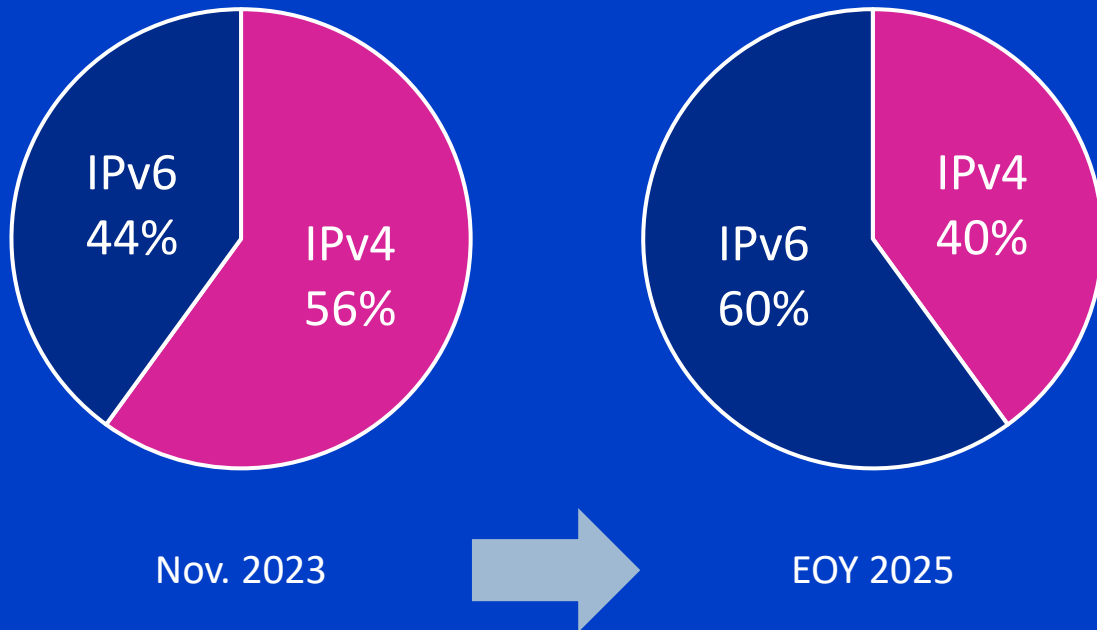
A holistic approach is needed across access, transport and core to secure and scale the network for long-term growth.



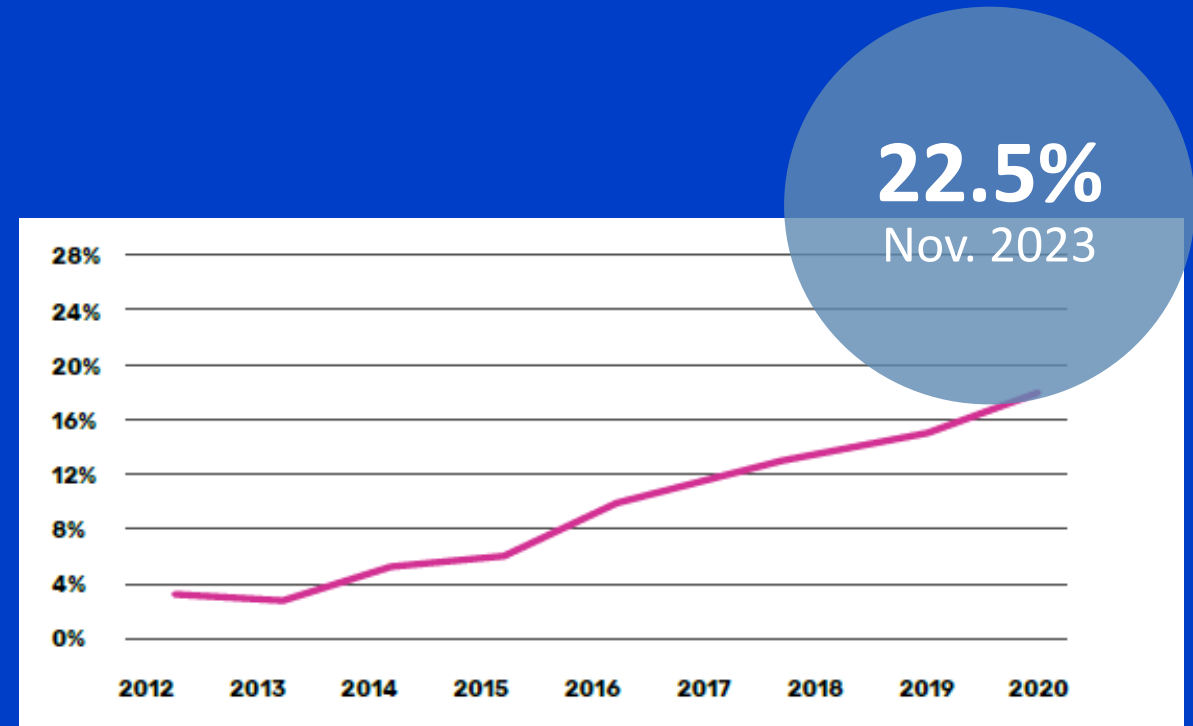
Stable OPEX - Reduce Investment Risk

Dilemma: IPv4 and IPv6 will Coexist for Years

Worldwide Users Accessing Google



Percentage of Websites Using IPv6*

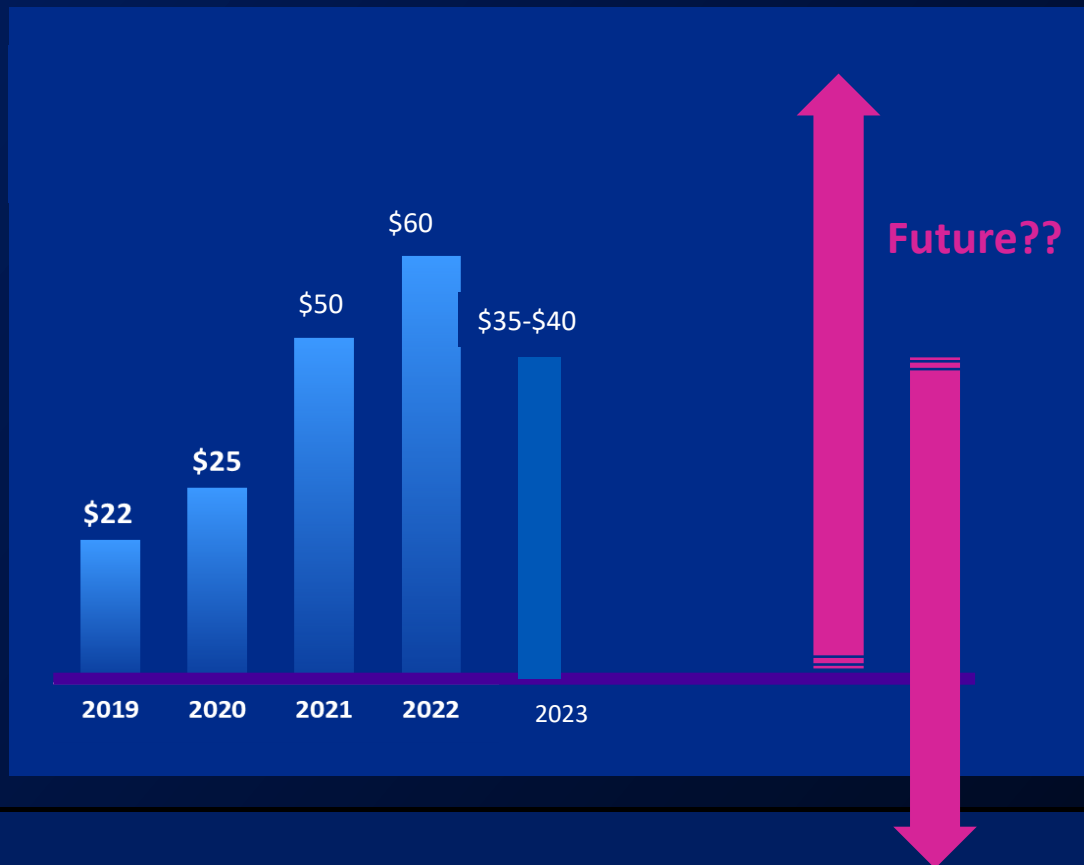


*Source: [Google](#), based on users accessing Google on IPv6

Assumes Quadratic second order regression, using Google data over past nine years, [Vyncke.org](#)

