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ID 611

The Best-Laid Plans: Networking That Can Hurt Your Applications

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Agenda

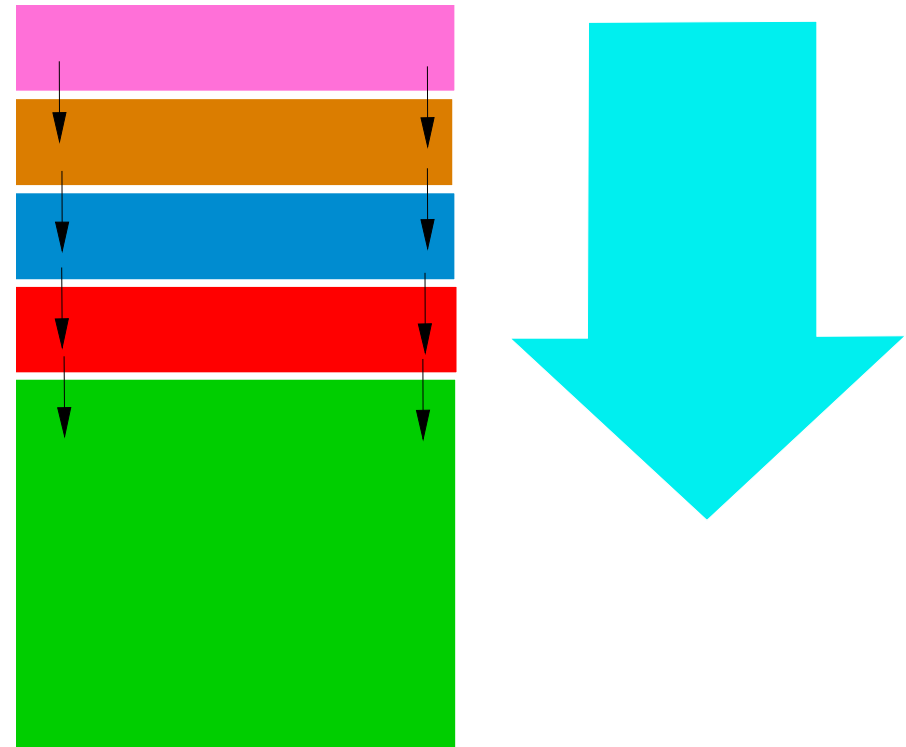
- Why Are We Here?
- Understanding Your Data Flow
- Pain Points: Hurting Your Servers, Clients and Network
- Striking a Balance
- Q & A

Why Are We Here?

- Networking technology continues to evolve
- We take the network for granted
- Networking varies widely among customers/clients
- More and more work being done with network appliances
 - Anti-spam
 - Encryption
 - Compression
 - Data Validation
- Changes often occur without your knowledge
- Networking guys don't always understand your applications

Understanding Your Data Flow

- Who's doing what?
 - Be aware of third parties
- Connection level
 - Firewalls/proxies
- Validation level
 - Firewalls/proxies
 - Server-side validation
- Authentication
 - Who owns directory?
 - Is it remote?
- Authorization
 - ACLs/privilege groups



Pain Point #1 – Overloaded Directories

- Affects both authentication and access control
- Can also affect specific products (e.g. IBM Lotus Sametime)
- Typical approach: Centralized directory cluster + load balancer
- Difficult to anticipate load in such an environment
- Consistent search filters a must
- Congestion/load can affect multiple applications
 - Possible solution: Local replicas
 - Possible solution: Multiple directories
 - Possible solution: IBM Tivoli Directory Integrator

Pain Point #2 – Web Security & Authentication

- Single-sign-on (SSO) system may depend upon remote service
- Web access controls may depend upon remote services
- Centralized Web access controls may suffer under load
- Using SPNEGO? Where's your server?

Pain Point #3 – Multiple NICs

- Not always a good idea
- Can result in asymmetrical routing
 - Outbound data takes different route than does inbound data
- Can overload one NIC in the system (inbound or outbound)
- This is NOT the same as “teamed” NICs
 - If teaming, use pair as hot-swap failover, not divided responsibilities
- Always check system routing table
 - Ensure proper default route (0.0.0.0)

Pain Point #4 – Remote Disk Mounts

- CIFS (Common Internet File System)
 - Also known as Server Message Block (SMB)
 - Small request size (64Kbytes) introduces “in transit” delays
 - Any network congestion/latency will exacerbate disk I/O concerns
- NFS (Network File System)
 - “Wire speed” protocol
 - Will send/receive as much data as quickly as network allows
 - Network bottleneck waiting to happen
- NAS (Network Attached Storage)
 - May use proprietary protocols
 - Performance varies widely

