In the UK, the Pandemic has Shifted Investment and Purchasing Strategies

98% say COVID-19 increased demand by an average of

53%

Resulting in scale-up of:

Network infrastructure – 61%

High-demand locations 60%

Redistribution of network capacity – 44%

Investment in more security technologies – 48%

What are your highest priority security investments for 2021–2022?

48%	45%	43%	33%	28%
Upgrade Firewalls & Security...	DDoS Mitigation - Core &...	DDoS Protection as a Se...	DDoS Detection - Core &...	Security Policy Autom...

What changes have you seen from enterprise customers in their purchasing strategies for network services over the last year?

58%	51%	50%	44%	18%
Splitting Traffic	End-to-End SLAs	Expanded Telco Vendor ...	Exploring Private LT...	Willing to Pay Premium for...

The Digital Divide in the UK – The Race to Close the Gap

- **Project Gigabit: £5 billion**
  - Phase 1 to one million hard-to-reach homes
    - £ 210m – areas with slow speeds
    - £ 110m – 7,000 rural surgeries, libraries, schools
    - Break ground in 1H2022
  - Download speed of 1 Gbps with FTTH or Cable
- **Shared Rural Network: £ 500 million**
  - Four UK MNOs (EE, O2, Three, Vodafone)
  - Close "not-spots" and upgrade radio equipment
  - 700 partial "not spots" – only 1 MNO
  - Goal of 95% coverage in UK by EOY 2025
- **UK behind in FTTH coverage at 10%**
  - Japan – 95%; South Korea – 99%

| Project Gigabit | £ 5 billion
For Underserved Rural Areas
1 million hard-to-reach homes |
| Shared Rural Network | £ 500 million |

"Project Gigabit is the rocket boost that we need to get lightning-fast broadband to all areas of the country. This broadband revolution will fire up people's businesses and homes, and the vital public services that we all rely on, so we can continue to level up and build back better from this pandemic."

PRIME MINISTER BORIS JOHNSON

The IP Connectivity Decision
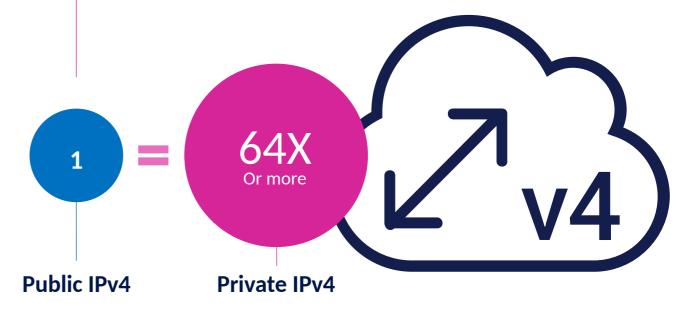
IPv6 Advantages

- Increased address space
- Improved performance and security
- Easier and better address management
- Handle packets more efficiently
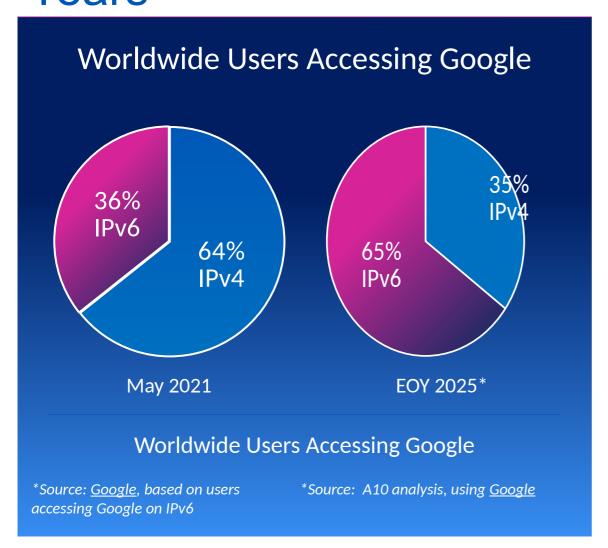- Reduce the size of their routing tables

