



Open & Disaggregated BNGs

Giving Power Back to ISPs to Support Growth

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Our Speaker



David Williams
Senior VP Sales & Marketing
netElastic Systems

- 25 years of ISP experience.
- Residential, business, and wholesale broadband expertise
- 2 start-up ISPs and held executive positions at two national providers
- Has helped hundreds of ISPs adopt Open, Disaggregated Solutions

About netElastic

- Helping ISPs move to Open / Disaggregated networks
- Virtual Routing and Gateway Solutions: vRouter, BNG & CGNAT
- Emphasis on market-leading performance and scalability
- Based in Santa Clara, CA / Silicon Valley
- Serving the Broadband Industry since 2015



Helping ISPs Around the World

Over 300 deployments globally

“The **performance**,
scalability, and **stability** of
vBNG along with **support** from
netElastic have been keys to our
network success.”

— *Tom Bishop, CTO, Harbour ISP*



Bandwidth Growth – By the Numbers

22

Annual Global Traffic Growth %

1.48

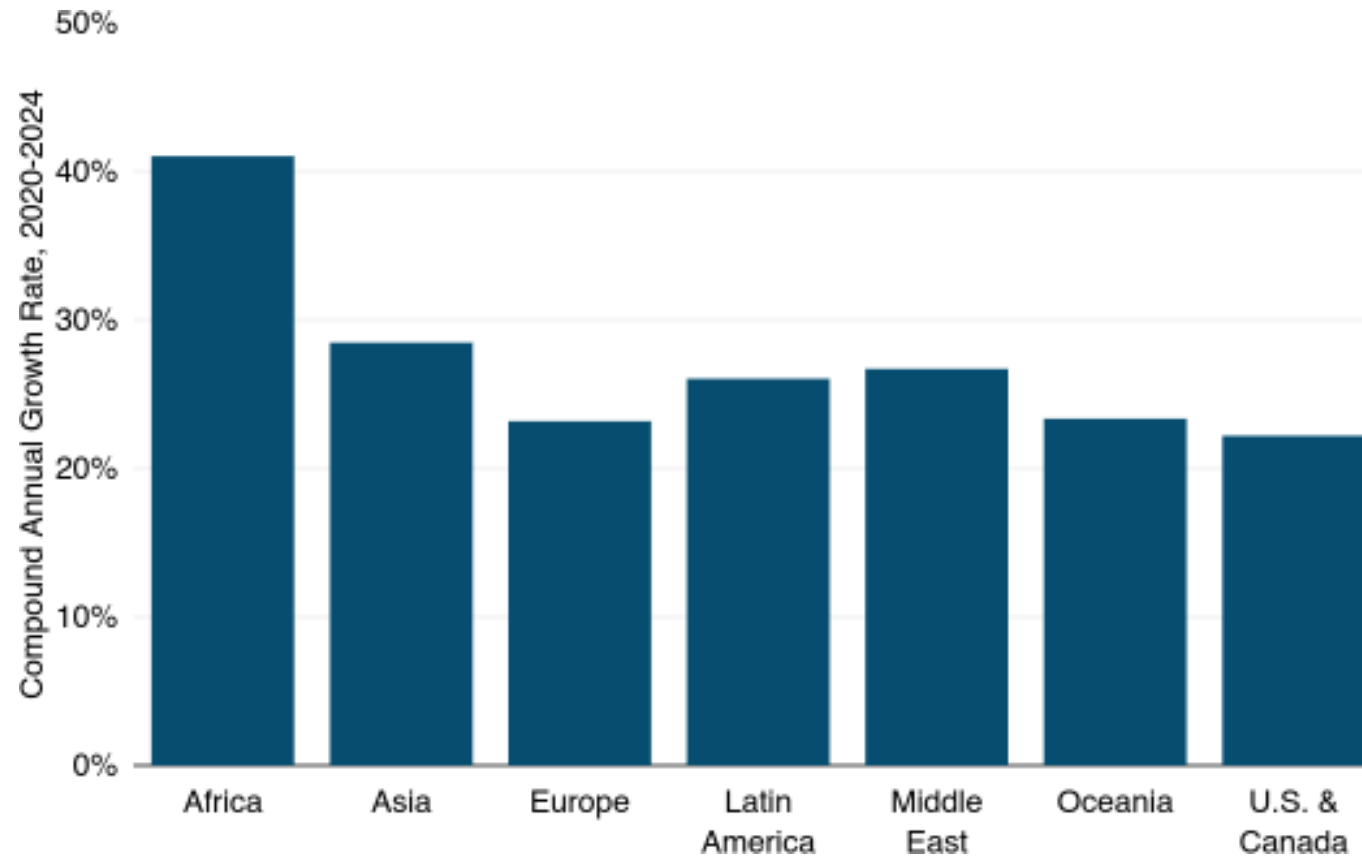
Global Bandwidth in Tbps

2X

4 Year Traffic Growth

2024 Global Traffic Growth

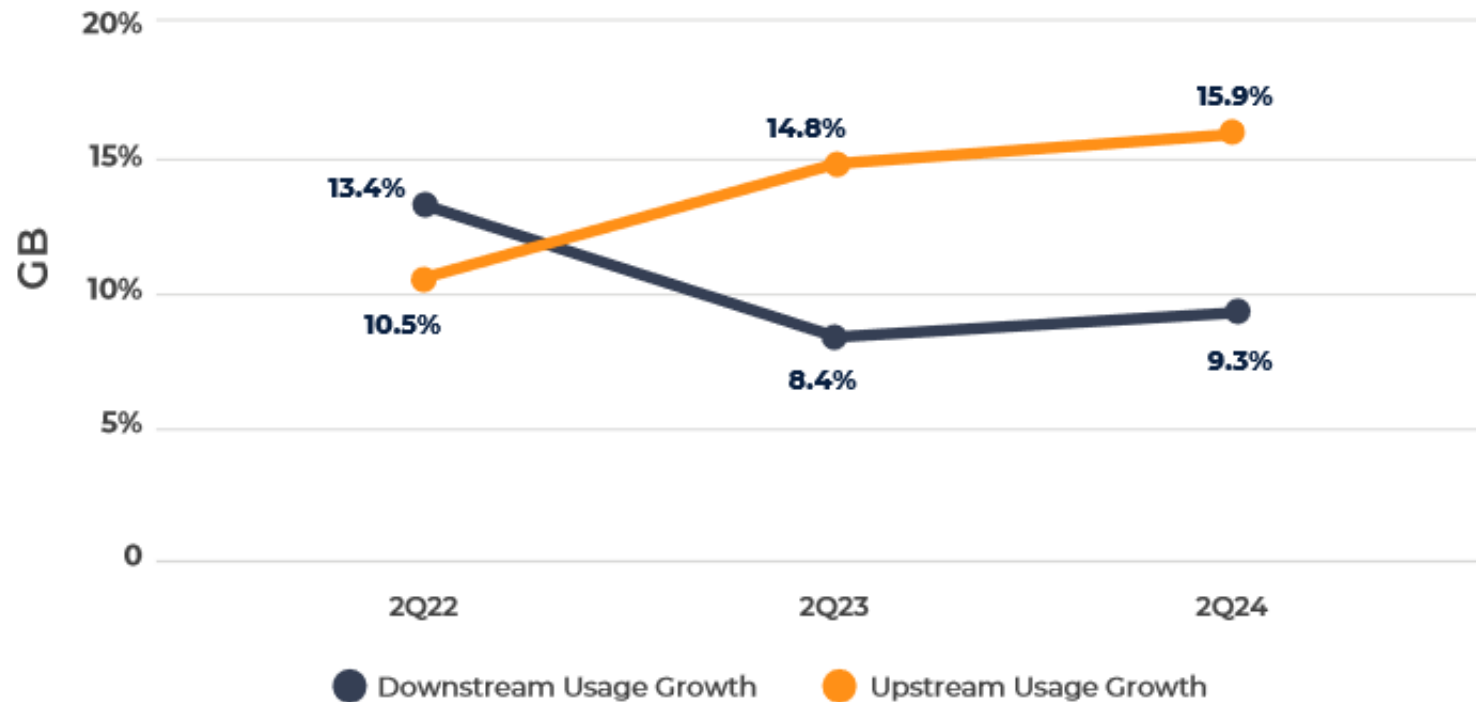
International Internet Bandwidth Growth by Region