Investment Risk : The Volatile Price of Crucial IPv4 Capacity

Will the price of IPv4 keep going up?



Or...

will the bottom drop out and IPv4 space becomes worthless?

IPv4 Investment Protection

How Quickly will IPv6 be Adopted?



2023
40-50% IPv6



2025
60-70% IPv6



Future
~90% IPv6

Thunder CFW with CGN



IPv4
Preservation



IPv6
Migration



Carrier-class
Firewall

- Rising costs
- Availability of supply
- Address quality
- Blacklisted

Business Risks

Security Risks

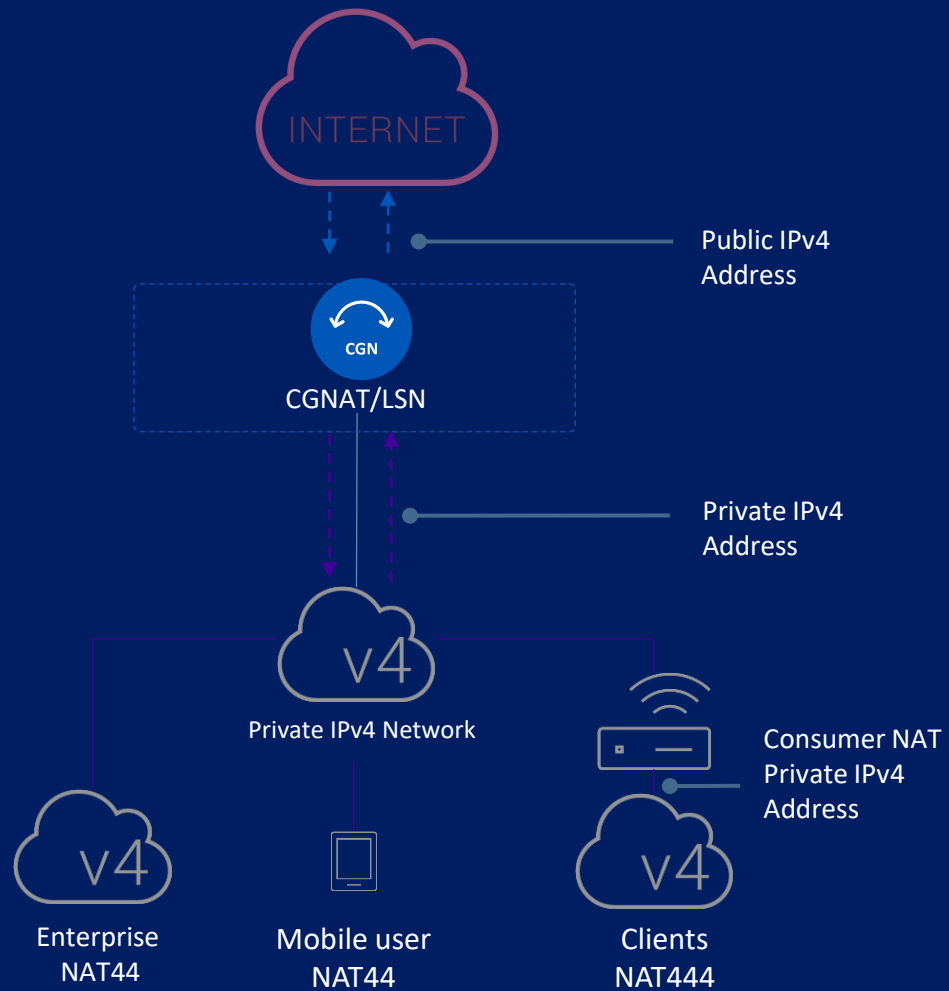
- DDoS on IPv4 address pools
- Unprotected IPv6 users

Poll Question

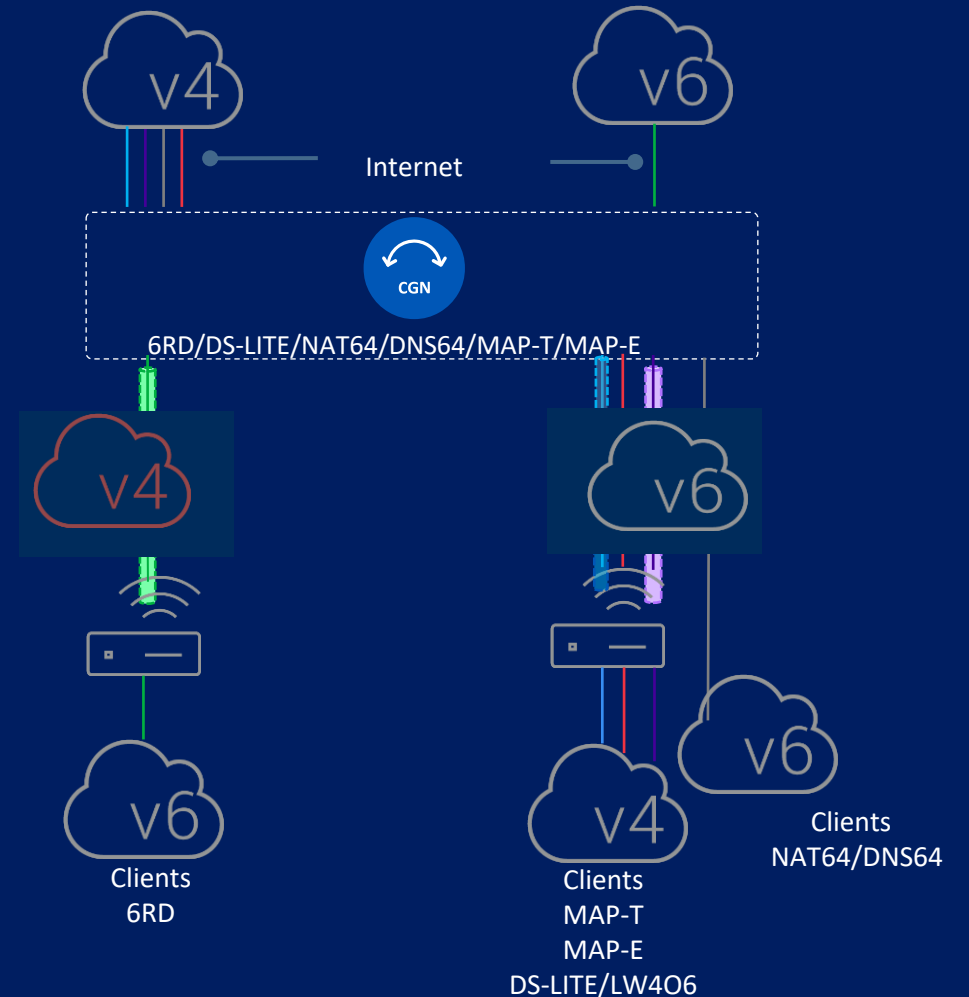
- Which is your top concern impacting your complete network conversion from IPv4 to IPv6?
 - Non-compatible subscriber premise equipment
 - Lack of IP resources or expertise
 - Fear of service disruption to subscribers
 - Lack of budget
 - Effective and efficient logging for quick response to law enforcement queries