Pain Point #5 – Firewalls

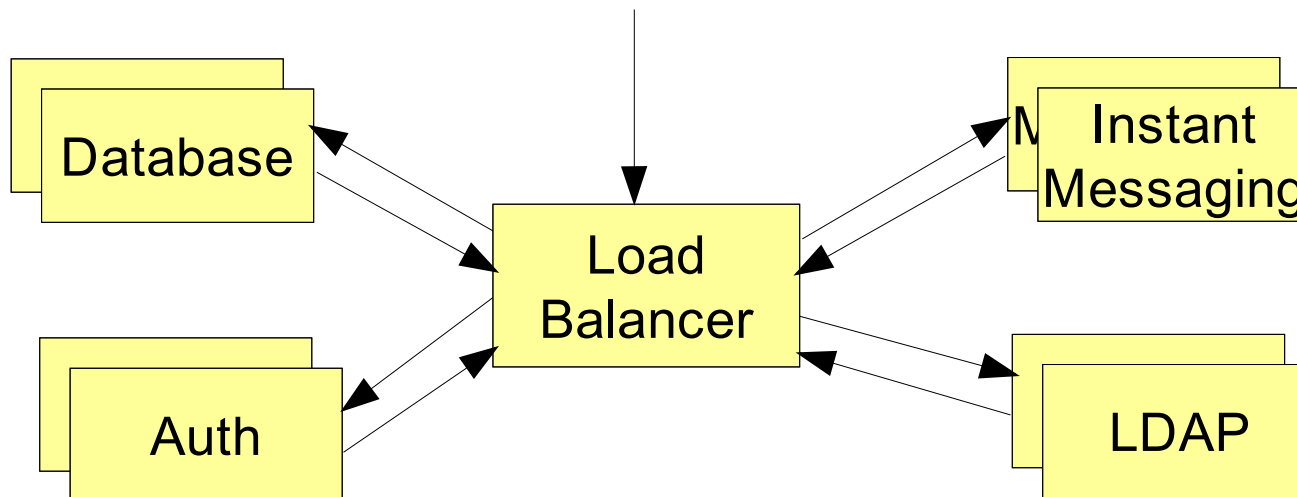
- Firewalls becoming more prevalent within the data center
- Additional point of failure
- Likely point of network congestion/latency
- Your applications may be “falling back” to poor performing mode

Pain Point #6 – OS “Upgrades”

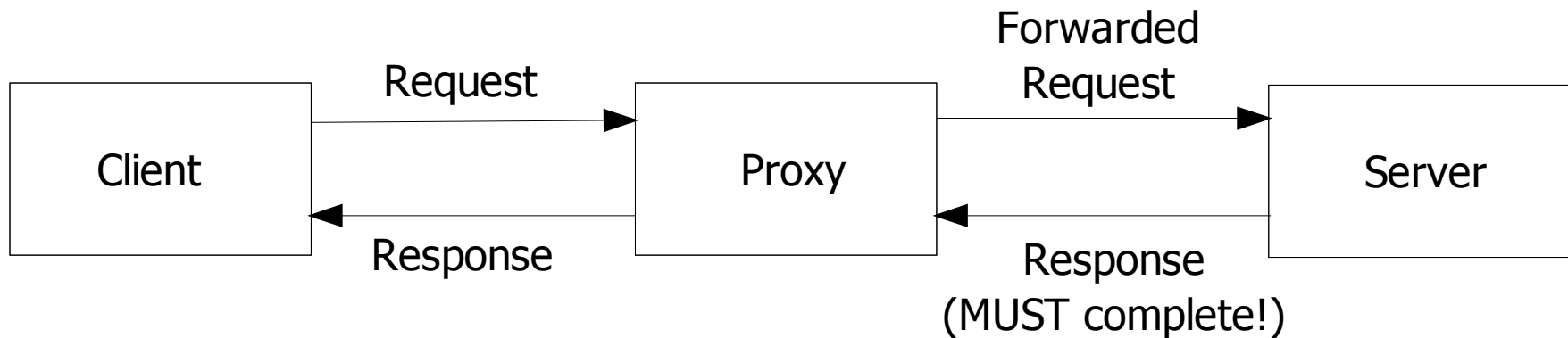
- New OS-layer networking technology can shoot you in the foot
- Be wary of “TCP/IP improvements”
- TEST TEST TEST!
- Example: Microsoft Windows 2000 Scalable Networking Pack
 - Created specific problems for RPC-based programs
- Example: Microsoft Windows Vista networking “enhancements”
 - Rendered aircards/cellular connectivity almost unusable

Pain Point #7 – Load Balancers

- Can generate “false positive” alarms under stress
- Recognize transactional costs
- Don't use load balancers on the back-end
- Look for alternatives
 - e.g. IBM HTTP Server WebSphere Plug-in can load-balance
 - e.g. Round-robin DNS can be effective



Pain Point #8 – Proxies/Reverse Proxies



What if there's a firewall?