Source: TeleGeography

Upstream Growing Faster than Download

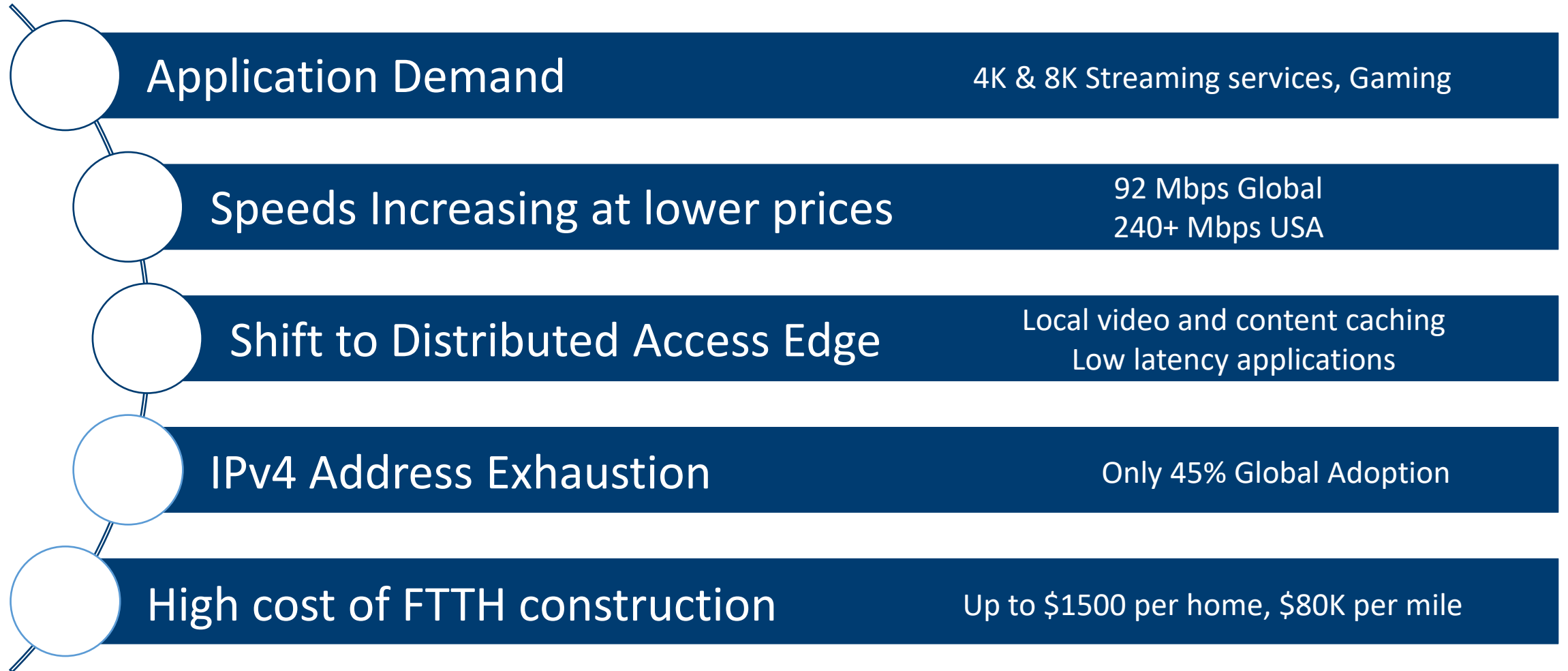
Upstream vs. Downstream Data Usage Trends — 2Q24



OpenVault Broadband Insights Report 2Q24



Trends and Challenges



Sources: Speedtest.net, 2024 OpenVault Broadband Industry (OVBI) report, Google IPv6 Trends, DgltInfra.com

What is Open, Disaggregated Networking?