But

- Data center conversion to IPv6 is not a trivial task
- Dual-stack does not resolve IPv4 scarcity
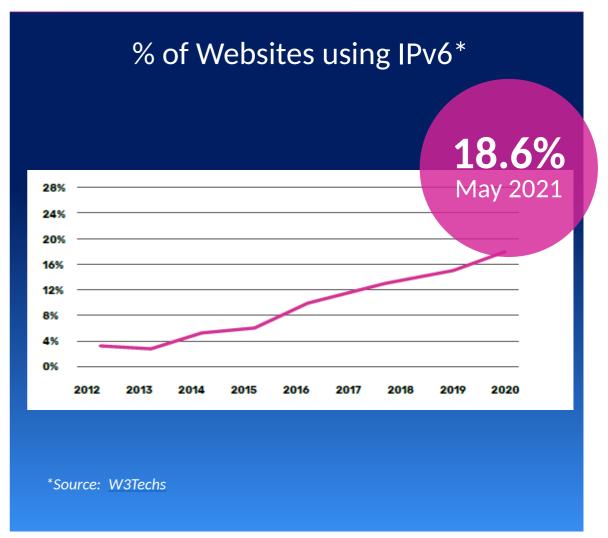- For many, total conversion is not feasible in short term

The IPv4 / CGNAT Option

- Leverages existing investment in IPv4
- Enables sharing of scarce IPv4 addresses
- Eliminates cost and uncertainty of acquiring more IPv4 addresses
- Can be deployed with IPv6 transition

1 = **64X** Or more

Public IPv4   **Private IPv4**

Uneven Adoption...IPv6 will Co-exist with IPv4 for Years

Worldwide Users Accessing Google

May 2021
- 36% IPv6
- 64% IPv4

EOY 2025*
- 65% IPv6
- 35% IPv4

Worldwide Users Accessing Google

Source: Google, based on users accessing Google on IPv6

Source: A10 analysis, using Google

% of Websites using IPv6*

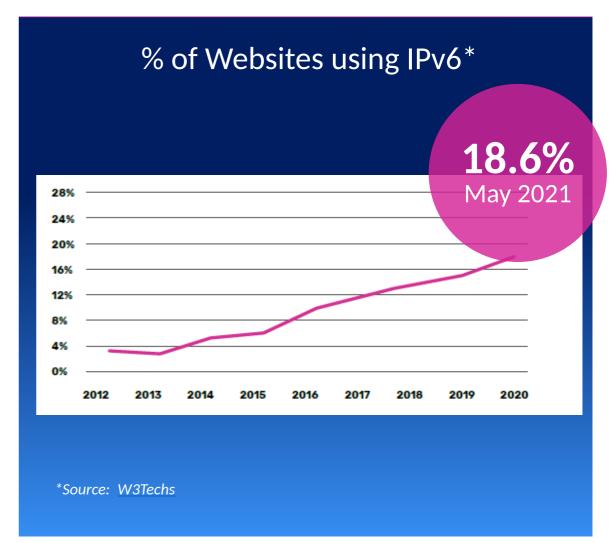**18.6%**
May 2021

Source: W3Techs

Uneven Adoption...IPv6 will Co-exist with IPv4 for Years

> **"** *Each customer wants connectivity to many possible points, and even if 80% of internet traffic is over IPv6, nearly every customer will still have numerous IPv4-only sites that they wish to*
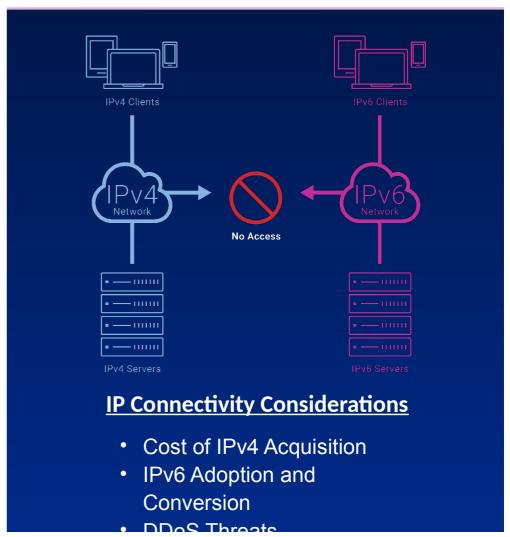
John Curran | President and CEO, ARIN
North American IPv6 Summit 25 April 2017

