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Disruption and the DNS

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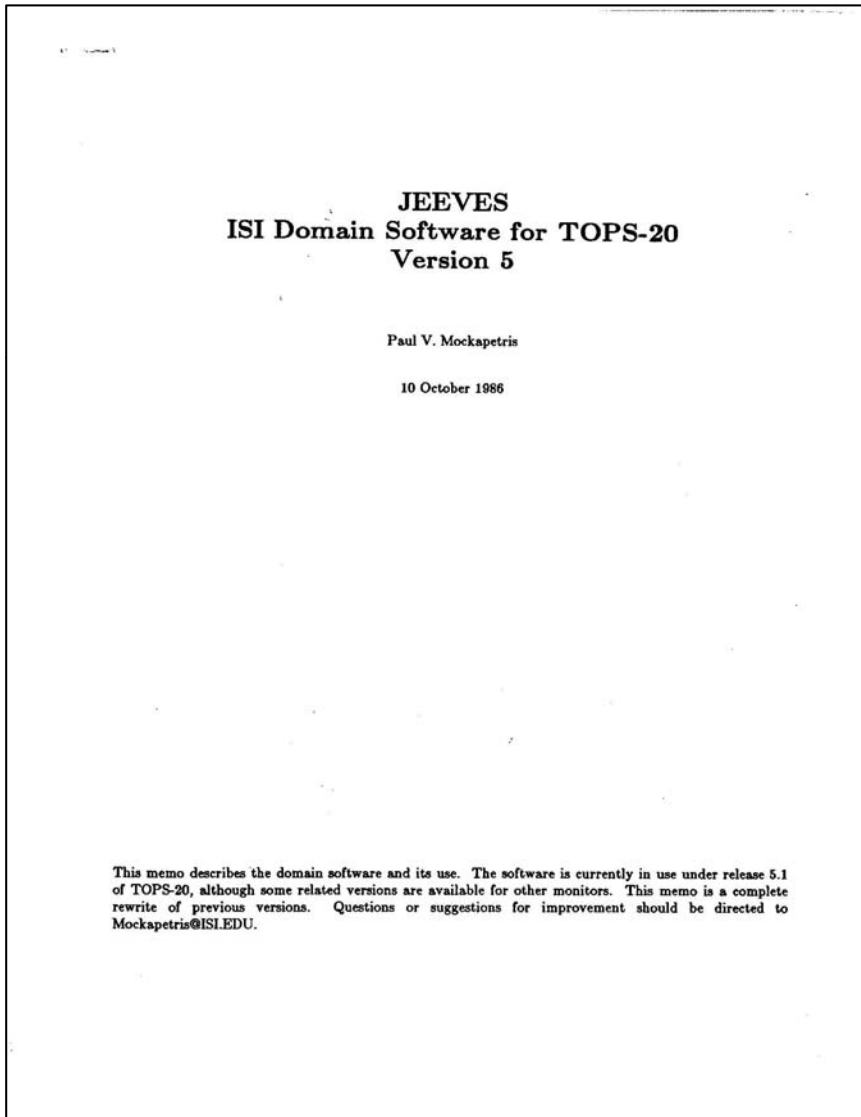
Thesis: We need more!

My Original Marching Orders from Jon Postel



1. Find something better than `hosts.txt`
2. Look at 5 or so proposals, find a compromise

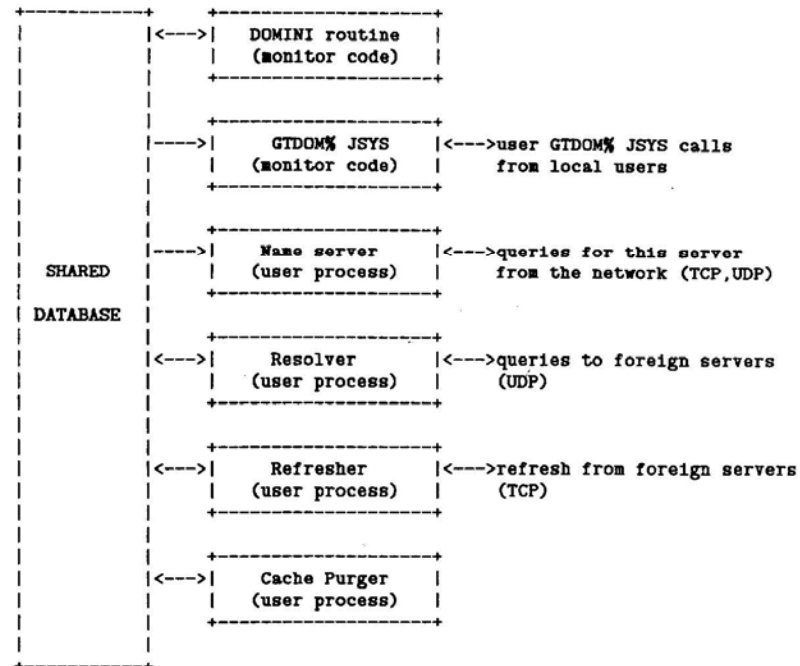
Root Server Progress



- 1984 redundant roots operational
- 1985 Symbolics.com
- 1986 documentation starts to appear
- Parallel progress in resolvers

Early Implementation Ideas

- Shared Memory Architecture
- No reparse to restart
- Separate upgrades of server functions



- But, zero interest in implementation standardization

What happened?