Disaggregation

The separation of hardware and software

Open

Must be open in terms of **hardware compatibility**

Support open standards for **network interoperability**

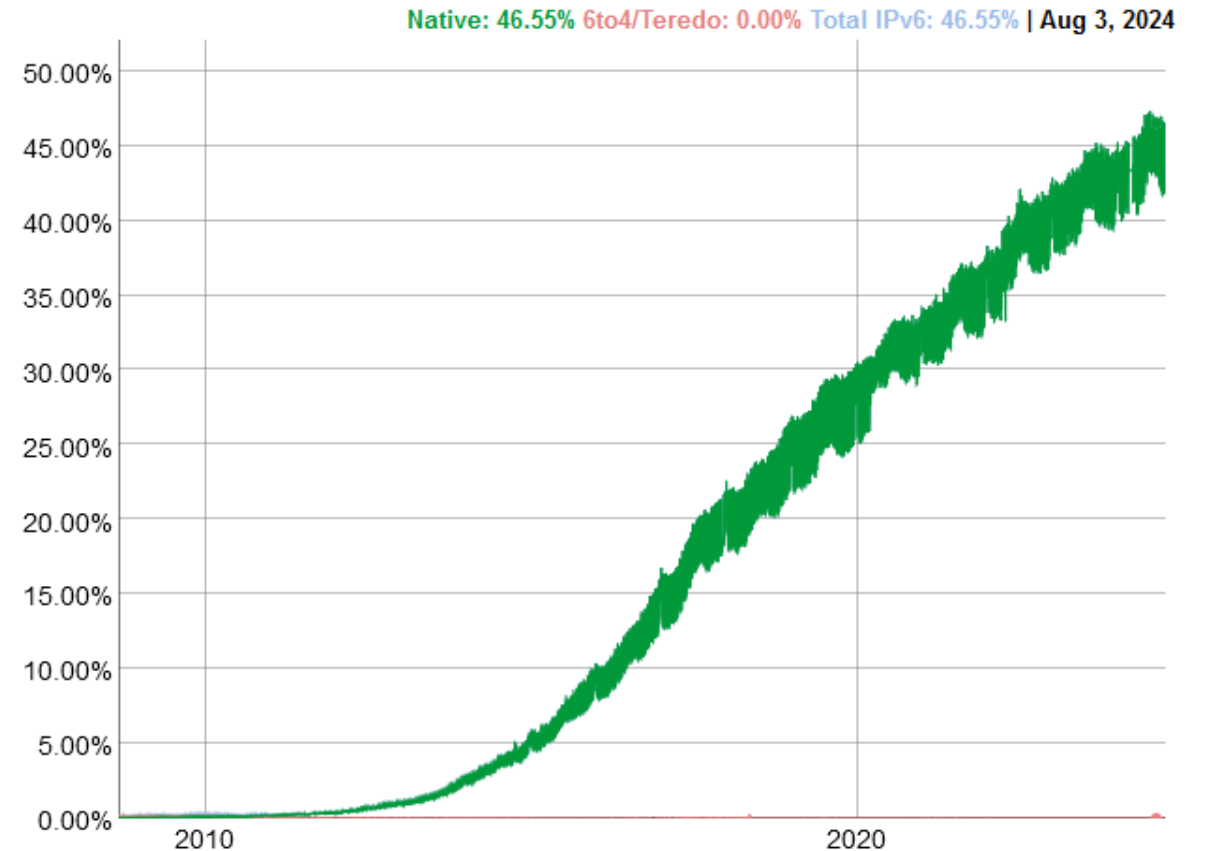
Industry Status - BNG

- **Broadband Forum: TR-459**
 - Started in 2020. Issue 2 published in 2023
 - WT-474: Protocol Definition in progress
 - Issue 3: In consideration
 - Issue 4: Future
- **Telecom Infra Project: OpenBNG Version 2.0**
 - Requirements from Telefónica, Deutsche Telekom, BT, TIM and Vodafone
- **Open/Disaggregated Software Vendors**
 - Available Today
 - 5+ Years in Production