% of Websites using IPv6*

18.6%
May 2021

28%	
24%	
20%	
16%	
12%	
8%	
4%	
0%	

2012 2013 2014 2015 2016 2017 2018 2019 2020

*Source: W3Techs

IP Connectivity is a Critical Capacity Requirement
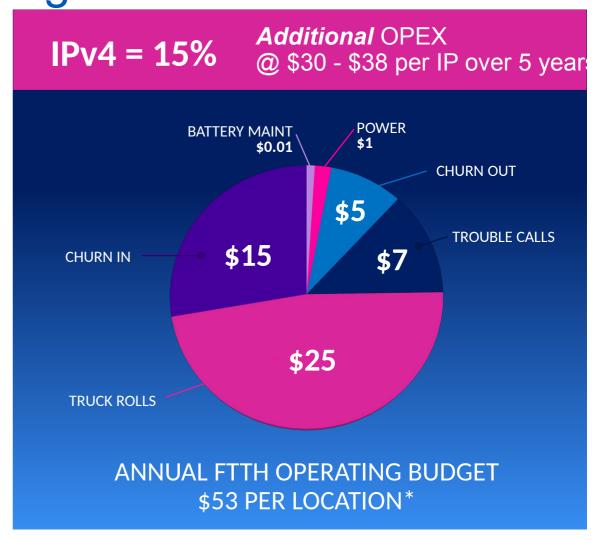
➡️ Every Internet-connected device needs an IP address

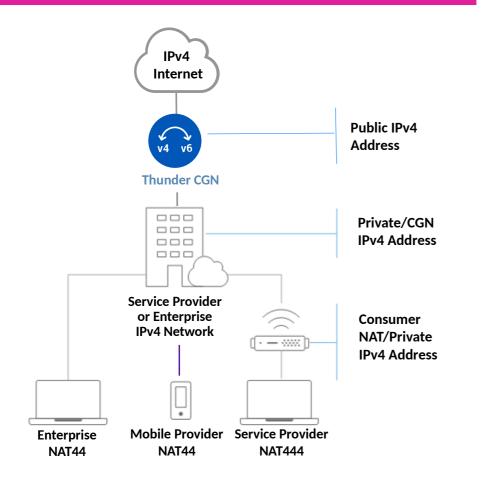➡️ IPv6 is not backward compatible with IPv4

IP Connectivity Considerations

- Cost of IPv4 Acquisition
- IPv6 Adoption and Conversion
- DDoS Threats

IPv4 Demand is High, Supply Uncertain, and Prices Rising

IPv4 Price Trends

- Other Considerations
  - Quality of Addresses
  - Auction Availability

$6	$17	$18	$25	$32	??
2015	2018	2019	2020	Mar-21	*Future*

IPv4 = 15%

Additional OPEX @ $30 - $38 per IP over 5 years

ANNUAL FTTH OPERATING BUDGET
$53 PER LOCATION*

- BATTERY MAINT $0.01
- POWER $1
- CHURN OUT $5
- TROUBLE CALLS $7
- CHURN IN $15
- TRUCK ROLLS $25

*Source: Fiber Broadband Assoc., June 2020
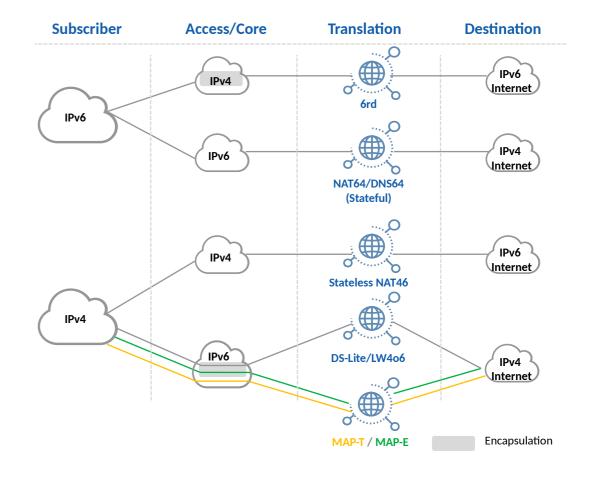
Thunder CGN for IPv4 Preservation and Transition to IPv6

IPv4 Preservation

IPv4 Internet

v4 v6
Thunder CGN — Public IPv4 Address

Service Provider or Enterprise IPv4 Network — Private/CGN IPv4 Address

— Consumer NAT/Private IPv4 Address

Enterprise NAT44

Mobile Provider NAT44

Service Provider NAT444

IPv4 – IPv6 Transition

Subscriber	Access/Core	Translation	Destination

IPv6

IPv4 — 6rd — IPv6 Internet

IPv6 — NAT64/DNS64 (Stateful) — IPv4 Internet

IPv4 — Stateless NAT46 — IPv6 Internet

IPv4

IPv6 — DS-Lite/LW4o6 — IPv4 Internet

MAP-T / MAP-E   Encapsulation

Community Fibre

" *Seventy percent of our traffic is IPv4....We have to maintain our IPv4 address resources, which set us on a journey to CGNAT.*"

