

Xen Virtual Workhorses

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Overview

- What we have
- How we got here
- Problems in using Xen
- Advantages in using Xen
- Conclusions
- Demonstration

My Section

- Internet Services:
 - Distance Learning
 - Email
 - Web and related services
 - Legacy services

My Team's Services

- Web hosting
- Network file system: AFS
- User access: SSH, SFTP, FTP
- MySQL
- Student Portal
- LVS, rsync, Zope, RequestTracker, CMS, CVS, Kerberos, tftp, webstats, search engines
- 100% Debian (Ubuntu)

How Big is our Operation?

- 483 virtual hosts under apache
- 108m successful GETs in January
= 40 per second
- 79 server machines (plus others)
+ 42 virtual hosts (plus others)

Terminology

- Virtual host
- hypervisor
- dom0, Domain 0
- domU

What we have

- 16 Domain 0 servers
- 42 Domain U virtual machines
- 28 old server machines (commodity)
- 35 other servers (Dell PowerEdge)

- Xen 3.0.2 (late version, Debian patches)
- Kernel 2.6.16.27

One Kernel at a Time

DOCTOR FUN

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How we got here

- Many services (including legacy)
- Commodity hardware (£300)
- Clustered using LVS (direct routing)
- Low cost / High availability

Management Takes a Hand



The next stage

Changes in management philosophy:

- Important applications should run on 'quality' hardware.
- At £4000 per server, we can't replace all our old machines.
- Pressure to reduce numbers of machines, to replace 4 or 5 old machines with each new machine.
- But with network services, dangerous.

Investigating Xen

- Xen was my first choice as platform for virtualisation.
- Unsatisfactory attempts with Xen 2
 - DomU kernel froze during heavy network I/O
 - Caused by USB subsystem in Dom0 kernel
- Satisfactory attempts with Xen 3
- First from a mercurial snapshot
- Then two (backported) Debian packages

Alternatives

- IBM's Power servers
 - Good hardware support for virtualisation
 - Negotiations fell through
- VMWare
- QEMU
 - Higher overhead (or is there?)
 - Concerns about our LVS networking

Testing

- Performance under load
- Potential interference between virtual hosts
- A model of our LVS cluster with multiple services sharing the same IP addresses
- Some real work

Experiences

- About 1 year of service with no problems
- No desktop clients; all servers
- All machines with the same 2 kernels
- Treat virtual machines as real machines
 - but with adjustable sizes and processors
 - I keep similar clients on different servers
- No checkpointing or migration
- Simple, paranoid configuration

Problems in using Xen

- Being tied down to a kernel
 - hardware, other changes
- Extra maintenance
 - dom0, parallel upgrades
- Mapping services to machines for the boss

Advantages in using Xen

- Same virtual hardware everywhere
- Easy configuration
- Low overhead
- Quick installation time
- Quick reboot time
- Good user support list

Conclusions

- Xen works
- Keep it simple
- Don't chase bleeding edge kernels

Demonstration

- xm list
- xm top
- xm console
- reboot
- config files

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