Transition to IPv6

- Still transitioning
- Globally: 44% of user traffic is IPv6
 - USA: 50%
 - UK: 47%
 - India: 71%
- BNGs need to support IPv6 transition
 - Dual Stack IPv4+IPv6
 - Look for Integrated CGNAT

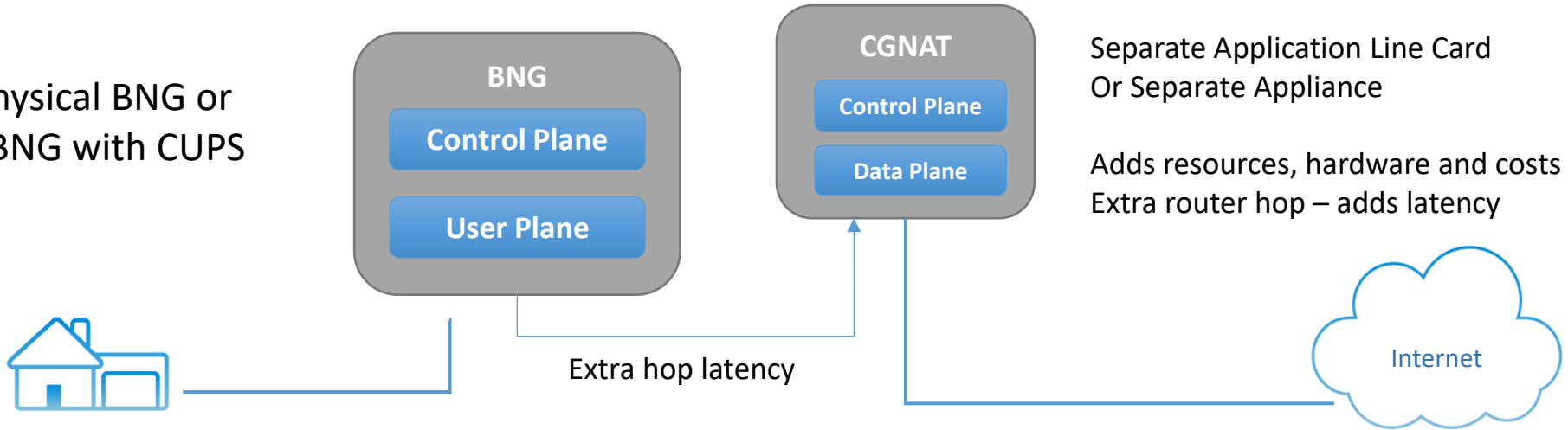
Global IPv6 Adoption – Google Trends



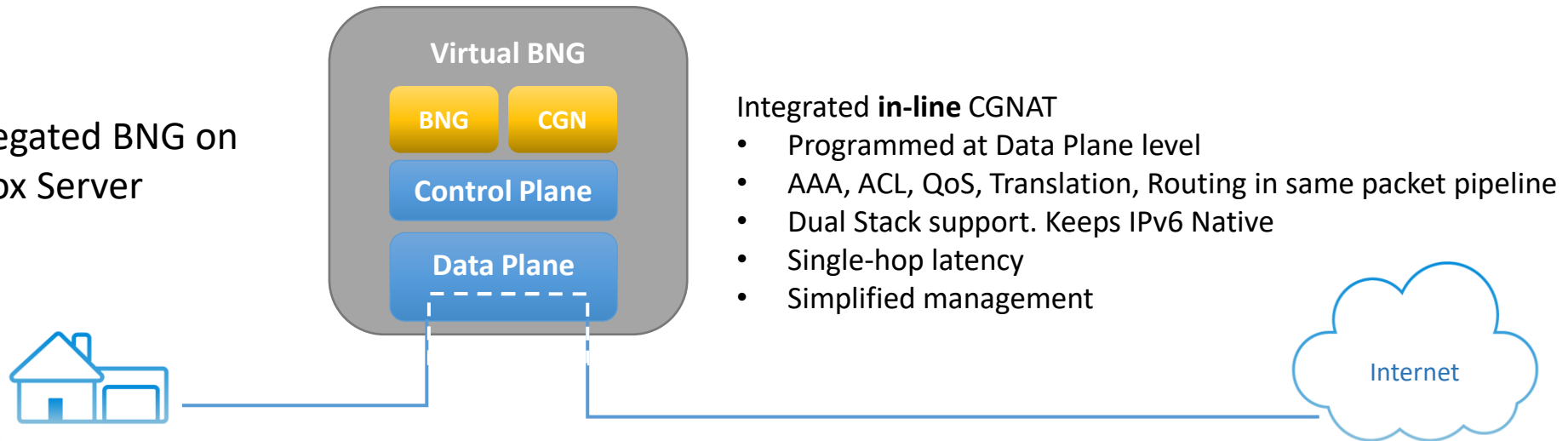
Sources: Google IPv6 Statistics 2024

Benefits of Integrated, In-line CGNAT

Physical BNG or
vBNG with CUPS



Disaggregated BNG on
Whitebox Server



Fiber Deployment Costs

- \$1000 to \$1500 per home passed
- \$60K to \$80K per mile
- Factors impacting Costs
 - Aerial versus underground
 - Sparse rural vs high-density urban markets
 - Government regulations
 - Rights of way

It's Capital Intensive!

Shifting CAPEX for Growth

Significant Revenue Possible with Open, Disaggregated Solutions

- Saves \$100K to \$200K in CapEx per market
 - Lower cost of Open, Disaggregated solutions
 - CGNAT avoids high cost of additional public IPv4 addresses
- Redirect savings to expand fiber deployments to 100 to 200 more homes
 - \$500K to \$1M in revenue for 100-200 additional homes
 - At \$85/mo for 1G service

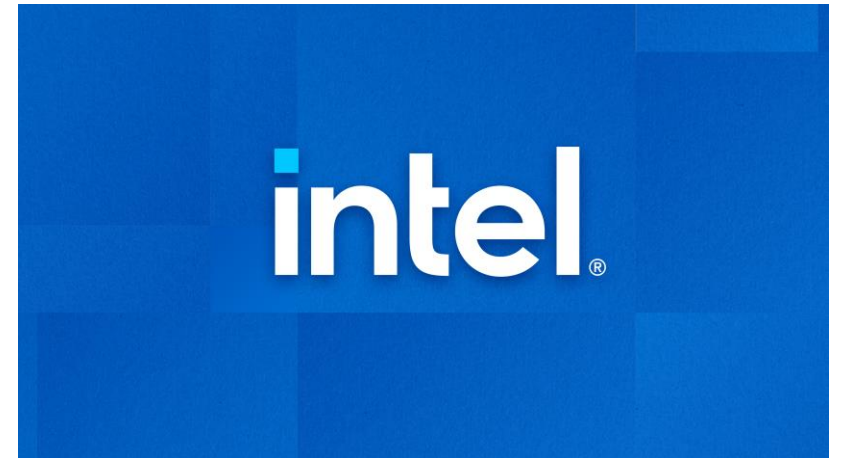


Lower Costs

- Most Disaggregated Solutions have granular licensing options at lower costs
- COTS – Whitebox Servers powered by Intel®
- Vendor Neutral Hardware
- Eliminate CGNAT Appliance Costs
- Operational Savings with Central Management, EMS, NMS, FCAPS
- Lower energy costs - power & cooling

“netElastic’s pay as you grow licensing model helps reduce our risk in entering new markets and allows us to start small and stay profitable”

- Tom Bishop, CTO Harbour ISP



Real World Feedback



*"Replacing our Juniper MX gear with netElastic back in 2019 has been a great decision. netElastic has been **100% reliable** and upgrades to support our growth have been very **easy and cost effective**." – Martin Pagano, CEO, Telpin.*



*"With netElastic, we could put netElastic on a Dell server **for one-fourth of the cost**. This is a straightforward solution that works well. It's a plug-and-play solution."*
- Russ Reynolds, HighStream Fiber



*"We installed netElastic vBNG in our data center, where it still is today. It's been **up for over 740 days**, so what more can we ask for?"*
- Daniel Beyzade, Squirrel Internet



Real World Example

- Praction Networks
 - Tier 2 ISP w/ 20K Subscribers
 - Cisco ASR BNG
 - Separate CGNAT Appliance
- Challenges
 - “Scalability was really an issue with our previous routers.”

