IPv6 Business Case for Enterprise

UK IPv6 Council

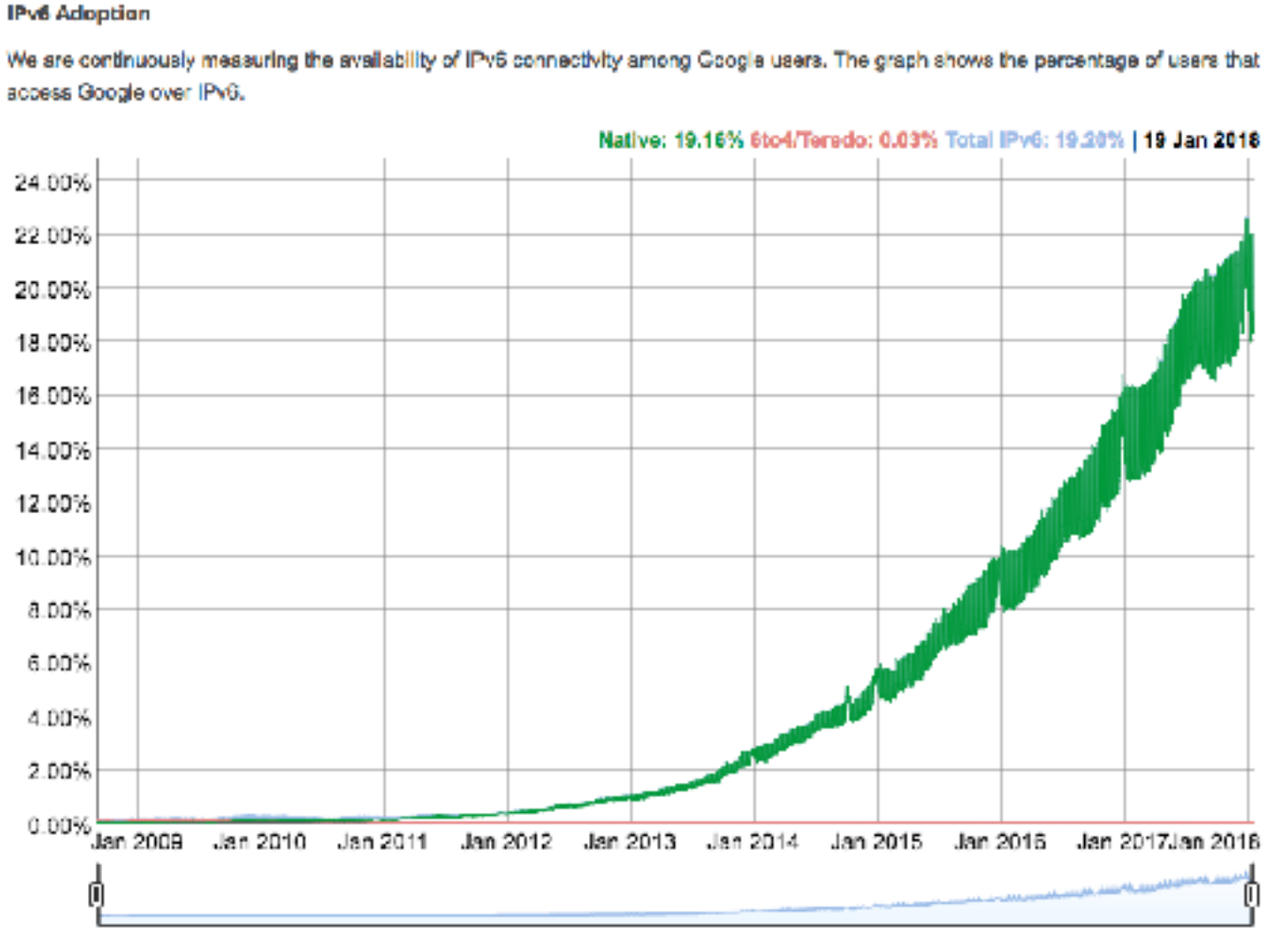
IPv6 Business Case

- What happens on the Internet drives what happens in the Enterprise

- The Internet has mature IPv6 - no question of future - IPv6 will win

- Mobile data in the US passed 50% in 2016 and is now ~75%

- UK at ~20% (Google) ~22% (APNIC)