Common Deployment Scenarios

Carrier-Grade NAT / LSN

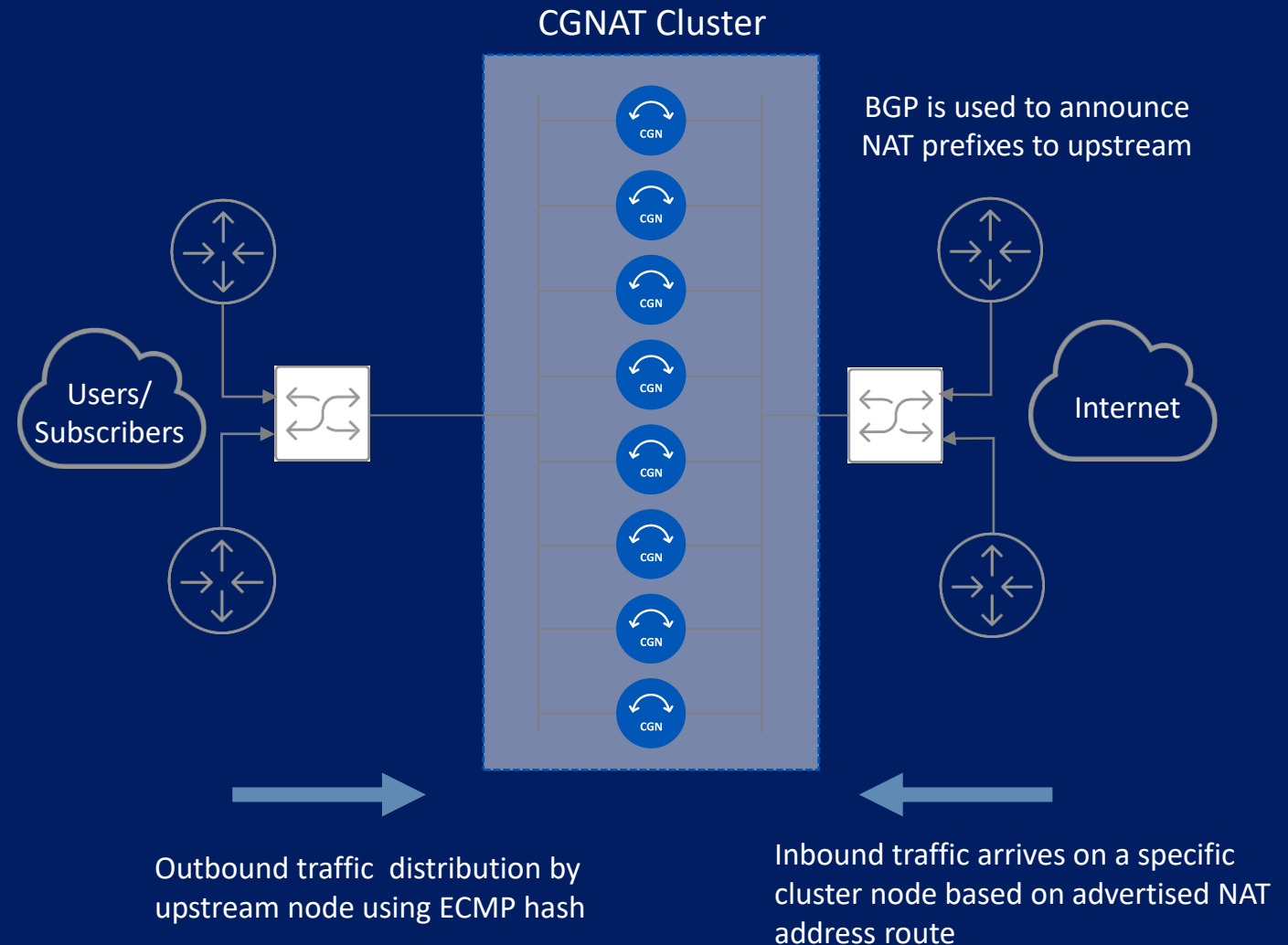


IPv6 Transition



CGNAT Scaleout

- “Add as you grow” capability
- Throughput on demand with temporary cluster resizing
- Built-in redundancy addressing a failure of one or several nodes
- Simplified management – Manage cluster as one logical entity with a unified interface



Logging and LEA Compliance

The Need

- Logging is required by financial and other regulated industries
- Session logging identifies bad actors/hackers by IP address for law enforcement (LEA)
- Volume of session logs produced can overwhelm legacy system



Solution: Advanced CGN Logging

- **Logging optimization features – string size and volume reduction**
 - Port Batching
 - Fixed-NAT (Deterministic NAT)
 - Compact (HEX) and Binary logging (string size reduction)
- **Transport:**
 - Syslog TCP or UDP transport option
 - Traffic logs to multiple servers (up to 32) with hashing and load balancing support
 - Support source IP based hashing algorithm
 - RADIUS attributes support for logging to a RADIUS server
 - NetFlow v9 and IPFIX exporter function support. Export to multiple NetFlow collectors
- **Formats (traffic logs):**
 - ASCII, HEX, Binary, RADIUS and SYSLOG (RFC 5424) logging formats
 - Also supports fully customizable logging message format for Syslog and NetFlow IPFIX

