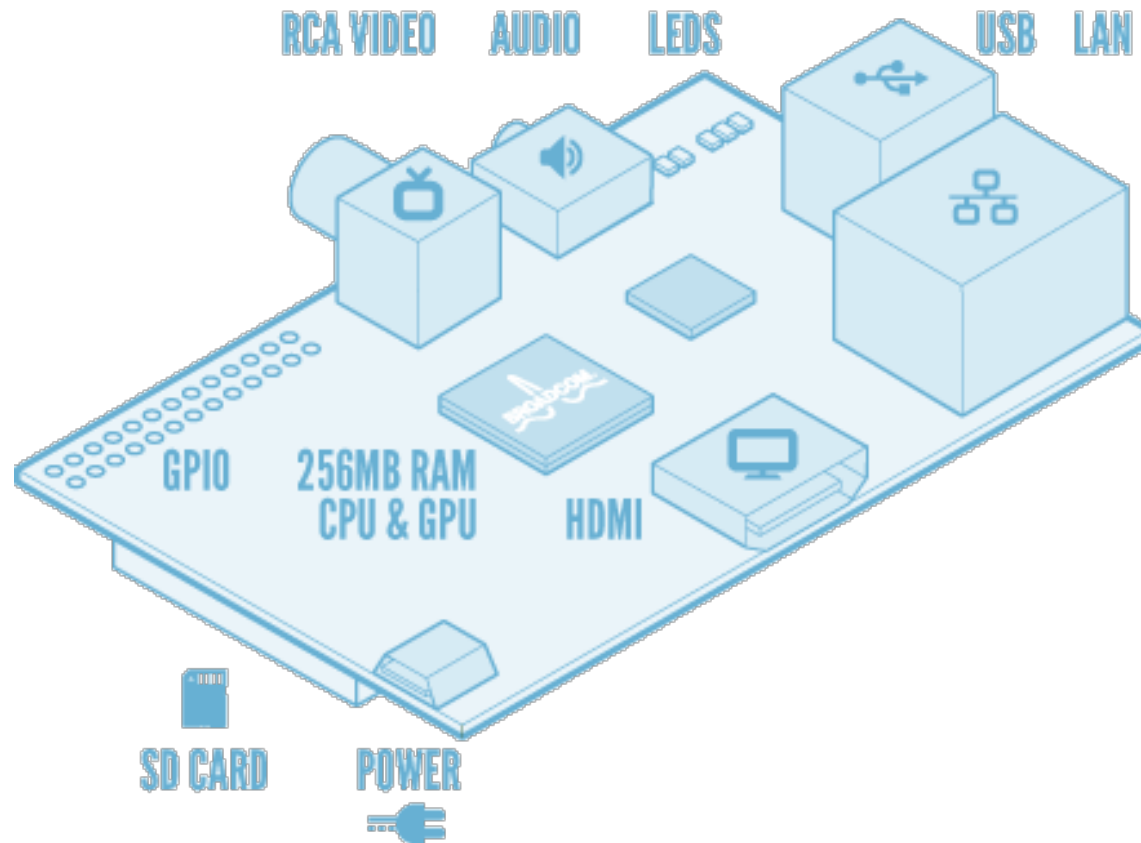


Raspberry Pi Cloud

Pete Stevens
Mythic Beasts Ltd

In the beginning...



Raspberry Pi B – can it be a server?

- 100MBps network
- 1 arm core, 700MHz
- 256MB RAM
- SD card for storage
- Runs linux
- Looks promising

Comparison - sphinx

- Launched Mythic Beasts in 2000
- 2 cores, 300Mhz Intel Celeron
- 256MB RAM
- 2x 40GB disks
- 0.5Mbps Internet
- Runs Linux

How to get one?

- 29th Feb 2012, Raspberry Pi launched
- And sold out immediately
- 15 week wait to get one through official channels
- You couldn't obtain one for love nor money.
- But could you steal one?

Ask a supervillan



Step 1: Obtain a white cat!



A (mostly) white cat!



Mooncake!



Raspberry Pi ✓

@Raspberry_Pi

Following



Pete from Mythic Beasts is in my kitchen, threatening to steal Mooncake (who is on his knee, the traitor) if we don't give him a Raspi.

