

Redundancy with Linux

Supporting a large network?

Less is more!

**Provide redundancy with Linux; Anycast
DNS, Fail-over DHCP, Peering NTP**

Kim Hawtin
University of Adelaide

Redundancy with Linux

Objectives

- Why do we need redundancy?
- The start of the project; what is core?
- Goals
- Decisions made; why/how/what/where
- Lessons learned
- Questions

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Why?

Why do we need redundancy?

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file:///home/silvia/Desktop-Backup/Why_You_Need_A_DR_Site.JPG

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What is Core?

What are the core services
for your site or your org?

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What is Core?

Users perspective

- Email
- Phones
- Web apps
- Other apps

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What is Core?

So what are the dependencies?

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What is Core?

Core hardware

- Network cores, switch & routers
- Servers running core services

Core services for hosts

- DNS
- DHCP
- NTP

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What is Core?

Site Design

- How do we design for redundancy?
- Where do you find information?
- Who can you talk to?
- Where do you start?

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What is Core?

Find info from;

- Local SysAdmin & Network teams
- Vendors
- Other Unis and local corporates
- LUGs
- The all knowing Internets

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Goals

- Aim for best practice deployment
- Aim for redundant DNS, DHCP and NTP
- Use native package management
- Use vendor packages
- Three projects; DNS,DHCP,NTP

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Why/What/How/Where

Why; DNS upgrade project

- Add redundancy
- Hardware refresh
- OS refresh; Redhat 7.x to Redhat AS 4
- Upgrade Bind 9

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Why/What/How/Where

How; DNS and Anycast IP

- OSPF and AnyCast IP
- Use existing Primary/Secondary tree
- Use existing host database scripts
- Use Quagga on host with OSPF

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Why/What/How/Where

What; Idea of "Less is more"

- If your DNS client can only handle two DNS servers
- Two is plenty when using Anycast, routers move routes if first server "goes away"

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Why/What/How/Where

Where; Locate a server physically local to your clients

- Three campuses; Four new servers, one each at the remote, three at the central
- Routers actively push routes out for closest server via OSPF
- Location diversity is good!
- LAN diversity is good!

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Why/What/How/Where

Why; DHCP Project

- Hardware refresh
- Had one server with no redundancy
- Using Cisco IP helper on every VLAN and subnet to forward to one host
- Add redundancy

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Why/What/How/Where

How; DHCP and fail over pairs

- Three campuses, three zones
- Three failover pairs on five hosts
- Cisco IP helper send to two hosts

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Why/What/How/Where

What/Where; Locate a server physically local to your clients

- Tune lease split to closer to remote campus
- Tune for 50%/50% on central campus
- With 50%/50% servers share load

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Why/What/How/Where

Why; NTP project

- Peering from upstream stratum 1
- More servers needed for accurate timing
- Model is the Byzantine fault tolerance problem

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Why/What/How/Where

How;

- Already run a stratum 2
- Add four stratum 3 as peers
- Make stratum 2 server preferred
- Add off site stratum 2 servers
- Clients configured with up to four stratum 3 servers

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Why/What/How/Where

What;

- Standard current version of NTP from ISC
- Stratum 3 servers peer

Where;

- NTP service local to clients, for unreliable network links

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Lessons Learnt

Social Lessons Learnt;

- Spend time consulting local network guru for network configs
- Engage local tech gurus for server configs, good ideas and gotchas
- Spent more time in research than deployment
- Spent more time chasing packaging bugs than testing

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Lessons Learnt

Technical Lessons Learnt;

- VLANs rock, but makes more work
- testing environment needs to be isolated from production network
- NTP needs three machines upstream to get the right time
- NTP should run local hardware clocks like GPS, GPRS, CDMA

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Resources

- "Three Practical Ways to Improve Your Network" by Kevin Miller from the CMU; <http://www.net.cmu.edu/pres/lisa03/>
- "Deploying IP Anycast by Kevin Miller" from CMU; <http://www.net.cmu.edu/pres/anycast/>
- "The Reasons and Configuration of Anycast DNS Servers" by Glen Turner from AARNET; <http://www.linuxsa.org.au/meetings/2006-07/anycast-dns.pdf>
- Failover DHCPd Paul Heinlein; <http://www.madboa.com/geek/dhcp-failover/>
- DHCPd; <http://www.isc.org/sw/dhcp/>
- Byzantine Fault Tolerance from Wikipedia; http://en.wikipedia.org/wiki/Byzantine_fault_tolerance
- NTPd; <http://www.isc.org/sw/ntp>
- Quagga; <http://www.quagga.net/>

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Questions

