

IPv6 in the Enterprise Sector

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Agenda

- Business Drivers for v6 rollout
- Process
- Problems
- Observations

Interviewed

- **Fred Wettling**, Bechtel
- **Paul Hoogsteder**, DOK Delft Library
- **Rich Groves**, Microsoft IT

Business Drivers

- All interviewees reported similar business drivers
 - Drive to '**everything IP**' = enormous demand for addresses
 - **V4 exhaustion** a real concern
 - Maximise global **routing reachability**
 - V6 a new **customer requirement**, e.g. government requirements from 2005

Drive to early rollout

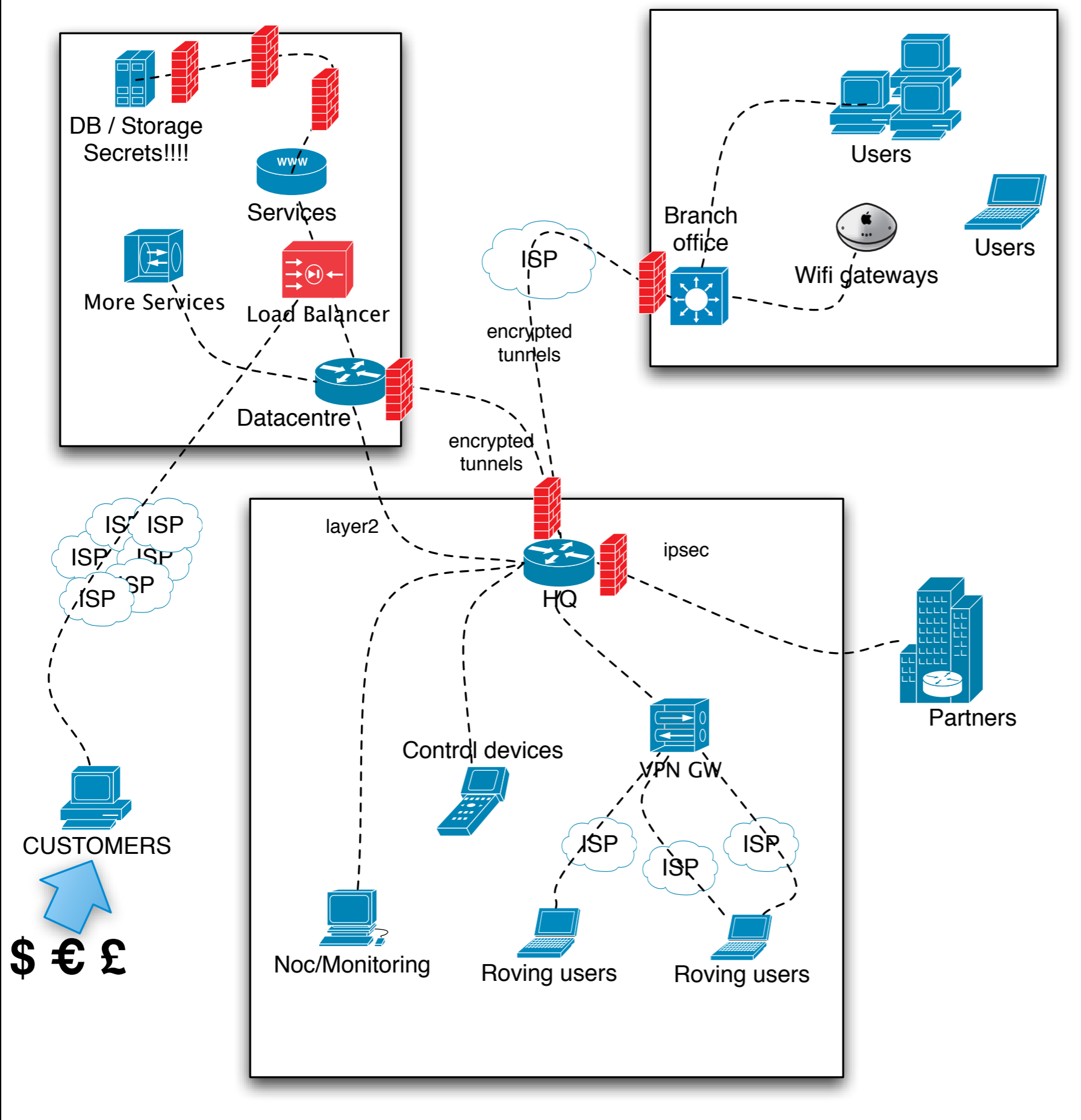
- Gradual change **much cheaper** than 'big bang' rollout
- Early adoption leads to **lower risk** and **greater continuity**

