



# Thinking Linux'06

Linux & Open Source Business Solutions

## Open Source in the Data Centre

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Bulletproof Networks



# About Me

# Experience

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- Previous
  - Engineer, ZipWorld (ISP)
  - Senior Engineer, Pacific Internet (ISP)
  
- Current
  - Technical Guru, linux.conf.au 2007
  - Owner, Beagle Internet
    - ✓ Internet Service Provider
    - ✓ Dialup and ADSL
  - Research and Development Manager, Bulletproof Networks
    - ✓ Managed Dedicated Hosting
    - ✓ Managed VM Hosting
    - ✓ Monitoring (as a service)

# The Data Centre

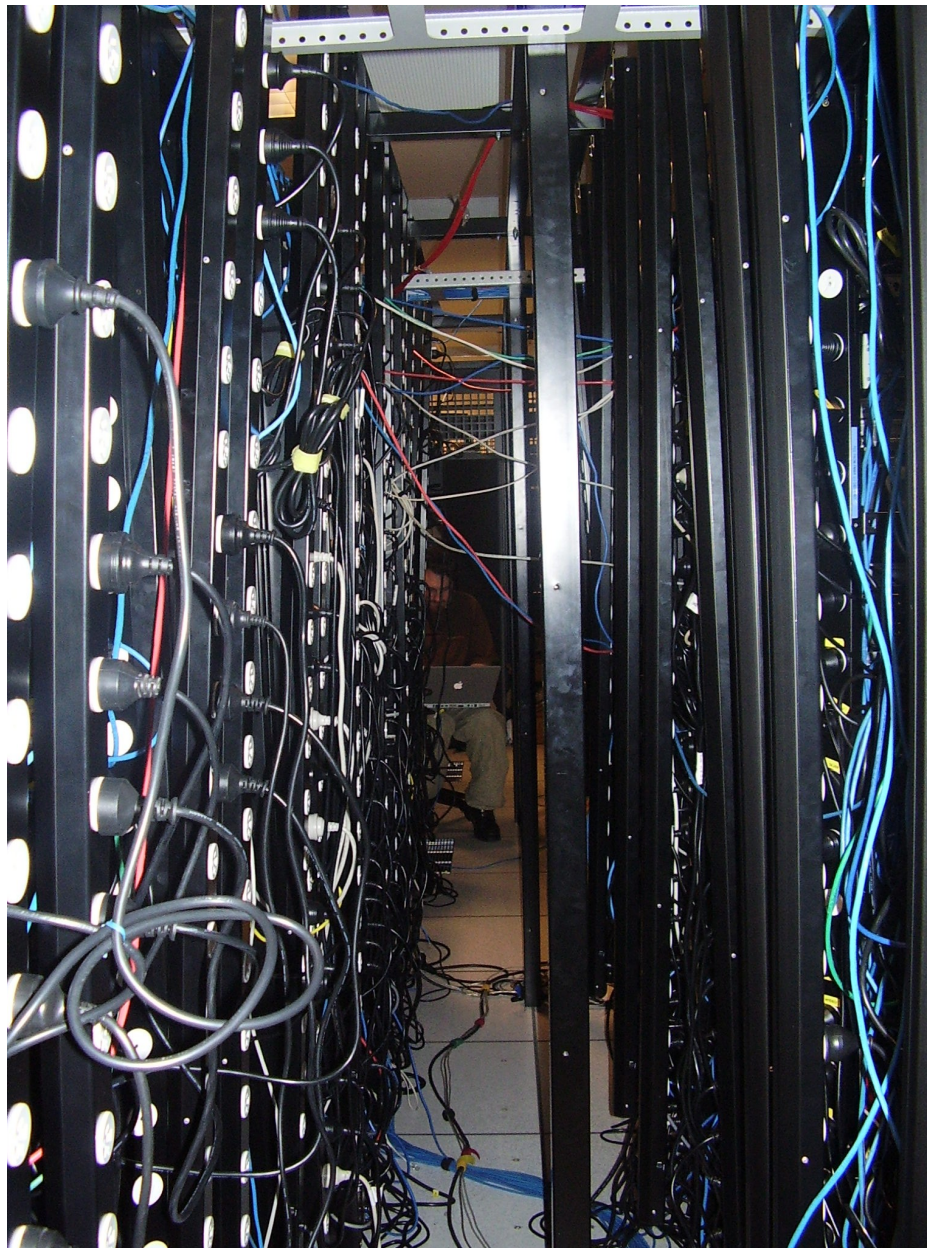
# The Data Centre

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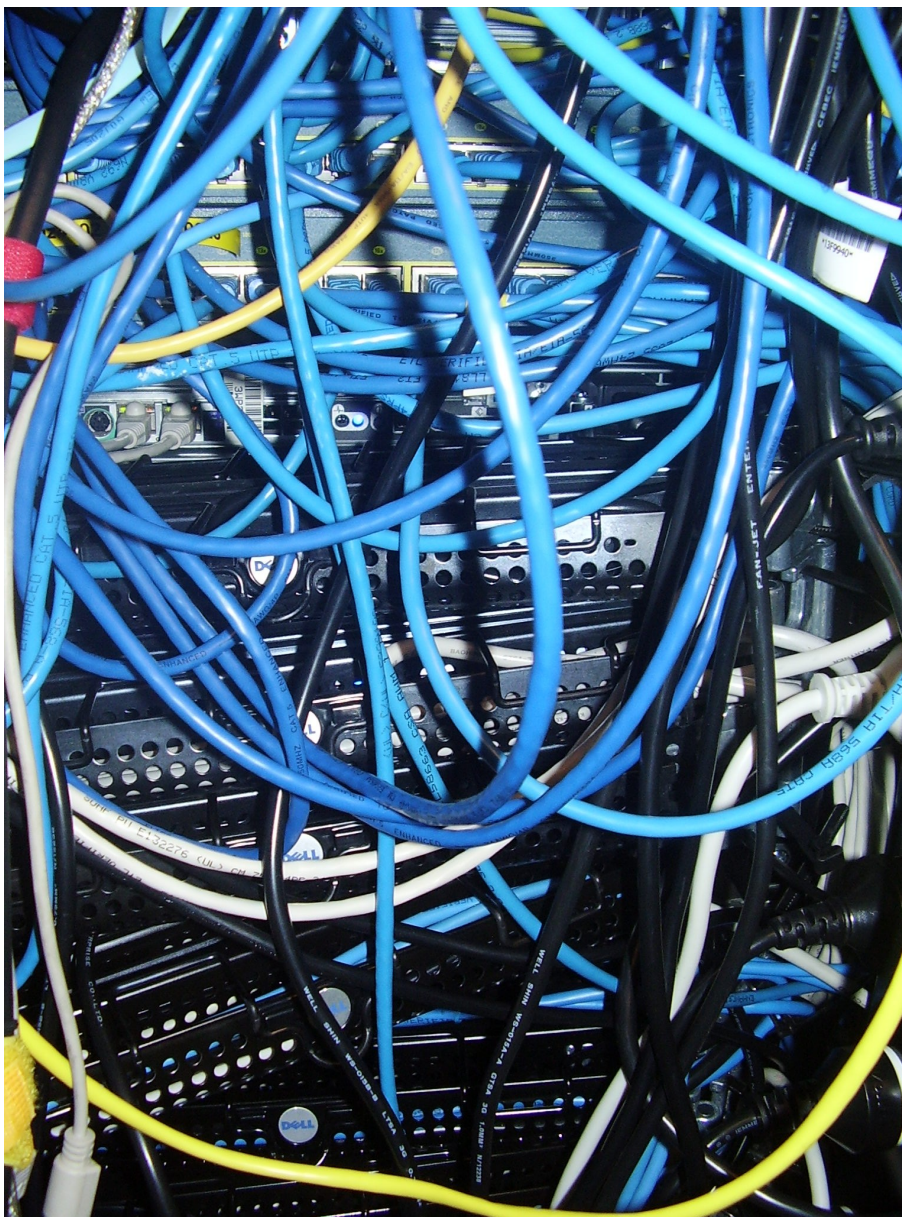
- Some data centres look like this