Community Fibre Overcomes IPv4 Exhaustion to Connect Londoners

- Mission: deliver ultra-fast, affordable internet wo homes and businesses
  - 100,000 homes/businesses
  - By 2023: 1 million London households
- State-of-the-art network
  - Uses IPv6 addressing for scale and security
  - Rapid subscriber growth
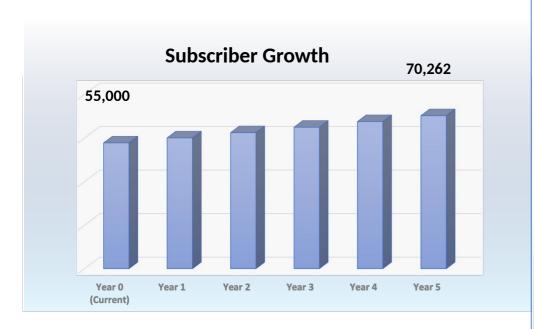 - Majority of destinations use IPv4

"A10 Networks went the extra mile to help Community Fibre overcome IPv4 exhaustion. A10 Networks understood what we wanted to do, and we felt bought into the solution."

Sam Defriez
Head of Networks, Community Fibre

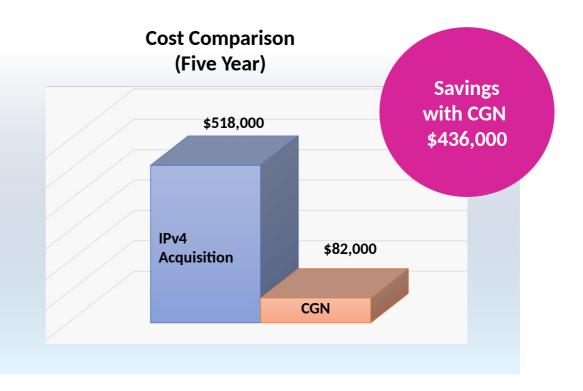# Example Cost Comparison Regional Broadband Service Provider

Subscriber Growth

55,000

70,262

Year 0 (Current) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5

- Cost per IPv4
  - $30 - $38
  - 5% price increase / year
  - RIR Fees
- Oversubscription Ratio: 32:1

*Source: A10 CGN_IPv4 Cost Estimator analysis
Based on real customer input and A10 industry expertise*

- Goal: FTTH Buildout
- Five Year Subscriber Growth
  - 55,000 – 70,262
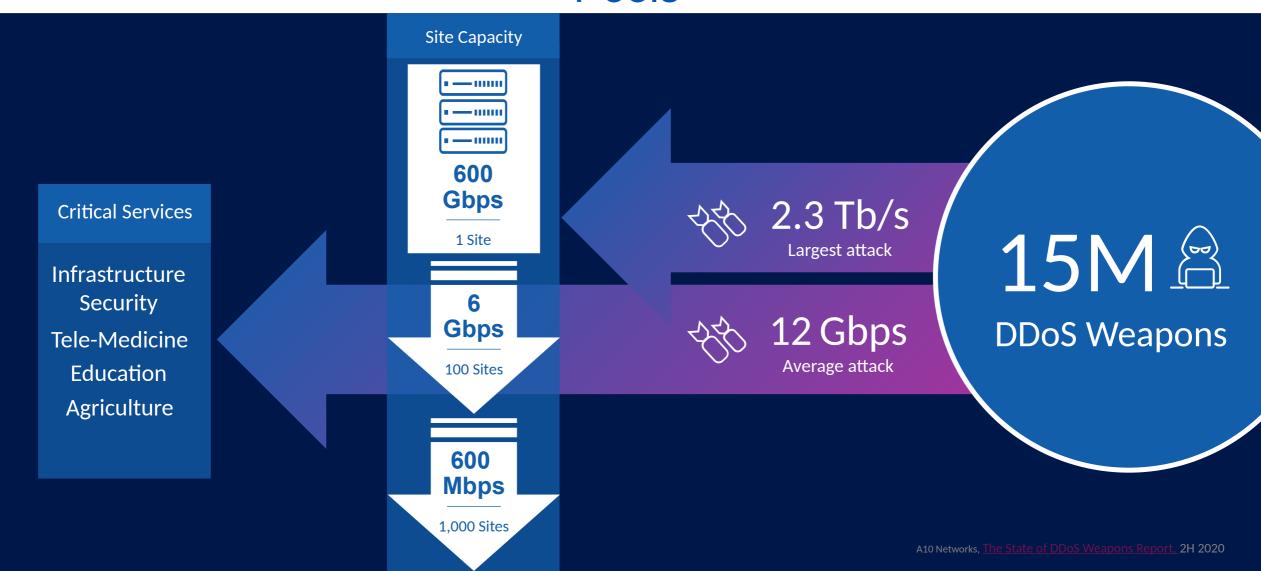 - 5% Annual Growth
- Available IPv4 Allocation – 57,000