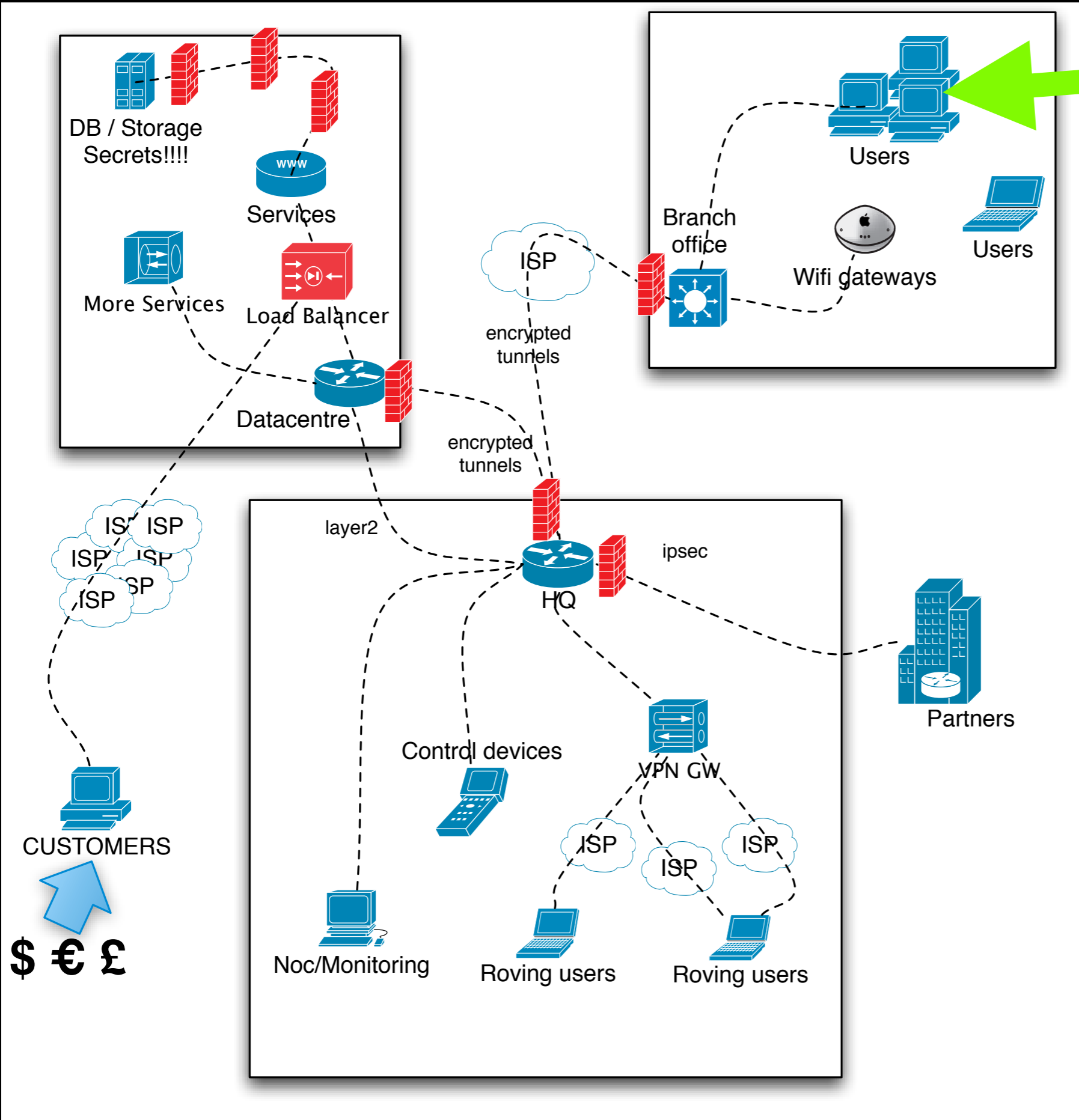
Process

- Modify **procurement specification** to mandate v6 support
- Use **existing change control** process to gradually introduce v6
- Rollout has to be '**business as usual**'

Initial Observations

- Routing infrastructure, Desktop OS, all **well supported**
- Service infrastructure (firewalls, load balancers) & applications have relatively **poor maturity**



