



IPv6 adoption is killing my throughput

A Tale of Two Pipelines

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Bits, glorious bits

- ▶ I am blessed
- ▶ I have a symmetric 1 Gbps FTTH link to my home
- ▶ For about \$500 a year

- ▶ But there's a snag..



DHCP Option 82 provisioning

- ▶ The FTTH is shared between a number of providers
- ▶ Transport options are
 - ▶ PPPoE
 - ▶ Native, BUT using DHCP option 82 - DHCP Relay
- ▶ This links your connection to your external IPv4 address
- ▶ ..but doesn't support native IPv6



So What? There's 6RD, right?

- ▶ Sure. We didn't need those 1500-byte MTUs anyway.
- ▶ And any CPE supports GRE - usually in hardware



Two Pipelines (in your CPE)

- ▶ Hardware accelerated:

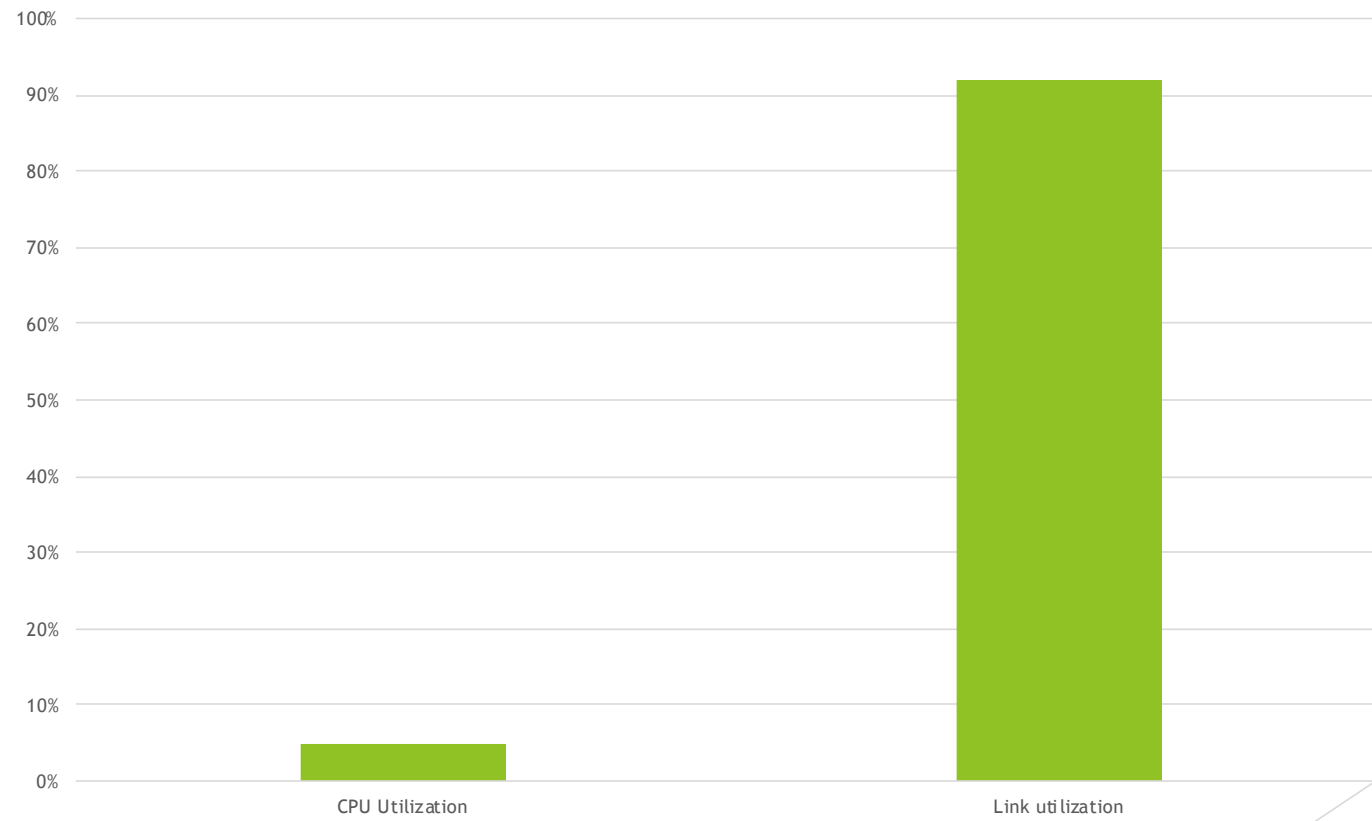
- ▶ IPv4 forwarding
- ▶ IPv6 forwarding
- ▶ PPPoE
- ▶ IPv4 IPsec
- ▶ IPv4 GRE