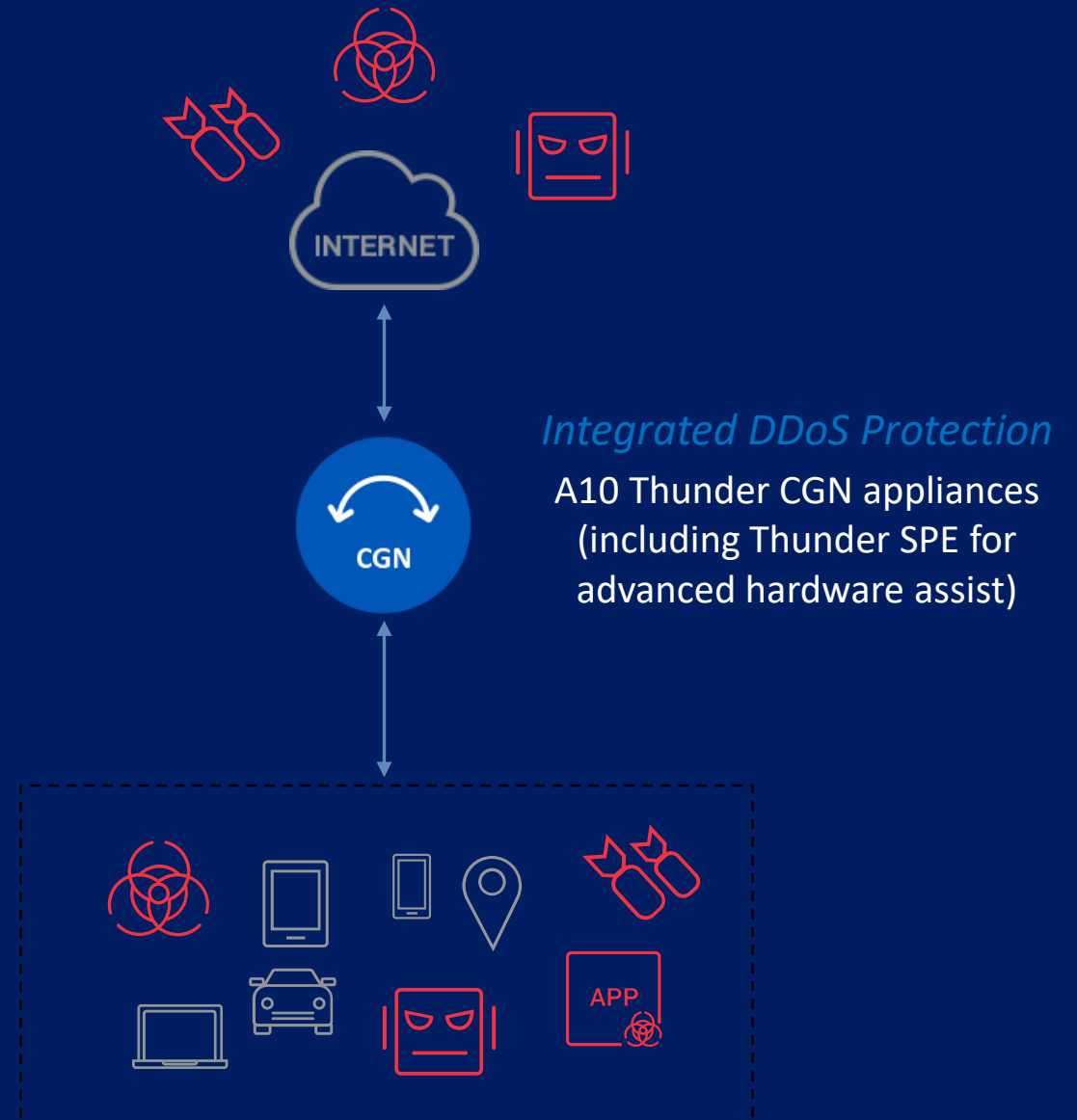
Application Integrity

- Some applications can break with CGNAT
- Applications commonly at risk:
 - Encapsulating Security Payload (ESP)
 - File Transfer Protocol (FTP) Enabled by default
 - H.323 standard (H323)
 - Media Gateway Control Protocol (MGCP)
 - Point-to-Point Tunneling Protocol (PPTP) Generic Routing Encapsulation (GRE)
 - Real Time Streaming Protocol (RTSP)
 - Session Initiation Protocol (SIP)
 - Trivial File Transfer Protocol (TFTP)
- Application Layer Gateway (ALG) can ensure that the application is unaffected and continues to function normally as before



Integrated DDoS Protection

- IP Anomaly Filtering
- ICMP & Connection Rate Limiting
- Selective Dynamic Filtering
- TCP SYN Flood Protection
- Dynamic CPU Flow Redistribution
- Session Table Overload Protection





Harris Duncan, VP of Network Engineering, Shentel

“conservatively we're estimating the savings to more than two million dollars”

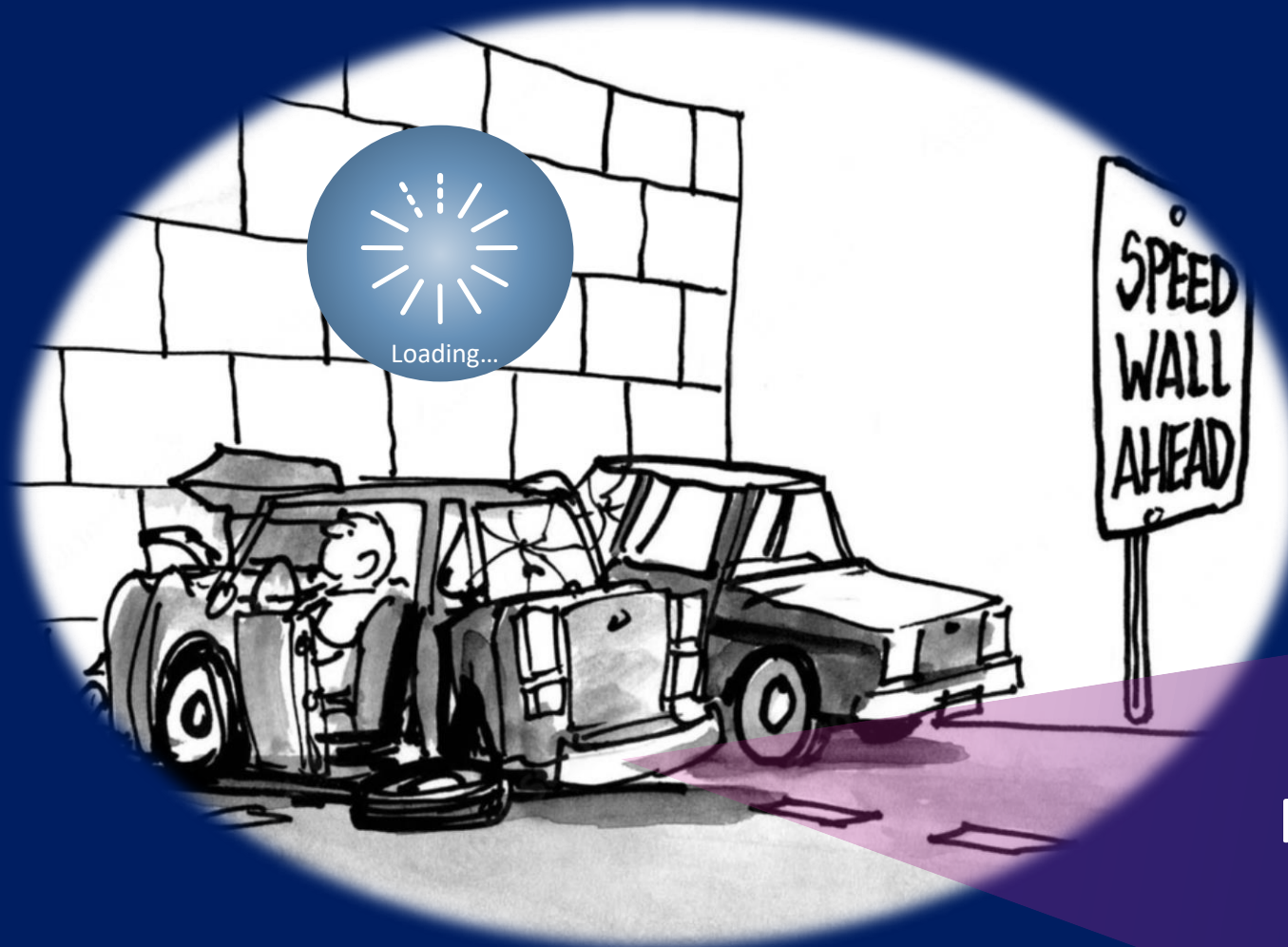
You know you have a solution that exceeds all of our requirements backed by a team of great professionals who want a partner for success.

