

# **DNS Capabilities**

**Sigcomm 2001 Outrageous Opinions**  
**August 30, 2001**

---

**Joe Touch**

***Director, Postel Center for  
Experimental Networking***  
**Computer Networks Division**  
**USC/ISI**

# DNS – basic uses

---

- Name to address lookup
  - Simpler to remember and type names
  - A level of indirection
  - Includes 1:many
- Address to name lookup
  - Less clear, esp. for many:many systems
- Name indirection

# Uses of the DNS

---

- Load balancing (RR)
- IPsec key exchange (KX)
- Security validation (PTR, in X.509, web)
- Service location (SRV)
- Orienteering (GPS records)

# Other *uses* of the DNS

---

- Forwarding
- Routing
- Code server (DeCSS)
- IP tunnel

# Some new DNS uses...

---

- In-addr as an *adder* (DNS calculator)
  - 3.4.add.calc -> 0.0.0.7
- calc.xbone.net
  - x.y.add.calc.xbone.net
  - x.y.mul.calc.xbone.net
- It's up ☺
  - for x,y in [0..99]

# Some protocol details

---

- Postfix notation
  - distribute to specialized processors (e.g., 3.sqrt.calc)
- Floating point
  - currently 8 digit decimal, 4.4 format
- Convenient constants by name (pi.calc, e.calc)
- Eventually:
  - Complex numbers encoded via CNAMEs
  - >32 bits via piecewise operations
  - Symbolic calculations

# Caveats

---

- Some forward lookups are tricky
  - Transcendentals may have long responses
- Reverse lookups are tricky
  - Return all equations that result in a value
- Makes DNS caches a little larger
  - But RAM is cheap, right?
  - Cache timeouts can be long (2+2 stays 4)

# What's next?

---

- Graphing DNS
  - Return plot files
- Random DNS
  - pink.noise.rand, white.noise.rand, normal.rand, etc.
- Magic 8-Ball DNS
  - yes\_definitely, you\_may\_rely\_on\_it, very\_doubtful
- Turing machine DNS
  - Request is input + code; response is output
- Solutions to NP-completes, *and...*



# Answer life's mysteries

---

- Omniscient DNS
  - No need for a new option/protocol number
    - It already knows whether you want it
  - Avoids pesky configuration
    - No need to communicate with other O-DNS's
  - Works through firewalls
    - It already knows the query is coming
  - Responses are brief
    - It knows you won't understand them anyway