RETWEETS

7

LIKES

8



2:40 pm - 7 May 2012



7



8

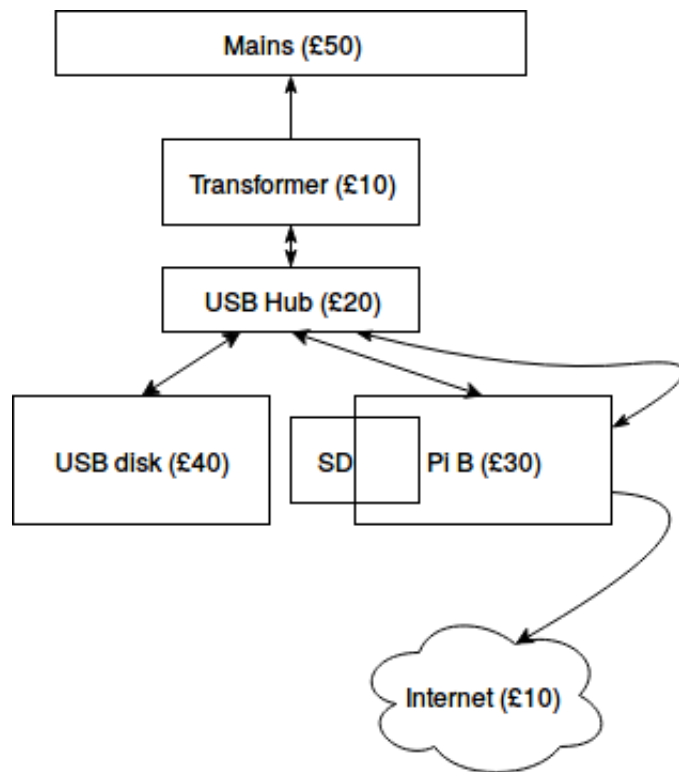
Trying it out



Mains in the datacentre



Schematic



Is it any good?

Is it any good?

- Not really.
 - It's too slow for interactive applications
 - SD card unreliable – crashes
 - Network too slow for downloads (40MBps)
 - Not enough memory for more than a handful of users

Pi 2 – is it any better?

- Good things
 - Four faster cores – fast enough
 - 100Mbps ethernet that works at speed
 - 1GB RAM
- Bad things
 - SD card still unreliable
 - Power infrastructure still expensive

Power over Ethernet



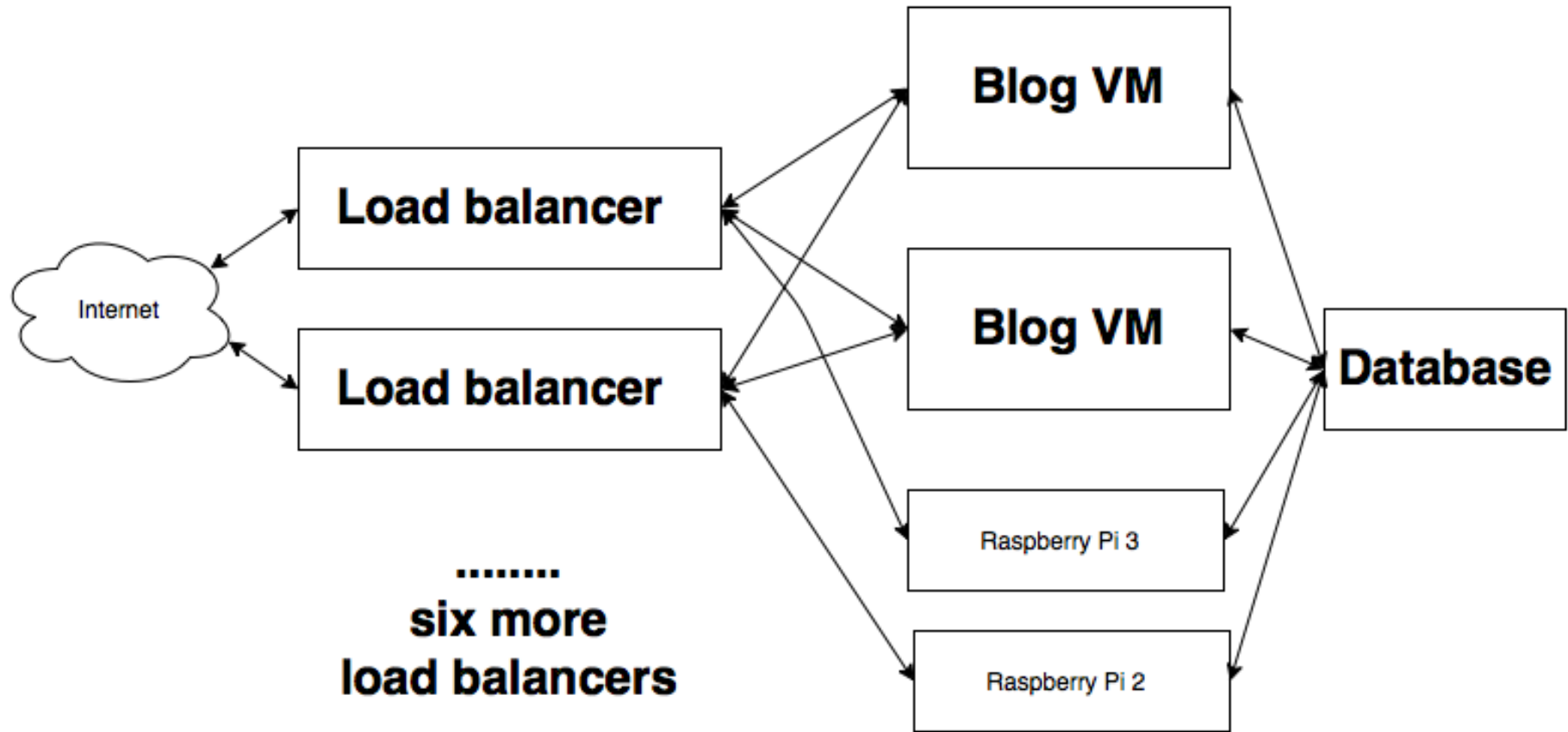
Pi2 + PoE – Is it any good?

