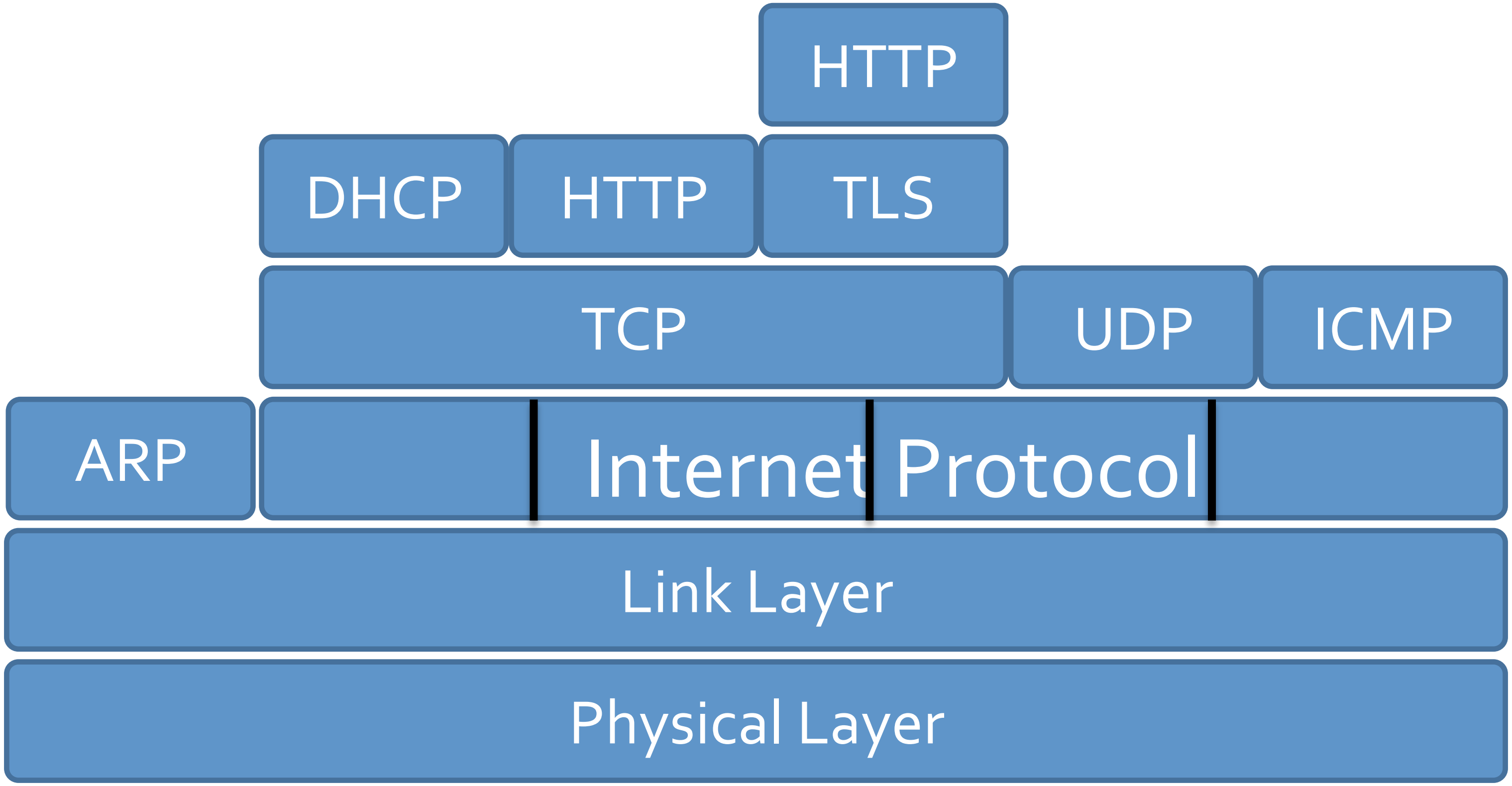
The Myth of Twelve More Bytes

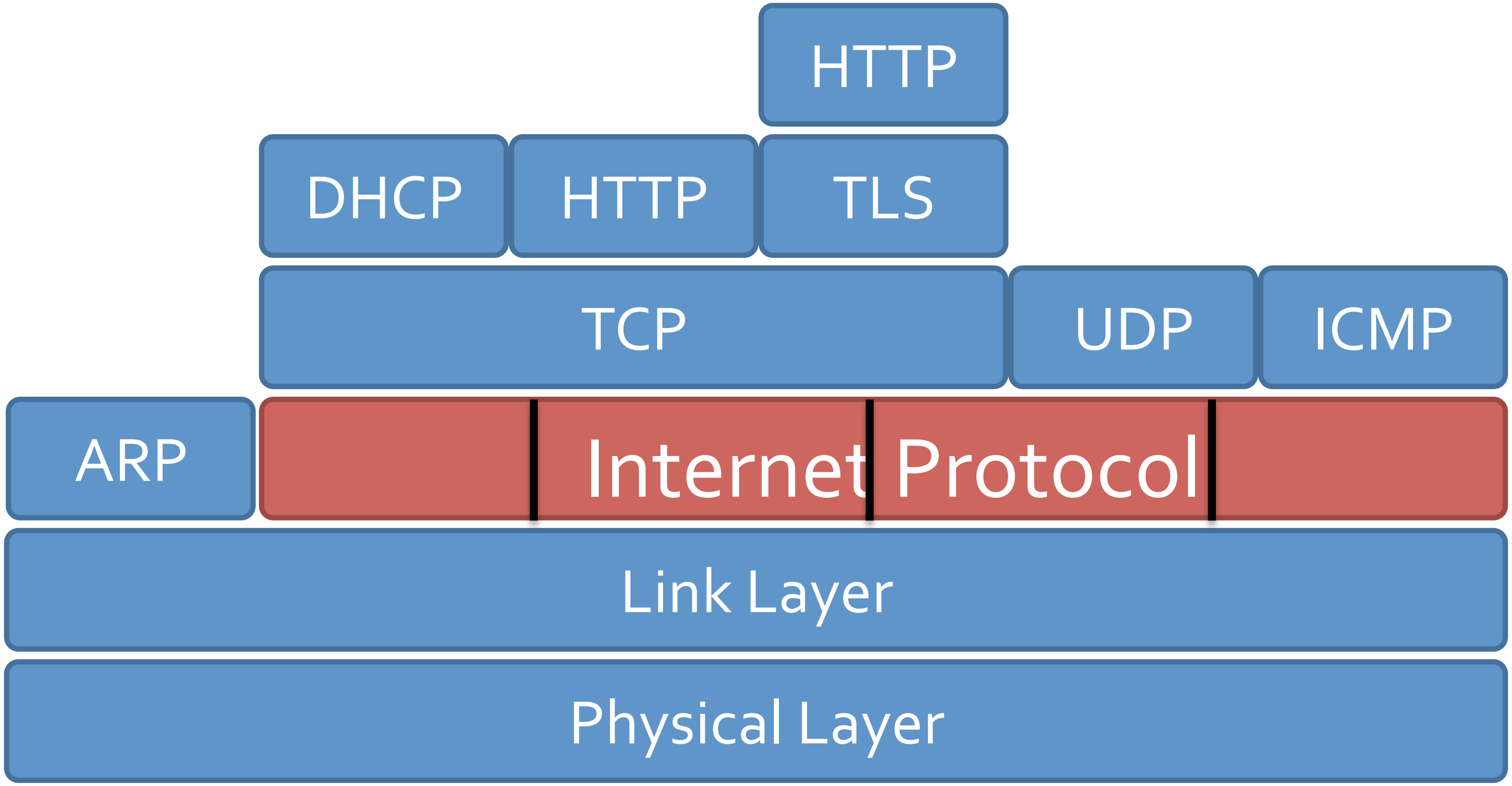
Security on the Post-Scarcity Internet

IPv6

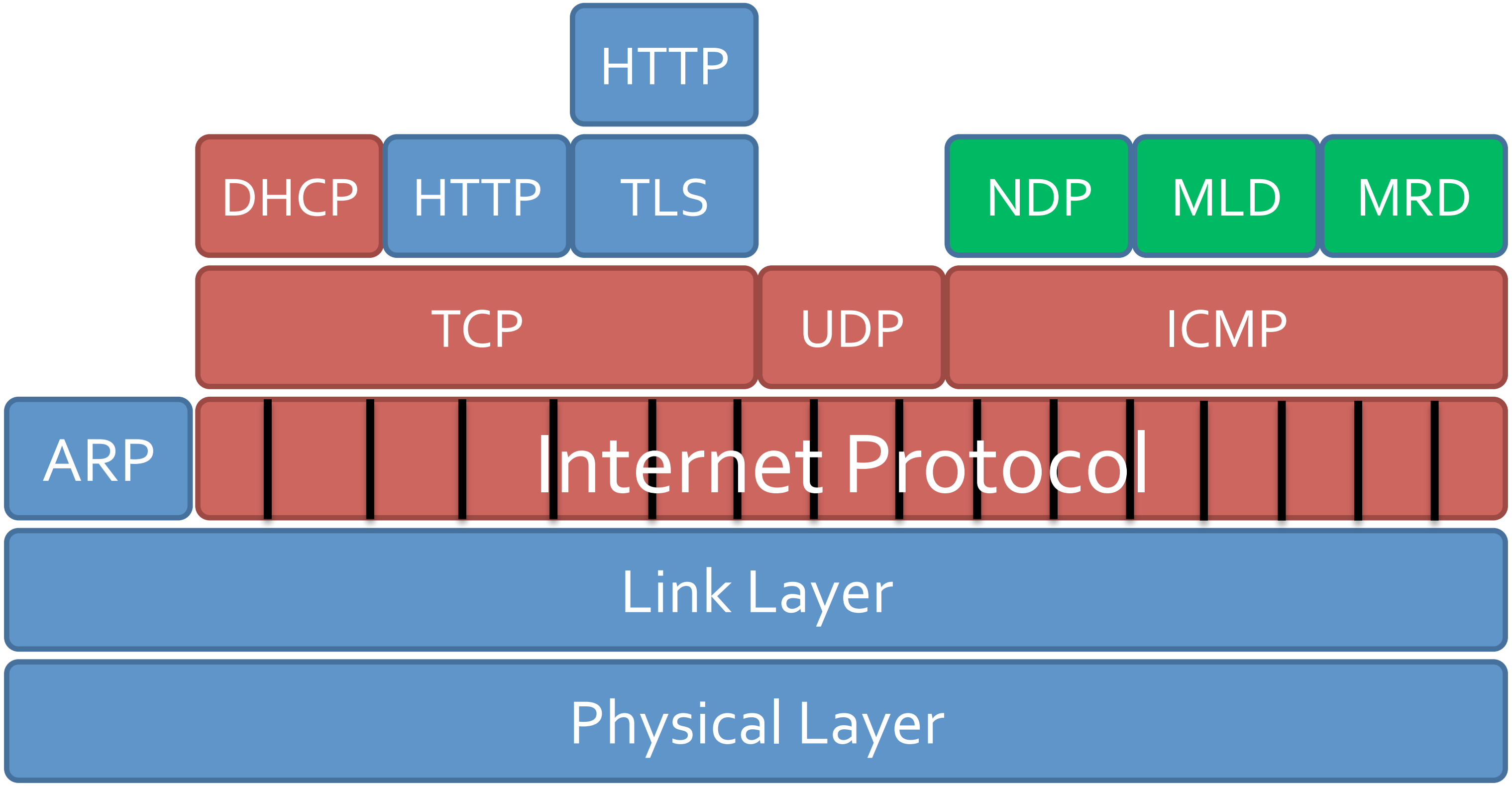
The Myth of 12 More Bytes



The Myth of 12 More Bytes



The Myth of 12 More Bytes



Come Join the Party

Stateless Address Auto-Configuration

- Give Yourself a local address in your subnet
  - Prefix: fe80:0:0:0: :
  - IPv6 Address: fe80::f03c:91ff:fe96:d927
- Ask what network you're in
  - example: 2600:3c03::
- Take your MAC Address, use it in the prefix
  - MAC: f2:3c:91:96:d9:27
  - IPv6 Address: 2600:3c03::f03c:91ff:fe96:d927

Privacy Addresses

- Using your MAC in the last 64 bits identifies you, globally, to every website you visit, no matter where you are
- Super-Mega Evercookie

- RFC 4941 Privacy Addresses
  - Generate a random /64 address
  - Prefer it for outgoing communications

DHCPv6

- Conceptually the same as DHCP
- Clients can get more than IP Address
- Can also get DNS Servers

The Default For Windows

Don’t Know, Need to Fill in:

Getting an Address

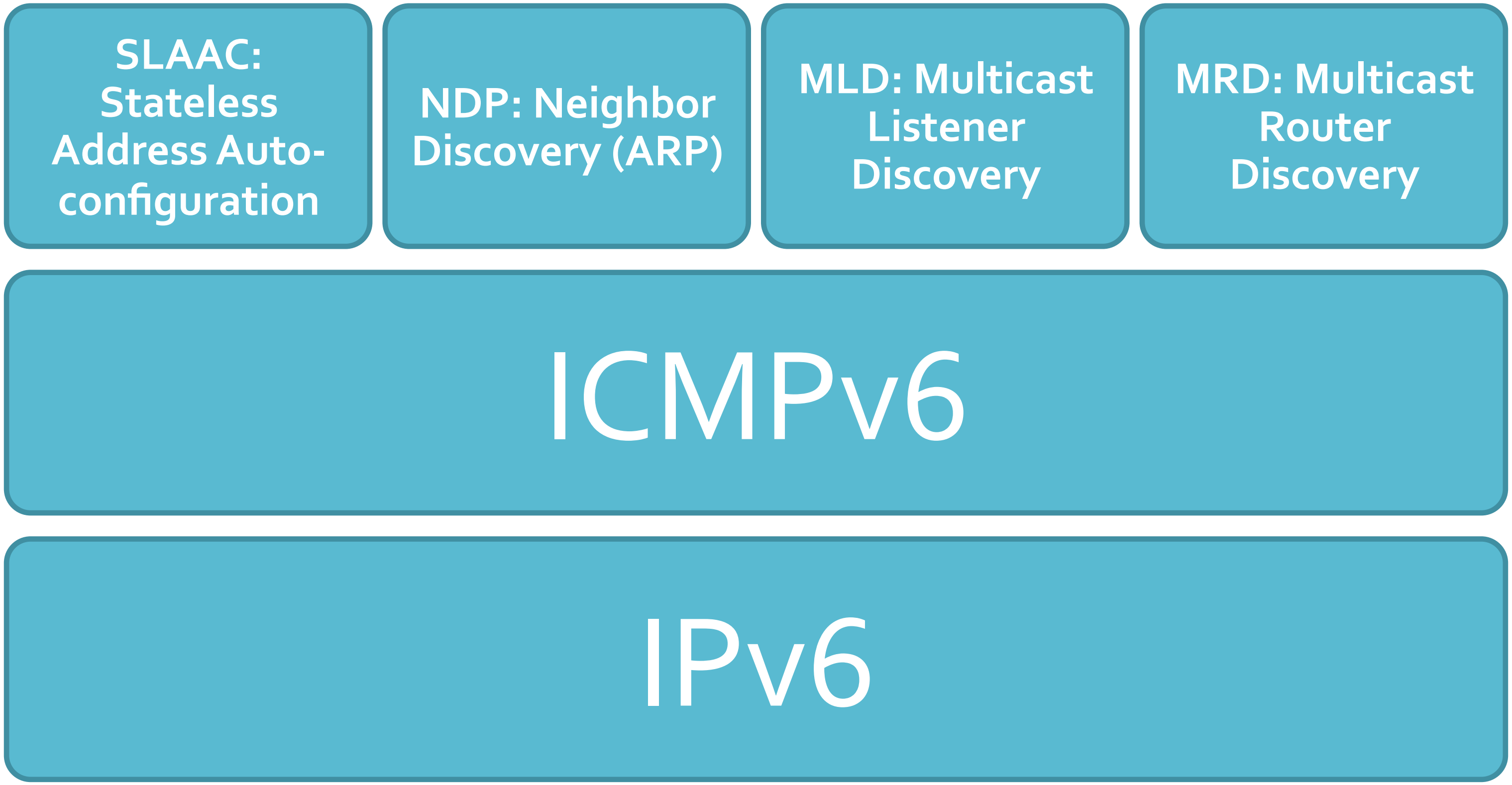
- SLAAC?
- DHCPv6 or Both?

DNS Servers

- RDNSS in NDP?
- Or DHCPv6?