IPv6 Business Case

- Innovation occurring in IPv6, e.g. SRv6, IPv6 over BLE
- IPv4 becoming legacy - when will this no longer be supported in new OS versions?
- 2 years to be ready from a standing start
- Every day that goes by deployment will cost more
- Deploy now with engineering discipline or with poor planning and engineering hacks

IPv6 Business Case

- Security - visibility and an opportunity to remove complexity
- Regulatory
- Business opportunities - simplify B2B connectivity
- IPv4 address exhaustion
- Performance
- RFC7381 “Enterprise IPv6 Deployment Guidelines”

Getting Buy In

- Communicate to every level from CxO to grass roots
    - CIO, CTO/Architecture office, Application developers, Infrastructure teams, Cyber teams
- Me too! We’re a technology company after all :-)
- Now what? Make sure there’s a plan of action, the buy in may be easier than you think
- The plan itself explains the scale of the undertaking
- Which waves can you surf?

Organizing

- Get the CIO talking about it
- Have a community with embedded champions
- Measure and publish successes
- IPv6 support as a standard question in design reviews
- Embed it in the software development lifecycle (SDLC)
- Provide test facilities if this wasn’t already part of your engineering
- Early wins - edge inwards
- Be prepared for a long journey

JPMC

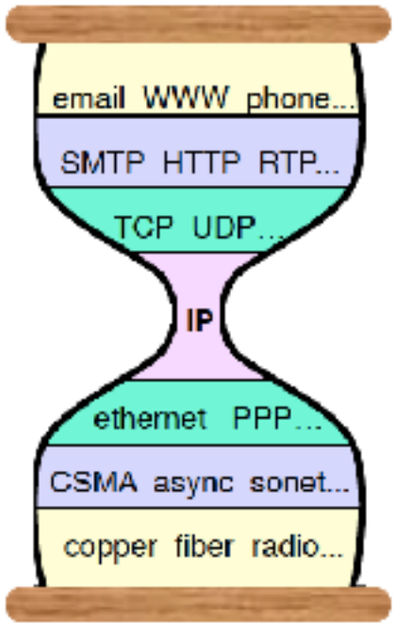
- Business case made, C-level bought in
- IPv4 address exhaustion
- Outside-in strategy
- IPv6 only data center
- Automate, automate, automate

The Differences for Enterprise

- Complexity that IPv4 has generated has driven application developers to take matters into their own hands

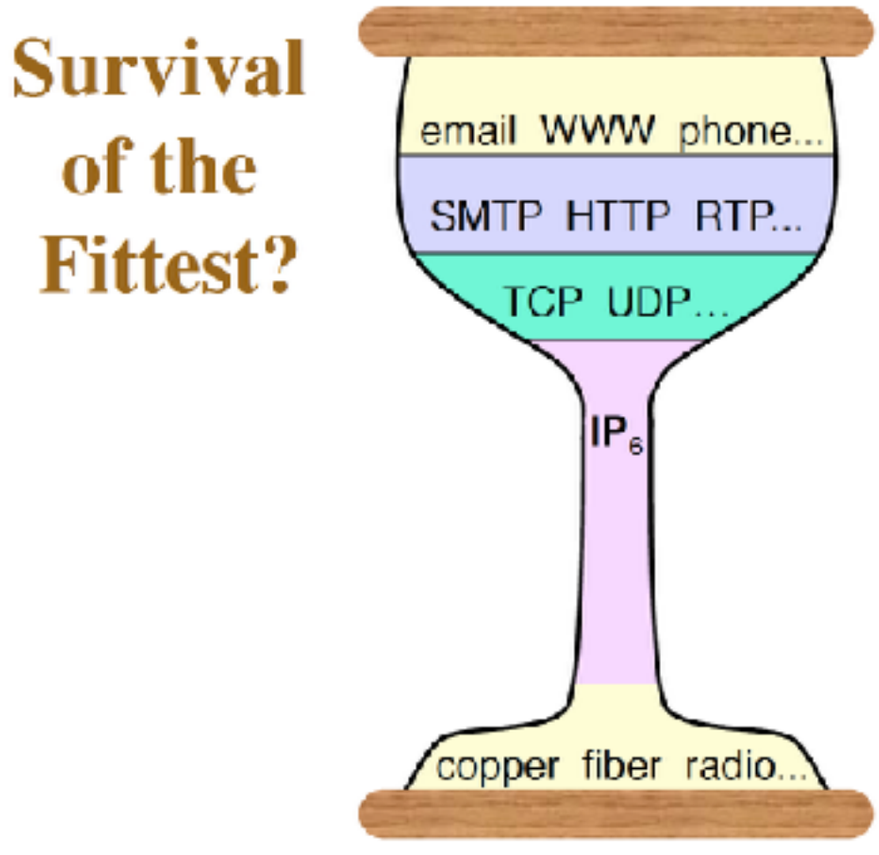
Why the Hourglass Architecture?