Outcomes

Replaced multi-device solution with 1 vBNG
Increased performance and future scalability



“Scalability, performance, and cost effectiveness were the key criteria for us in evaluating BNGs. With netElastic vBNG, we got everything we were looking for.”

- Rohit Kumar, Co-Founder and CTO at Praction

Open Hardware Choice

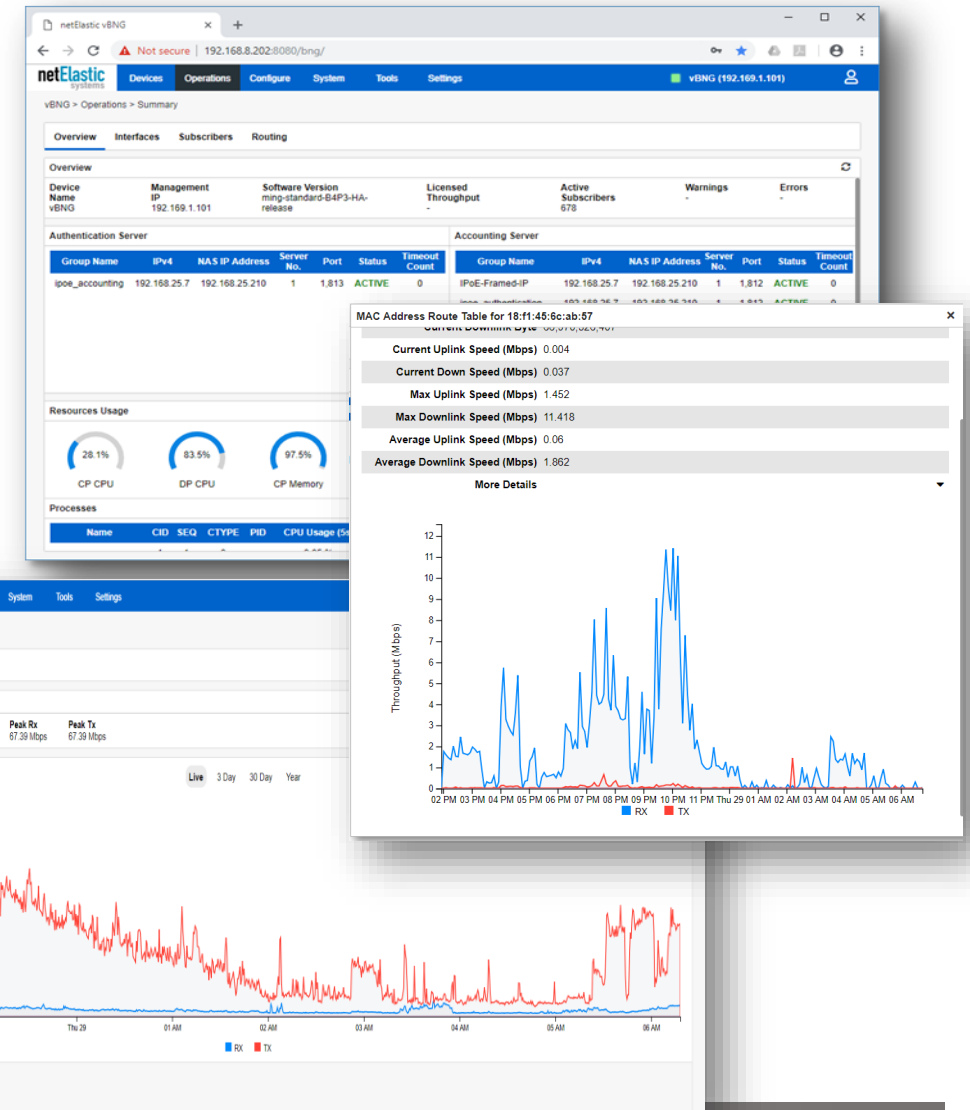


And many more...