ICMPv6

Critical Infrastructure



SLAAC: Stateless Address Auto-configuration

NDP: Neighbor Discovery (ARP)

MLD: Multicast Listener Discovery

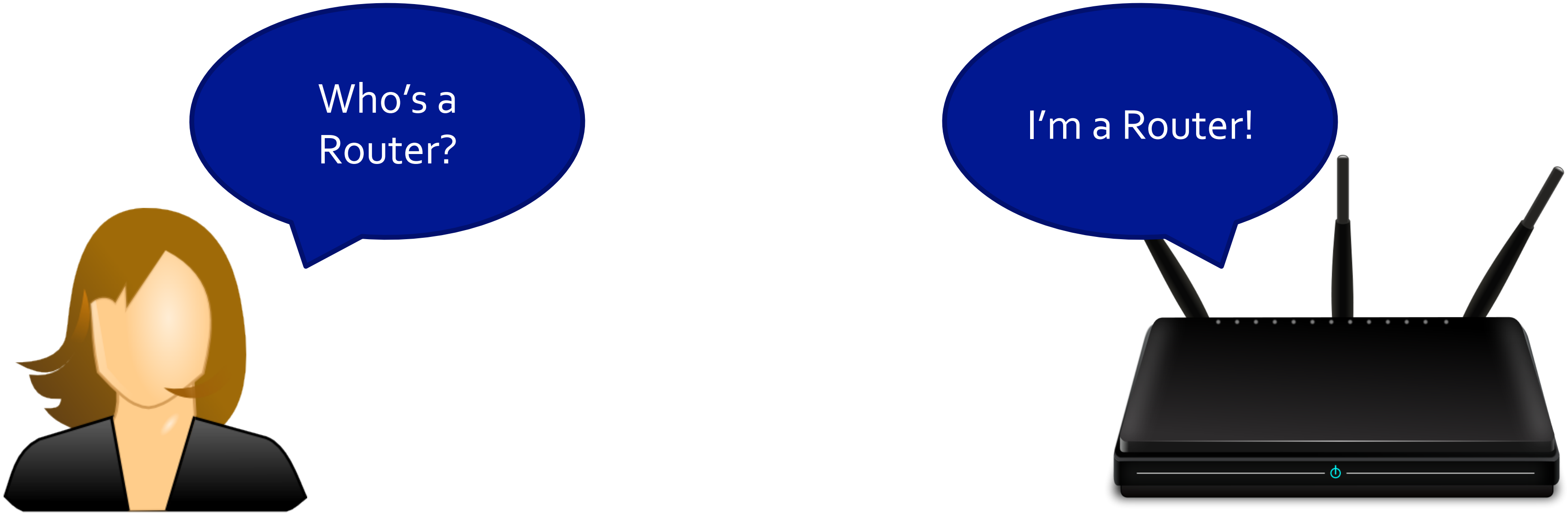
MRD: Multicast Router Discovery

ICMPv6

IPv6

ICMPv6 Protocols

Router Discovery

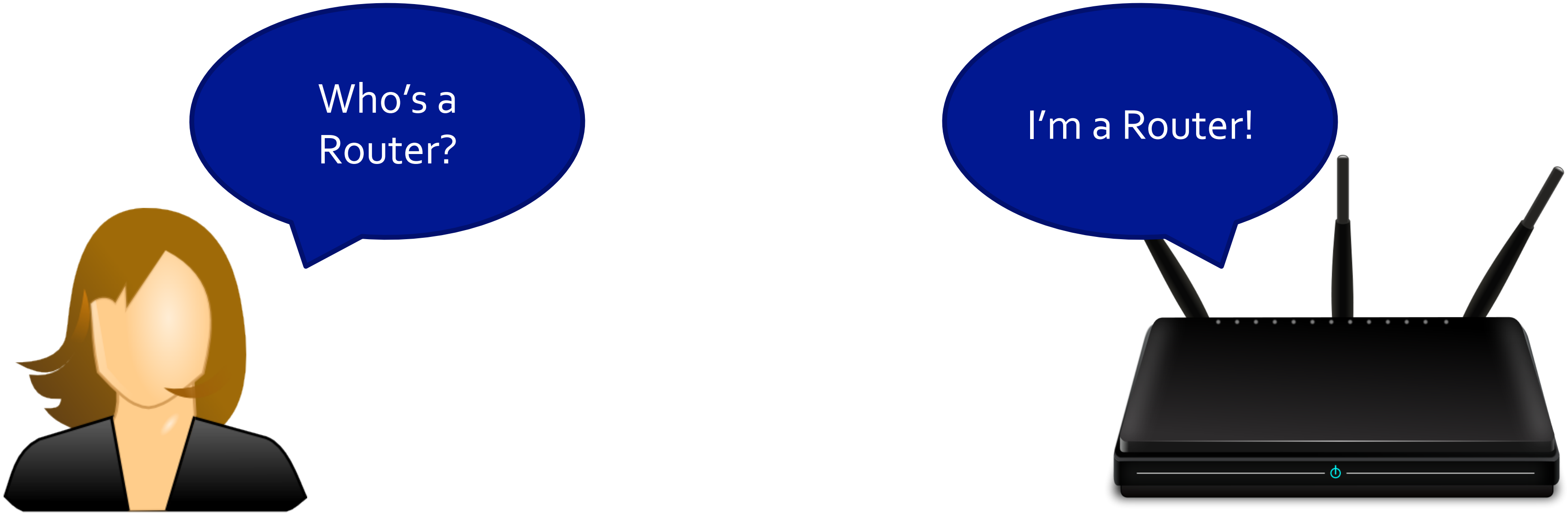


New Protocols
New Protocol Vulnerabilities

(Same Tactics)

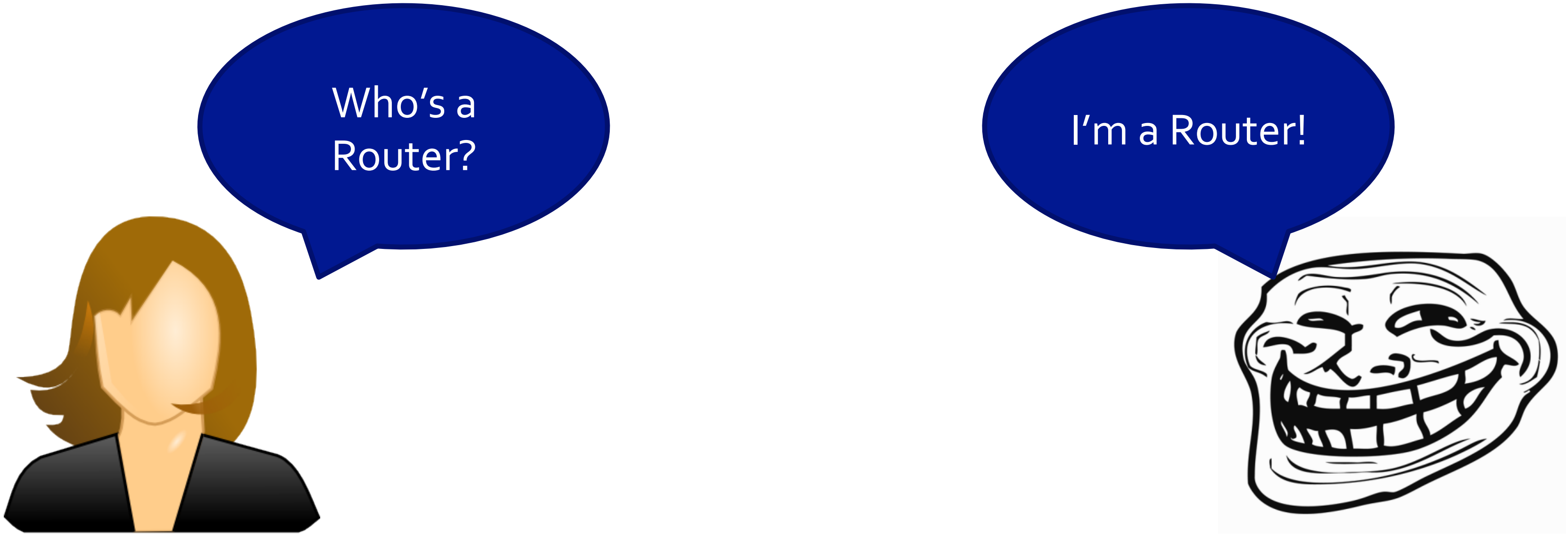
NDP

Router Discovery



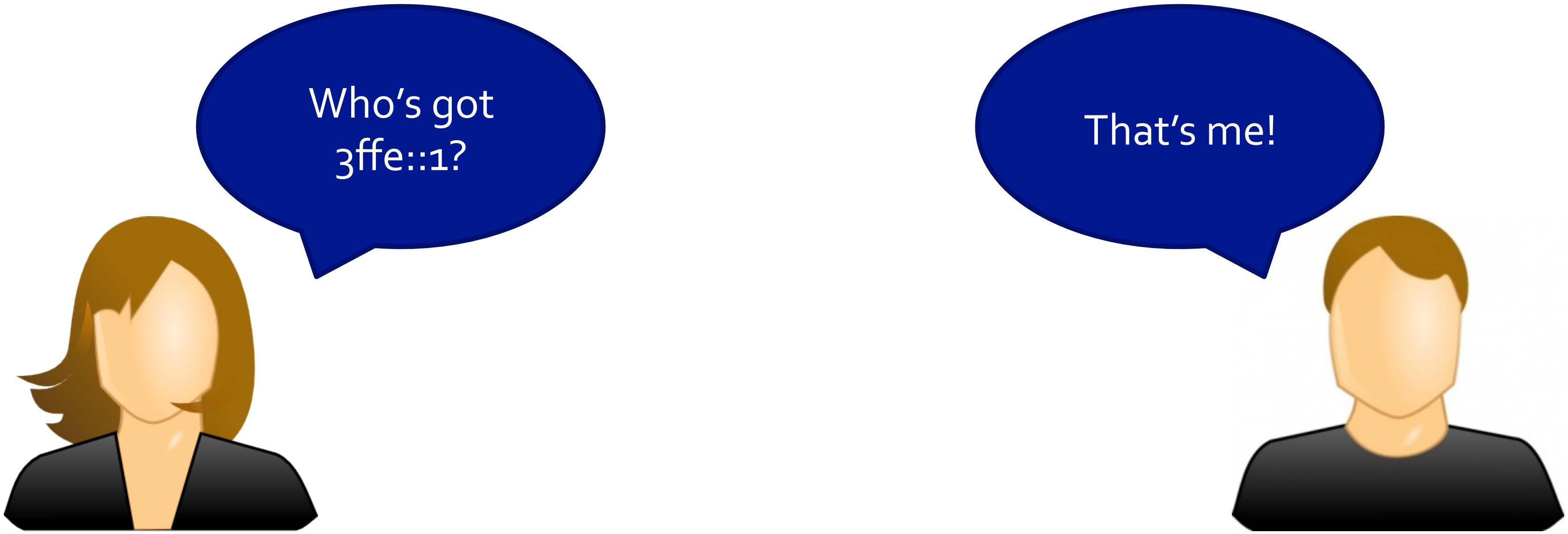
NDP

Router Discovery



NDP

Router Discovery

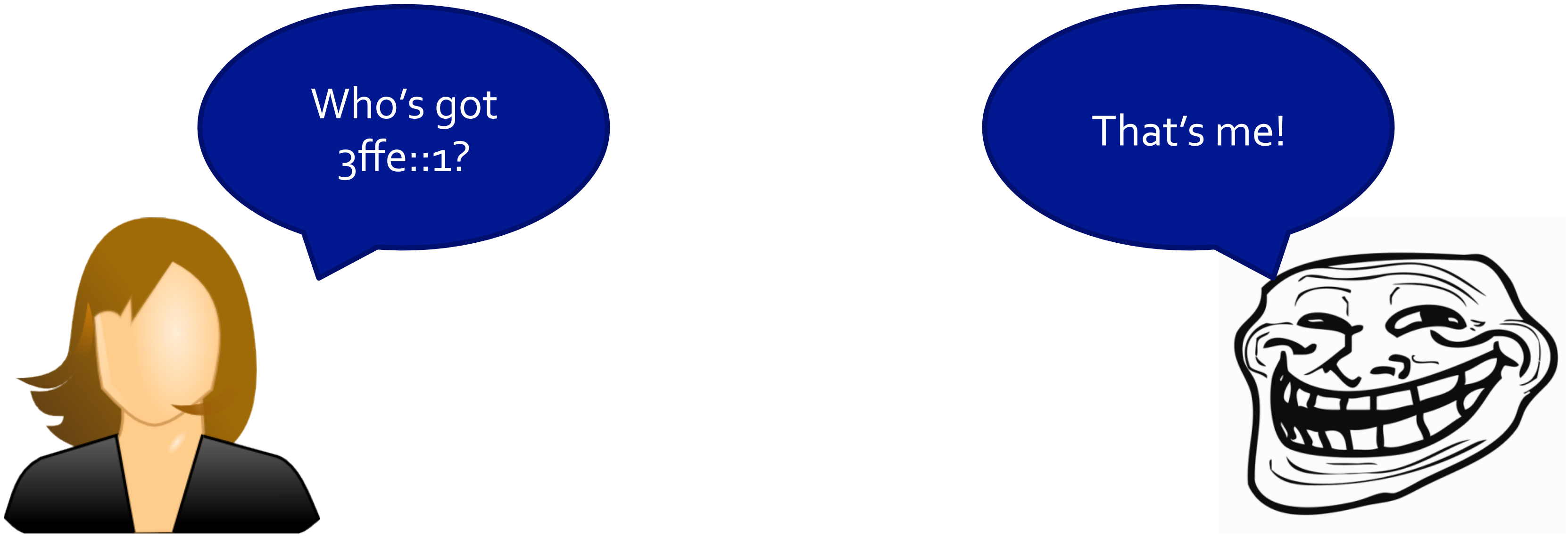


Who’s got 3ffe::1?

That’s me!

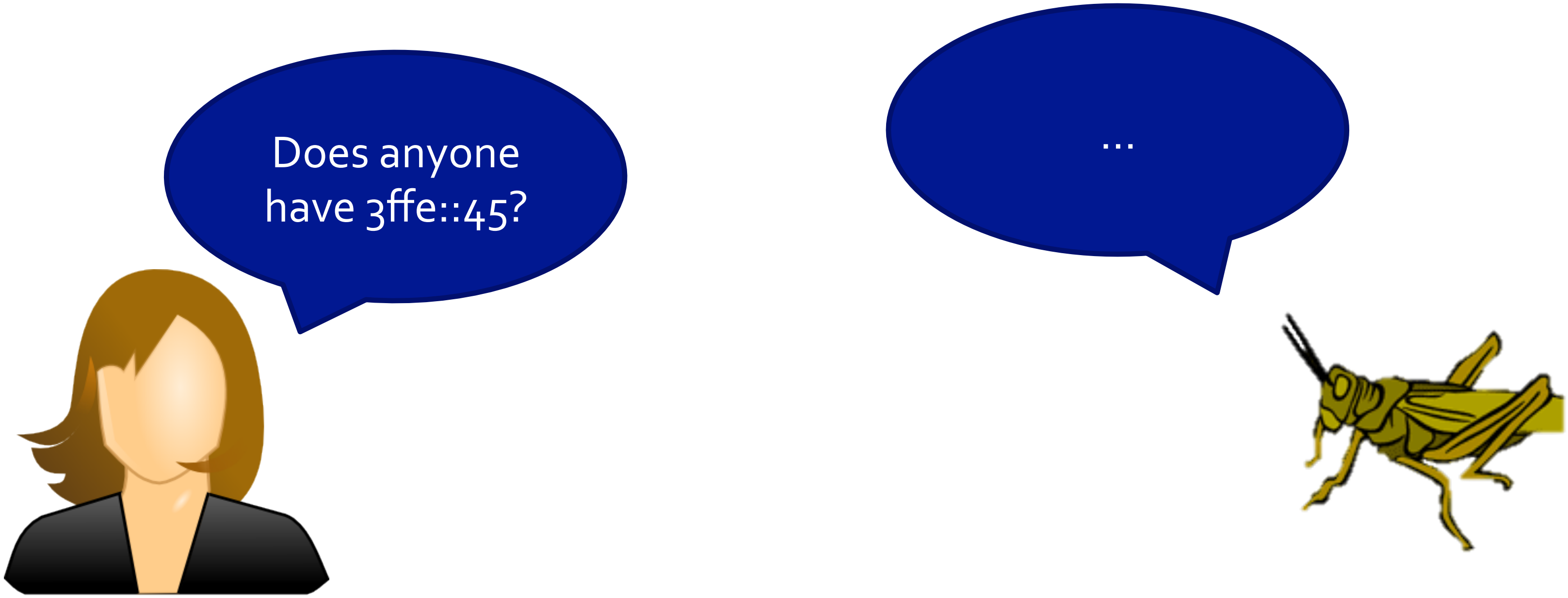
NDP

NDP Spoofing is the New ARP Spoofing



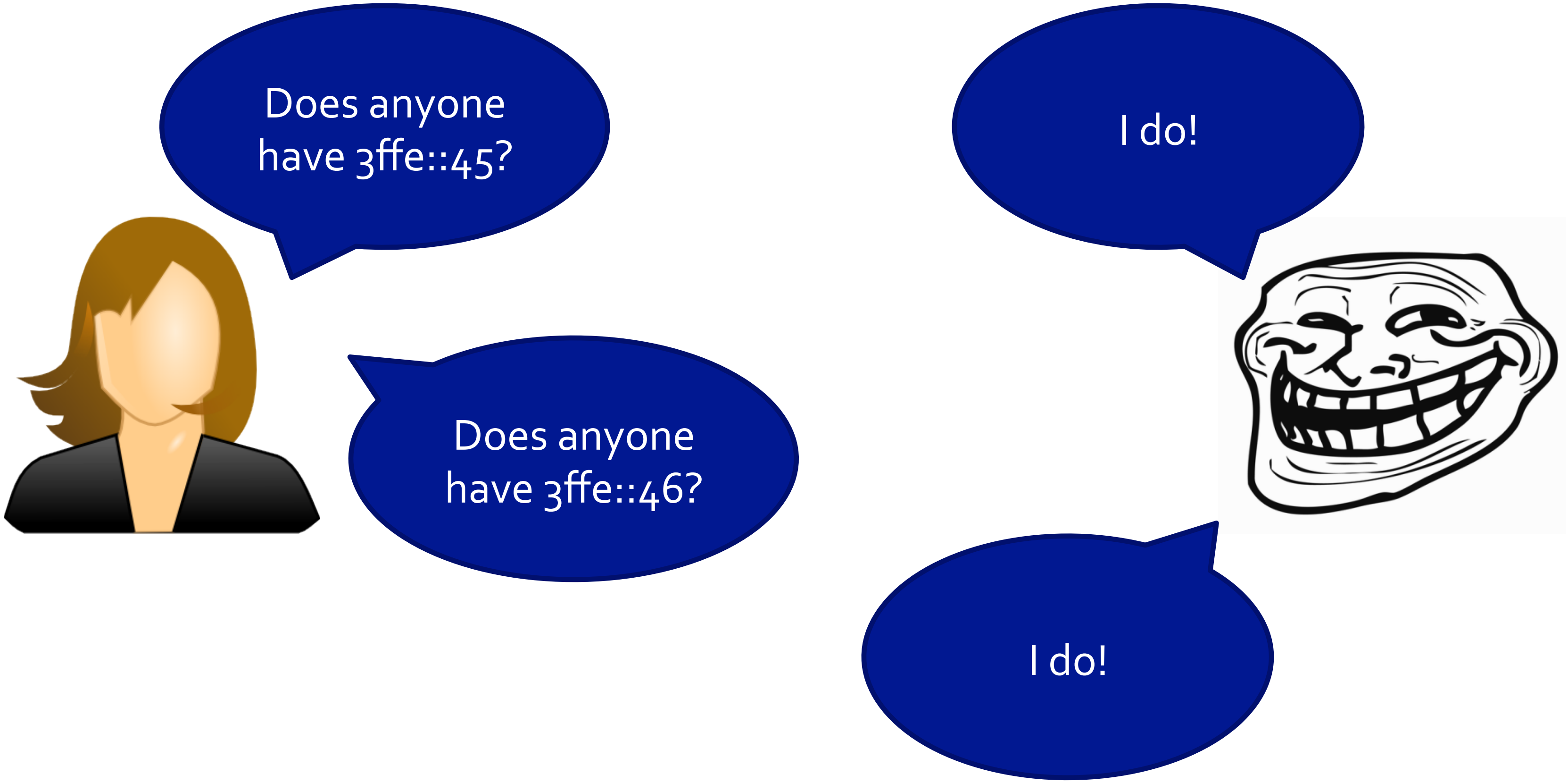
ICMPv6 Protocols

Duplicate Address Detection



ICMPv6 Protocols

Router Discovery



Does anyone have 3ffe::45?