- ▶ Not Hardware accelerated:

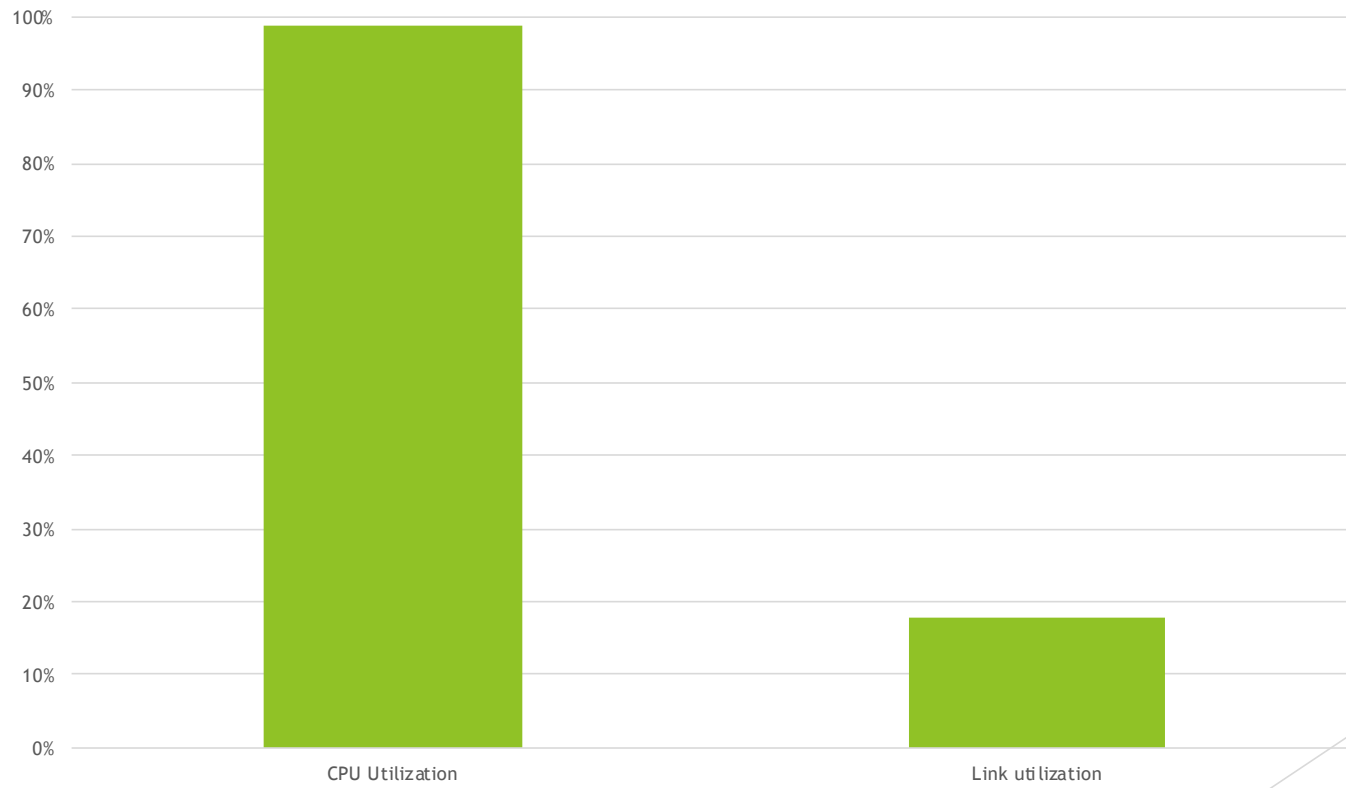
- ▶ Wireguard (too new)
- ▶ OpenVPN (too many options)
- ▶ IPv6-in-IPv4 GRE



The Impact - IPv4



The Impact - IPv6



Conclusion

- ▶ DHCP Option 82 for provisioning is not great
- ▶ IPv4/IPv6 parity in hardware is still not there
- ▶ The more people implement IPv6, the slower my home connection gets
- ▶ Anyone with a < \$200 alternative CPE without this issue, we need to talk