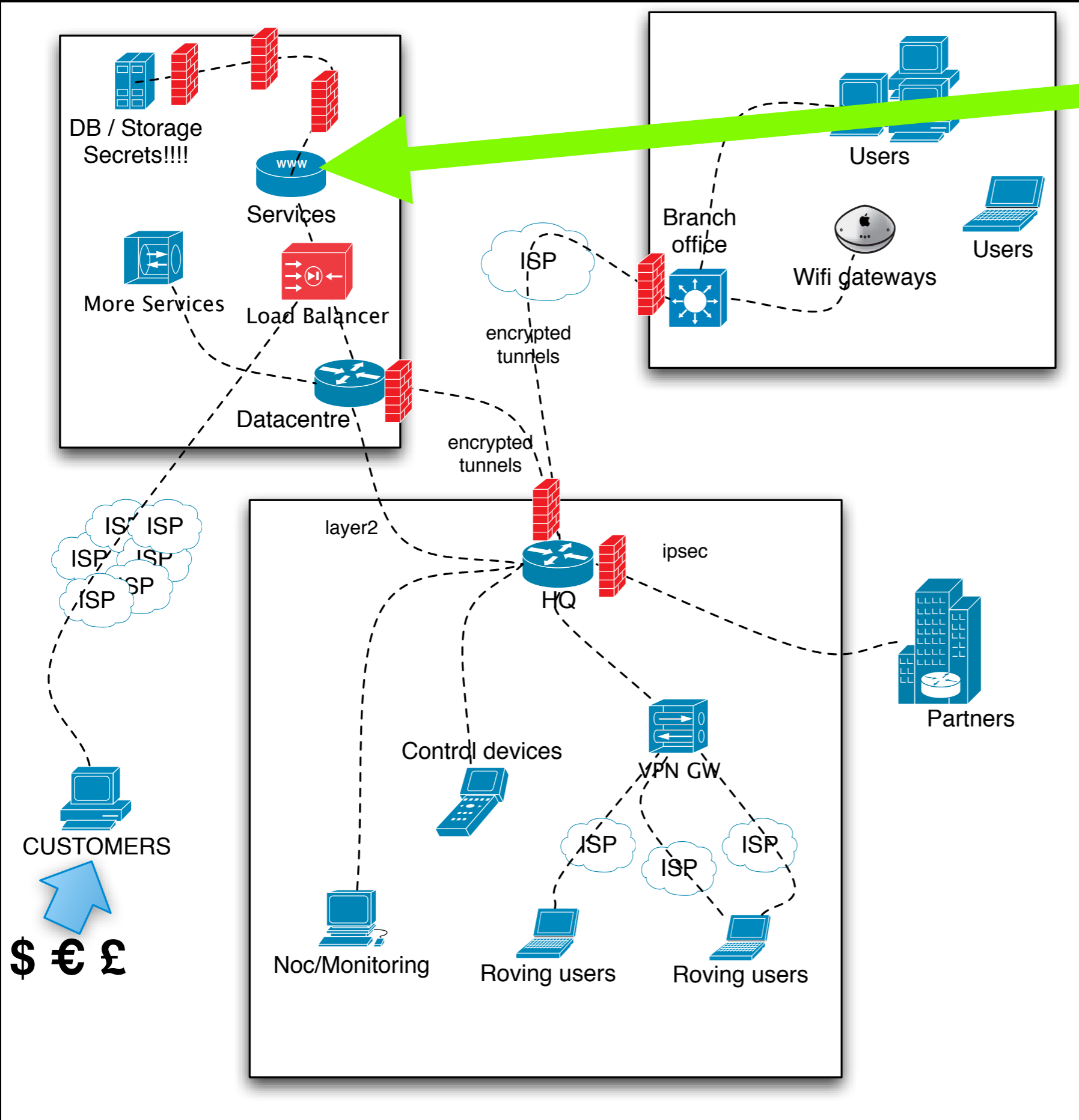


Broad support

User operating systems tend to be acceptably compliant

Users don't notice - this should be a design goal

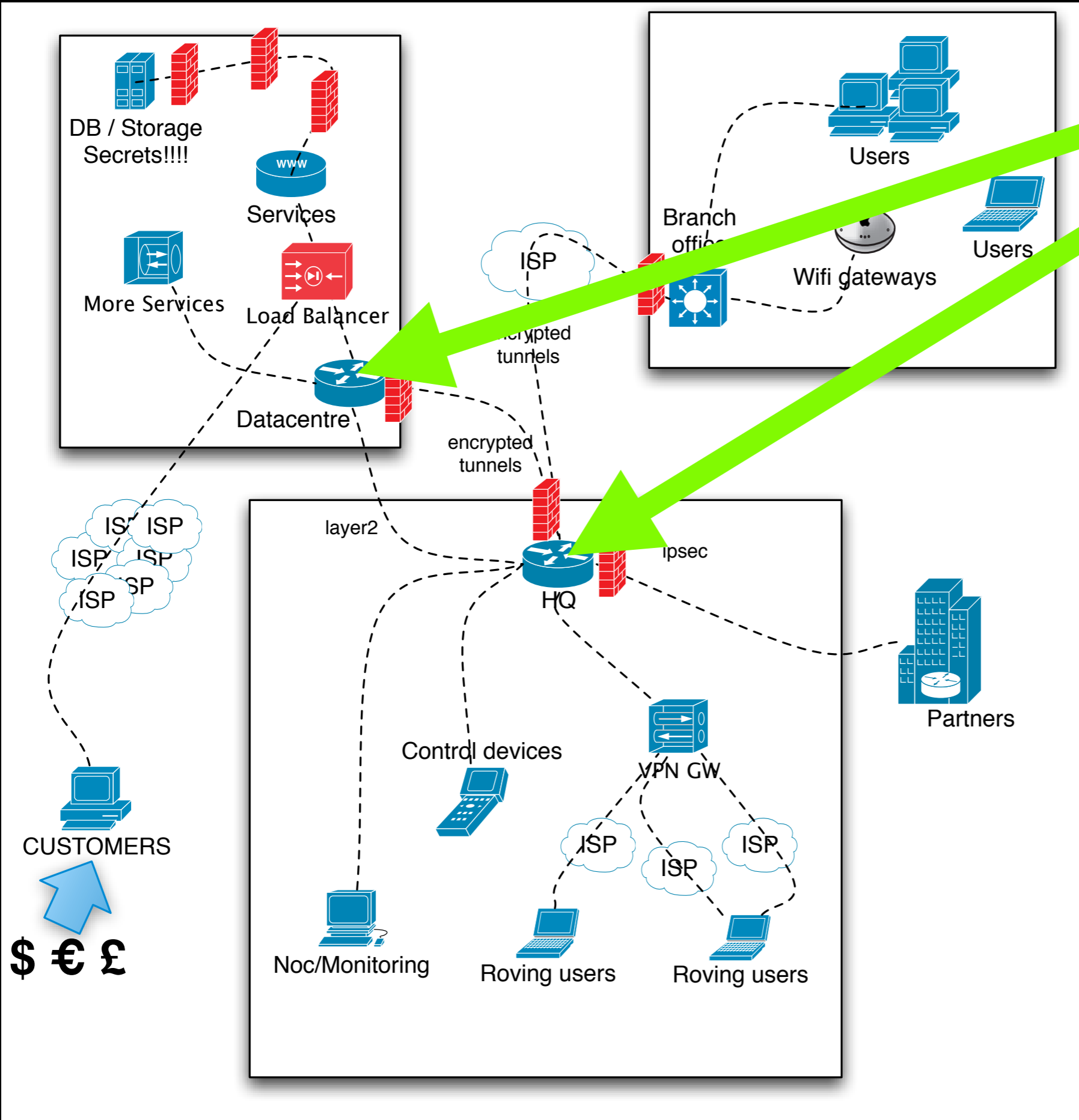
However, many applications which talk over the network are not v6 aware