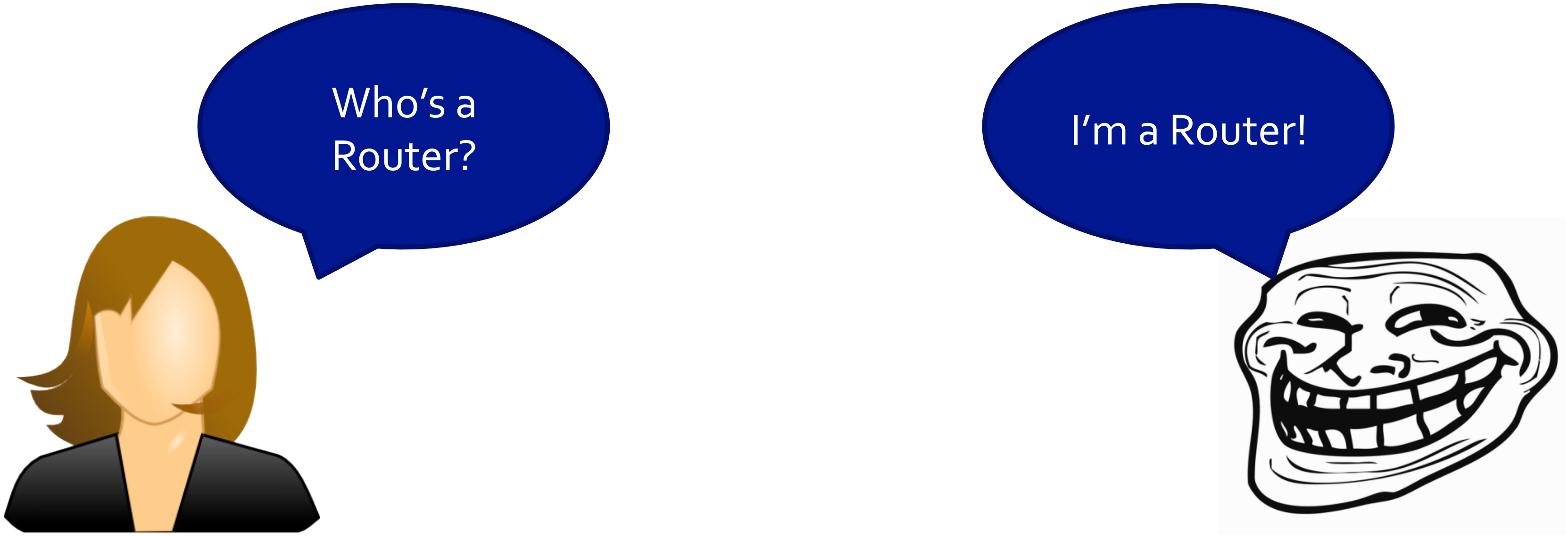
I do!

Does anyone have 3ffe::46?

I do!

ICMPv6 Protocols

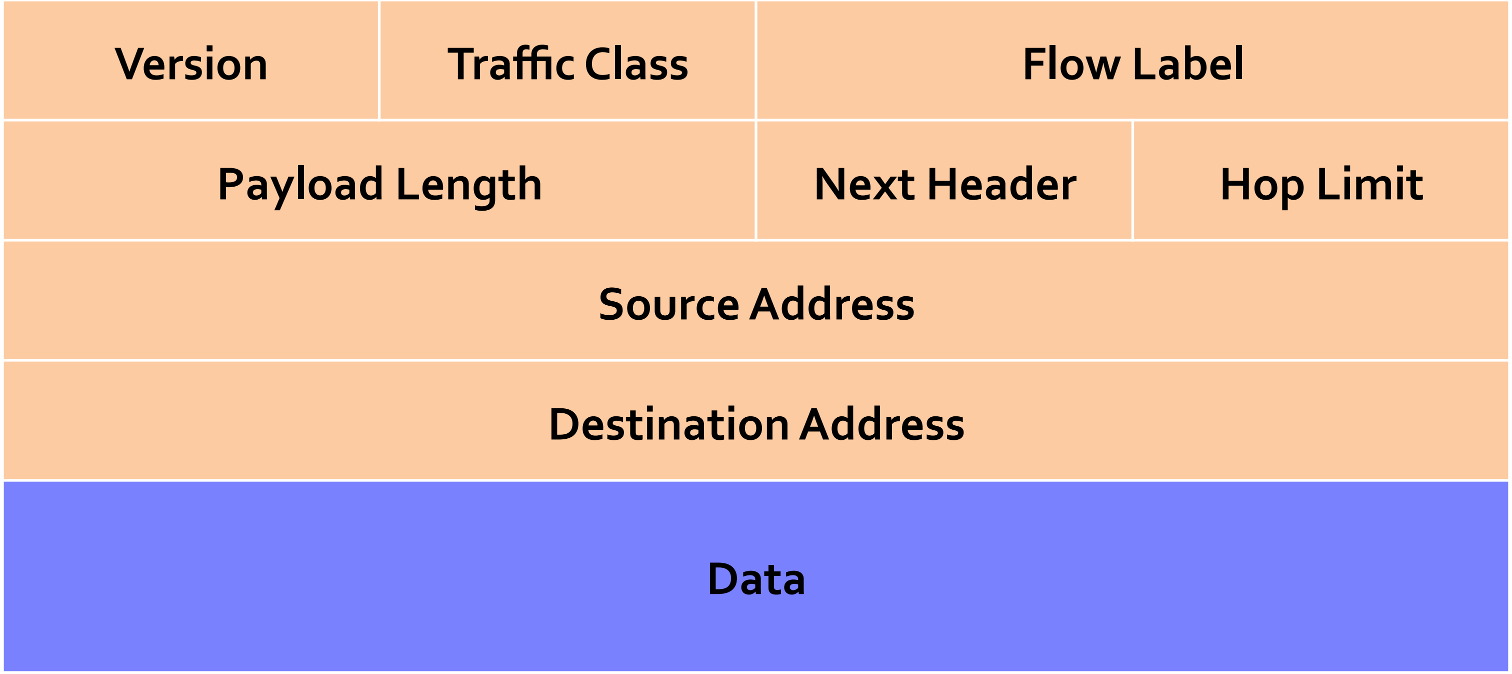
Duplicate Address Detection



Extension Headers

Pain in the Firewall

IPv6 Packet Format



Version

Traffic Class

Flow Label

Payload Length

Next Header

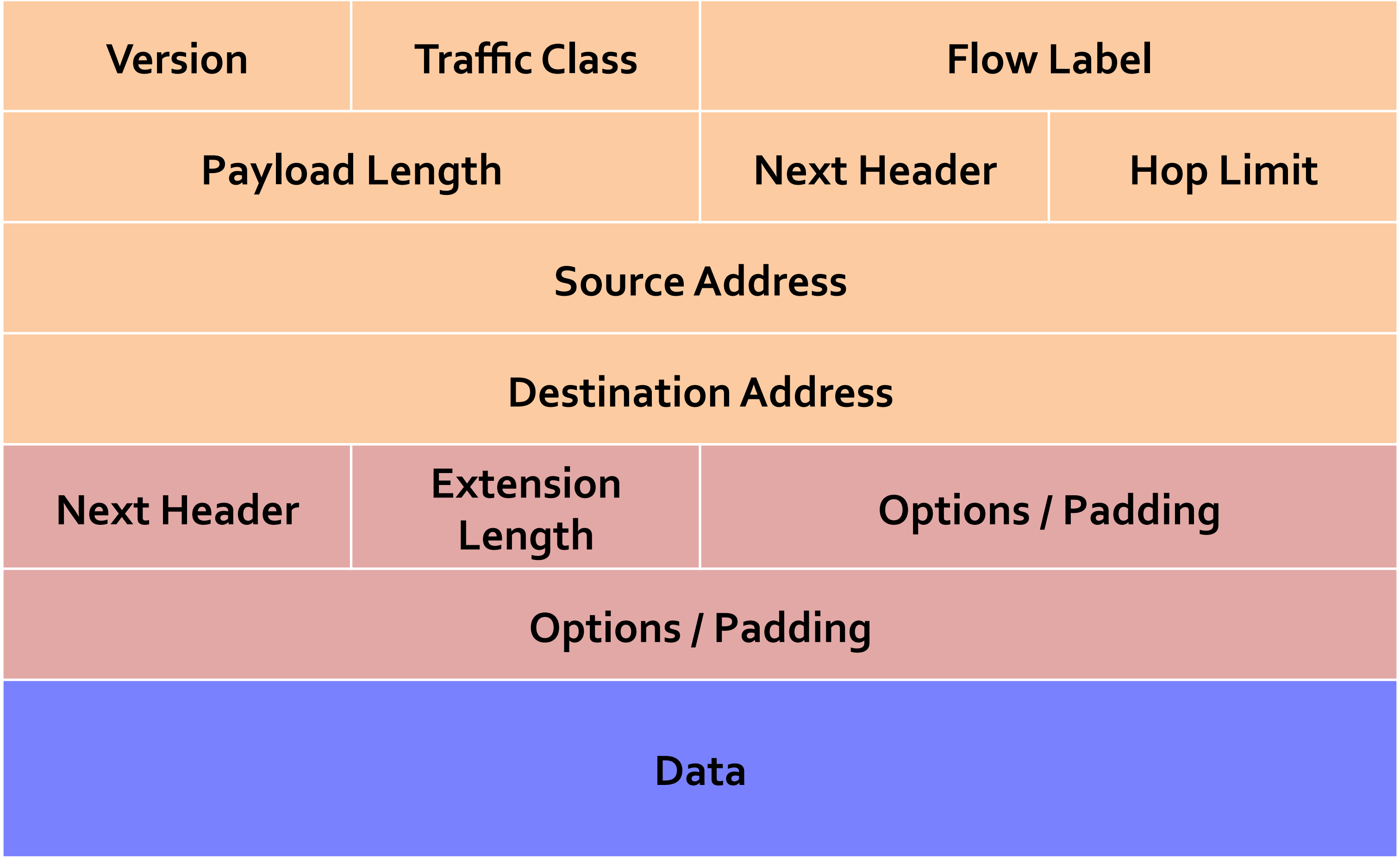
Hop Limit

Source Address

Destination Address

Data

IPv6 Packet Format



Version | Traffic Class | Flow Label

Payload Length | Next Header | Hop Limit

Source Address

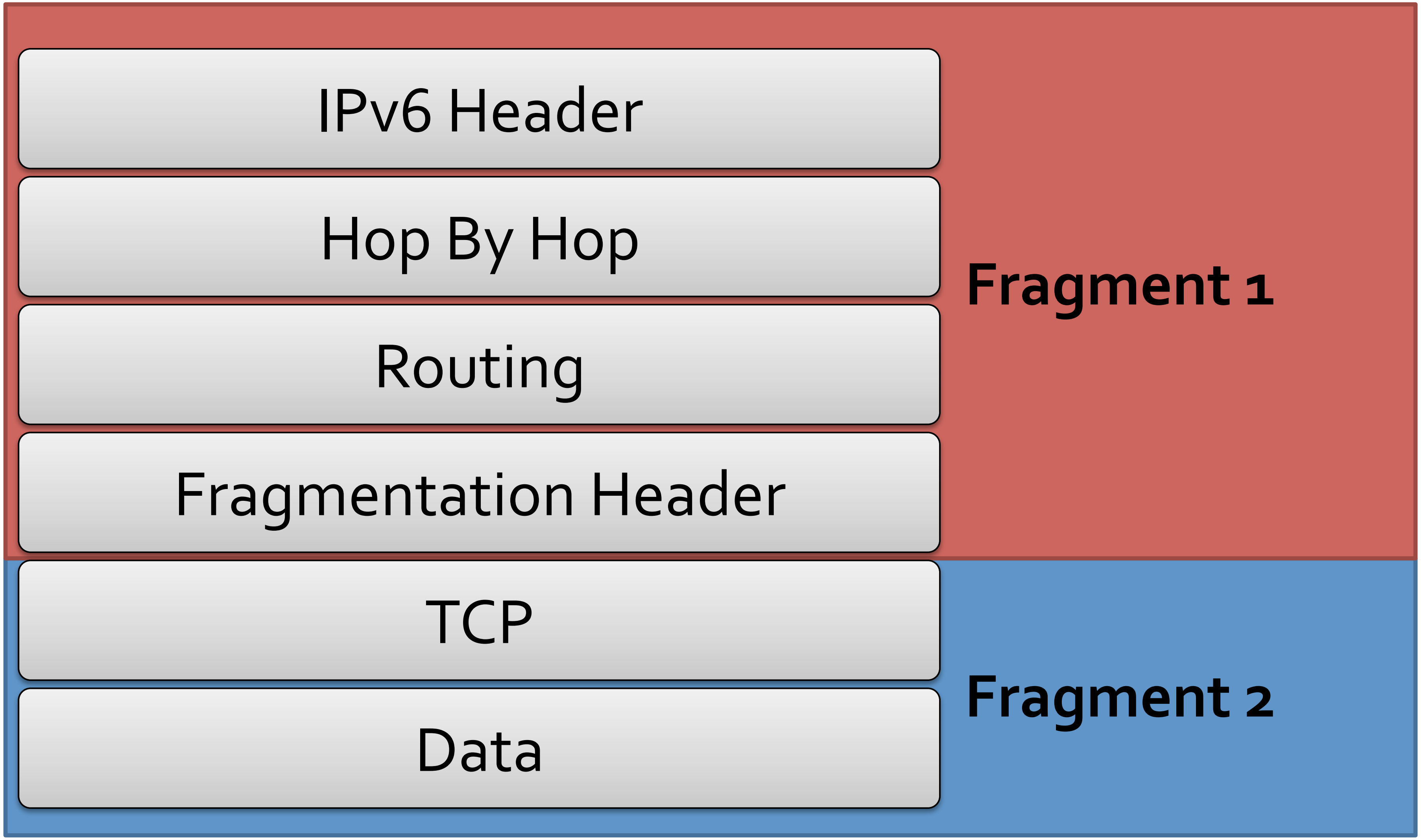
Destination Address

Next Header | Extension Length | Options / Padding

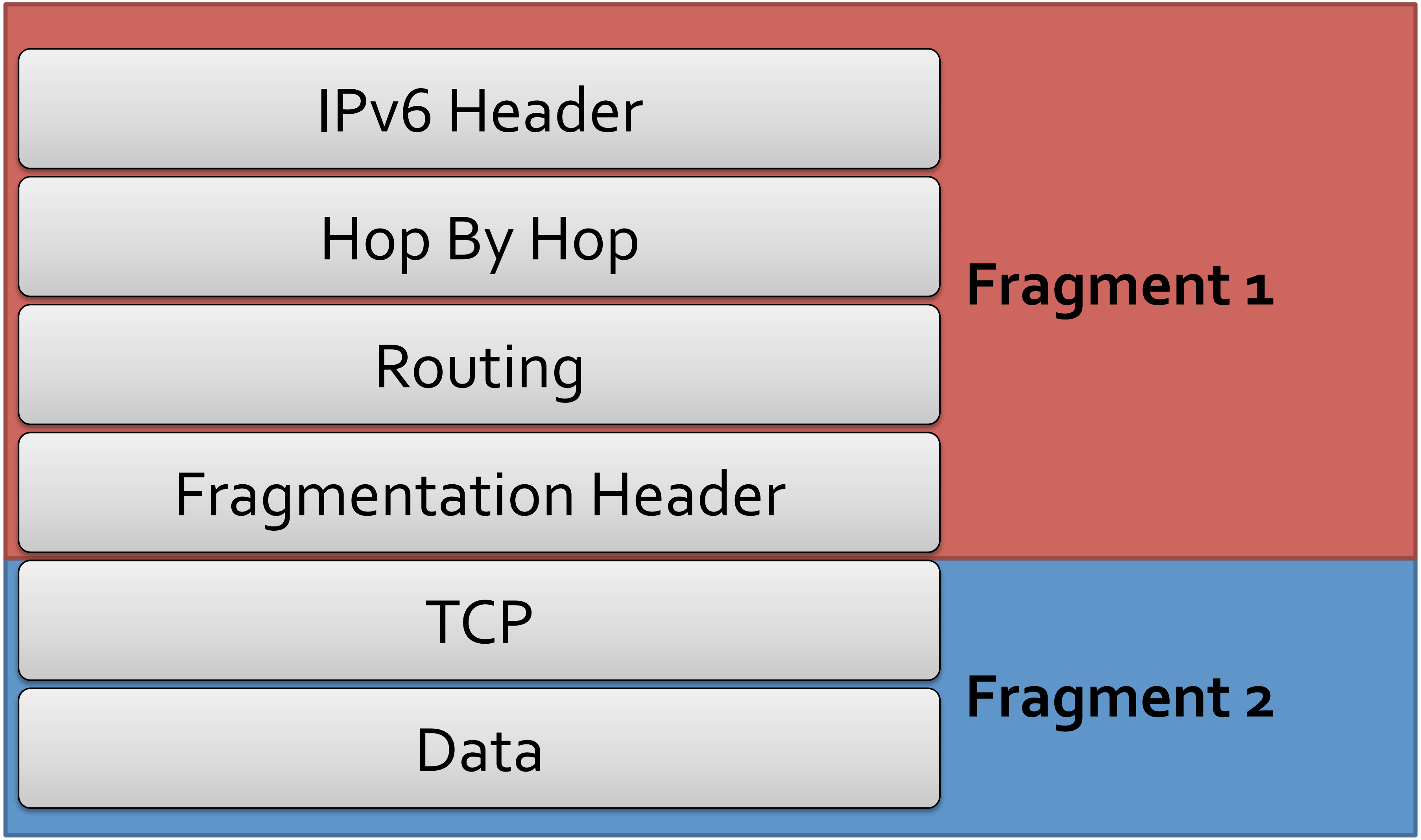
Options / Padding

Data

Extension Headers + Fragmentation



Stateless Filtering is Impossible



IPv6 Header

Hop By Hop

Routing

Fragmentation Header

TCP

Data

Fragment 1

Fragment 2

Translation & Transition Mechanisms

They’re Such Nice Guys.