<https://www.youtube.com/embed/s6irzV6BEIA?autoplay=1&rel=0&wmode=transparent>

Maintain the High-Speed Subscriber Experience

Overwhelmed DNS Can Stop the High-Speed Experience Dead in its Tracks

DNS under Attack
Slow Response

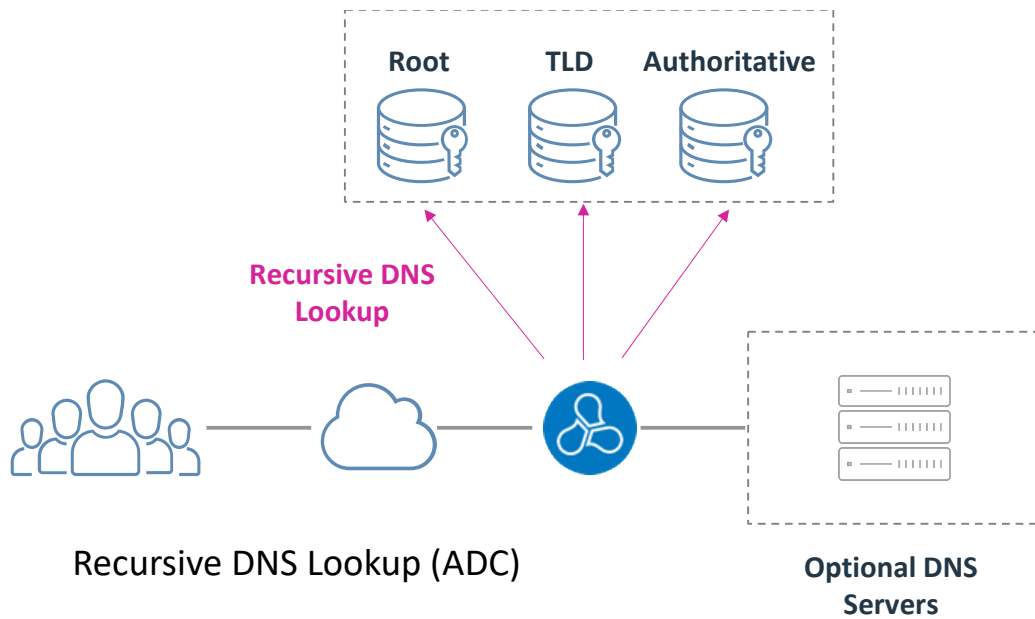


\$M
FTTH Investment

Improve DNS Performance

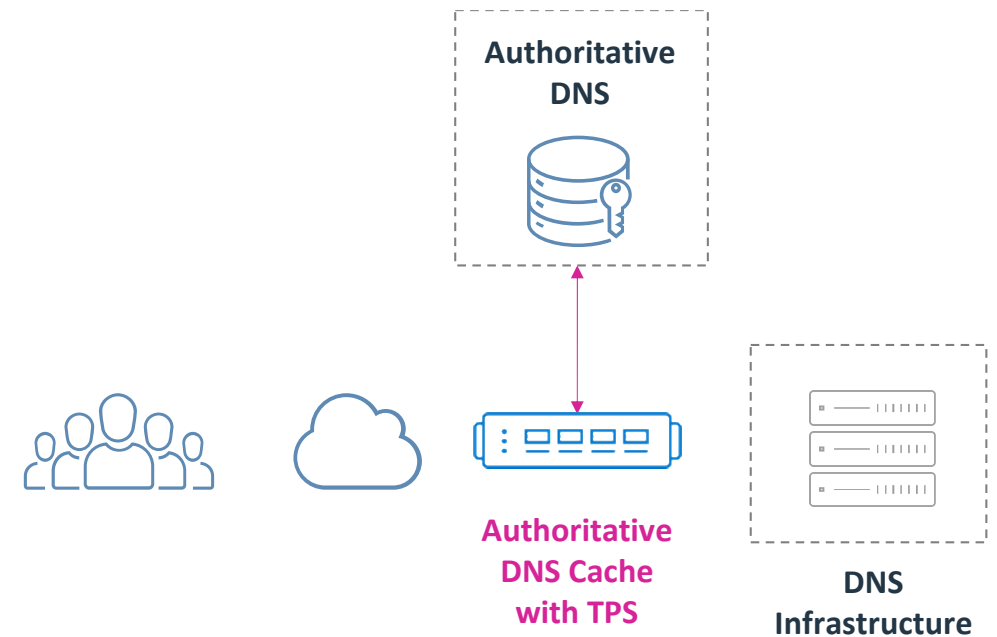
Recursive DNS (ADC/CFW)

- Consolidate DNS servers
- Coexist with current DNS features



Non-Stop DNS (TPS)

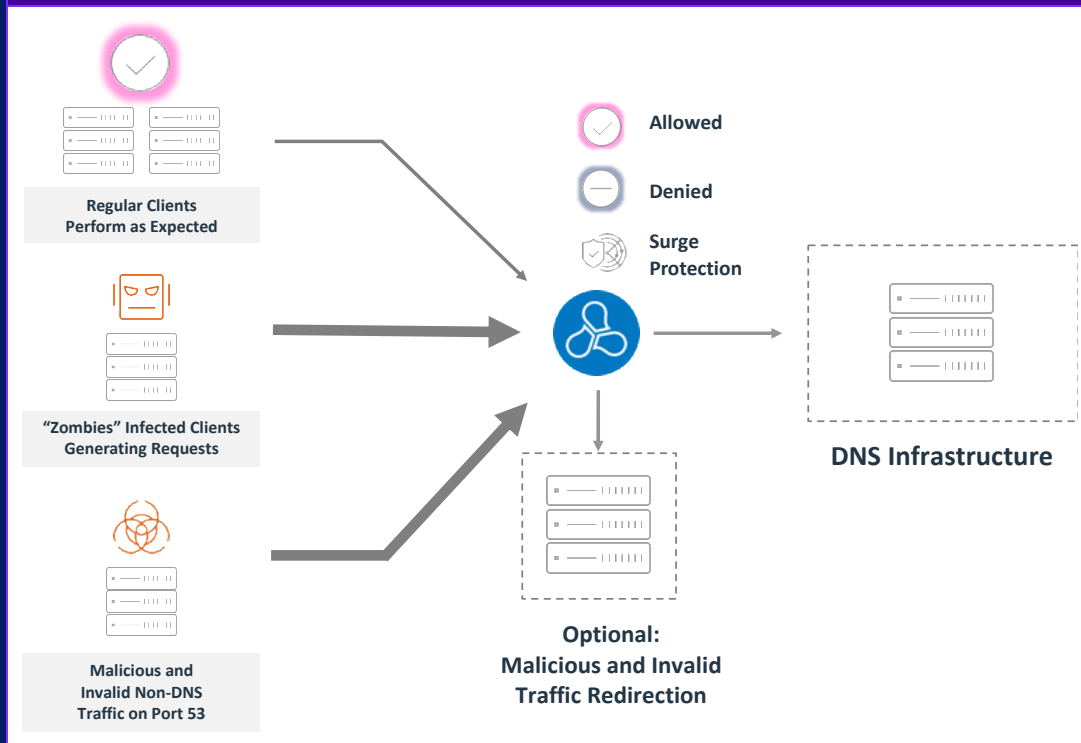
- Relieve DNS servers from high query volumes
- Periodic DNS cache update with authoritative (backup) DNS servers