Broad support

Server Operating Systems also appear to work

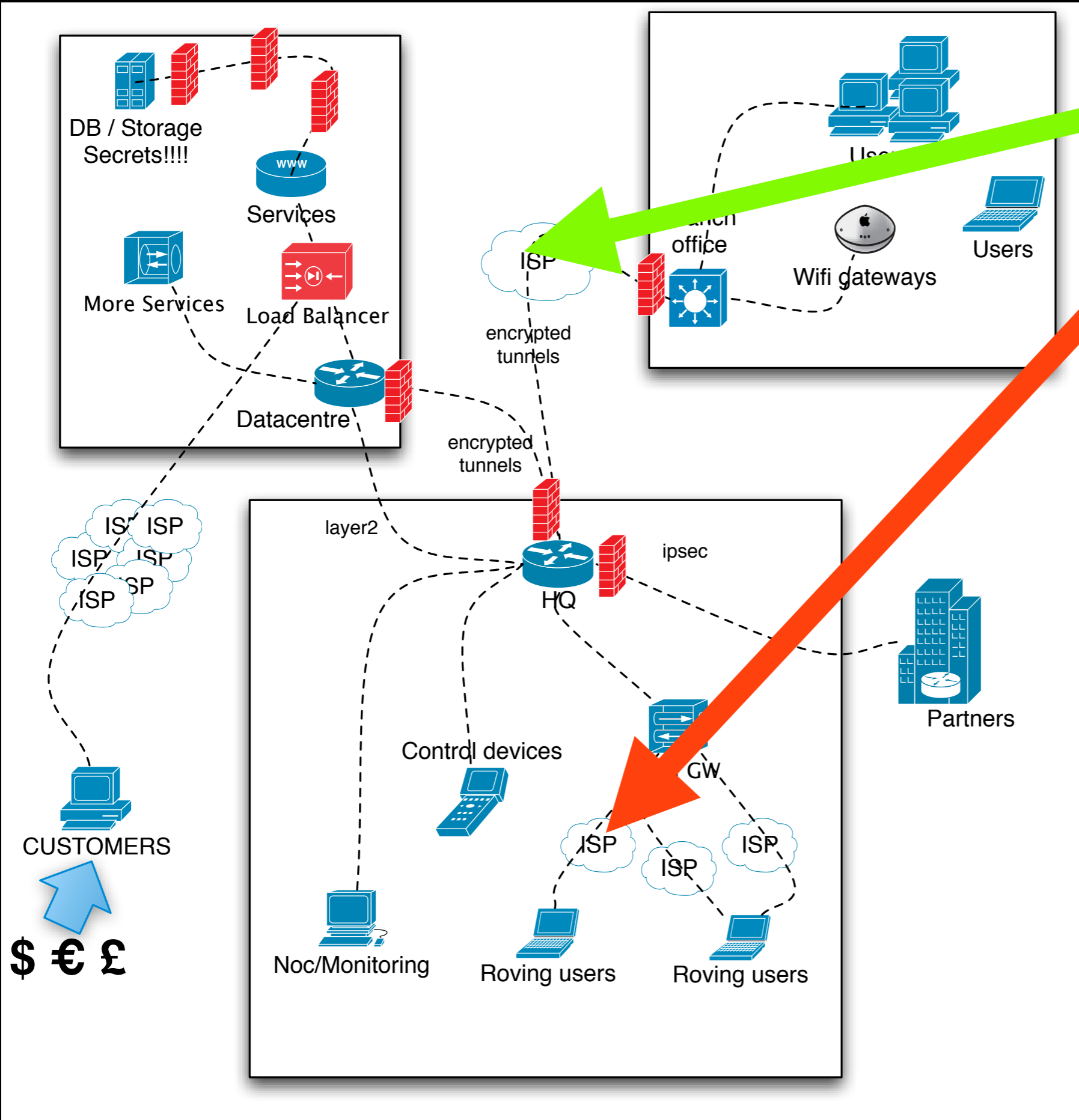
Support in Open Source platforms now very mature



Good

Core routing infrastructure tends to be good (the stuff SPs also use!)

