How domains fail
and what they cost

Gavin Brown, CentralNic
CentralNic is a domain registry
Been around since 1995
Runs 27 domain extensions
  .uk.com, .us.com et al
  .la since 2007
  New gTLDs in 2012
How domains fail

1. Technical
2. Financial
3. Legal
4. Criminal
5. Political
Insight

To ensure persistence of identifiers, we need solutions to these problems.
Technical

- Nameservers go offline
- Zone files are lost
- Errors in parent

These are mostly transient issues
Financial

- Domain isn't renewed
- Hosting isn't renewed

These are often permanent:
providing services costs money
(more on this later)
Legal

- Domain names are property
- Domain names can be sold
- Domain names can infringe trademarks
- Governments seize domains
- Governments censor the Internet
  - badly
Criminal

- DDoS attacks are scary
- Domain hijacking
- DNS spoofing

These are usually temporary, but can become permanent (eg Blue Security)
Political

- TLDs don't last for ever
- eg. .su, .yu
- The new gTLD program allows TLDs to fail
Economics

• Estimated global DNS query volume is \( \sim 3 \times 10^9 \) queries per day (\( \sim 3 \times 10^6 \) qps)

• Total data volume is \( \sim 2.6 \)TB per day

• gTLD registries have to maintain 100% availability
  • not one second downtime, ever!
Anycast

Anycast is deployed to meet load, ensure resilience and isolate faults to geographic areas.
Anycast

- Lots of sites, lots of servers
- Lots of redundancy
- Registries operate at 5-10% utilisation due to DDoS threats
Anycast

(source: root-servers.org)
Economics

In 2010, VeriSign announced Project Apollo, a $300 million project to expand capacity of the authoritative DNS system (ATLAS) for COM and NET. Builds on a previous investment of $100m in 2003.
Economics

- To provide a reliable global DNS service, the costs of providing the service need to be met.
- The business model that has been developed is based on rental of domain names.
- Economies of scale don’t always apply.