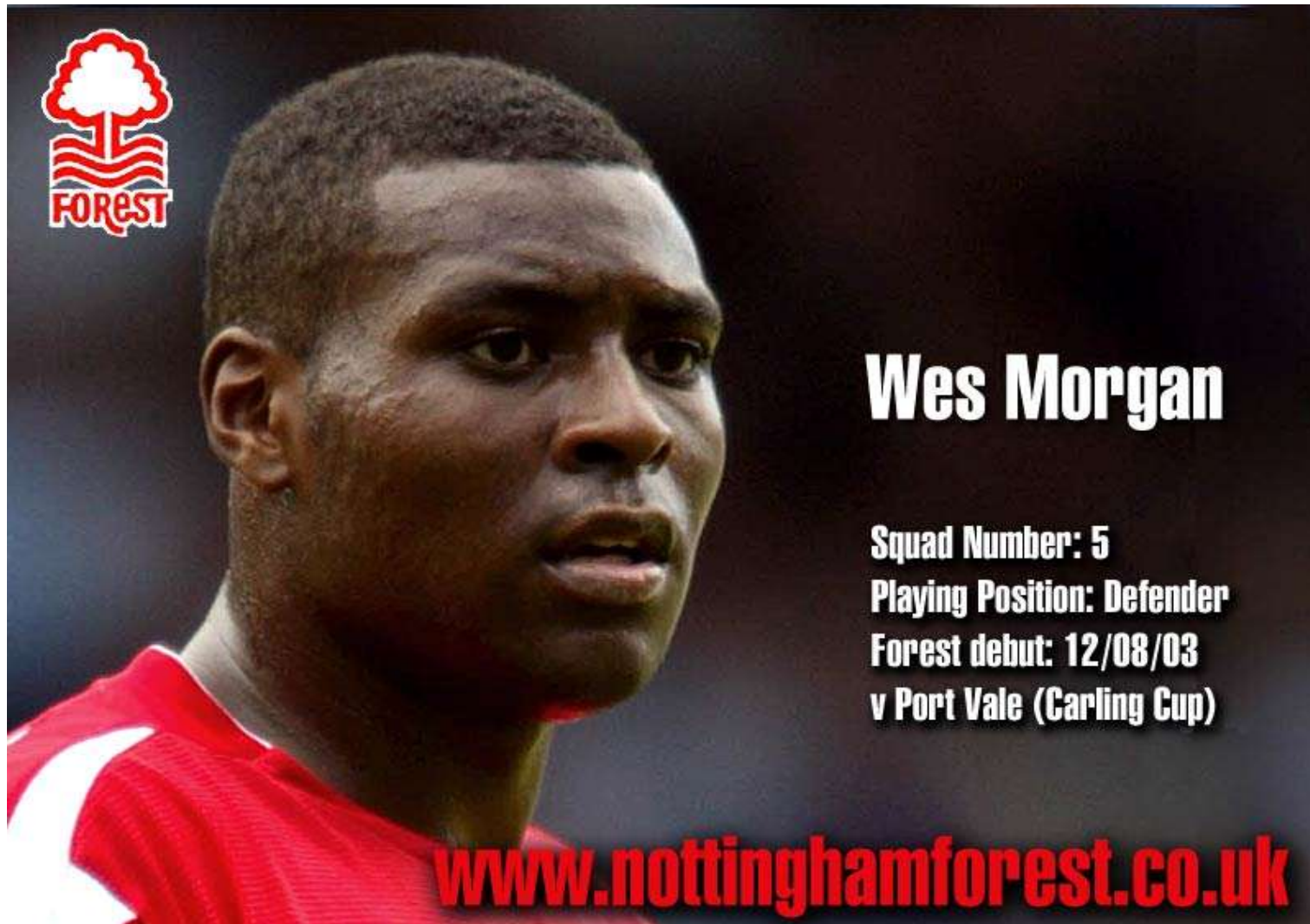
What if there's a reverse proxy, too?

What if both are present?

MAY BE TRANSPARENT (NO CLIENT SETTINGS)!

Pain Point #9 – Bad Data on the Back End

VERIFY, VERIFY, VERIFY!



Pain Point #10 – Add-ons & Third-Party Products

- Know what they are
- Know what they're doing
- Recognize that they may be traversing:
 - Proxies
 - Firewalls
- May have their own authentication schemes
- Follow the failures

Striking the Balance

- Don't work against each other!
- Network Compression
 - Don't use application-layer compression
- Network Caching Devices
 - Don't use application-layer encryption
- Don't create new pain points
 - Local replica of directory may help
 - Simplify directory searches
- Verify/validate back-end performance regularly
- Be prepared to adjust!

Conclusions

- Know your data flow!
- Understand your network path
- Directories are key
- Keep abreast of changes
 - OS upgrades
 - Network appliances
 - NIC/BIOS drivers
- “Follow the failures” if trouble occurs
- Partner with your network team!

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