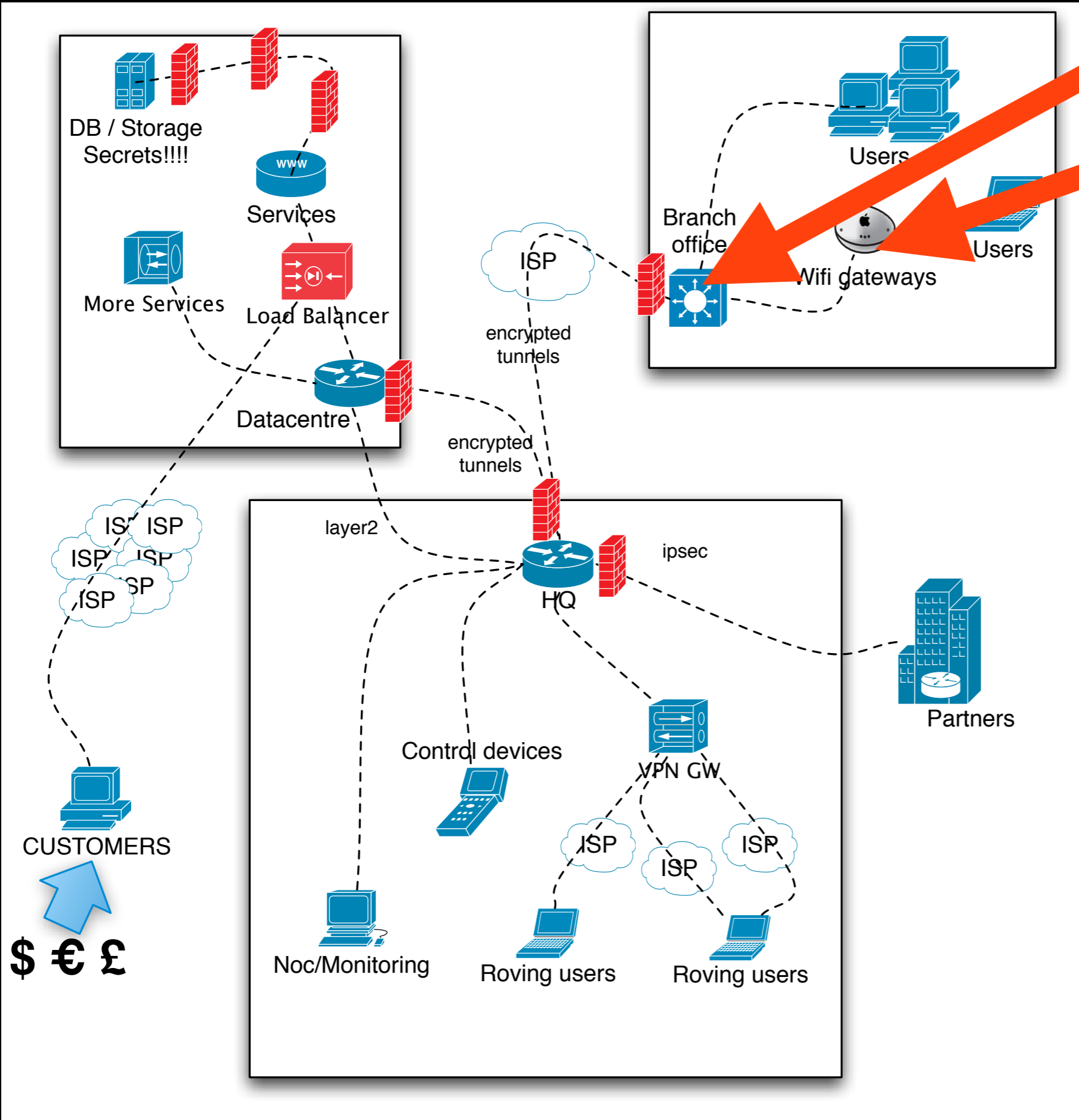
Specific problems that require complex labbing (more shortly)



Support Varies

Service providers in different geographies have strongly different v6 adoption maturity

For every service provider that is extremely mature, there are many more who have not started adoption process