- Good things
 - 4 cores / 1GB RAM
 - Single wire for power and data
 - £30 HAT, £10 switch port, £30 Pi, £10 SD card
- Bad things
 - SD card unreliable
 - Needs a visit if the customer breaks the card

Pi3

- We obtained a Pi3 early
- So we added it to the webserver setup and delivered 2.5% of the pages for the Pi3 launch from a Pi 3
- <https://www.raspberrypi.org/blog/serving-raspberry-pi-3-launch-raspberry-pi-3/>

Pi3 Launch



Pi3 launch

- It worked!
- For a few hours, then the SD card corrupted and it fell over
- If at first you don't succeed try again....

April Fools Day 2016



The Little Computer That Could

- Ran the whole site for three days using only Pi3s for the blog.
- Picked April Fools day so if it all exploded we could claim it was a big joke.
- Lots of people didn't believe us.
- <https://www.raspberrypi.org/blog/the-little-computer-that-could/>

Pi3 + netboot

- Netboot means no unreliable SD card!
- We can remotely reimage via a network file-server
- Removes the last remaining issue before we can offer Pi in the datacentre
- Only one issue, we have to make it work
- Well-tested is not an adjective you'd use to describe it

Netboot

- Pi3 fetches an internet address over the local network (dhcp)
 - It's picky about timing, it doesn't work if you have
 - Spanning Tree – redundancy in your network
 - VLANs – virtual networks
 - Switches / network servers that reply too fast or too slow
 - Each Pi3 has it's own private VLAN with nothing else attached


Netboot

- This then fetches a file using tftp from the dhcp server
 - Can't fetch from a different server
 - Has to be on the same network, routing doesn't work
- Executes this file (the bootrom)
 - This reads the serial number, and fetches files from
 - <serial>/kernel7.img
 - <serial>/cmdline.txt

Netboot

- We put configuration into cmdline.txt to boot from our network file server
- This then starts up the Raspberry Pi 3 from a network fileshare using NFS
- Just add billing and we have

A Raspberry Pi 3 cloud




Servers ▾ Hosting ▾ Domains ▾ Support ▾ Blog

Search Account ▾

Raspberry Pi 3 servers

Educational computing in the cloud

[Find out more](#)



● ○ ○ ○ ○ ○

Domains & DNS

Register your own domain name and benefit from our powerful DNS management interface and API.

- DNS API
- DNSSEC support
- IPv6 support (AAAA & glue)

Virtual & Dedicated Servers

We offer a broad range of both physical and virtual servers.

- Choice of SSD or HDD storage
- Upgrade and downgrade virtual servers as required
- **Raspberry Pi 3** servers now available

Web & Email Hosting

Our flexible hosting accounts allow you to run your own website and use email addresses on your own domain name.