- Why an internet layer?
  - make a bigger network
  - global addressing
  - virtualize network to isolate end-to-end protocols from network details/changes
- Why a *single* internet protocol?
  - maximize interoperability
  - minimize number of service interfaces
- Why a *narrow* internet protocol?
  - assumes least common network functionality to maximize number of usable networks



The Differences for Enterprise

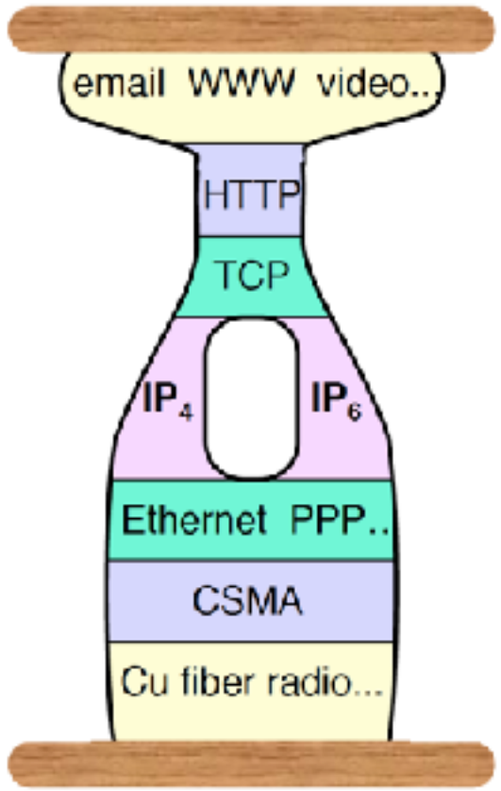
- IPv6 _*should*_ have helped but instead caused us problems along the way



The Differences for Enterprise

- The applications were driven to take matters into their own hands and converged on their own narrow layer

20 Years Later …

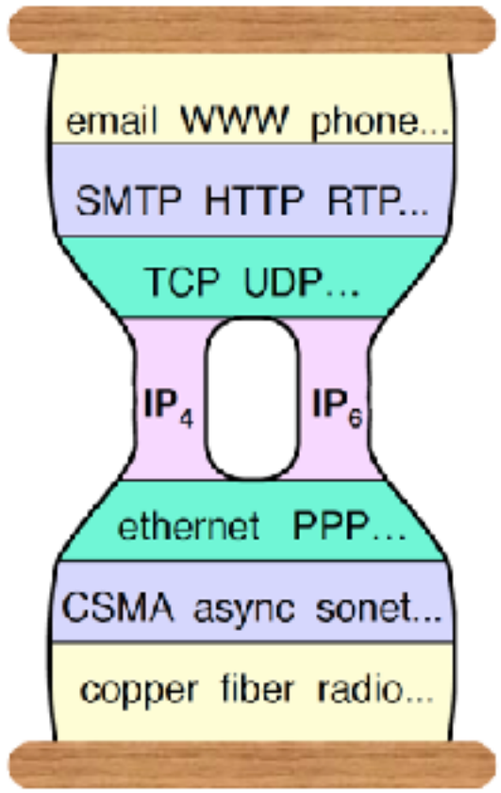


- Unexpectedly long "mid-life crisis"
- L1-L2 commoditized and slimmer
- HTTP becomes the "slim waist" to avoid the chaos below
- Useful only if you designed your application in recent history to a web architecture