Protect DNS Infrastructure

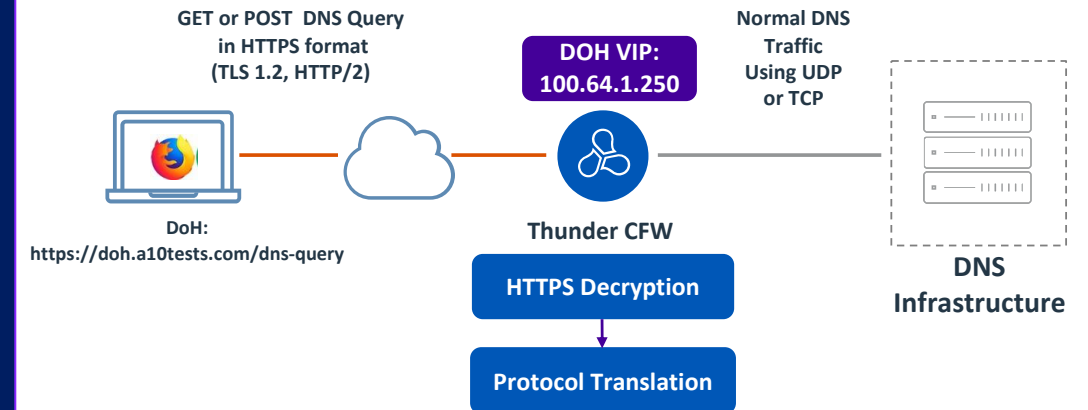
DNS Application Firewall (CFW)

- Protect critical DNS service and infrastructure



DNS over HTTPS/TLS (CFW)

- Ensures privacy through encryption



Improve DNS Scalability and Availability

Case Study

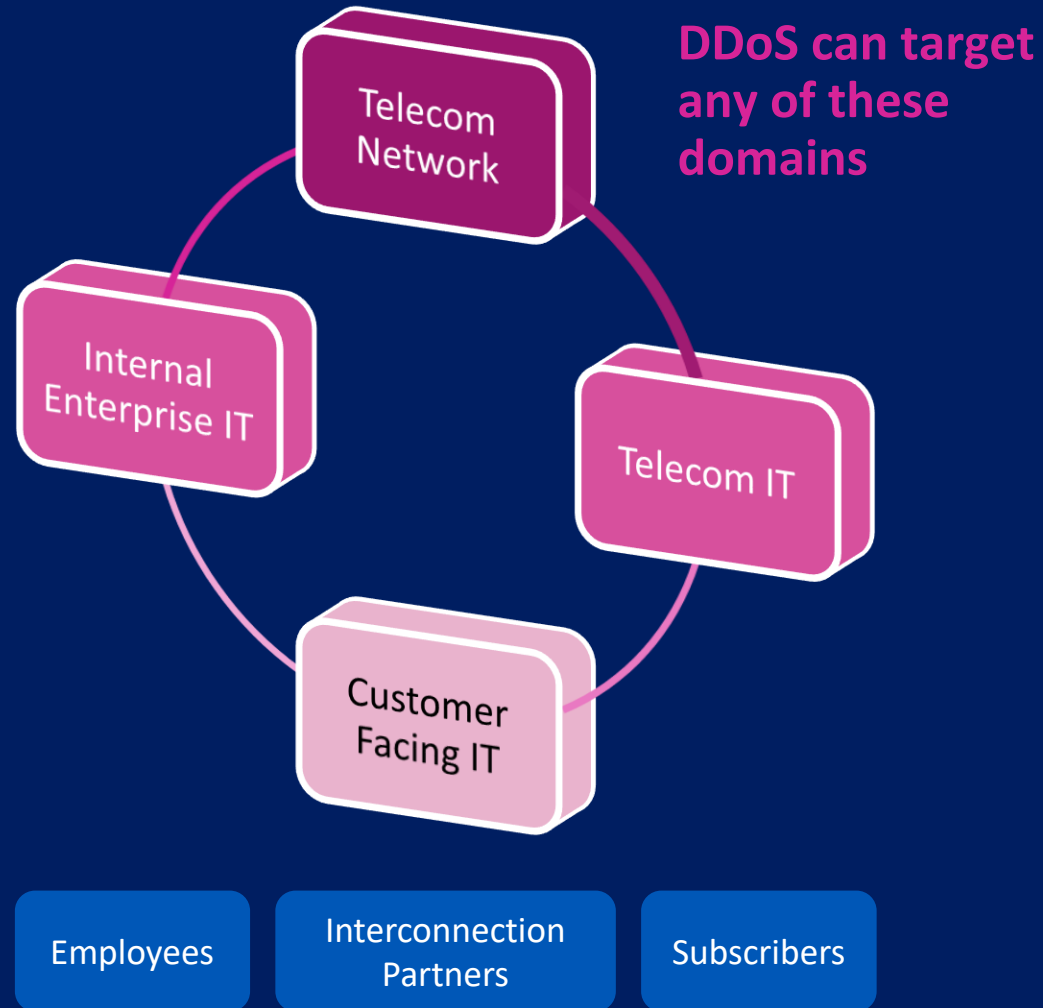
Largest MSO in Brazil

- Existing CGN customer
- Started by load balancing DNS
- Added caching for improved performance
- After suffering DNS attack and decided to enable DAF
- Replaced +90% of back-end DNS servers with recursive resolution on A10

OPEX savings by reducing back-end DNS Servers (from 80+ to 3 per site)

Network Security and Resilience

Telcos Have a Broad Attack Surface to Defend



“ 2023 is shaping up to be the year of telecom hacks...
Broadly, the situation doesn't come as a surprise. Hacks and other cybersecurity troubles have become de rigueur among corporate America in recent years as aging IT infrastructure struggles to withstand dramatic increases in the scope and scale of cyber attacks. ”

— Mike Dano , Editorial Director, Light Reading

Rural Communities are Especially Vulnerable

“

We're getting past where rural hospitals used to feel like, 'Oh, nobody's going to target us because we're rural...'

You can still be attacked by cybercriminals...

”



Source: Data Breach Today
May 31, 2023

“

...We would encourage all health care providers, especially smaller hospitals, to verify that their website hosting and service providers have adequate DDoS protection in place

”

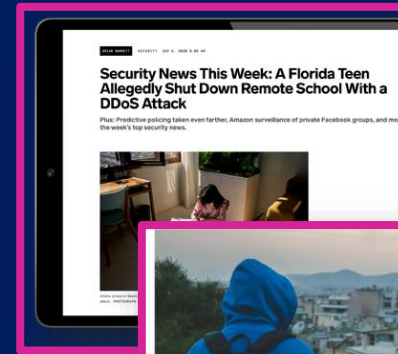
*American Health Association
Jan 30, 2023*