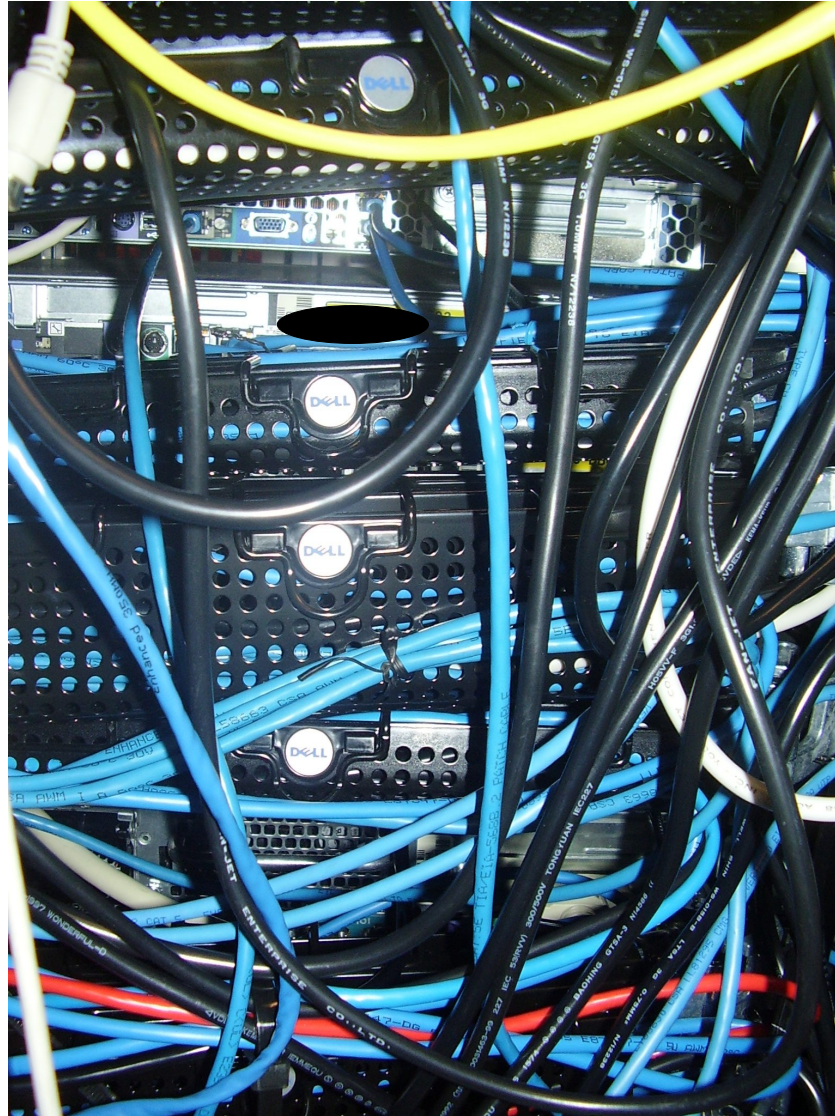
- Most I know look like this...



Why do servers come with 3 meter power cables?



Now, where's that power cable?



Oh! I just have to extend the CM arms?



# IDC Components

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- Internet Connectivity
  - Border Routers, Peering Links
- The Network
  - Switches, VPN Links
- Core Infrastructure
  - DNS, AAA, Monitoring
- Hosted Infrastructure
  - Web Sites, Email, B2B

# Software in the IDC

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- Operating Systems
- Monitoring
- Backups
- High Availability
- Load Balancing
- Authentication
- Networks
- Support
- Web Hosting

# Free and Open Source Software

# Where can FOSS be used?

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- In all of the components in the previous slide
- Although, this doesn't mean you always should
- PC hardware vs Appliances vs Routers
- Where can't FOSS be used??
  - Network and fibre switches
  - Windows, **well No**

# FOSS on Windows

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- cygwin
- Open Office
- Apache
- Postgres
- MySQL
- Most of the things in the following slides

# Why use FOSS?

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- Easier to Troubleshoot
  - You can work anything out when you have the source
- Higher Quality
- More Flexible
- Openness, Standards
- Choice

# FOSS as a small business

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- Cheap
- Buy vs Build/Deploy
- Commercial Software
- Lowers the barrier to entry
- Scalability

# Monitoring



# Monitoring

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- Is my Server Up or Down
- Are all the services running
  - Individual service checks
  - Process Fingerprint
- Utilisation Graphs
  - Disk
  - CPU
  - IO
- Notifications
  - SMS
  - Pager
  - Email

# Monitoring

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- Nagios
  - My monitoring platform of choice
  - Used to be called Netsaint
- Very extensible with plugings
  - Standard plugins – (http, smtp, ping, https, etc)
  - Any script, return codes evaluate to status
  - WWW::Mechanize
- Lots of 3<sup>rd</sup> party extensions
- net-snmp
  - formerly ucd-snmpd
  - Vendor snmpd #?&%!!!