Translation & Transition

Transition

IPv6 Island

|

IPv4 Internet

|

IPv6 Island

Translation

IPv6 < -- > IPv4

Transition

6to4

IPv6 Island to IPv4 Network to IPv6 Island

Relies on Nice people to run border routers

6rd or IPv6 Rapid Deployment

6to4 but instead of nice people, it’s an ISP running it, applicable only to their customers

Teredo

Host supporting IPv6 sits on an IPv4 Network

Magic NAT-punching IPv6 –in-IPv4 to a Teredo Service Provider (Can be open, can be paid)

Allows an IPv6 Server to sit in an IPv4 Network

ISATAP

Host supporting IPv6 sits on an IPv4 Network

Can talk to IPv6 Internet, but not the reverse IPv6

Translation

NAT-PT

- Old, Deprecated
- IPv4 or 6 Clients to IPv6 or 4 Servers
- Has External IPv4 addresses for Internal IPv6 Servers
- Breaks a lot of stuff

NAT64

- IPv6 Clients to IPv4 Servers
- Fakes a IPv6 Address for the IPv4 Server
- I talk to the NAT64 device, it forwards to IPv4

And More

Time Limits =(

IPv6 Enumeration Mechanisms

Internet-Based	
MAC Address Guessing using OUI	24-26 Bits
Sequential Address (DHCPv6 or Sysadmin)	8-16 bits
Reverse Mapping ip6.arpa	Very Efficient
Limited to Local Network	
Multicast Echo nmap	0 Bits
ICMPv6 Parameter Problem nmap	0 Bits
Multicast Listener Discovery nmap	0 Bits
SLAAC Fake-out nmap	0 Bits

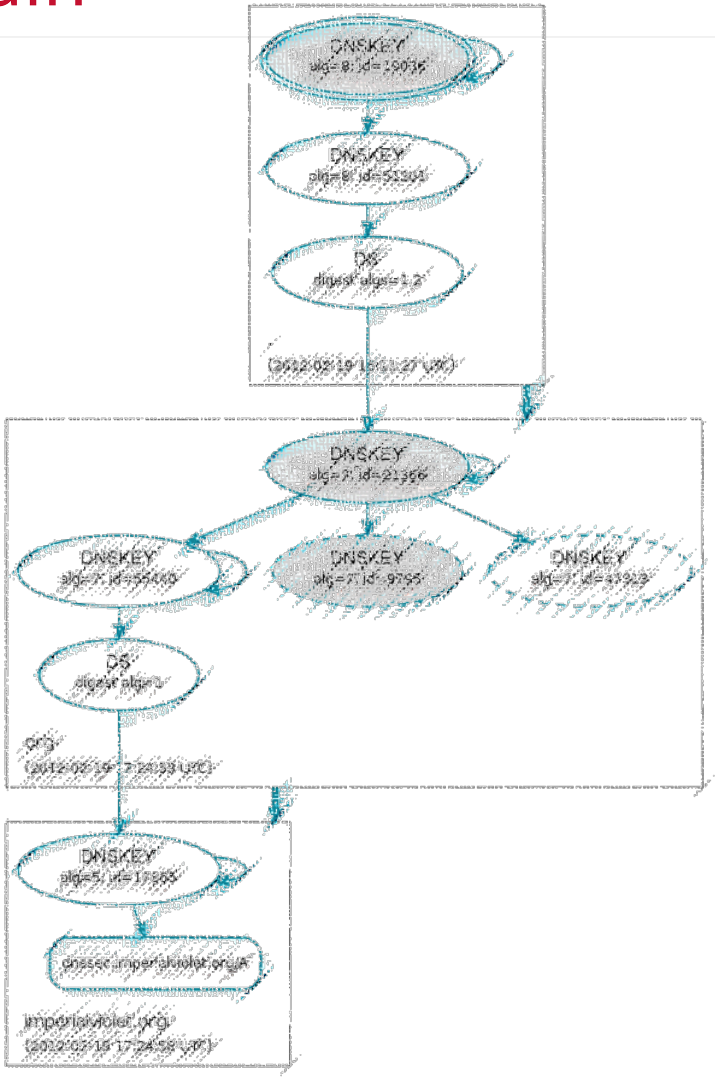
Remember to Remove the Things We're Actually Talking About

- **Multicast!**
  - Listener Discovery
  - Listener Enumeration
  - Router Discovery
  - Router Enumeration
- **Node Querying**
- **UDP/TCP Checksum Calculation**
- **Transition Mechanisms**
  - 6to4
  - 6rd
  - 4rd
  - Teredo
  - ISATAP
  - 6in4
  - 6over4

- **Address Autoconfirguarion – SLAAC**
- **Neighbor Discovery Protocol**
- **Duplicate Address Detection**
- **Router, DHCP, and DNS Discovery**
- **Redirection**
- **SeND**
- **New Features in DHCPv6**

DNS(SEC)

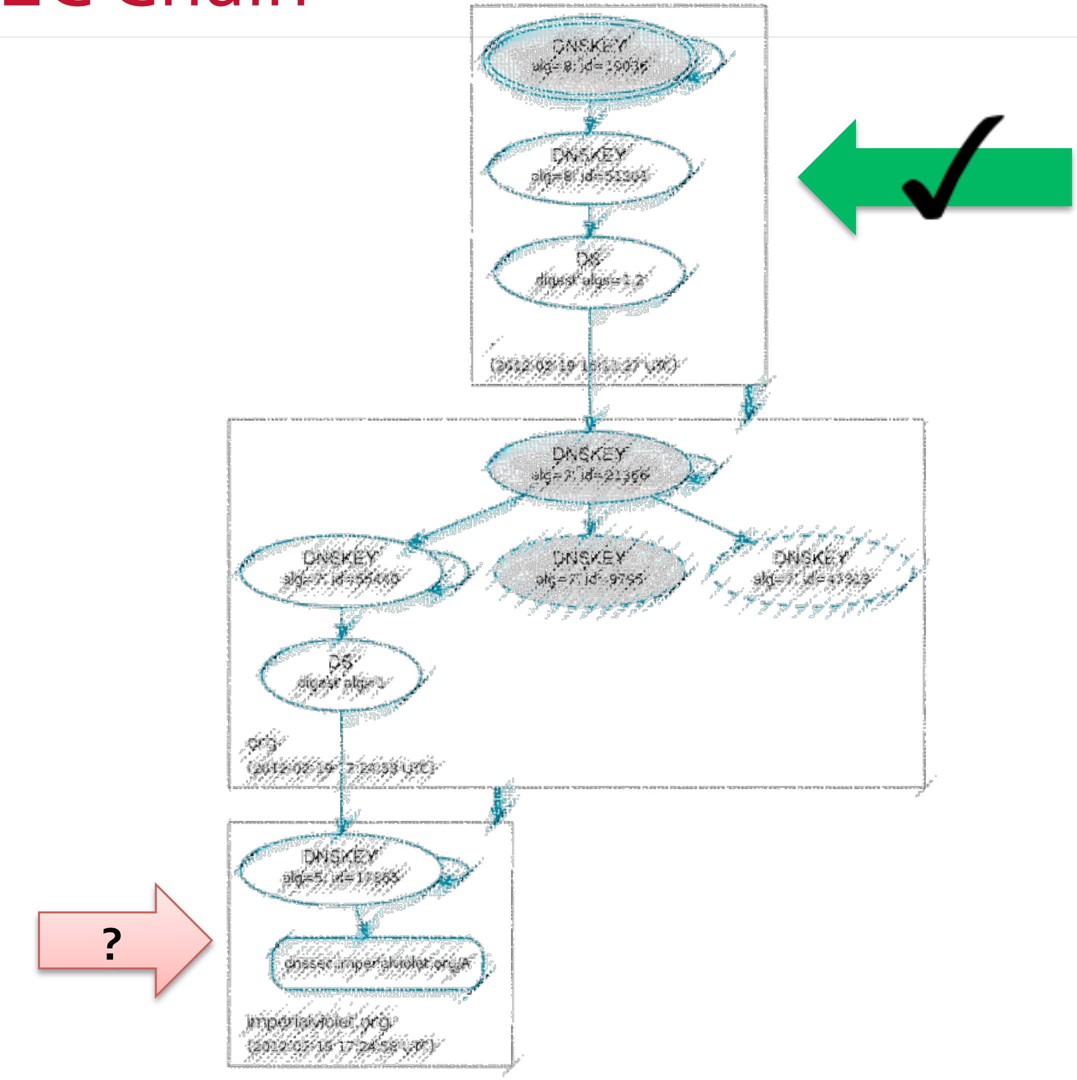
DNSSEC Chain



att.com

?

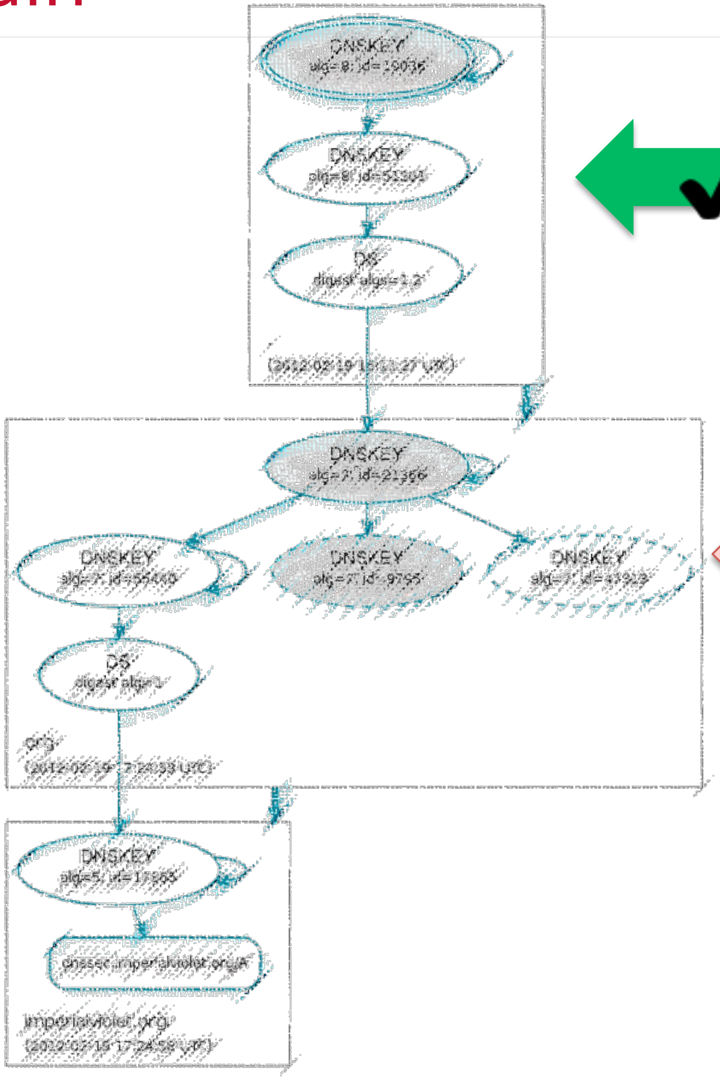
DNSSEC Chain



ICANN

att.com

DNSSEC Chain

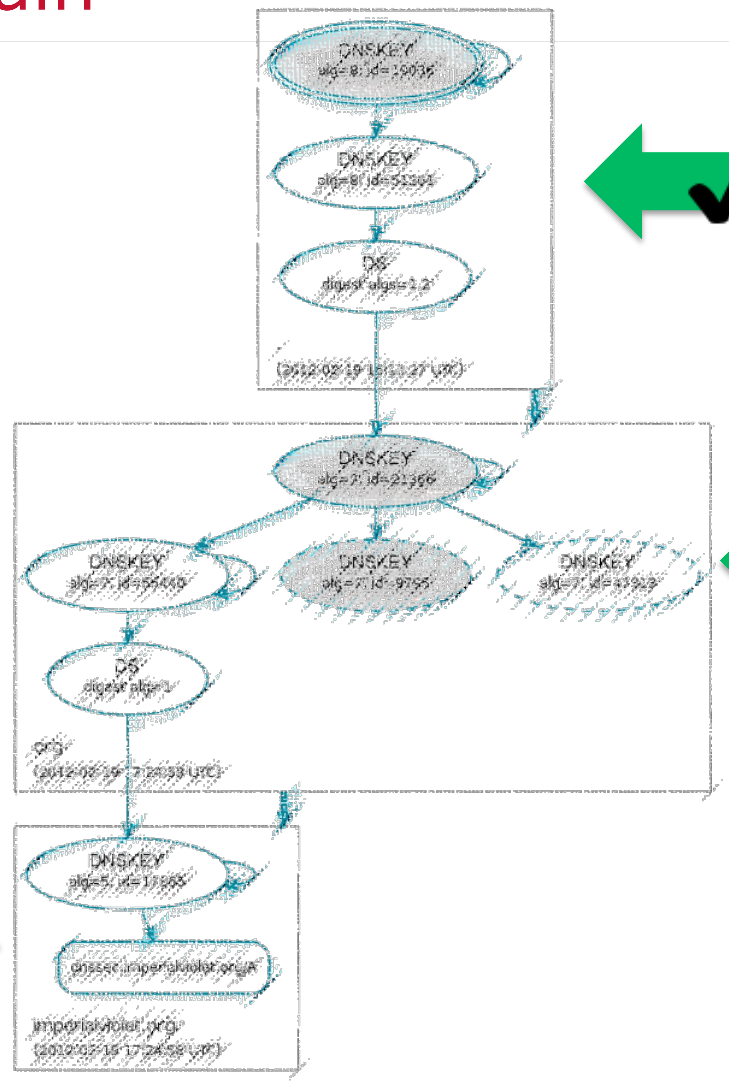


✓ ICANN

? .com
Verisign

att.com ?

DNSSEC Chain

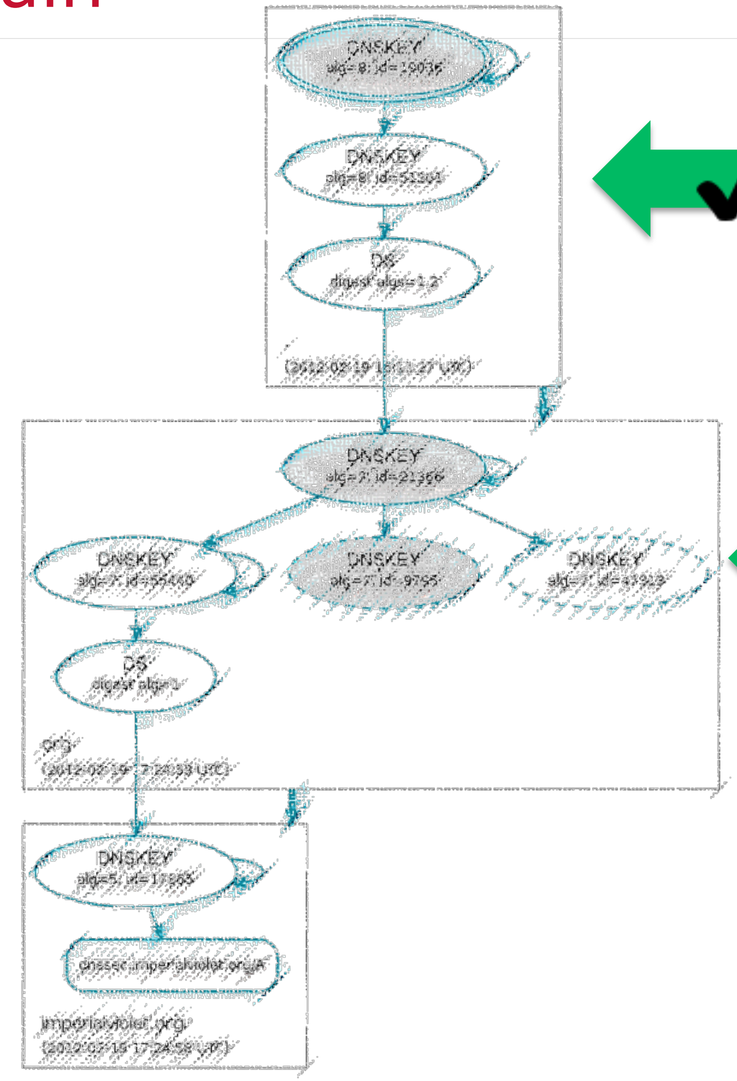


✓ ICANN

✓ .com
Verisign

att.com ?