DDoS Attacks Disrupt Subscriber Experience

Unique DDoS Weapon
Tracked by A10 Networks

Approximately

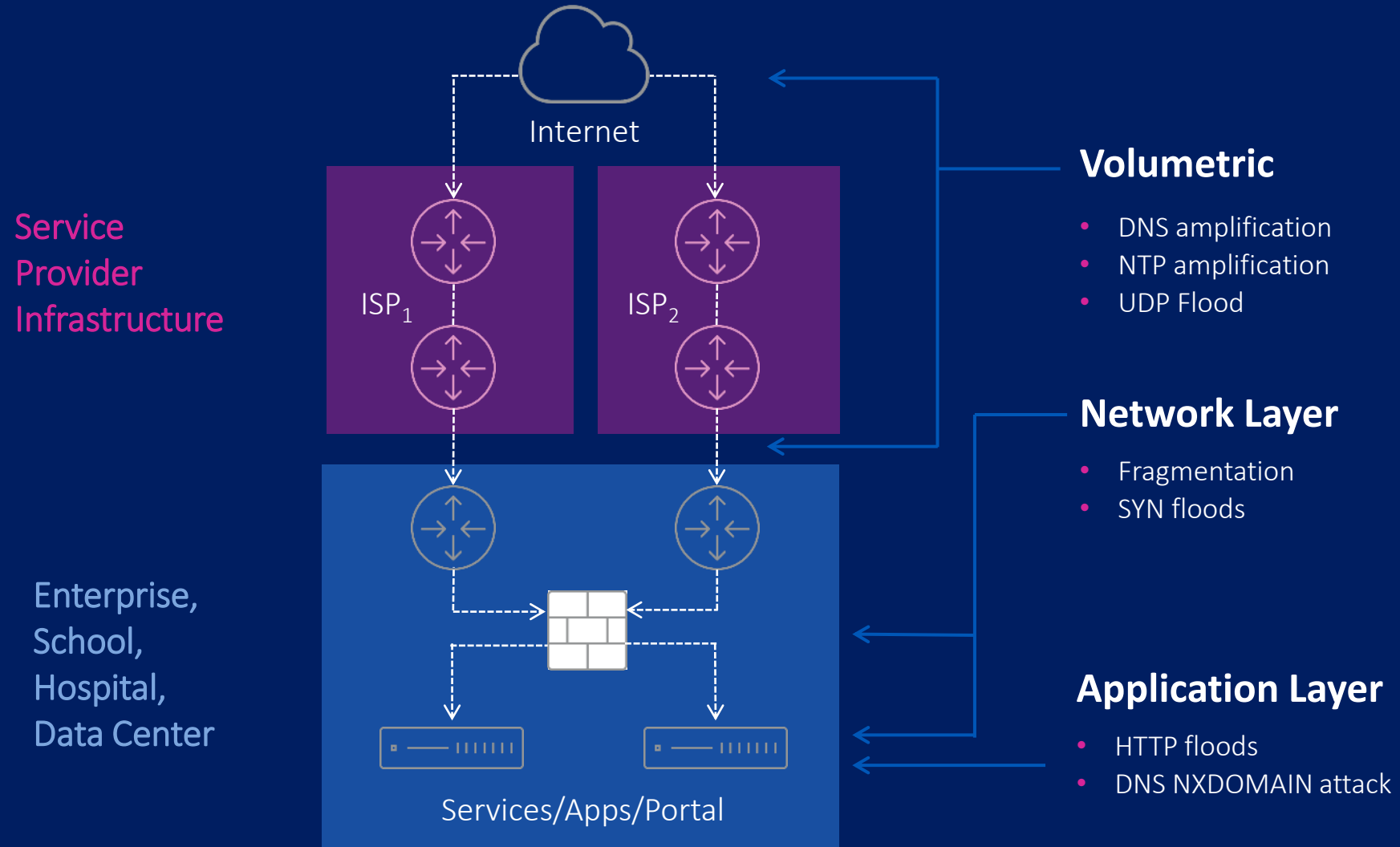
15.4 Million



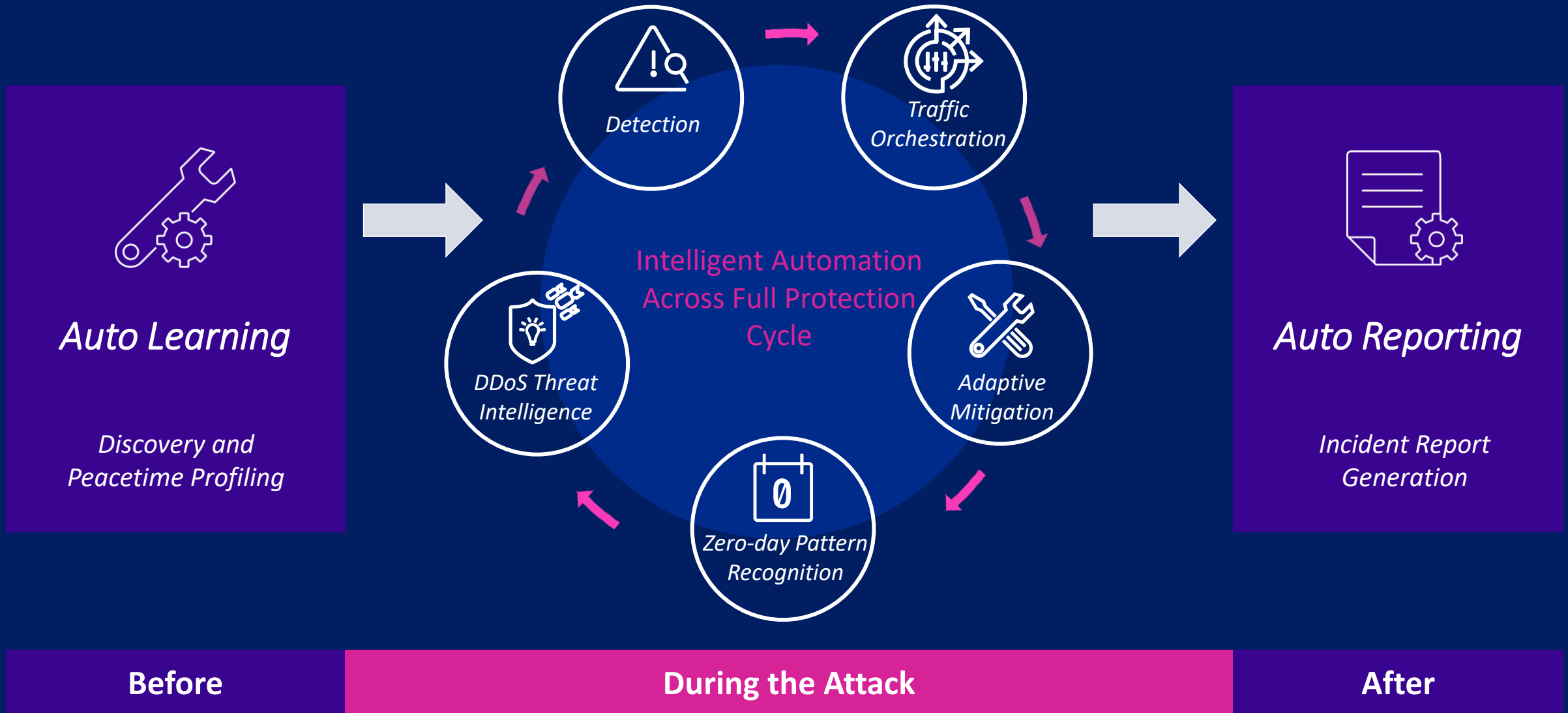
| | | | | |
|--|--|---|--|--|
|  |  |  |  |  |
| Cyber Criminal | Disgruntled Employee | Hacktivist | Script Kiddie | Gamer |

**DDoS Attacks can be
Launched by Anyone at
Anytime from Anywhere**

Both ISP and Downstream Customers are at Risk



A10 Defend



Leverage Network Investments



Monetize Investments

CGN as a Service



“Richweb provides the infrastructure services, such as routing, network address translation and peering, that electric coops need to deliver broadband to rural communities.”

