

Internet Governance: Not Just Dealing with a Uniqueness Requirement

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5/2/2006

Unique Values

data packets include fields used to say what the payload is & detail options

a.k.a. “protocol parameters”

field contains a value (e.g. 25)

different values indicate different applications or features

you & I have to agree to use same values or I will not know what you mean

e.g., 25 = SMTP (email)

Assigning Values

for Internet protocols values originally assigned
& maintained by Jon Postel

started in Aug 1971: asked for reports of sockets in use

acting as the “Internet Assigned Numbers Authority”
(IANA) under US government contract

filled blanks in standards documents with
unique values and maintained a database of
values and associated uses

actual value not important, just must be unique
(within application) and used consistently

Uniqueness Range

values must be unique within scope of use to avoid confusion

e.g. “Bill” is not globally unique

most of the time “Bill” is unique within a family

protocol parameters must be unique within group of nodes that will use that protocol

e.g., the value “15” can mean one thing in the protocol field in the IP header and a different thing in the port field of the TCP header

More Values #1: Names

1st RFC list of names: Nov 1971

non-hierarchical names (e.g., MIT-MULTICS)

thus name had to be unique on ARPANET

later (Nov 1983) domain name system (DNS)

hierarchical names

e.g. newdev.eecs.harvard.edu

“newdev” only needs to be unique within

“eecs.harvard.edu”

Names, contd.

IANA (Jon) assigned top level domains (TLD)

assign = enter name server IP address in “root zone file” (the database for “13” root servers) for a TLD

TLD types established in RFC 920 (Oct 1984)

also includes basic requirements to register a subdomain

e.g., need to have at least 2 nameservers & at least 50 hosts

initial subdomain registration done by SRI-NIC

under US government contract

no registration fees

Names, contd.

two types of TLDs (names of types came later)

generic TLD (gTLD)

e.g., .com, .edu, .net, .mil, .arpa

country code TLDs (ccTLD)

e.g., .us, .fr, .uk

list from ISO list of “names of countries, territories or areas of geographical interest”

has caused issues: e.g. French Polynesia ccTLD = .pf

but France says that French Polynesia is not a separate country

Names, contd.

sample domain names

www.Plymouth.com → Plymouth Tube Company

www.Harvard.com → Harvard Book Store

WhiteHouse.com → WhitePage.com

Questions

what is the basic purpose of trademark law?

in what ways are domain names
not like trademarks?

note: trademark people blocked introduction
of new TLDs for many years

More Values #2: Addresses

network nodes are identified by network addresses

e.g., MAC addresses on Ethernet

e.g., IP addresses on IP networks

address must (generally) be unique within scope of network

special case: “anycast” address

find “closest” (in routing terms) instance

IP Addresses

IP addresses 32-bit value

combined network location and identifier

early format: 8-bits network, 24-bit node on network

current format: no specific dividing point

can have “private” IP addresses (aka RFC 1918)

ranges of addresses for use on private networks

addresses must be translated in packets if connected to Internet - use network address translator (NAT)

many wireless access points & cable modems use private addresses and NATs

IP Addresses, contd.

IANA (Jon) made early IP address assignments

1st assignments Nov 1977 (RFC 739)

- 1 BBN Packet Radio Network
- 2 SF Bay Area Packet Radio Network (1)
- 3 BBN RCC Network
- 4 Atlantic Satellite Network
- 5 Washington D.C. Packet Radio Network
- 6 SF Bay Area Packet Radio Network (2)
- 7-9 Not assigned
- 10 ARPANET
- 11 University College London Network
- 12 CYCLADES
- 13 National Physical Laboratory
- 14 TELENET
- 15 British Post Office EPSS
- 16 DATAPAC
- 17 TRANSPAC
- 18 LCS Network
- 19 TYMNET

Address Distribution 3/1987

class A (8-bits network, 24-bits node)

27 assigned (1 non US, 5 corp, 4 univ, rest mill)

Class B (16-bits network, 16-bits node)

205 assigned (10 non US, 36 corp, 115 univ, ...)

Class C (24-bits network, 8-bits node)

7,395 assigned

Question

why so few non-US assignments?

Transition 1: Sep 1991

too much work for Jon (and Joyce)

IP address assignments & root zone editing
moved to Government Systems Inc (GSI)

under US government contract (with NSF)
services “free” to users

GSI subcontracted operations to Network
Solutions, Inc. (NSI)

IANA (Jon) kept policy process for new TLDs
and block IP address assignments

Transition 2: Jan 1993

NSF rebid management function and NSI won the IP address, domain name and protocol values registration/coordination function

part of bid was to establish a European IP address registry at RIPE and call for an asia/pacific one to be established

~7,500 DNS registrations at this point

Nuclear Events

1/ early 1990s - www protocol and browsers

mom could surf

domain registrations passed 2,000/mo by 1995
and were on an upward trend

NSI was under fixed \$4.2M/year budget

something had to give

2/ sep 1995 - NSI started to charge \$50/year (2-
year minimum) per domain name in .com, .net
and .org

(.edu registration was still government funded)

Question

what were the main issues people had with NSI charging for domain name registrations?