Frustrating

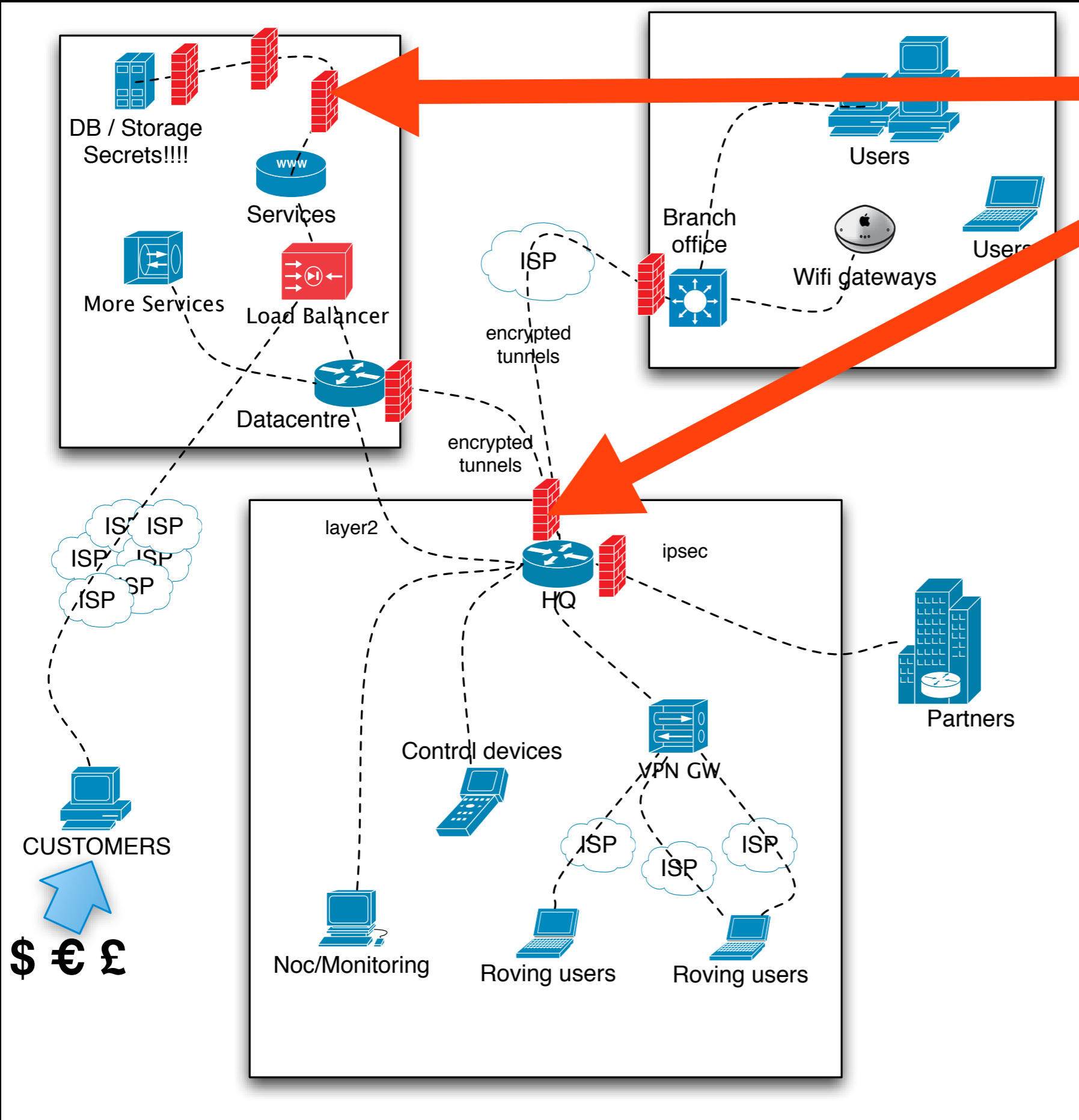
CPE poor at v6

**Complaints:
Hard to buy CPE
that does it**

**Wifi kit that refuses
to pass v6 frames**

**Some glimmers of
hope in next-gen kit**

**Success with:
Apple Airport
AVM Fritz!box
A&A Firebrick
Cisco 837, 1800**



Bad

v6 forwarding performance lower (asic support missing)