Operational Savings with Modern Tools

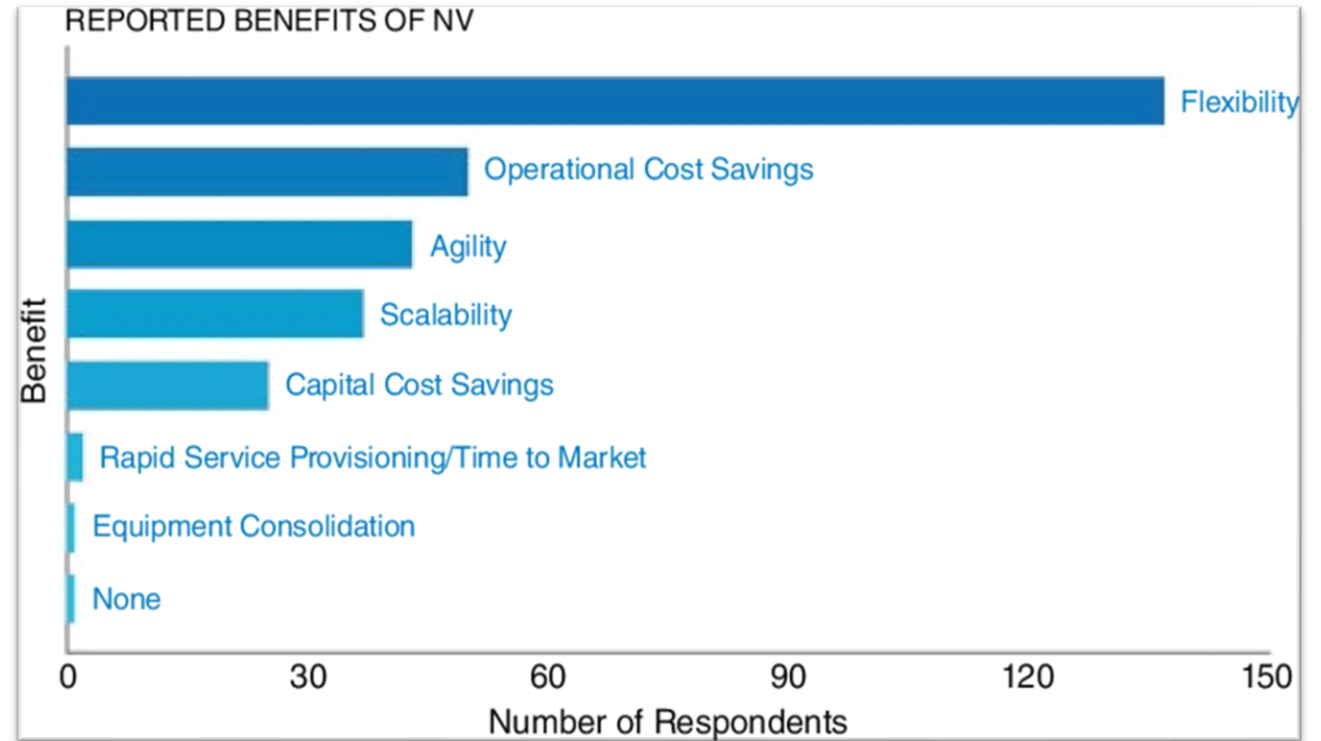
netVision Router Manager

- Centralized Management
 - Combines EMS, NMS, and FCAPS
 - Enables network and configuration management automation
 - Visibility and Troubleshooting tools
 - Role-based, Task-Specific Access
- Open REST and NETCONF APIs
 - Extensibility, Automation, Integration
- Easier to Manage; Lowers OpEx



Summary

- Flexibility
 - Faster resource provisioning
 - Add HW and SW resources as needed (Scalability)
- Agility
 - Deploy functions and services quickly
 - Rapid Time to Market
- Integrated In-Line CGNAT
- Performance
- Drives down OpEx & CapEx
 - COTS Hardware
 - Pay-As-You-Grow Licensing
 - Ease of Management



https://www.researchgate.net/figure/Benefits-of-network-virtualization_fig3_32246640



Questions



Thank You

For more information

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