The Differences for Enterprise

- At least that is what the web companies did

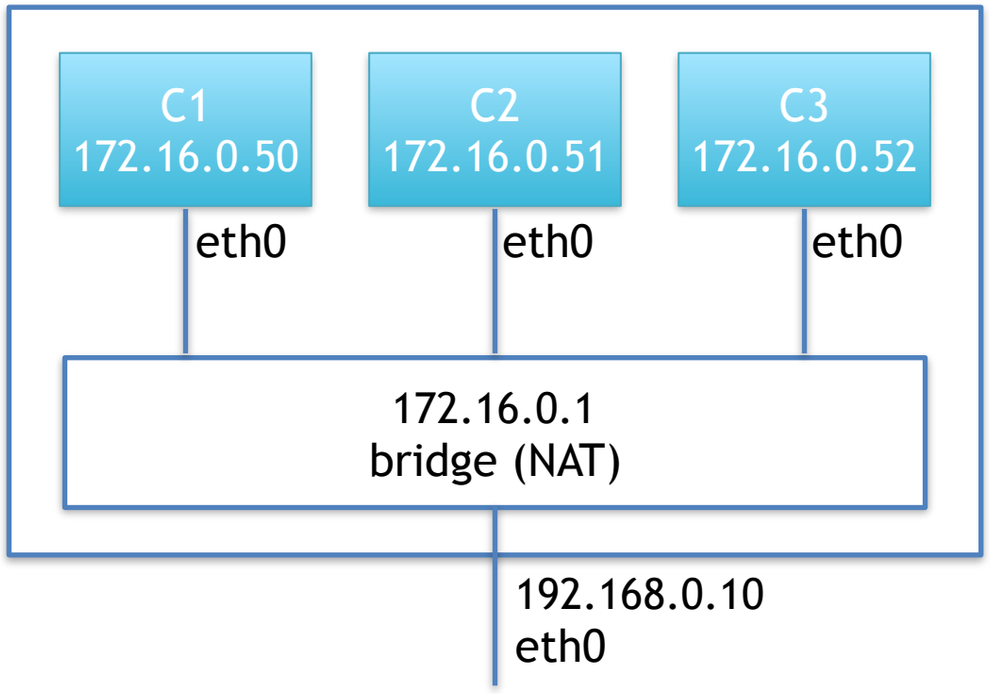
20 Years Later …



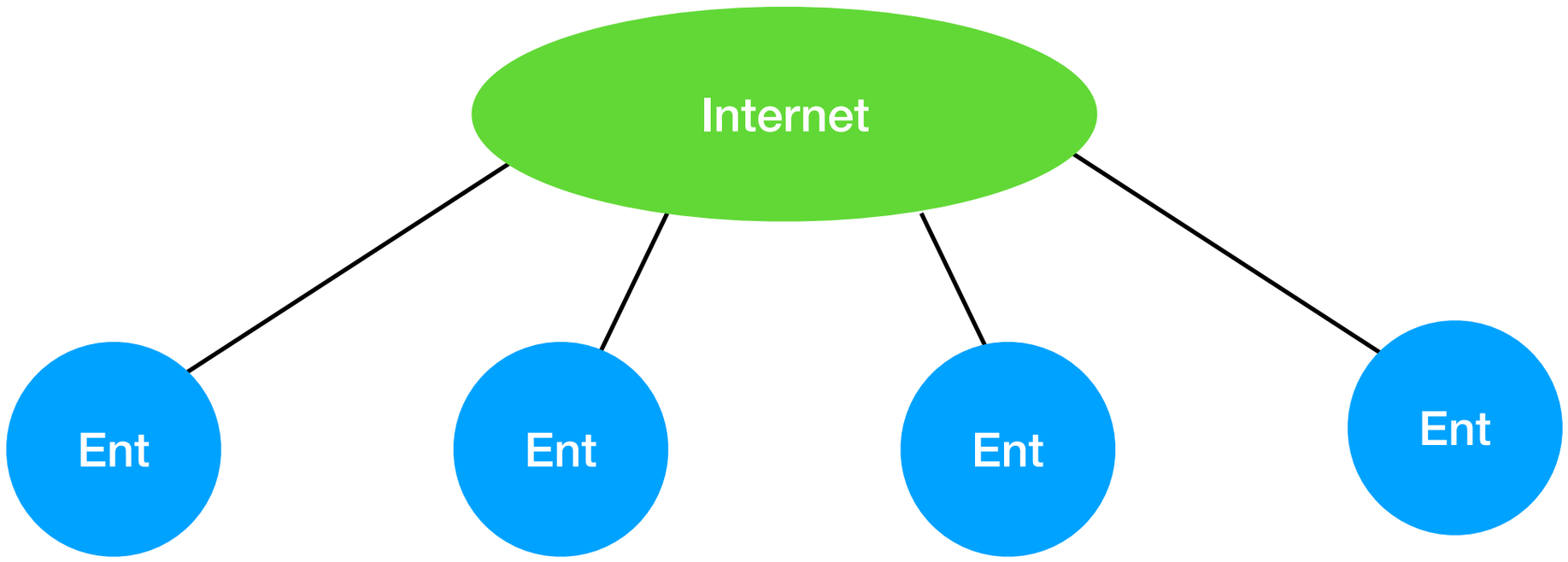
- But what if you bought wholesale into IP being the "slim waist" and wrote/deployed applications that assumed that for 20 years?
- With that application legacy IPv[46] must continue to provide seamless connectivity