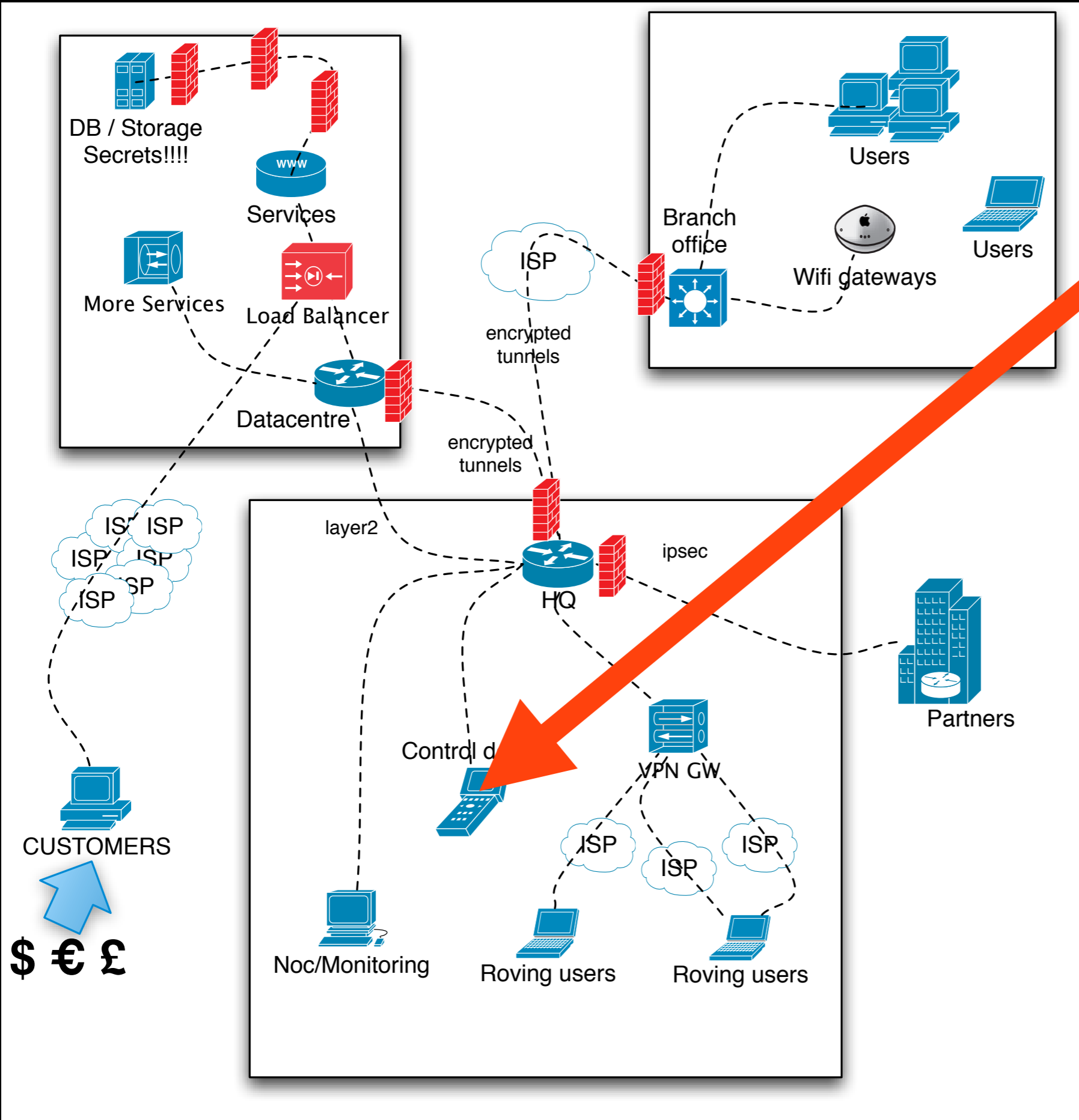
v6 interfaces often missing

Inconsistent feature set in product range, e.g. Protocol41 on ASA

Success with:
ASA > v7

Checkpoint (v4 mgmt)
Linux ip6tables/Sun ipf

Screenos > v5



Bad

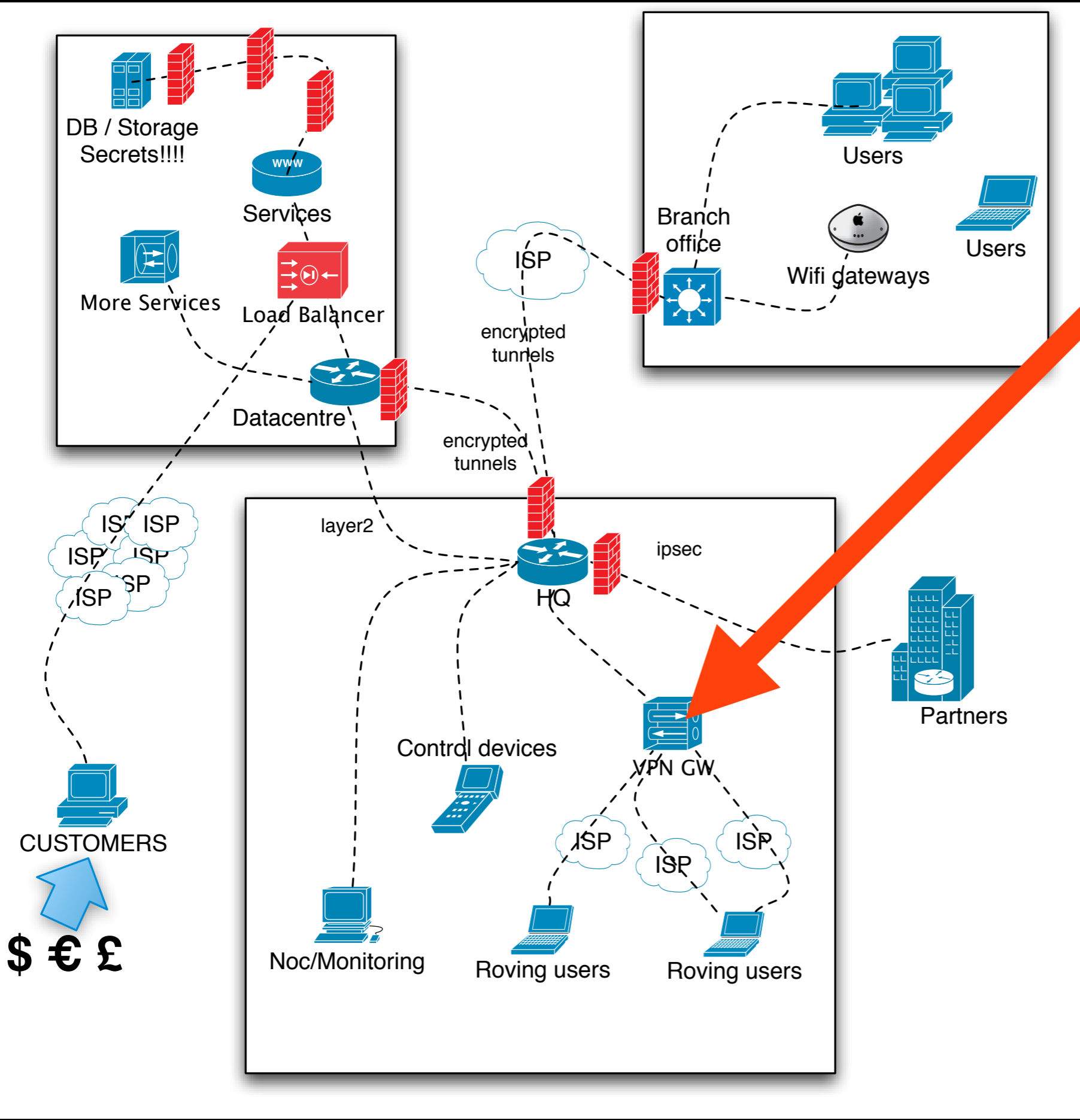
e.g. Handheld devices, or control units, or cameras, etc.

Was often serial, now driving 'ip everywhere' & address consumption

RFID ethernet?