- Install popular web applications such as WordPress, Joomla and Drupal

Automation

- We accept an order through our website
 - Check our database and allocate a Pi 3
 - Create a new LVM partition and filesystem
 - Mount it on the fileserver, put a Raspbian install in it
 - Write an network address into the config file
 - Write ssh keys into the config file
 - Write the netboot configuration
 - Tell the switch to turn it on

Pi Cloud



Networking

- 93.93.128.1
- 2a00:1098:0:80:1000::1

IPv4



This computer still costs \$5

- 93.93.128.1

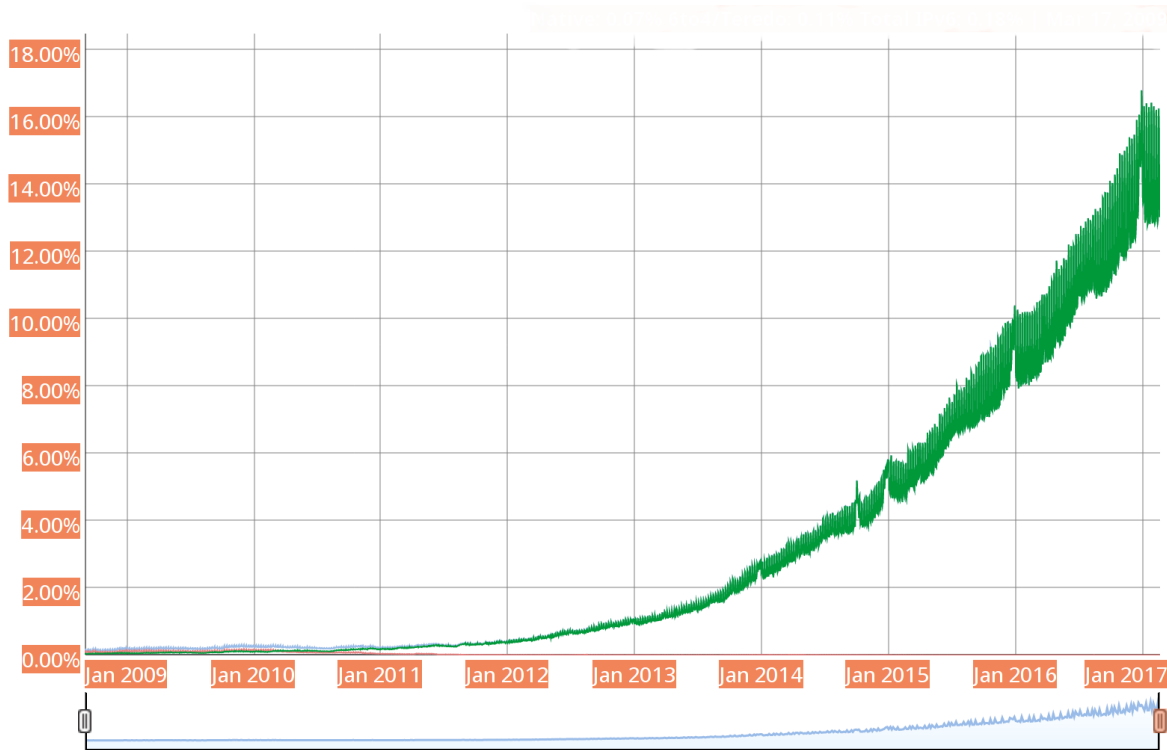
~~This IP address costs \$10~~

This IP address costs \$20

IPv4

- 4 billion addresses, 7 billion people
- Multiple computers each, we ran out of addresses
- It's getting harder and harder to keep things working
- We have a new standard, IPv6 which we're trying to get everyone to move to