Mark Lea | CEO and Cofounder,
Richweb

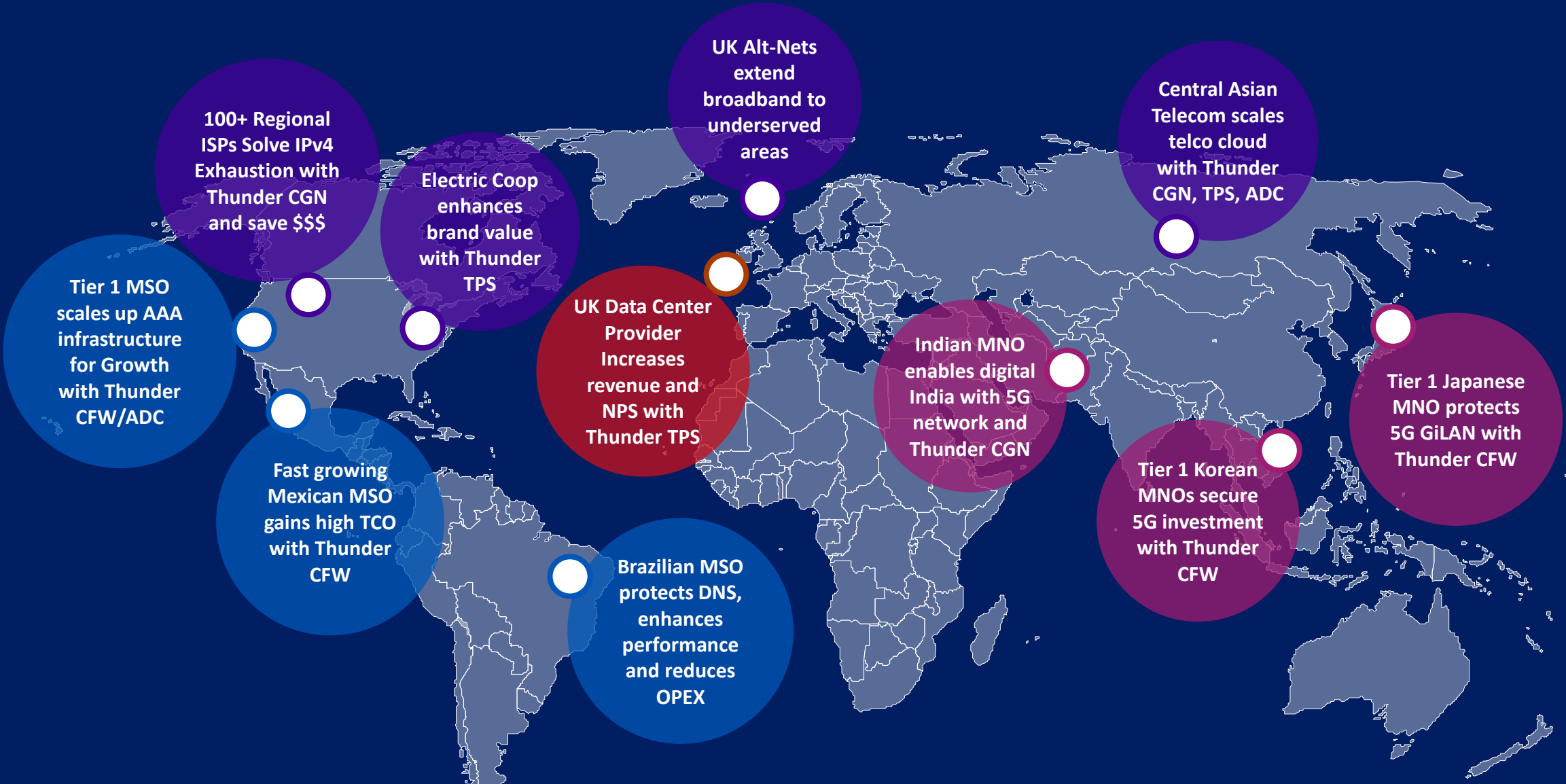
DDoS Protection Service for Retention

Park Region Telephone Co.

It has worked for customer retention. We have some larger customers and we can offer them DDoS prevention as part of our service, so they don't have to go somewhere else.... It's just another value-add to retain the customer.”

Ken Budd, Network and Plant Operations Manager,
Park Region Telephone Co.

Customer Examples – Global and Regional



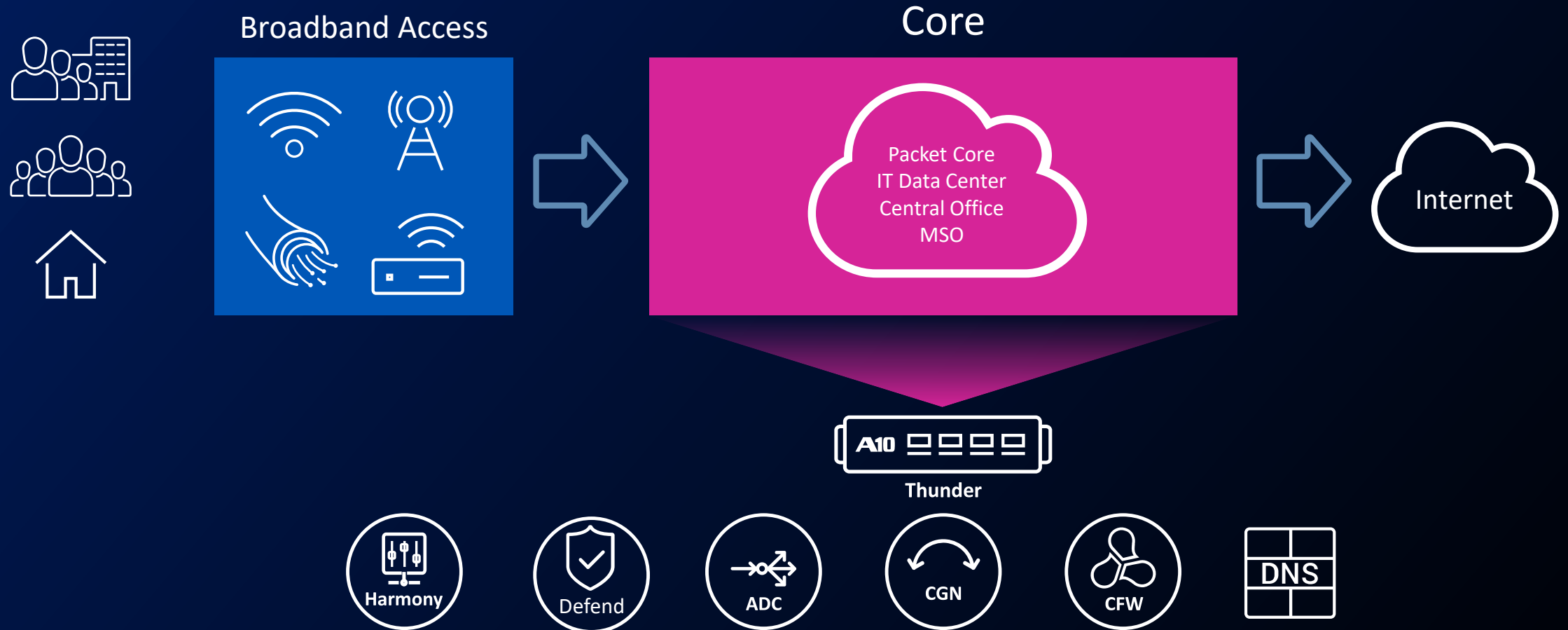
...and many more.



Always Secure. Always Available.

A10 Networks Portfolio for Regional ISPs

A10 Helps Regional ISPs Build a Sustainable Business



A10 Secures the *Heart* of Service Provider Networks

Q&A

<https://www.a10networks.com/solutions/service-provider/rural-broadband/>

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