**Cost Comparison
(Five Year)**

**Savings
with CGN
$436,000**

$518,000

IPv4 Acquisition

$82,000

CGN
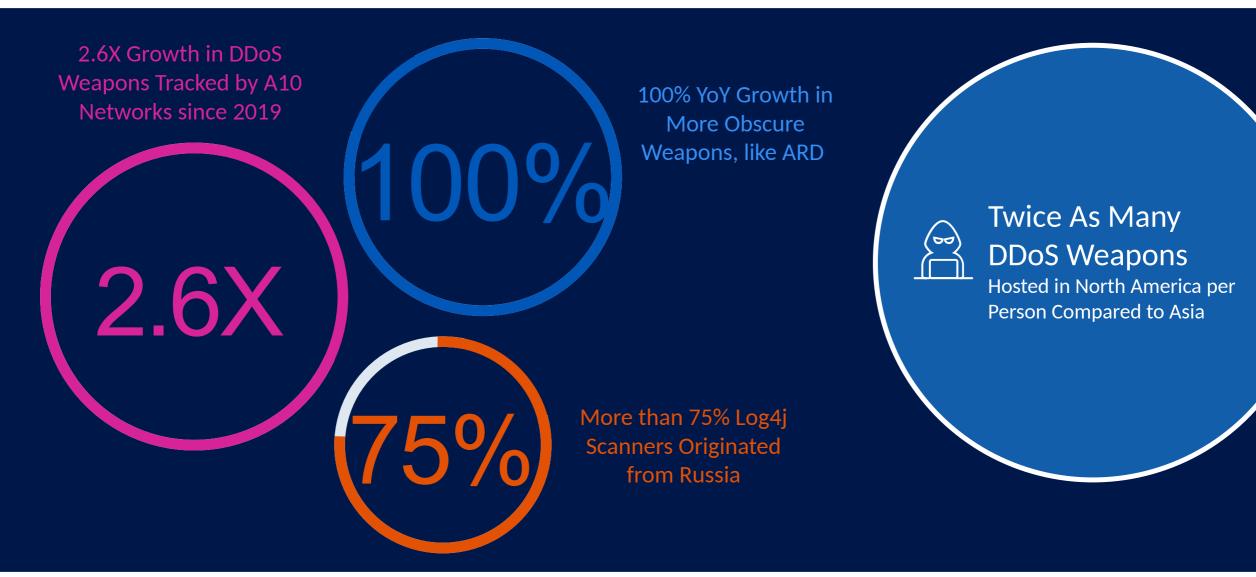
DDoS Threatens Customers & Network, Targeting IP Address Pools

Site Capacity

600 Gbps
1 Site

6 Gbps
100 Sites

600 Mbps
1,000 Sites

Critical Services

Infrastructure
Security
Tele-Medicine
Education
Agriculture

2.3 Tb/s
Largest attack

12 Gbps
Average attack

15M
DDoS Weapons

A10 Networks, The State of DDoS Weapons Report, 2H 2020

Key Highlights From Upcoming Threat Report

2.6X Growth in DDoS Weapons Tracked by A10 Networks since 2019

2.6X

100%

100% YoY Growth in More Obscure Weapons, like ARD

Twice As Many DDoS Weapons Hosted in North America per Person Compared to Asia

75%

More than 75% Log4j Scanners Originated from Russia

"It is advisable for organizations in sensitive sectors worldwide, whether government, military or critical commercial infrastructure, to reassess their services and ensure adequate defenses are in place to avoid being an unwitting participant or a targeted victim."

Paul Nicholson

Sr. Dir. Product Marketing
and Analyst Relations

A10

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