IPv6

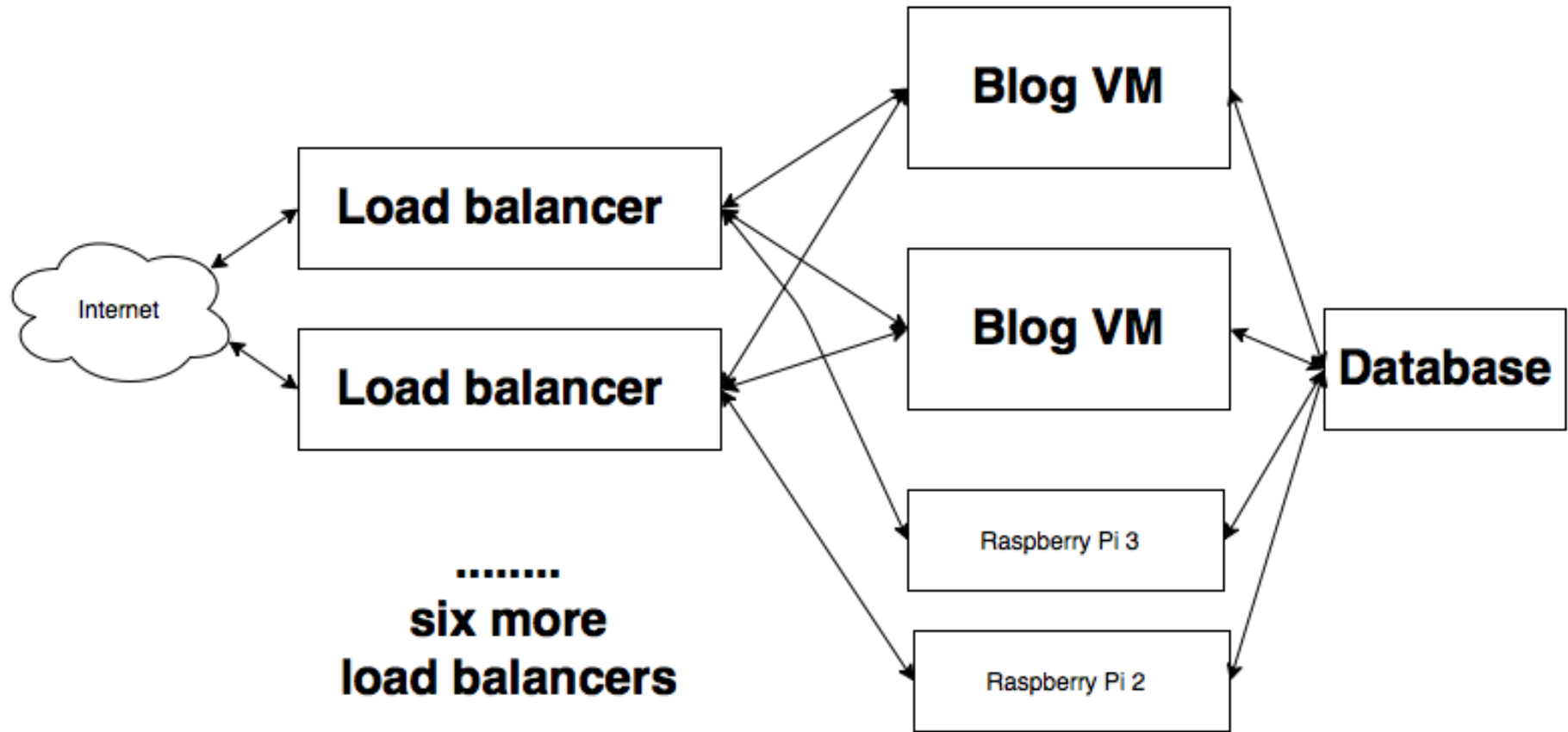


IPv6

- Raspberry Pi has had an IPv6 only network for hosting servers since 2012
- It was one of the first, along with Google and Facebook
- Now joined by Netflix, Linked In, Cloudflare, Microsoft, Apple, Yahoo, Amazon....
- In the UK, Sky has full IPv6, BT is rolling it out, EE similarly, Virgin to follow . Nearly 20% of the UK now has IPv6.

IPv6 & IPv4

IPv6 Only



IPv6

- It's entirely practical to websites servers with only IPv6 addresses on the servers, you just need a translation for inbound and outbound connections.
- This is how Raspberry Pi has worked for nearly five years.
- We provide translation layers free of charge for all customers.
- This is what the world is moving too, we're educational so we're making you learn about it now.

Raspberry Pi in the Cloud

- We sell Raspberry Pis in our data centre, buy direct from our website
- Your own Raspberry Pi 3, 10GB of disk space
- 2^{64} IPv6 addresses for every customer
- Free translation for Ipv4
- £6/month

Is it any good?

- Compared to our base £6/month virtual machine
 - It's a little bit slower
 - The disk performance is rubbish
 - Same memory allowance
 - No contention – it's always guaranteed to run at maximum speed
 - Runs Raspbian just like your Pi 3

Questions?

- Follow us on twitter
 - https://twitter.com/Mythic_Beasts
- Read our blog
 - <https://blog.mythic-beasts.com/>
- Buy a Pi3 in the cloud
 - <https://www.mythic-beasts.com/order/rpi>