DNSSEC Chain



✓ ICANN

✓ .com Verisign

att.com ✓

Everything Is Signed

```
$ dig +dnssec nic.cz +short
217.31.205.50
A 5 2 1800 20120719160302 20120705160302
40844 nic.cz.
IWGHqGORGO0jh4UuZnwx1P2qoCGYDOcHLhJBIQVJm
h6+0Fskr6Sh2dgj
E6BHQJQJ9HuzSDCHOvJkH98QkK4ZUgMCLSN5DHuVc
mJ/J/g5VMjeWS3i
NmLQVmcvpizwfYVo7cuCg1OteazB2QH7JRp+/KhR+Q
+P8tNpDZKe2kEN VMQ=
```

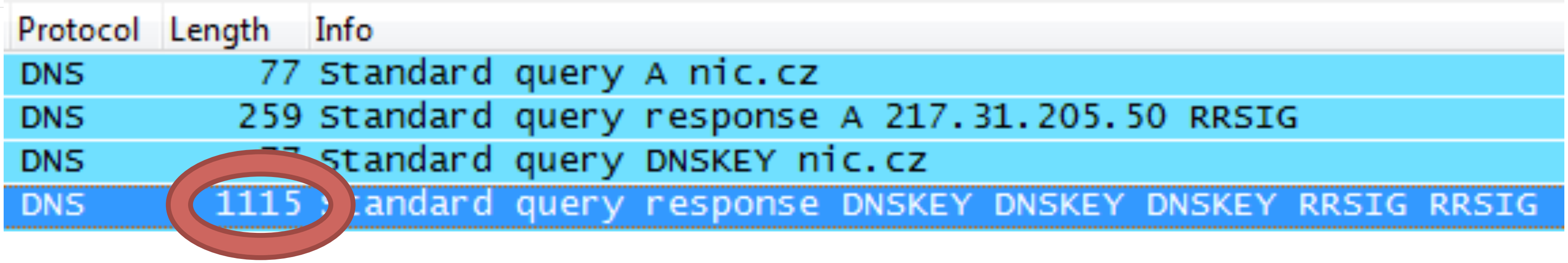
Everything Is Signed

```
$ dig +dnssec nic.cz

;; ANSWER SECTION:

nic.cz.          1797   IN     A      217.31.205.50

nic.cz.          1797   IN     RRSIG   A 5 2 1800 20120719160302 20120705160302 40844 nic.cz. IWGHqGORGO0jh4UuZnwx1P2qoCGYDOcHLhJBIQVJmh6+0Fskr6Sh2dgj E6BHQJQJ9HuzSDCHOvJkH98QkK4ZUgMCLSN5DHuVcmJ/J/
g5VMjeWS3i NmLQVmcvpizwfYVo7cuCg1OteazB2QH7JRp+/KhR+Q+P8tNpDZKe2kEN VMQ=


;; AUTHORITY SECTION:

nic.cz.          1797   IN     NS     a.ns.nic.cz.

nic.cz.          1797   IN     NS     b.ns.nic.cz.

nic.cz.          1797   IN     NS     d.ns.nic.cz.

nic.cz.          1797   IN     RRSIG   NS 5 2 1800 20120719160302 20120705160302 40844 nic.cz. aAWmFODbEaHEt6NxuaIu82wWiL+9jMMH+EvBx4jDS5ViydnSV/lb+hLr dEZlVgBOSG5VdGKZ2y7cx8fGF8w9/9U1FioVowFfP0dOnZ5ZGAS9dNxm
CzHV0+1LiiY0KKSUvPHq9y+thOOwfgkwkFEiofvvRtck1rh8fGfZCFL8 4JY=


;; ADDITIONAL SECTION:

a.ns.nic.cz.       1797   IN     A      194.0.12.1

b.ns.nic.cz.       1797   IN     A      194.0.13.1

d.ns.nic.cz.       1797   IN     A      193.29.206.1

a.ns.nic.cz.       1797   IN     AAAA   2001:678:f::1

b.ns.nic.cz.       1797   IN     AAAA   2001:678:10::1

d.ns.nic.cz.       1797   IN     AAAA   2001:678:1::1

a.ns.nic.cz.       1797   IN     RRSIG   A 5 4 1800 20120719160302 20120705160302 40844 nic.cz. Aj/zemlwTy2FM8+XDZPlDSKhcoKtKSSySugtqrQ8YZx/nOe7i3l/4H3D XW7cQO/ND1lpW5VR
+1RLbsQuovhAcQRtJj47WTkxYwWa4GdWH327aNn2 aklCdCOz6F8bGqZ2Af9EGqIZY+0Rk22FIqZc2qLpNoukI0Hfc0a6OP82 9/E=

b.ns.nic.cz.       1797   IN     RRSIG   A 5 4 1800 20120719160302 20120705160302 40844 nic.cz. XZVf0rEBg1R1j1KHGXt/2lx76s5EbBqfe9a2tU3eyO0MnudsKiPu1VM4 +cBLIgVDUsZMhOaX7i/qHaLAaTa98CucKIQKiwsVVG9kQEWV+OmMrZE3
01xjVd6KNGq77jDyEVz2l6yiTIt/8U7KHDtM3haUXITeyUGJZcJvZ3Ta IOc=

d.ns.nic.cz.       1797   IN     RRSIG   A 5 4 1800 20120719160302 20120705160302 40844 nic.cz. nFN5NWMibodVQYurwwdOlLIQbEWR0hSH+6OJDGRnsCpGGXiWr9VdeAhM XFWehN/uVa6a
+TpwJgnJFYkPzDVrVaFxTGdgNqqTFNcVtwLupbvc6Qq0 Nh6/0yKxbFEkK7n4R0m9Akwnr0BXVkdkpwy3xvZZGlMvfJMq/AKESqlD t3A=

a.ns.nic.cz.       1797   IN     RRSIG   AAAA 5 4 1800 20120719160302 20120705160302 40844 nic.cz. ghUpNuAs+8F08OfPucZg3/P+dOqQRdTYHoZVH8toyEcFqSTU3+yIp7HB +O9hStK2RASMLi8lonzASZ2YbQRPZXmoBN
+zEAZi6s3PIf3EFx7V388A UMowRyTyeh1qvf7fHn0llHDc2K1L4TZ5ZFuUg2PVNBaqcSSdI1mLDHsX AUM=

b.ns.nic.cz.       1797   IN     RRSIG   AAAA 5 4 1800 20120719160302 20120705160302 40844 nic.cz. MxlTDSe0Dkfyzbf9qdDj0Cs0oWrMpzkRsN8g4mfi1uWMuYlHTdUuu9d/ ec27we65x5B/
SJJ6+Lb40A030BuuzJyvpuPNvpXh1fFCLZuvNuFPbhs9 MbptJmuEKjutraaA8jnxgK1KLT4kB+Nekf2IrwSC3oxAoyn5wXZJF0Fu /6o=

d.ns.nic.cz.       1797   IN     RRSIG   AAAA 5 4 1800 20120719160302 20120705160302 40844 nic.cz. AIRg88oIb4AR1QYeu5J0VBd6pjgeHI8vWAvJzy7m7O6Mmpn+KldrHu4M gz7vOYPWZK8qNSvE/
lDm7GZ3vERbVvprCwsvzaZCTb8h2wo1VxPx9tVA GQLo2yPTtX9gUqNBMRr/xS7CwyJLVNy3ZJTrQ3G8HyYOyRUVf/SubxPr srI=
```

Everything Is Signed

- **Where is att.com?**
  - 10.4.50.60
  - RRSIG("isecpartners.com", ATT-Key$_{ZSK}$)
- **What are ATT's Keys?**
  - Zone Signing Key AE363FF13468D83.....
  - Key Signing Key 563ADF348143.....
  - RRSIG("…..", ATT-Key$_{KSK}$)
- **Can I trust ATT-Key$_{KSK}$?**
  - RRSIG("ATT-Key$_{KSK}$ Fingerprint", .com-Key$_{ZSK}$)

Signatures Are Large



```
Protocol  Length  Info
DNS           77  Standard query A nic.cz
DNS          259  Standard query response A 217.31.205.50 RRSIG
DNS           77  Standard query DNSKEY nic.cz
DNS         1115  Standard query response DNSKEY DNSKEY DNSKEY RRSIG RRSIG
```

- DNS UDP Limit is 512
- EDNS UDP Limit is 4096
- DNS TCP has no limit

- 24 Residential and SOHO routers were tested
- 18 of 24 Devices tested couldn’t support EDNS
- 23 of 24 Devices tested couldn’t support TCP
  - http://www.icann.org/en/groups/ssac/documents/sac-053-en.pdf

Everything Is Signed - Including No's

Where is doesntexist.att.com?

There is no doesntexist.att.com

RRSIG("There is no doesntexist.att.com", ATT-Key$_{ZSK}$)

Denial of Service

Where is doesntexist1.att.com?

There is no doesntexist1.att.com

RRSIG("There is no doesntexist1.att…", ATT-Key_{ZSK})

Where is doesntexist2.att.com?

There is no doesntexist2.att.com

RRSIG("There is no doesntexist2.att…", ATT-Key_{ZSK})

Where is doesntexist3.att.com?

There is no doesntexist3.att.com

RRSIG("There is no doesntexist3.att…", ATT-Key_{ZSK})

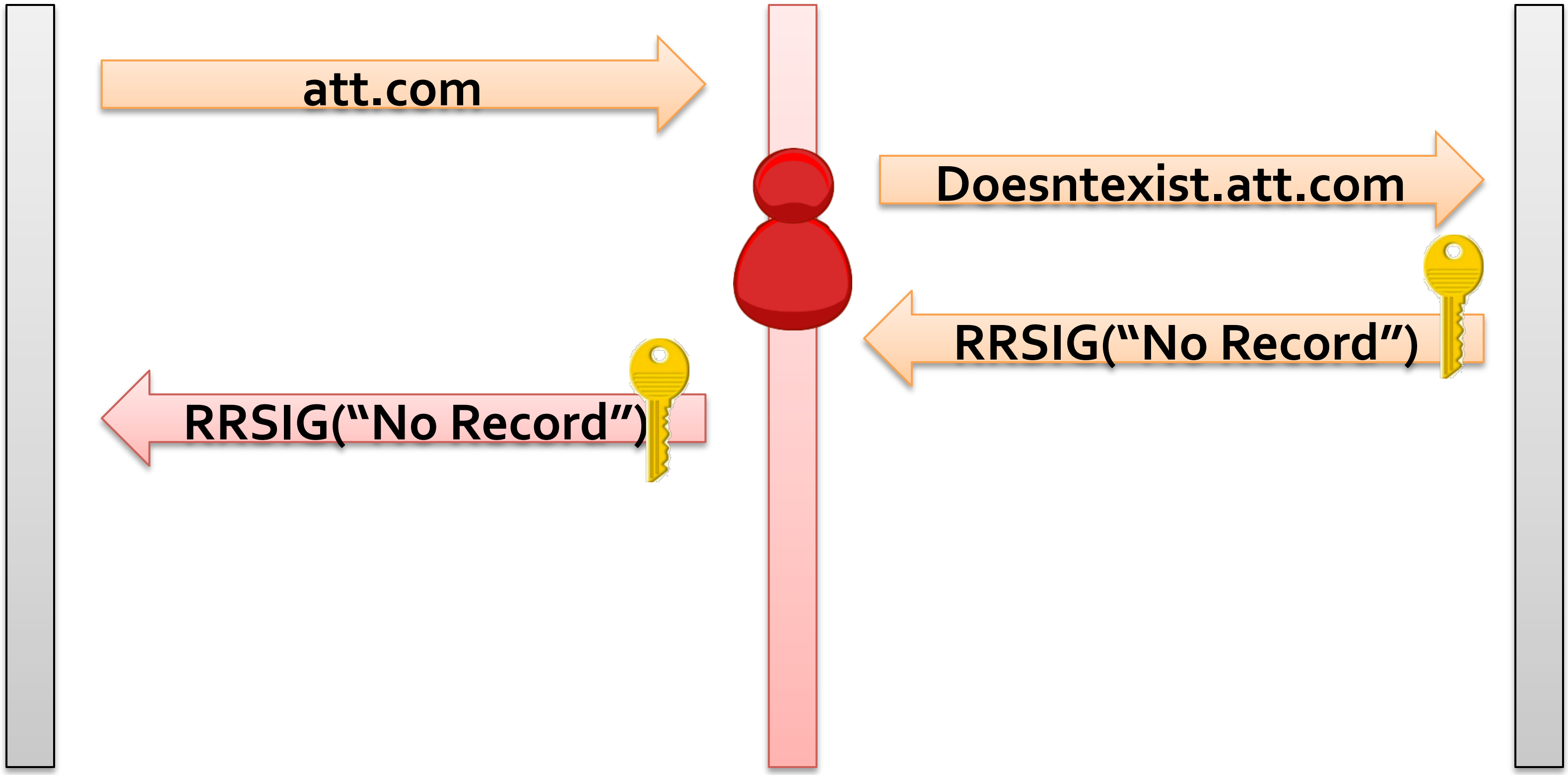
Sign a Single Response?

Where is doesntexist.att.com?

No Record

RRSIG(“No Record”, ATT-Key$_{ZSK}$)

Man in the Middle



Sign The Ranges

Where is doesntexist.att.com?

There is nothing between admin.att.com and keyserver.att.com

RRSIG(“There is nothing between...”, ATT-Key$_{ZSK}$)

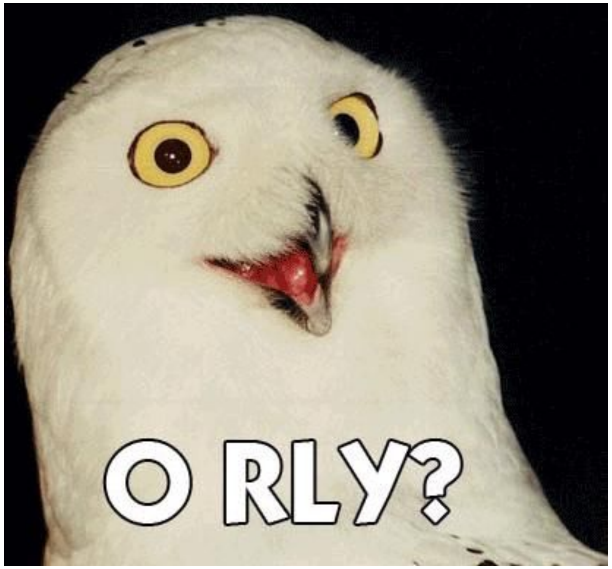
Called NSEC

Sign The Ranges

Where is doesntexist.att.com?

There is nothing between admin.att.com and keyserver.att.com

RRSIG("There is nothing between…", ATT-Key$_{ZSK}$)



Hash, then Sign The Ranges

Where is doesntexist.att.com?

doesntexist.att.com -> hash it -> da739562.....

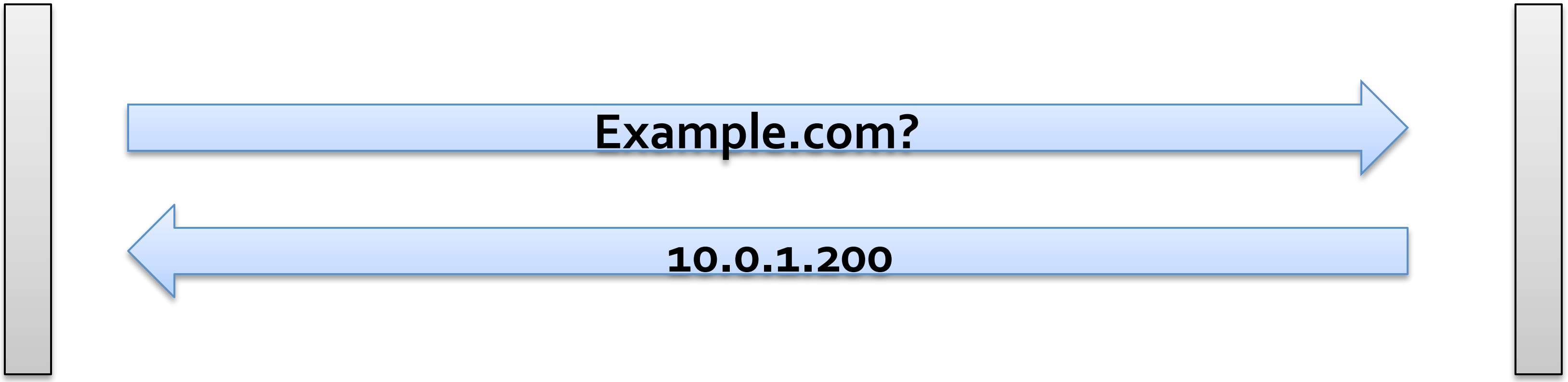
There is nothing between a847629.... and ff572645....

RRSIG("There is nothing between...", ATT-Key$_{ZSK}$)

Called NSEC3!

‘Put It In DNSSEC’

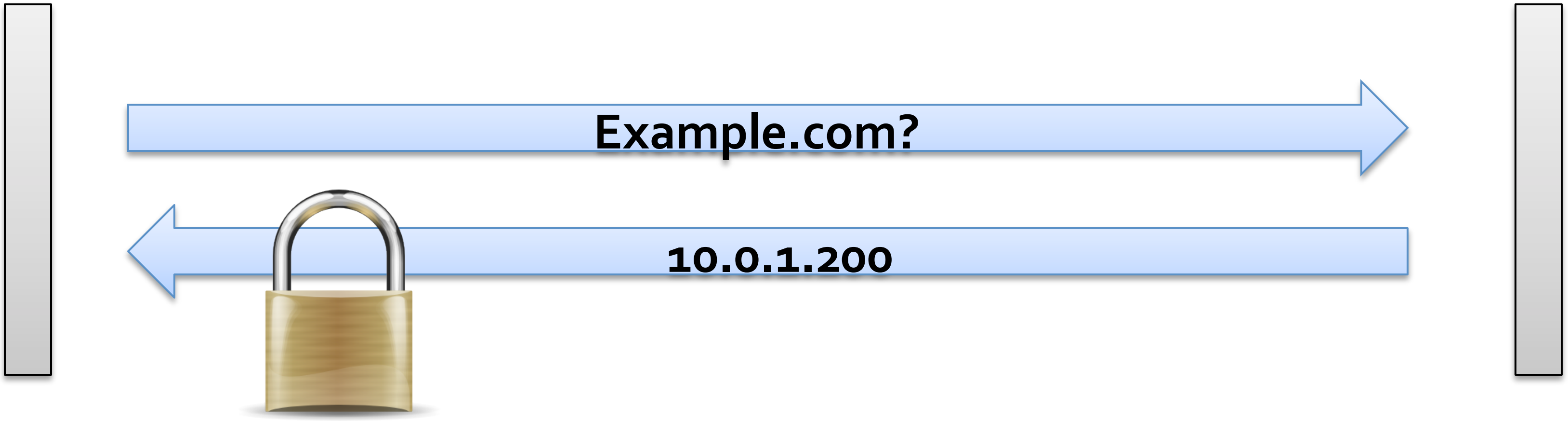
Shoving Stuff in DNSSEC



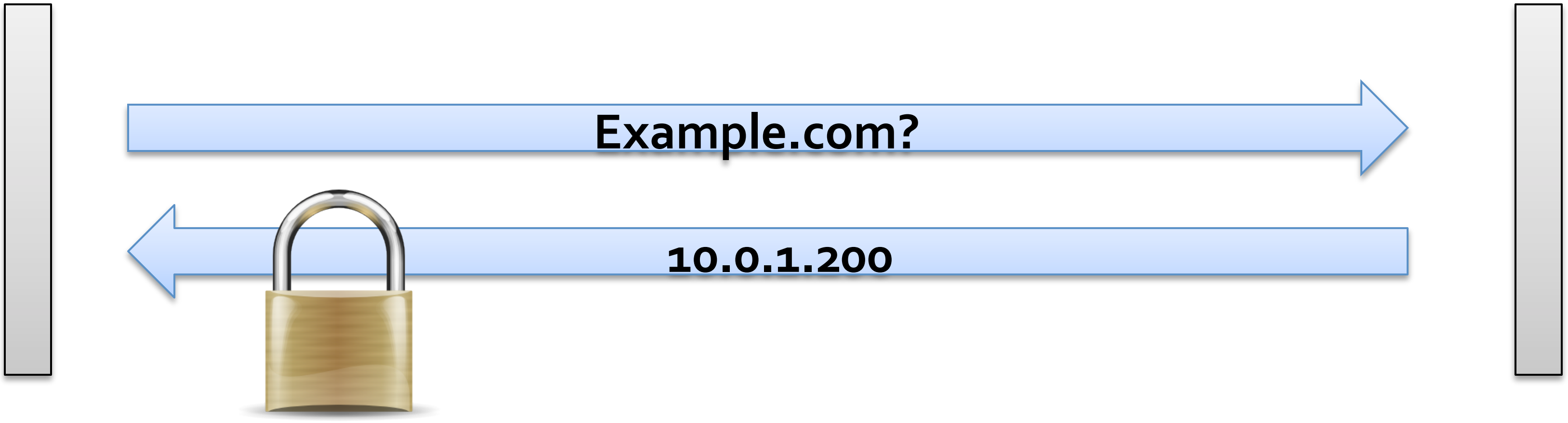
Example.com?