Often cheap and old technology with no v6 support

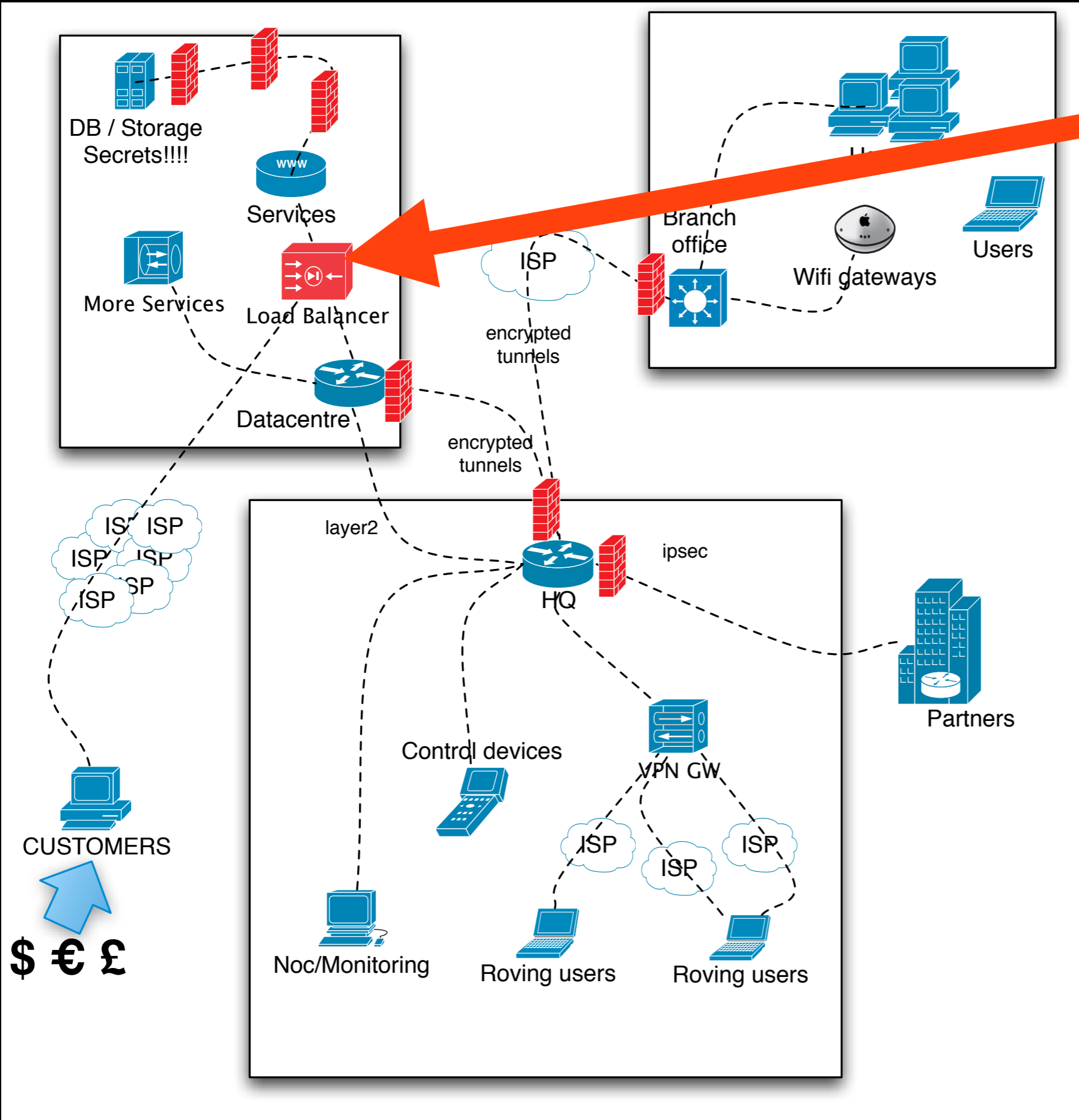
\$ € £



Bad

v6 missing in many VPN feature sets

\$ € £



Bad
 Urgently important
 to most large
 enterprises

LB logic/
 expectations
 engrained in
 enterprise software,
 hard to migrate
 between platforms

v6 support really
 lacking here

Vendor interest -
 A10 Networks
 Citrix
 Apache /
 mod_proxy_balancer

Key Grumbles

- Infrastructure has **different v4/v6 commands**
- Infrastructure has **no v6 in some interfaces** (e.g. cisco ASA has no v6 in web GUI)
- Vendors must be more consistent!
- Availability of v6 in **some regions poor**, some excellent - hard to predict availability
- First Hop **Redundancy protocols considered poor**

More Grumbles

- **“Interesting” bugs** you wish you’d found in the Lab
 - Various things can cause all forwarding to happen on the CPU rather than in hw, e.g. c6500/802.1ah
- Lots of platforms **can’t measure v4/v6 traffic volumes** independently (helps you find these bugs!)
- Enterprise v6 maturity feels a bit like routing v6 maturity did a few years ago
- **Transitional** technologies (will expand more)

Transitional Technology

- All wanted to **avoid** Transitional Tech
- Tunnels considered to provide **poor service levels**, native strongly preferred
- **Device support** for transitional tech (e.g. 4I) not as good as support for native
- Partial roll followed by full roll is **twice the work**, and engineers prefer to party

Successes

- **Users don't notice the difference**
- **Helpdesk training** not complex

Killer Apps?

- As if “more addresses” was not enough
- Microsoft Direct Access
 - Creates Always On ad-hoc VPNs that use IPSec over **IPv6**.
 - Coming in Windows 7
- Is really just an extension of the end-to-end debate - this innovation is possible because v6 end-to-end is a reality today and new p2p apps will follow.

What nobody mentioned

- **NAT6** - perhaps we don't need it after all
- **Good.** :-)
- Though ISATAP (or ALG layers) is a necessary evil for now to get reach of v6 from v4 only world.

Questions and Comments at the end

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