Best Practices in Network and System Administration

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Outline

- Some notes on Infrastructure
- 10 rules to live by
- Network Administration
- System Administration
- Reading list/training Info
Infrastructure I

- Space
  - Cabinets? Cages? Shared keys?
- Power
  - AC only? 220V only?
  - UPS area or in-cab?
  - Testing? UPS death?
- Air Conditioning
- Fire supression
- Should people be here?
Infrastructure II

- Cable routing
- Label EVERYTHING
  - (but don’t trust labels blindly)
- Access (diversity – see later)
Rule 1 - Be Good Citizens

- Visibility
  - Ticketing system
  - Updates must propagate outside your group
- Know your metrics
  - User perception (quick response)
  - CTO perception
  - Partner perception

Remember!
System administrators and network engineers manage systems and networks on behalf of other people
Rule 2 - Monitor your Systems

- Status
- Establish baselines
- Watch trends
- Use the right tools for the jobs
- Use the right tools for your team
- Start in a known state!
Routers

- Link traffic
- Capacity
- CPU
- Memory
- Environmental

- ACL hits, BGP routes...
Networks

• Reachability
  – Ping
  – Traceroute
  – Routing loops
• Latency
  – Directly affects end-user perception
Systems

- Disk
- CPU
- Memory
- Environment
- Services
Rule 3 – Perform Disaster Recovery Planning

- Things break. *All the time.*
- *Quis custodiet ipsos custodes?*
  - If your monitoring system breaks, who will notice? Who will care?
- Timestamps are essential for correlation
  - NTP is your friend

- **NO SINGLE POINTS OF FAILURE**
3a - Networks

- Redundant paths
- Dynamic routing
  - minimal human intervention
- Spares (GBICs and cables, too…)
- Know your S.L.A.
3b - Systems

- Load-balancing
  - DNS round-robin
  - F5/Cisco Director/Resonate Global Dispatch
- Redundancy of service
  - MX backups
  - Leaf nodes should cache
3c - Backups

No, really. That’s it.
3d - Backups

USELESS unless you have tested restores!
3e - Backups

- Remember “no single points of failure”?  
  – This goes for backups, too!

- Media fails
- Media devices fail
- Networks fail
- Try restoring on a different system…
Rule 4 - It’s not done until it’s documented

- YOU are the single point of failure!
- You do want to go on holiday sometime, right?  
  – If not, see Rule 9
4a - Change Control

- Peer review
  - Show others how you think
  - Shows people what’s coming
  - Catches typos

- Revision Control Systems
  - Roll-back. Say it again. Doesn’t it sound good?
Rule 5 – Establish Procedures

- Consistency
- Reproducibility
- ISO 9001 is all about procedures
- Helps to implement Rule 4
- Peer review
Rule 6 – Practise Defence in Depth

- Not all eggs in one basket
  - Heterogeneity
  - *quis custodiet ipsos custodes?*  
    (Monitoring systems can fail too)
- You get time to react between layers
- Some are more important than others
6a - Defence in Depth

- Software updates
  - OS and applications
    - *All software is buggy. Get over it.*
- Firewall
  - Can give false sense of security
  - Misconfigured? Worse than no firewall.
- Monitor your network, too (IDS, honeypot)
- Internal more likely than external
Rule 7 - It’s not done until it’s tested

- Software installation is a risk
  - Yes, patches too!
- Test systems
  - Must the software updates be applied *right* now?
- Automate your testing, if possible
Rule 8 - Learn from Others

• Don’t re-invent the wheel
  – Save yourself time
  – Save yourself money
• Mailing lists
  – SAGE and local groups
  – NANOG
• Conferences
8a - Other sources

- Vendors
  - Sometimes they hire smart people
- FAQs
- Search engines
- White papers
- Books
- Articles
Rule 9 - Learn to Relax

• The Big Blue Room
• The most important metric - your family!
• DELEGATE!
• Go for a pint (beer, blackcurrant, whatever)

• Nothing messier than an exploding sysadmin...
Rule 10 - *Non scriptum, non est*

“If it ain’t written down, it never happened”

- Acceptable Use Policies
  - Have all users signed them?
  - *ALL* users? Including the sysadmins?
  - Can’t have perception of multi-tier system
  - Sometimes you have to fire technical people, too
Rule 11

Learn how to count to 10

Thank you.
Questions?

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