10.0.1.200

Shoving Stuff in DNSSEC

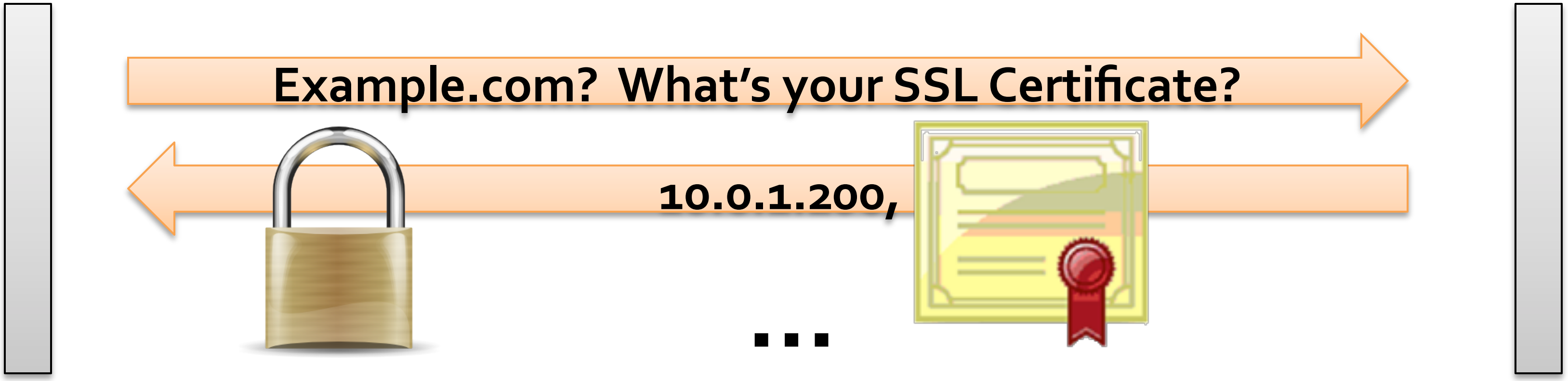


Shoving Stuff in DNSSEC



Example.com?

10.0.1.200

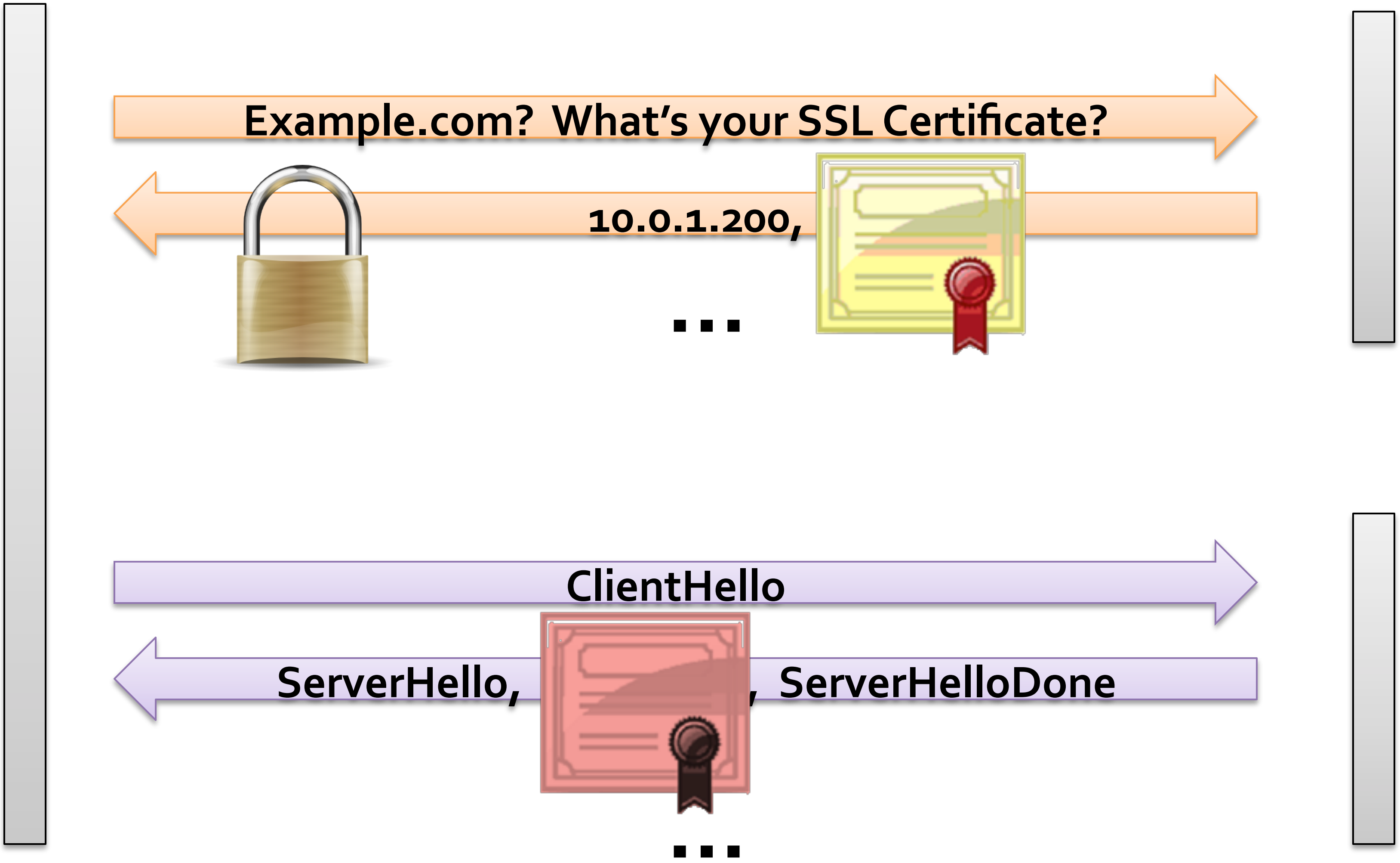


Example.com? What's your SSL Certificate?

10.0.1.200,

…

Shoving Stuff in DNSSEC



Example.com? What's your SSL Certificate?

10.0.1.200,

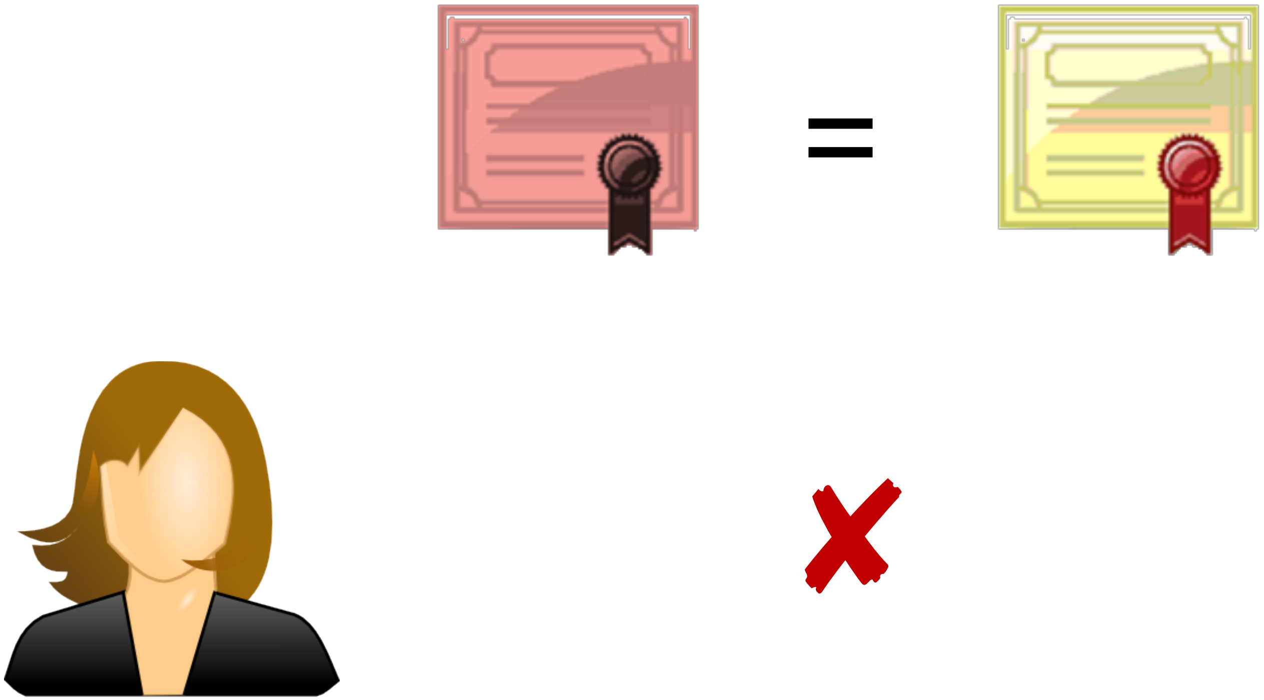
...

ClientHello

ServerHello, , ServerHelloDone

...

Shoving Stuff in DNSSEC



Bootstrapping Security

SSL Certs (DANE)

Product Update Checks

- SSL Certs (DANE)
- Product Update Checks
- SSH
  - ssh -o "VerifyHostKeyDNS yes”
  - RFC 4255
- OpenPGP
  - gpg --auto-key-locate pka
- S/MIME
  - draft-hoffman-dane-smime-01.txt

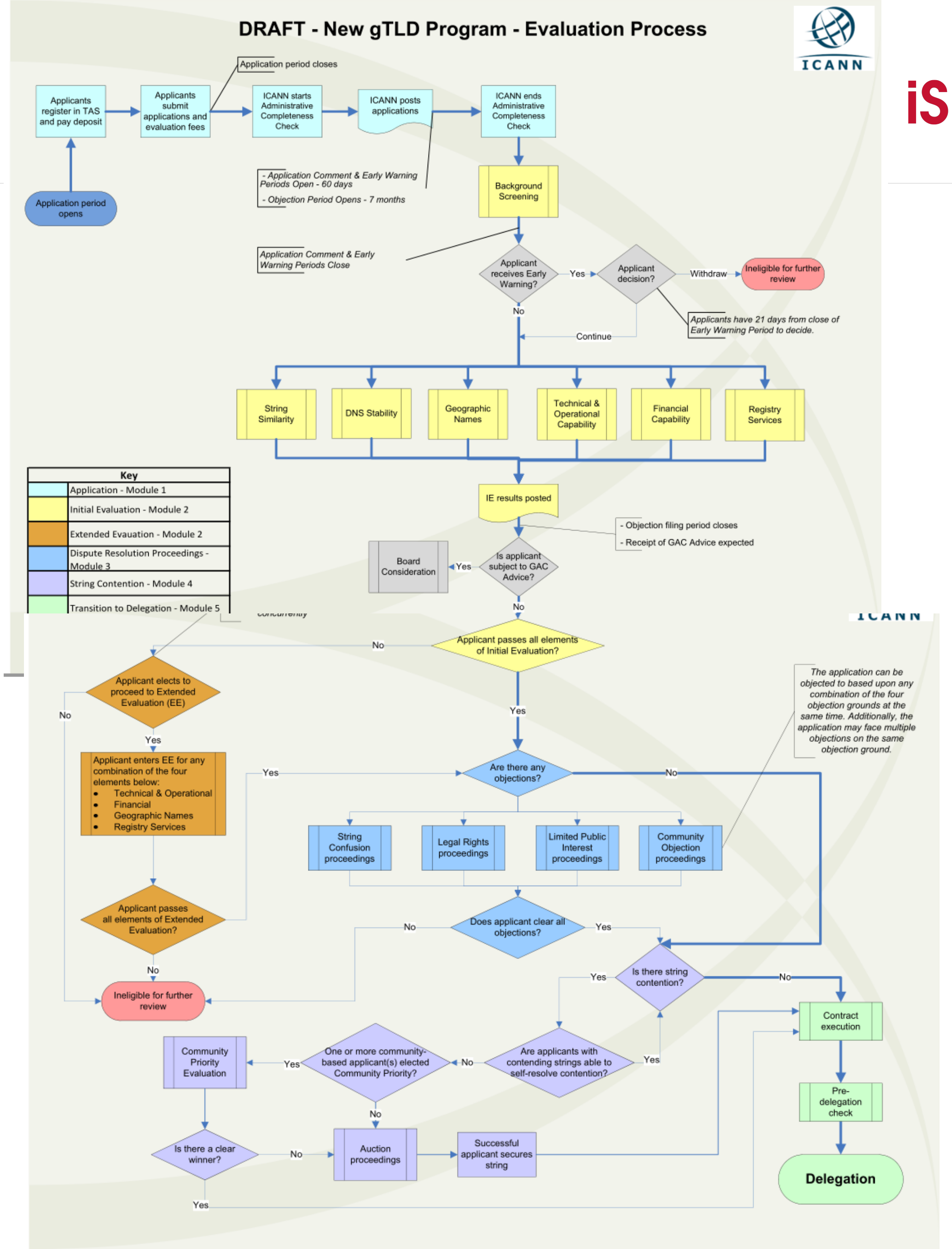
DPF Crazy Awesome

gTLDs

.com .org .net

.biz .museum .coop

.whatever .you .like



DRAFT - New gTLD Program - Evaluation Process

ICANN
Application period opens
Applicants register in TAS and pay deposit
Applicants submit applications and evaluation fees
Application period closes
ICANN starts Administrative Completeness Check
ICANN posts applications
ICANN ends Administrative Completeness Check
- Application Comment & Early Warning Periods Open - 60 days
- Objection Period Opens - 7 months
Background Screening
Application Comment & Early Warning Periods Close
Applicant receives Early Warning?
Yes
Applicant decision?
Withdraw
Ineligible for further review
Applicants have 21 days from close of Early Warning Period to decide.
No
Continue
String Similarity
DNS Stability
Geographic Names
Technical & Operational Capability
Financial Capability
Registry Services
IE results posted
- Objection filing period closes
- Receipt of GAC Advice expected
Board Consideration
Yes
Is applicant subject to GAC Advice?
No
Applicant passes all elements of Initial Evaluation?
No
Yes
Applicant elects to proceed to Extended Evaluation (EE)
No
Yes
Applicant enters EE for any combination of the four elements below:
Technical & Operational
Financial
Geographic Names
Registry Services
Applicant passes all elements of Extended Evaluation?
No
Ineligible for further review
Are there any objections?
Yes
No
The application can be objected to based upon any combination of the four objection grounds at the same time. Additionally, the application may face multiple objections on the same objection ground.
String Confusion proceedings
Legal Rights proceedings
Limited Public Interest proceedings
Community Objection proceedings
Does applicant clear all objections?
No
Yes
Is there string contention?
Yes
No
Contract execution
Pre-delegation check
Delegation
Are applicants with contending strings able to self-resolve contention?
Yes
No
One or more community-based applicant(s) elected Community Priority?
Yes
No
Community Priority Evaluation
Is there a clear winner?
No
Yes
Auction proceedings
Successful applicant secures string

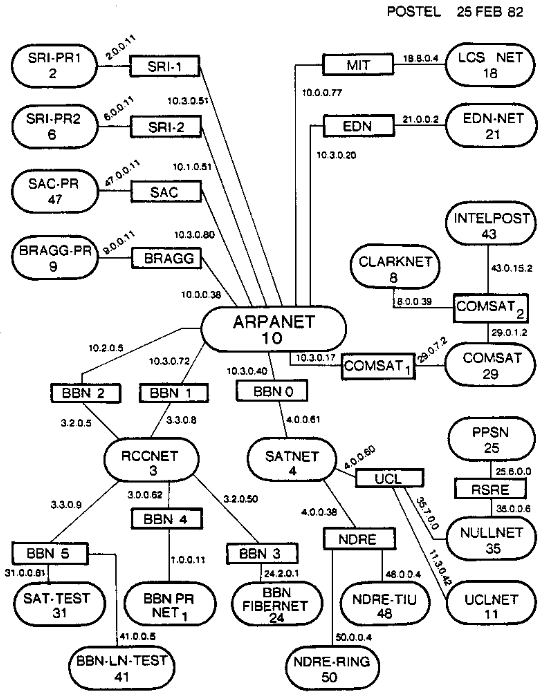
Key	
🟦	Application - Module 1
🟨	Initial Evaluation - Module 2
🟧	Extended Evauation - Module 2
🟦	Dispute Resolution Proceedings - Module 3
🟪	String Contention - Module 4
🟩	Transition to Delegation - Module 5