# Nagios

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Nagios Demo Here

# Graphs

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- MRTG
  - Has been used for years
  - Make sure you use Round Robin Database
- RRDTool
  - Lets you store graph data
  - Many tools to insert and display data
- Easy to roll your own

# MRTG and RRDtool Demo

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Demo Here

# Notifications

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- Use pagers, not SMSs
- SMSClient can be used to interface with most networks
  - Link SMSClient, modem or Internet
  - Redrock, simple perl script
- Jabber nagios notifications (soon to be open sourced)

# Backups

# Backups

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- Disk to Disk to Tape
- BackupPC
  - Methods
    - ✓ rsync
    - ✓ ssh
    - ✓ samba
  - Utilises hardlinks to save on space
  - Each incremental backup becomes a full backup
- Tape only used if Disk fails
  - use tar or dump



# BackupPC

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**sources**



**backup**



# BackupPC

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- 12 hosts
- 77 Full backups 871GB
- 72 Incremental backups 197GB
- Actual space used 183GB
- 5 times less space

# BackupPC Demo

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Demo Here

# Load Balancing and High Availability

# Load Balancing

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- Commercial options
  - Alteon
  - Cisco CSS
  - BIG IP
- Linux kernel supports IPVS
- Layer 4 load balancing
- ipvsadm is the command line tool
- Basically routing at TCP level
- Multiple backends + Sorry Server

# Load Balancing

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- Heartbeat
  - fake + ldirectord
  - fairly old and slow for large installs
- Keepalived
  - Fast and Simple
  - Checks back end servers
    - ✓ http, https, connect, script
  - Takes servers in and out of cluster

# High Availability

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- Keepalived
  - Implements VRRP
- VRRPd
- STONITH
  - Shoot the other server in the head
  - Solves quorum problem
  - Hardware needed
  - Experimental kernel module

# Authentication



# Authentication

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- PAM
  - /etc/shadow
  - XSQL
  - LDAP
- LDAP
  - OpenLDAP
- RADIUS
  - freeRADIUS
  - Integrates with multiple backends
    - ✓ LDAP
    - ✓ MYSQL, PostgreSQL, Oracle
    - ✓ BDBM
    - ✓ Shell scripts!!

# Support

# Tickets

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- Ticketing System
  - Request Tracker
- Highly Extensible
- Web and Email based
- Can support a basic workflow

# Requet Tracker

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## Demo

# Documentation

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- Wiki's are easy to use
  - wikipedia
- Twiki
  - Highly extensible
  - Lots of plugins

## Demo

# Email

# Email

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- A whole presentation in it self
- Exim, Postfix, Sendmail
- Spamassassin, DSPAM
- Dovecot (IMAP, POP)
- ClamAV
- IMP
- Integrate all of the above with LDAP
- perdition



# Networks

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- quogga (formely zebra)
- cflowd
- pptpd
- OpenSWAN
- iptables

# Web Hosting

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- Apache
- PHP
- Tomcat
- Perl, python etc

# Databases

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- PostgreSQL
- MySQL

# Operating Systems

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- Linux
  - Debian
  - Ubuntu
  - Redhat
- AIX
- HPUX
- Windows
  - cygwin

# Looking Forward

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- Virtualisation
  - VMware (not Open Source)
  - Xen
- More automation
- Patch Management

# Questions

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- Any questions?

# linux.conf.au 2007

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- 15<sup>th</sup> - 20<sup>th</sup> January 2007
- University of New South Wales, Sydney



# Employment

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- Bulletproof is currently employing people in Sydney please see the bulletproof website for details



# Bulletproof Networks

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## About Bulletproof Networks

Bulletproof Networks is a best-of-breed managed service provider, supplying some of Australia's largest companies with high performance, high availability managed hosting, virtualisation and website infrastructure monitoring.

Bulletproof is the first provider in Australia to launch a fully managed, dedicated virtualised hosting service.

Bulletproof is also the largest provider in Australia of customised website and Internet infrastructure monitoring as a service.