DNS Side Issue

DNS protocol only supports 13 root name servers

most current servers are run by US companies or US government agencies (10)

but Internet is international

lots of countries want their own root server

>13 countries in the world

also, with only 13 - easy DoS targets

5 roots are now anycast

lots of actual servers all over the world

does not satisfy some politicians

Rise of the RIRs

Regional Internet Registries

RIPE-NCC (Europe) 1993

APNIC (Asia / Pacific) 1993

ARIN (North America etc) 1997

spun out of NSI

LACNIC (Latin America etc) 2001

AfriNIC (Africa) 2005

RIR

allocate IP addresses to ISPs & some large sites

note: not “sell” - IP addresses are not property

exclusive territories

do not guarantee addresses will be routed

membership organizations

mostly ISPs

public policy processes

not restricted to members

Questions

Why are addresses not property?

How can RIRs have exclusive territories?

What about anti-trust?

IANA, Inc.

Jon Postel decided in 1994 that the IANA should not be a US-funded function needed an independent legal home

Internet Society set up an international ad-hoc committee to discuss issue in 1996 produced proposal

US government got interested in 1997 produced Green Paper (1998) similar proposal produced White Paper (1998) proposal still similar LOTS of 3rd party complaints

Gold in them Names

1M names registered in 1st half of 1998

\$100M

big push for new TLDs

seen as a way to print money

these forces did not like White Paper plan

but US Department of Commerce went ahead

chartered Postel proposal for Internet Corporation
for Assigned Names and Numbers (ICANN) - Feb
1999

Jon Postel died October 16, 1998

Question

if 10 new TLDs were created, how much
would each be worth?

what about 100 new TLDs?

ICANN

non-government but contract with US DoC to manage technical aspects of Internet

i.e., root DNS zone & servers, IP addresses & DNS TLDs

DoC must approve important actions

from start seen as able to address other issues

e.g., settlements, porn, spam, commerce ...

current budget \$23M

most revenue from DNS fees

some from RIRs

ICANN, contd.

“performs IANA function”

“As a private-public partnership, ICANN is dedicated to preserving the operational stability of the Internet; to promoting competition; to achieving broad representation of global Internet communities; and to developing policy appropriate to its mission through bottom-up, consensus-based processes.”

two “supporting organizations”

DNS

IP Addresses

plus Government Advisory Committee (GAC)

global policy from supporting organizations

OKed by ICANN board

Rest of the World

International Telecommunications Union (ITU)

traditional home of telecommunications standards

phone technologies, settlements, phone #s ...

UN treaty agency, **governments** do final standards approval

Internet Engineering Task Force

“traditional” home of Internet (and IP network) stds

consensus of geeks & others on standards

100s of focused standards bodies & forums

Regulations

all of telecommunications has heavy regulation

governments say what can be done & how

e.g., quality requirements, fees, deployment scope
and heavy taxes

e.g., universal service fee

none of Internet (in US) has any regulations

some in other countries

some starting in US (e911 for VoIP)

telcom without regulations is a strange concept

to governments & carriers (e.g., guaranteed return)

Convergence

the Internet is the answer

(what was your question?)

traditional phone and video moving to IP
networks

IETF technology dominating tecom future

SIP (voice over IP), MPLS (switched circuits under
IP), BGP (Internet routing), ...

where does that leave the ITU?

and the regulators?

Question

what would you do if you were the ITU?

or a regulator?

WSIS

World Summit on the Information Society
proposed by the ITU, OKed by the UN

‘convinced of the need, at the highest political level, to marshal the global consensus and commitment required to promote the urgently needed access of all countries to information, knowledge and communication technologies for development so as to reap the full benefits of the information and communication technologies revolution.’

lots of issues that could be looked at including:

should ICANN exist or who should control it if
ICANN should exist

who should define standards for next gen Internet

Undercurrents

US control of ICANN

e.g., OK on changes to root zone

if France wants to change IP address of DNS server for .fr the DoC has to OK the change

have/have not split in the world

who should pay to bring Internet to 3rd world
& cost split

content control

many countries want to control access to content
including the US

WSIS

1st meeting a loss

bogged down on have/have not issue

kicked WSIS future to UN

created Working Group on Internet Governance (WGIG)

produced non-specific input to 2nd meeting

prep meeting for 2nd WSIS meeting

US vs everybody

near unanimous view that US had to let go

US said 'we will not relinquish traditional role' (i.e., "no")

2nd WSIS meeting said nice things

& created Internet Governance Forum (IGF)

Meanwhile, International

World Trade Organization (WTO)

ruled in favor of Antigua and against the US
relating to Internet gambling

tells US that it cannot block US Internet users access to
Internet gambling sites

US has mostly ignored ruling (so far)

Question

what should US do about WTO ruling?

Meanwhile, Back in the USA

congress is debating “network neutrality”

carrier view - it's my wire

Edward E. Whitacre - CEO AT&T

‘Google, Vonage & Skype are using **my** network for **free**’

William L. Smith - CTO Bell South

‘we should be able to charge Yahoo to let their web page load faster than Google’

“Internet” view (e.g. Vint Cerf)

how does the next Google get started if the carriers demand an up-front fee

destroy innovation engine

Network Neutrality

specific network neutrality provision voted
down in House committee last week

separate network neutrality bill in Senate
might still happen

House draft blesses FCC “principles”

FCC Principles

*consumers are entitled to access the **lawful** Internet content of their choice*

*consumers are entitled to run applications and use services of their choice, **subject to the needs of law enforcement***

*consumers are entitled to connect their choice of **legal** devices that **do not harm the network***

consumers are entitled to competition among network providers, application and service providers, and content providers

Unanswered Questions

Who says who makes the rules?

Who says who pays for what?

Answers

ITU tried to answer

WSIS tried to answer

who next?

there will be answers

one way or another

Last Question

what will your children's Internet look like
(policy wise, not technology wise)

have fun finding out if you are right