.bugatti

A Little History

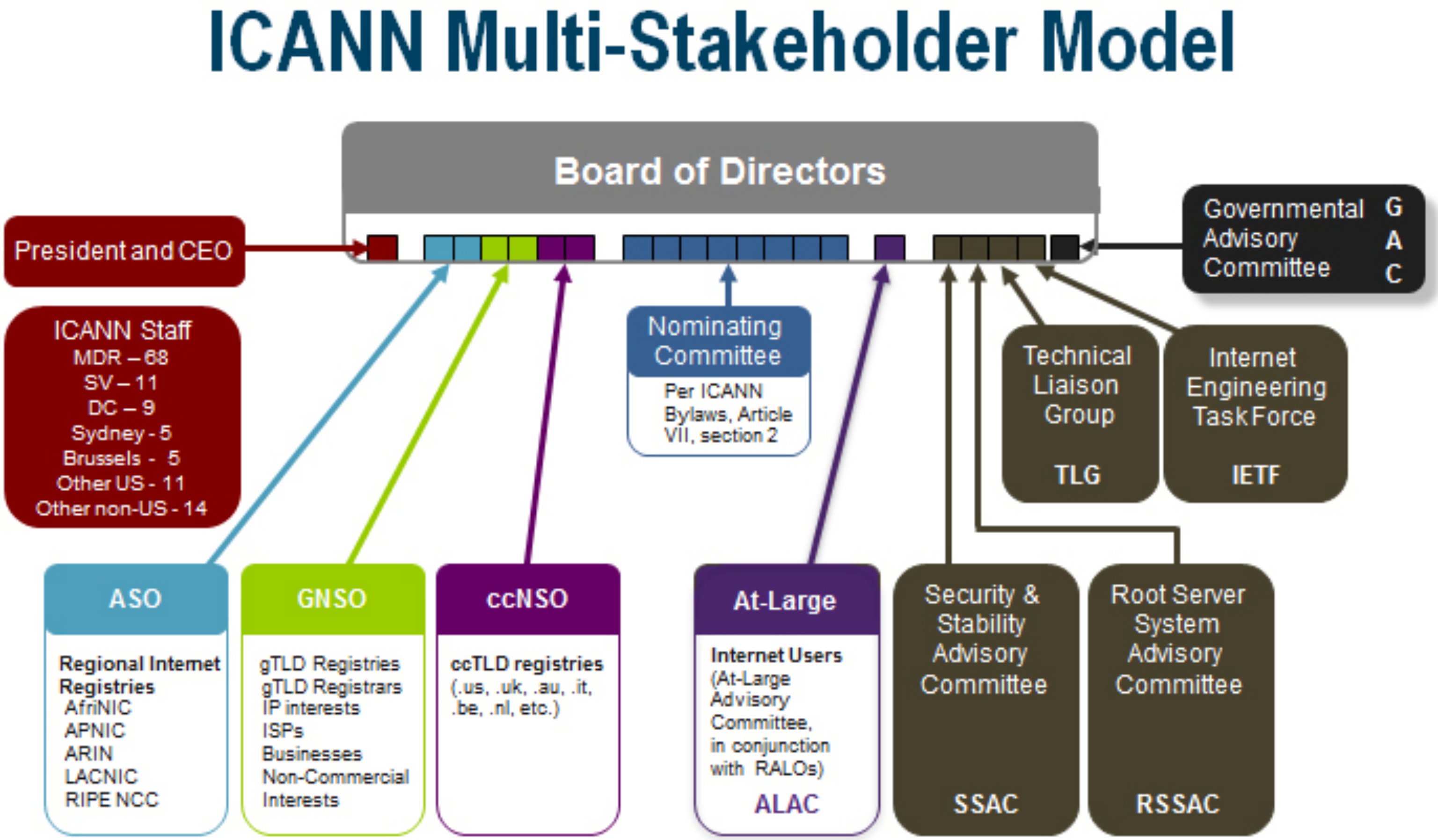
- **Jon Postel basically used to run the Internet by himself**

- **ICANN was charted in 1998 to:**
  - Diversify management of the Internet
  - Introduce democratic, “multi-stakeholder” model
  - Preempt UN Action


POSTEL 25 FEB 82

Where ICANN Ended Up

iSECpartners part of nccgroup



ICANN Multi-Stakeholder Model

Board of Directors

President and CEO

ICANN Staff
MDR – 68
SV – 11
DC – 9
Sydney - 5
Brussels - 5
Other US - 11
Other non-US - 14

Governmental Advisory Committee
G A C

Nominating Committee
Per ICANN Bylaws, Article VII, section 2

Technical Liaison Group
TLG

Internet Engineering Task Force
IETF

ASO
Regional Internet Registries
AfriNIC
APNIC
ARIN
LACNIC
RIPE NCC

GNSO
gTLD Registries
gTLD Registrars
IP interests
ISPs
Businesses
Non-Commercial Interests

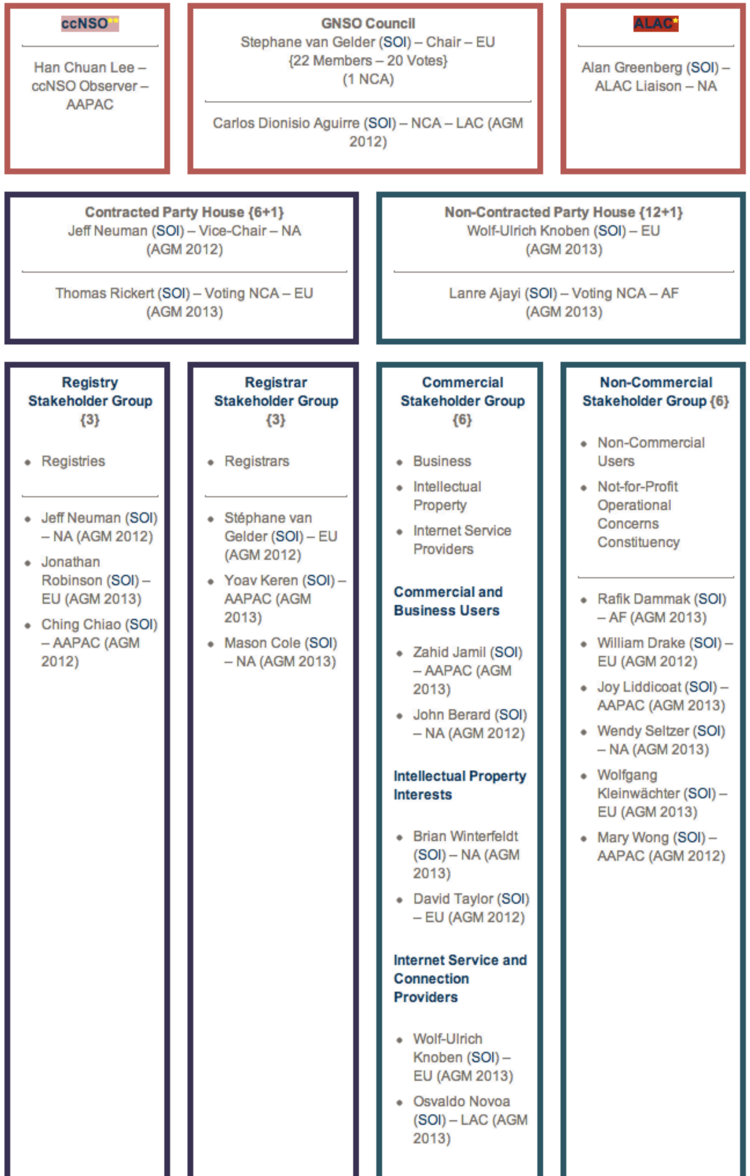
ccNSO
ccTLD registries
(.us, .uk, .au, .it, .be, .nl, etc.)

At-Large
Internet Users
(At-Large Advisory Committee, in conjunction with RALOs)
ALAC

Security & Stability Advisory Committee
SSAC

Root Server System Advisory Committee
RSSAC

Where ICANN Ended Up



ccNSO

Han Chuan Lee – ccNSO Observer – AAPAC

GNSO Council

Stephane van Gelder (SOI) – Chair – EU

{22 Members – 20 Votes}

(1 NCA)

Carlos Dionisio Aguirre (SOI) – NCA – LAC (AGM 2012)

ALAC

Alan Greenberg (SOI) – ALAC Liaison – NA

Contracted Party House {6+1}

Jeff Neuman (SOI) – Vice-Chair – NA (AGM 2012)

Thomas Rickert (SOI) – Voting NCA – EU (AGM 2013)

Non-Contracted Party House {12+1}

Wolf-Ulrich Knoben (SOI) – EU (AGM 2013)

Lanre Ajayi (SOI) – Voting NCA – AF (AGM 2013)

Registry Stakeholder Group {3}

- Registries

- Jeff Neuman (SOI) – NA (AGM 2012)
- Jonathan Robinson (SOI) – EU (AGM 2013)
- Ching Chiao (SOI) – AAPAC (AGM 2012)

Registrar Stakeholder Group {3}

- Registrars

- Stéphane van Gelder (SOI) – EU (AGM 2012)
- Yoav Keren (SOI) – AAPAC (AGM 2013)
- Mason Cole (SOI) – NA (AGM 2013)

Commercial Stakeholder Group {6}

- Business
- Intellectual Property
- Internet Service Providers

Commercial and Business Users

- Zahid Jamil (SOI) – AAPAC (AGM 2013)
- John Berard (SOI) – NA (AGM 2012)

Intellectual Property Interests

- Brian Winterfeldt (SOI) – NA (AGM 2013)
- David Taylor (SOI) – EU (AGM 2012)

Internet Service and Connection Providers

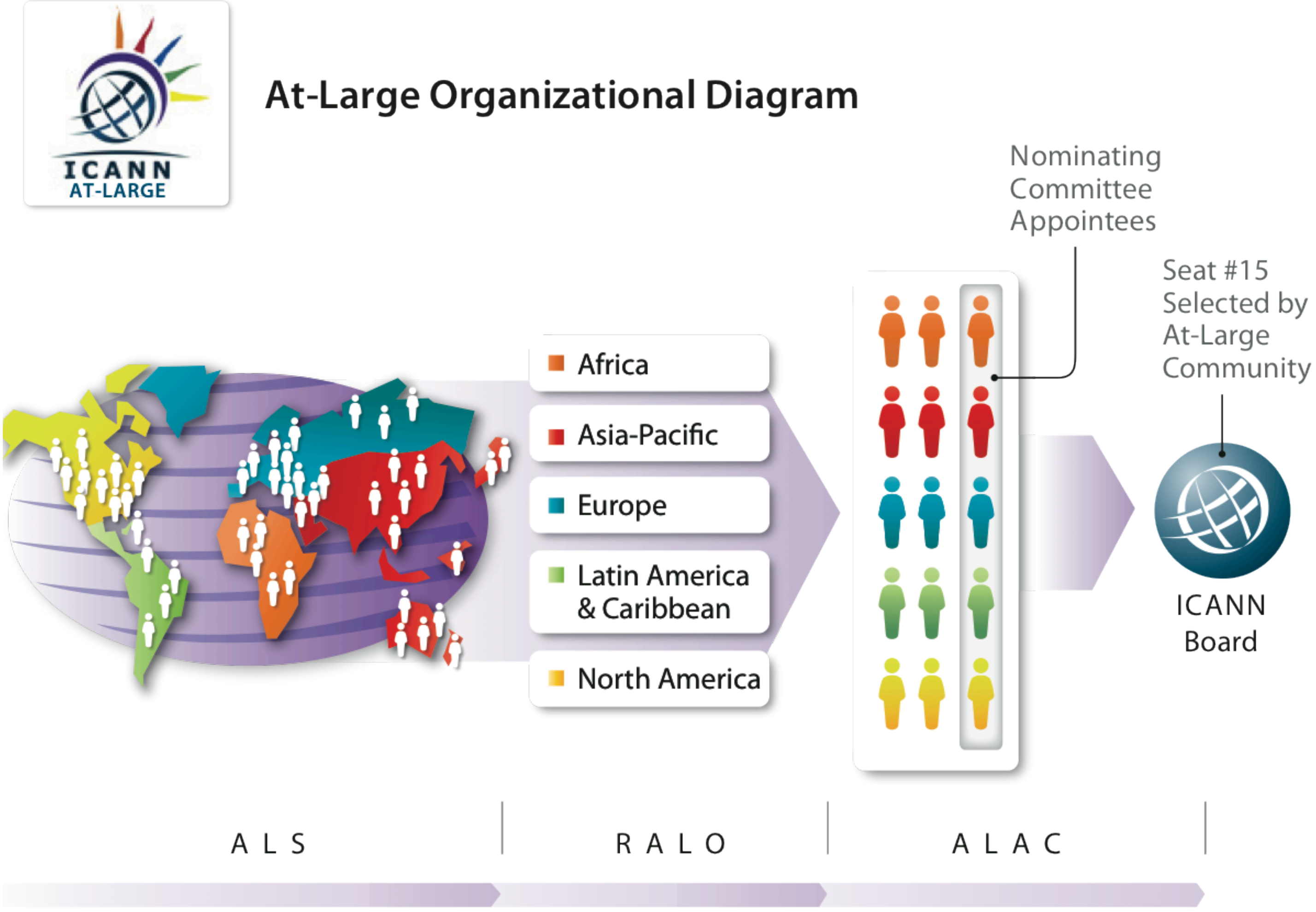
- Wolf-Ulrich Knoben (SOI) – EU (AGM 2013)
- Osvaldo Novoa (SOI) – LAC (AGM 2013)

Non-Commercial Stakeholder Group {6}

- Non-Commercial Users
- Not-for-Profit Operational Concerns Constituency

- Rafik Dammak (SOI) – AF (AGM 2013)
- William Drake (SOI) – EU (AGM 2012)
- Joy Liddicoat (SOI) – AAPAC (AGM 2013)
- Wendy Seltzer (SOI) – NA (AGM 2013)
- Wolfgang Kleinwächter (SOI) – EU (AGM 2013)
- Mary Wong (SOI) – AAPAC (AGM 2012)

Where ICANN Ended Up



ICANN AT-LARGE

At-Large Organizational Diagram

Nominating Committee Appointees

Seat #15 Selected by At-Large Community

Africa

Asia-Pacific

Europe

Latin America & Caribbean

North America

ICANN Board

ALS

RALO

ALAC

At-Large Structures

Regional At-Large Organizations

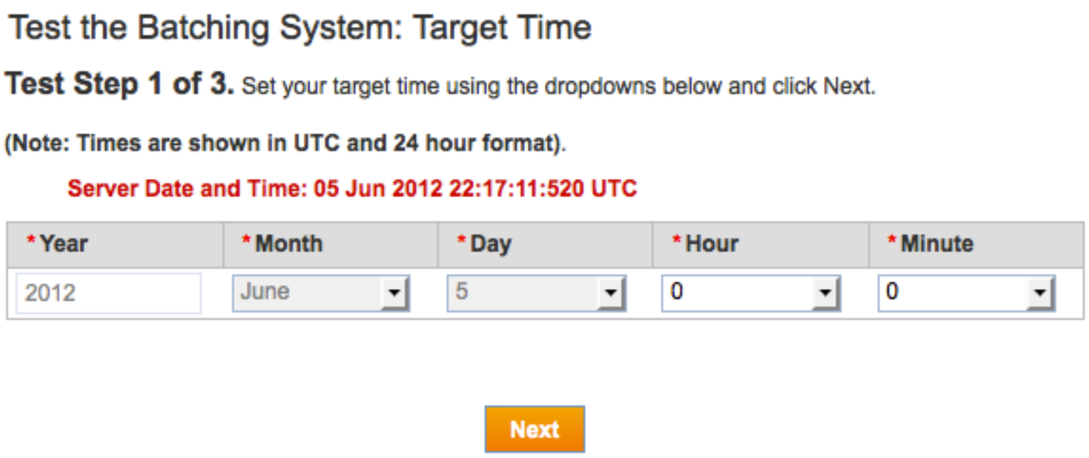
At-Large Advisory Committee

Map is for representational purposes only.
For more detailed information see the Google Map of the RALOs and ALSes at: http://www.atlarge.icann.org/maps/
Full country to region list: http://www.icann.org/en/meetings/montreal/geo-regions-topic.htm

Batching – What would you do?

iSECpartners part of nccgroup

Batching – What ICANN Decided



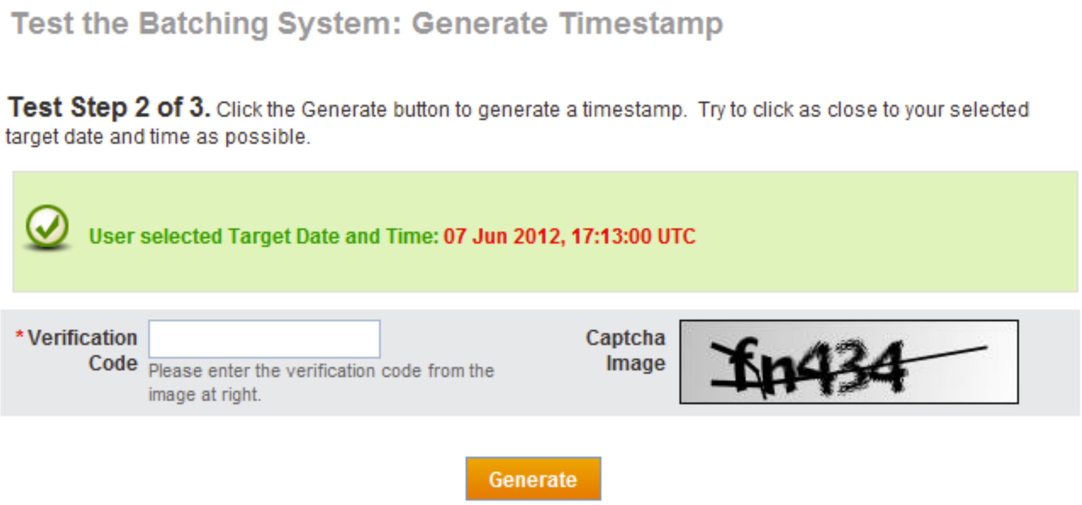
Test the Batching System: Target Time

Test Step 1 of 3. Set your target time using the dropdowns below and click Next.

(Note: Times are shown in UTC and 24 hour format).