The Differences for Enterprise

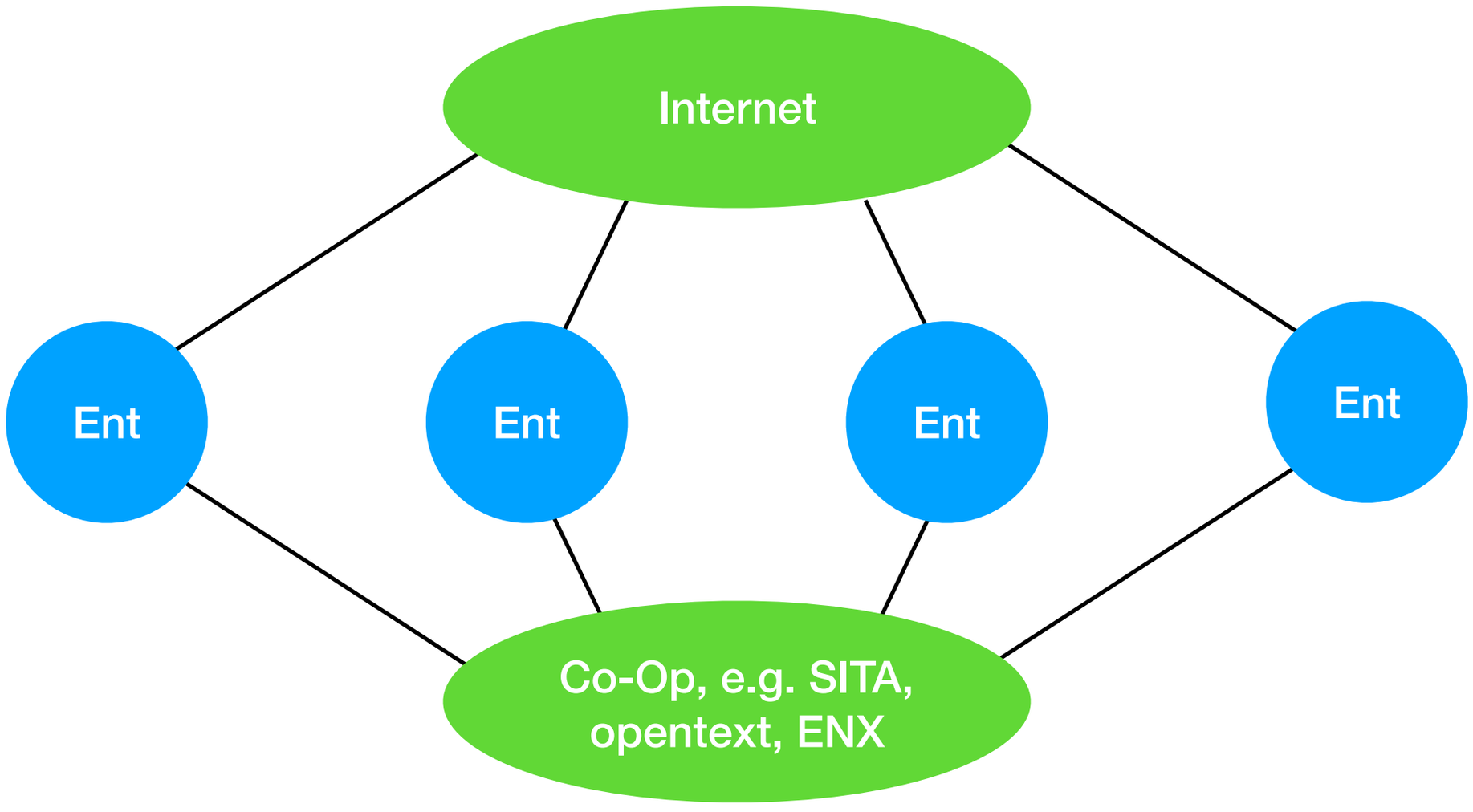
- Containers are another mechanism whereby the IP stack design is constructed to avoid dependencies on the network