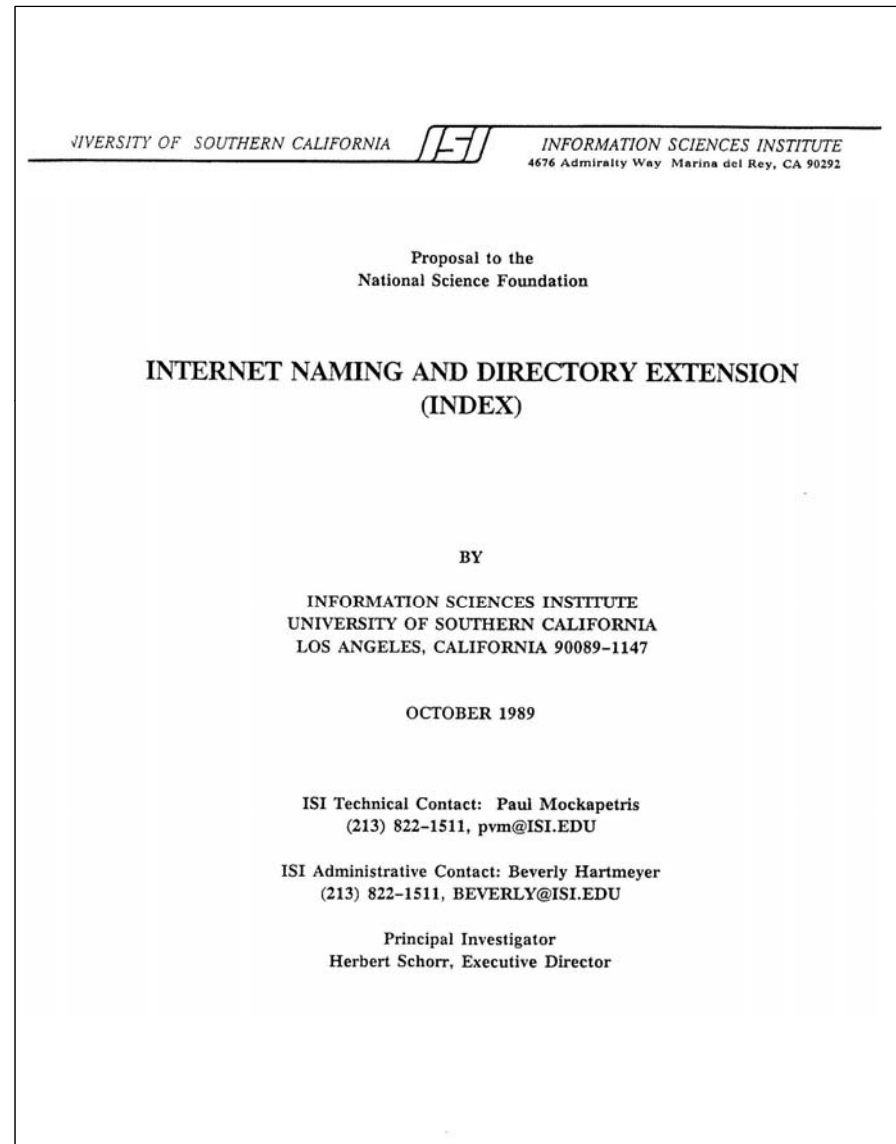
RFC 882/883

1. Little “DNA” from the original proposals
2. UDP and Server Redundancy recipe is novel
3. RFC 882 & 883 (1983) lead to small changes and 1034 & 1035 (1987)

Thank you ARPA for supporting ISI and UCB and ...

It's 1989 - NSF, Want to improve DNS?

- Propose:
 - Fix bind
 - Address
 - Incremental update
 - Security
 - Crawl and build a DNS index of the Internet
 - Abuse (accidental DDOS)



NSF feedback

- Reviewer 1: Excellent
- Reviewer 2: Very Good (critical, but not research)
- Reviewer 3: Very Good (please just fix bind)

- NSF Result: Can't decide

- So much for planned evolution...

But the fire was lit – DNS RFC family tree



1983 → Present

Google Search Results on PhD Theses



“Domain Name System
PhD Thesis”

2,110,000

“Transmission Control
Protocol PhD Thesis”

167,000

“Internet Protocol PhD
Thesis”

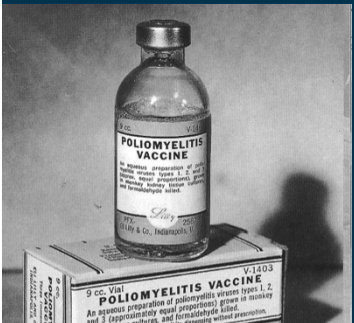
205,000

How about the Future?

Three places to Disrupt,

Eliminating the usual suspects

Other inventions and thoughts



DNS Basic Algorithms

- Initial algorithms were purposely minimal – We can afford more now!
 - Don't just go to the top and then down
 - Trust anchors
 - Don't defeat opportunistic caching everywhere
- Is there a way to kill backward compatibility?

Information Centric Networks

- In some ways a better DNS
 - Should it be considered as a replacement ?
- But has its own set of issues:
 - Replacing infrastructure means a IPv6-like timeline, so just layer and get over it
 - More research on name structures, less on hardware
 - Which ICN?
- Is there a way to blend?

ICANN Strategic Panel Recommendations

- ICANN to publish more signed data for reserved labels, etc.
- A study to define a vision for DNS in 2020
- Prototype open root publication
 - Several proposals, but get rid of addresses!
- Prototype shared zone control
 - “Bitcoin and Namecoin” for classical DNS
- Perform collision “fire drills”

(Some of these are decades old)

Algorithmic Contracts – a personal favorite

- Implement zone management using:
 - An accepted set of rules
 - Non-repudiable logs per delegation
 - No jurisdictional locus
 - One or more zone generators
- Extend to other applications
 - Number Portability
 - Contact Sharing
 - ...

Thank You!