Server Date and Time: 05 Jun 2012 22:17:11:520 UTC

* Year	* Month	* Day	* Hour	* Minute
2012	June	5	0	0



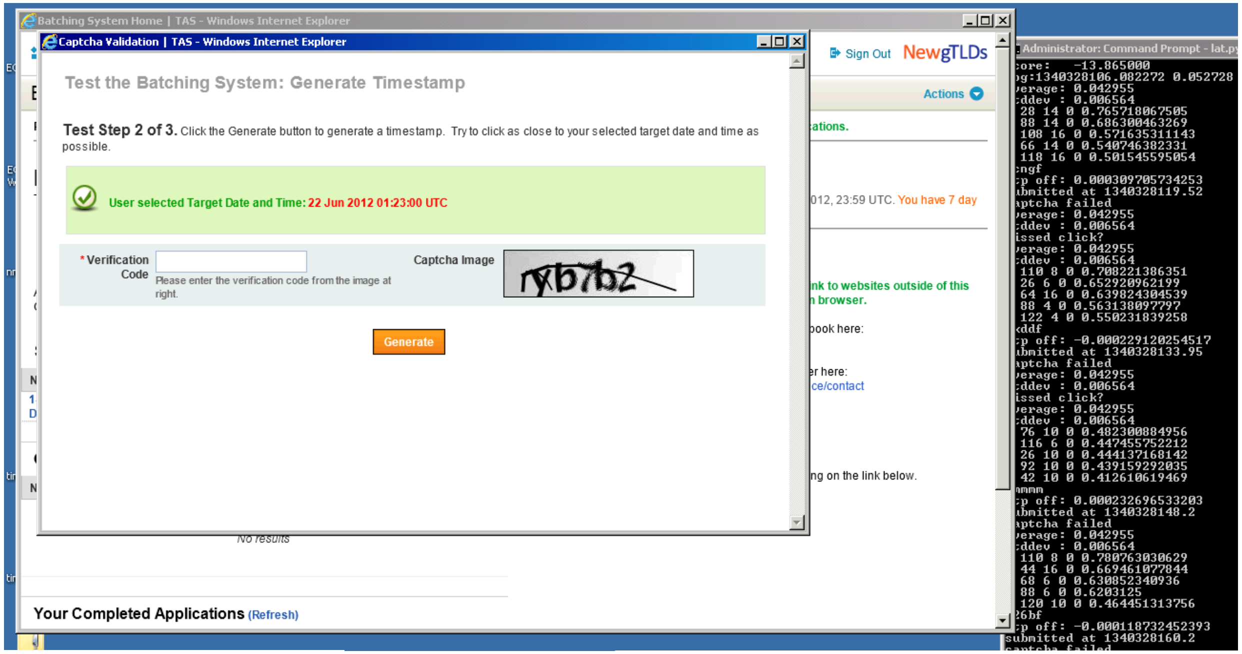
Test the Batching System: Generate Timestamp

Test Step 2 of 3. Click the Generate button to generate a timestamp. Try to click as close to your selected target date and time as possible.

✓ User selected Target Date and Time: 07 Jun 2012, 17:13:00 UTC

* Verification Code: Please enter the verification code from the image at right.

Batching – Our Response



Batching System Home | TAS - Windows Internet Explorer

Captcha Validation | TAS - Windows Internet Explorer

Test the Batching System: Generate Timestamp

Test Step 2 of 3. Click the Generate button to generate a timestamp. Try to click as close to your selected target date and time as possible.

User selected Target Date and Time: 22 Jun 2012 01:23:00 UTC

* Verification Code: ____ Please enter the verification code from the image at right.

Captcha Image: rxb7b2

Generate

No results

Your Completed Applications (Refresh)

Sign Out NewgTLDs

Actions

ations.

012, 23:59 UTC. You have 7 day

nk to websites outside of this n browser.

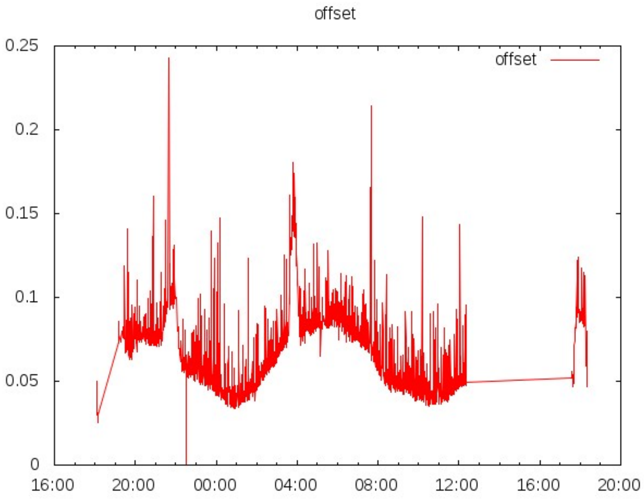
book here:

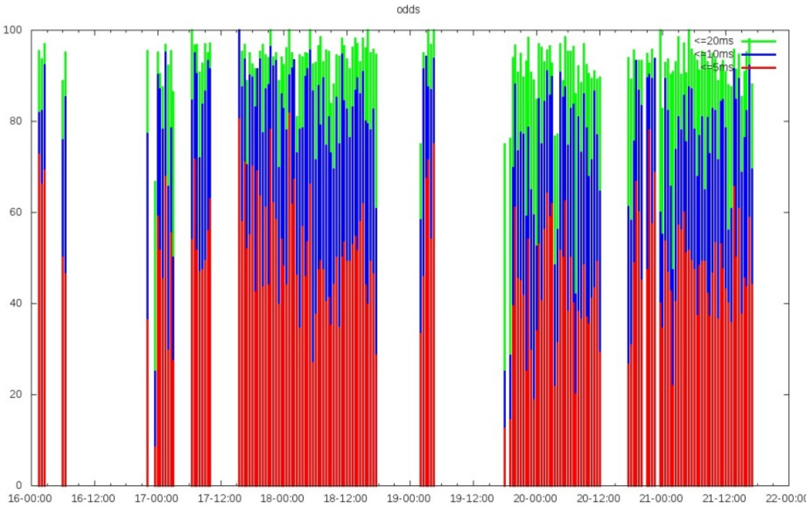
er here: ce/contact

ng on the link below.

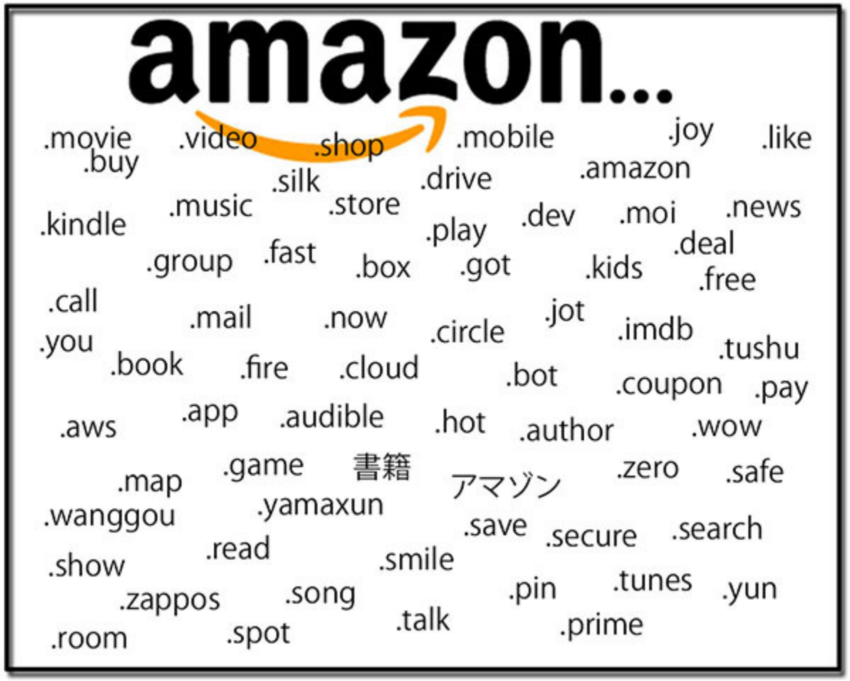
Administrator: Command Prompt - lat.py

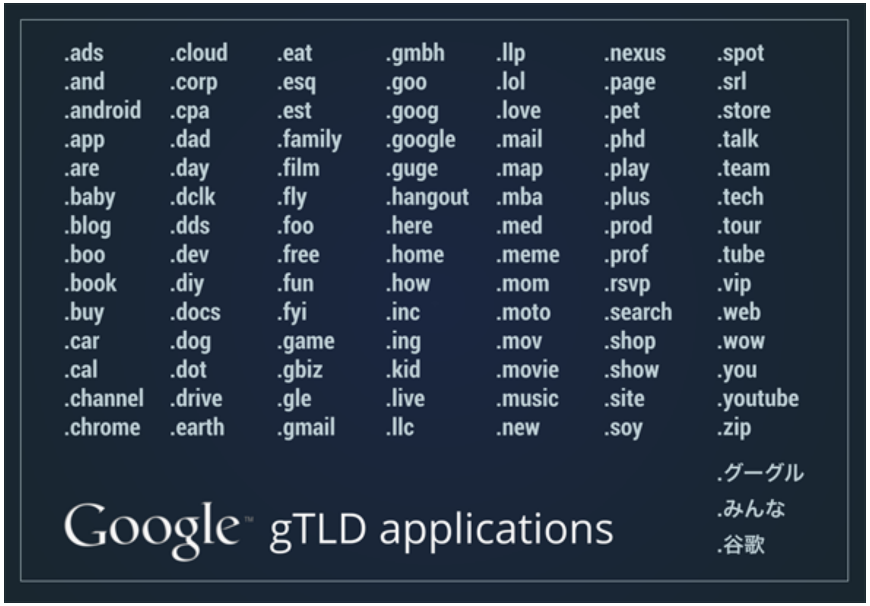
```
core:    -13.865000
pg:1340328106.082272 0.052728
verage: 0.042955
tddev : 0.006564
 28 14 0 0.765718067505
 88 14 0 0.686300463269
 108 16 0 0.571635311143
 66 14 0 0.540746382331
 118 16 0 0.501545595054
cngf
cp off: 0.000309705734253
ubmitted at 1340328119.52
aptcha failed
verage: 0.042955
tddev : 0.006564
issed click?
verage: 0.042955
tddev : 0.006564
 110 8 0 0.708221386351
 26 6 0 0.652920962199
 64 16 0 0.639824304539
 88 4 0 0.563138097797
 122 4 0 0.550231839258
xddf
cp off: -0.000229120254517
ubmitted at 1340328133.95
aptcha failed
verage: 0.042955
tddev : 0.006564
issed click?
verage: 0.042955
tddev : 0.006564
 76 10 0 0.482300884956
 116 6 0 0.447455752212
 26 10 0 0.444137168142
 92 10 0 0.439159292035
 42 10 0 0.412610619469
nmmm
cp off: 0.000232696533203
ubmitted at 1340328148.2
aptcha failed
verage: 0.042955
tddev : 0.006564
 110 8 0 0.780763030629
 44 16 0 0.669461077844
 68 6 0 0.630852340936
 88 6 0 0.6203125
 120 10 0 0.464451313756
26bf
cp off: -0.000118732452393
submitted at 1340328160.2
captcha failed
```





Competition and Public Interest





.ads
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.android
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.are
.baby
.blog
.boo
.book
.buy
.car
.cal
.channel
.chrome

.cloud
.corp
.cpa
.dad
.day
.dclk
.dds
.dev
.diy
.docs
.dog
.dot
.drive
.earth

.eat
.esq
.est
.family
.film
.fly
.foo
.free
.fun
.fyi
.game
.gbiz
.gle
.gmail

.gmbh
.goo
.goog
.google
.guge
.hangout
.here
.home
.how
.inc
.ing
.kid
.live
.llc

.llp
.lol
.love
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.map
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.mom
.moto
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.movie
.music
.new

.nexus
.page
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.search
.shop
.show
.site
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.team
.tech
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.tube
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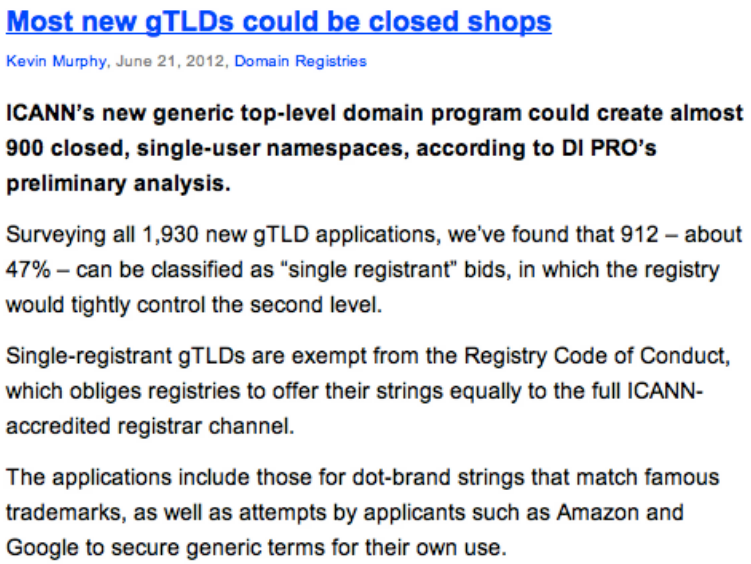
.みんな
.谷歌

Google gTLD applications

Competition and Public Interest



Most new gTLDs could be closed shops

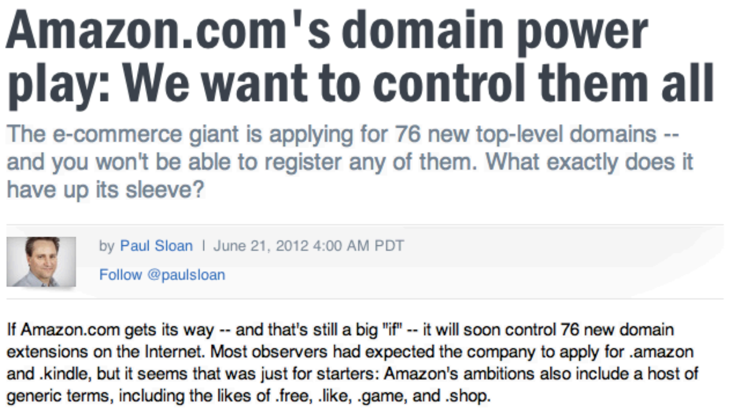
Kevin Murphy, June 21, 2012, Domain Registries

ICANN's new generic top-level domain program could create almost 900 closed, single-user namespaces, according to DI PRO's preliminary analysis.

Surveying all 1,930 new gTLD applications, we've found that 912 – about 47% – can be classified as "single registrant" bids, in which the registry would tightly control the second level.

Single-registrant gTLDs are exempt from the Registry Code of Conduct, which obliges registries to offer their strings equally to the full ICANN-accredited registrar channel.

The applications include those for dot-brand strings that match famous trademarks, as well as attempts by applicants such as Amazon and Google to secure generic terms for their own use.



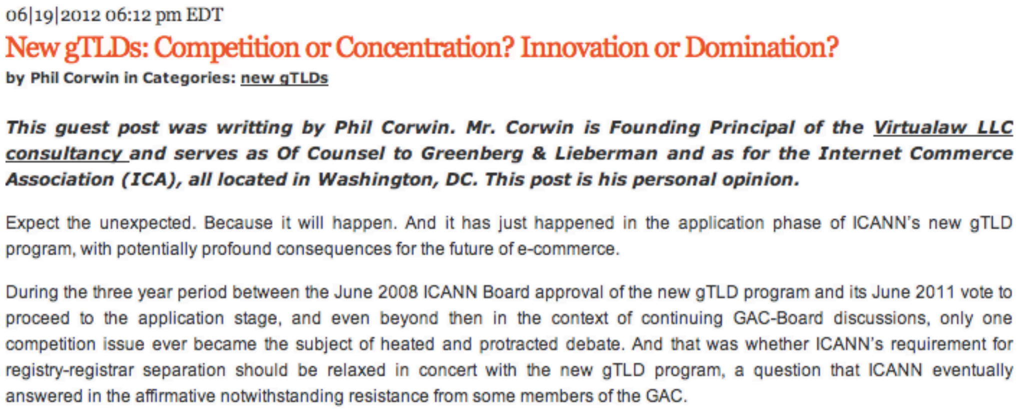
Amazon.com's domain power play: We want to control them all

The e-commerce giant is applying for 76 new top-level domains -- and you won't be able to register any of them. What exactly does it have up its sleeve?

by Paul Sloan | June 21, 2012 4:00 AM PDT

Follow @paulsloan

If Amazon.com gets its way -- and that's still a big "if" -- it will soon control 76 new domain extensions on the Internet. Most observers had expected the company to apply for .amazon and .kindle, but it seems that was just for starters: Amazon's ambitions also include a host of generic terms, including the likes of .free, .like, .game, and .shop.



06|19|2012 06:12 pm EDT

New gTLDs: Competition or Concentration? Innovation or Domination?

by Phil Corwin in Categories: new gTLDs

This guest post was writting by Phil Corwin. Mr. Corwin is Founding Principal of the Virtualaw LLC consultancy and serves as Of Counsel to Greenberg & Lieberman and as for the Internet Commerce Association (ICA), all located in Washington, DC. This post is his personal opinion.

Expect the unexpected. Because it will happen. And it has just happened in the application phase of ICANN's new gTLD program, with potentially profound consequences for the future of e-commerce.

During the three year period between the June 2008 ICANN Board approval of the new gTLD program and its June 2011 vote to proceed to the application stage, and even beyond then in the context of continuing GAC-Board discussions, only one competition issue ever became the subject of heated and protracted debate. And that was whether ICANN's requirement for registry-registrar separation should be relaxed in concert with the new gTLD program, a question that ICANN eventually answered in the affirmative notwithstanding resistance from some members of the GAC.

Internationalized

http://مثال.إختبار

http://例子.測試

http://пример.испытание

http://דוגמה.טעסט

A word you will hear often

Homograph!

http://paypal.com	http://paypal.com
xn--fsqu00a.xn—g8w231d	xn--fsqu00a.xn--g6w251d

PunyCode

iSECpartners part of nccgroup

http://مثال.إختبار

xn--mgbh0fb.xn--kgbechtv

http://例子.測試

xn--fsqu00a.xn--g6w251d

http://пример.испытание

xn--e1afmkfd.xn--80akhbyknj4f

http://דוגמה.טעסט

xn--fdbk5d8ap9b8a8d.xn--deba0ad

Top Level Websites

- Supposed to be outlawed
- How do you represent them
  - http://ai
  - http://ai.
  - http://ai/
- AC has address 193.223.78.210
- AI has address 209.59.119.34
- BT has address 192.168.42.202
- CM has address 195.24.205.60
- DK has address 193.163.102.24
- GG has address 87.117.196.80

Thank You

Alex Stamos

alex@artemis.net

Tom Ritter

tritter@isecpartners.com