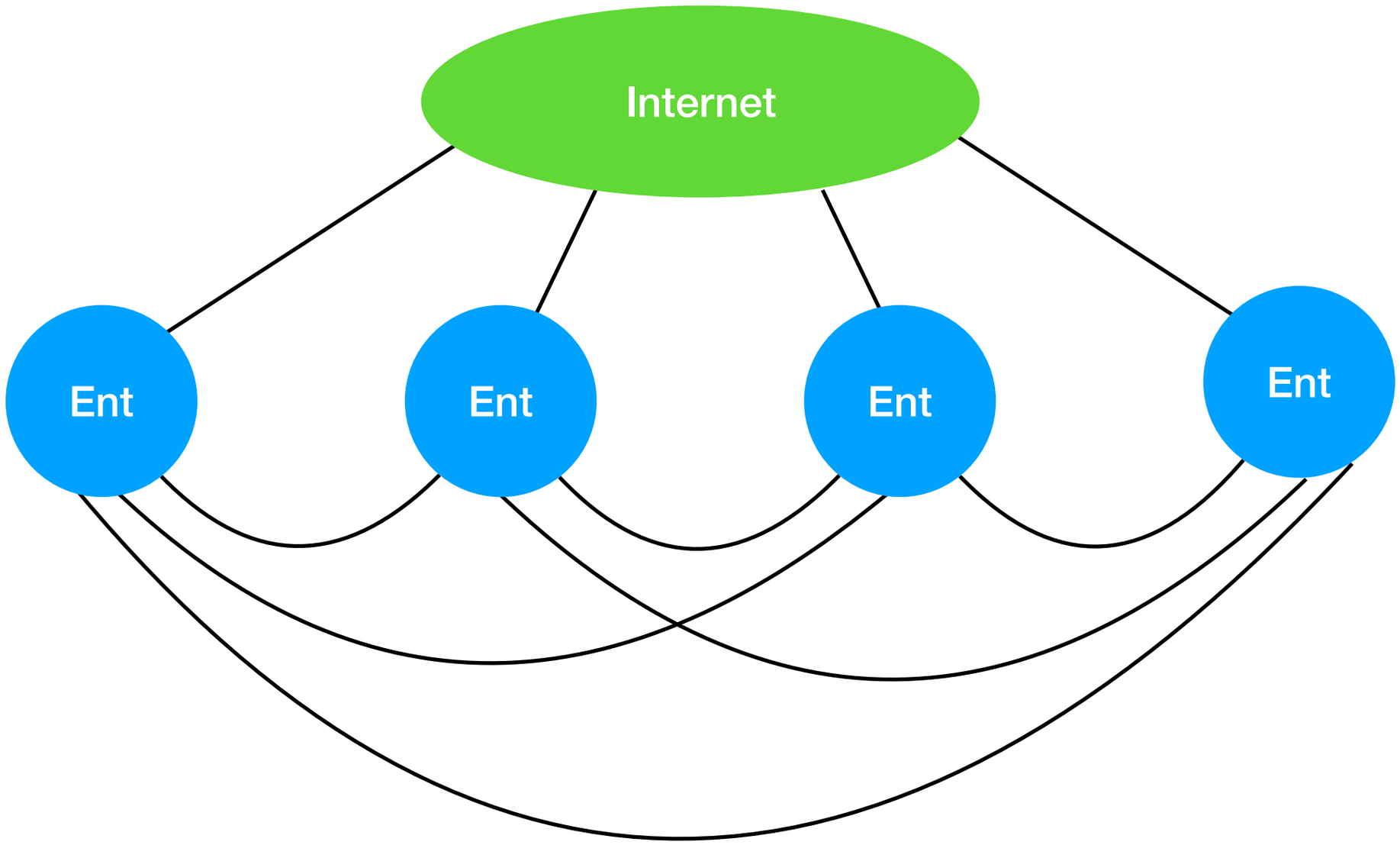
The Differences for Enterprise



The Differences for Enterprise



The Differences for Enterprise

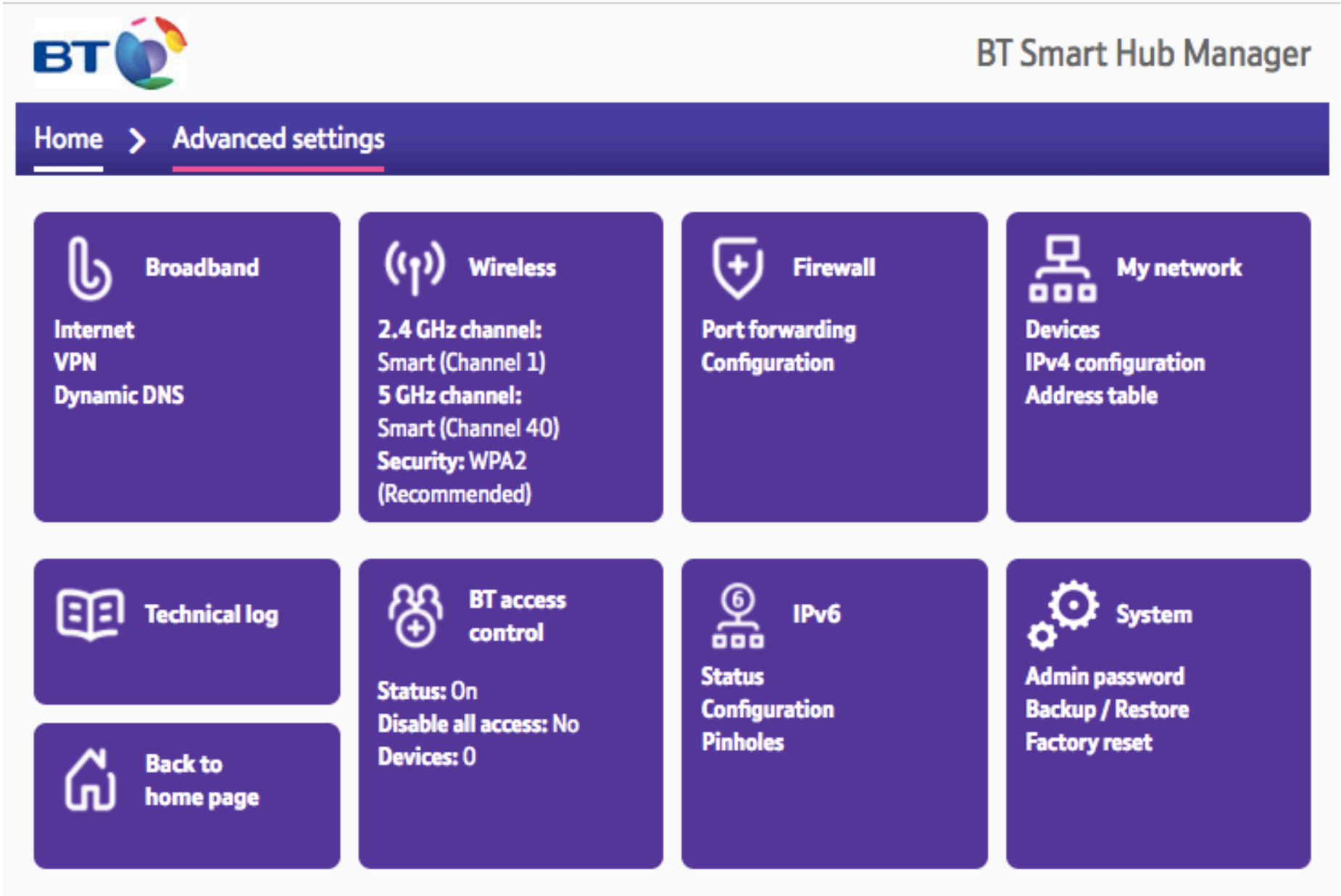


Result? NAT66? Separate IP ranges for public and private communication and with any luck standards for private connectivity

Software

- Enterprises often have 100s if not 1000s of applications
- 3rd party, open source, in-house developed, many languages
- Have a coding standards document
    - Focus on data structures - IPv6 as a first class protocol
- Ensure vendors’ support for IPv6 supports IPv6 only
- IaaS software will be hard hit
- Infrastructure inventory riddled with “ip_address”

IPv6 - 1st Class Protocol



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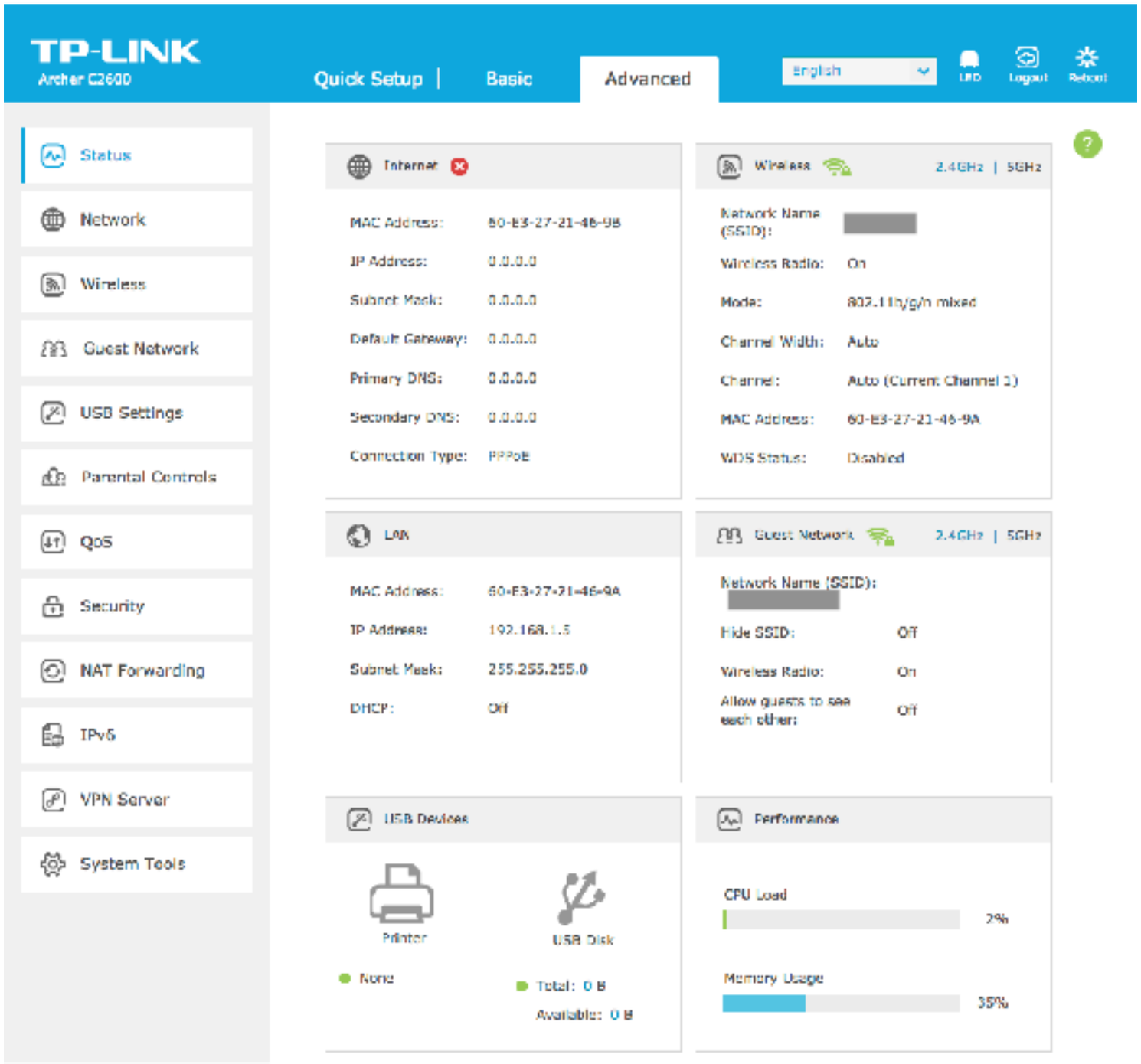

IPv6 - 1st Class Protocol

```
interface: {
    l2_address: "00:11:22:33:44:55",
    l3_addresses: [
        {
            address: "192.168.1.10"
            family: "ipv4"
            type: "private"
        {
            address: "fe80::1"
            family: "ipv6"
            type: "link_local"
        },
        {
            address: "2001:0db8::1"
            family: "ipv6"
            type: "global"
        },
        {
            address: "fd9e:e5b3:da8c::1"
            family: "ipv6"
            type: "ULA"
        }
    ]
}
```

Summary

- Start now if you haven’t already
- The business case is easier than you think
- Be ready with a plan
- Be ready to find some unique problems
- Leverage community and standards - don’t invent new
- Treat IPv6 as a first class protocol