

Prescriptive aspects of the systems of naming and addressing: numerical identities

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The different identifiers you can have

Soap box: Names & Addresses

In theory, names are what you are and Addresses are where you are. In practice, the difference is quite blurred. I will talk only about identifiers.

The different identifiers you can have

- ▶ Domain Names like `vportal.catholica.va`
- ▶ IP Addresses like `2a01:b8:0:1:212:77:0:2`
- ▶ URIs like `tag:bortzmeyer.org,2006-02:Blog/the-gift`
- ▶ ISBNs like `978-0-19-507993-7`

Or identifiers based on the above, such as URLs or email addresses.

Identifiers are used everywhere...

- ▶ Side of the bus
- ▶ Business cards

They are now a real **numerical identity**.

There are technical standards to comply with...

- ▶ maximum length of a domain name
- ▶ authorized characters in an identifier
- ▶ ...

There are hard limits...

For instance, IP version 4 addresses are stored on only 32 bits, which limit them to four billion, not even one per person. (The last one will be allocated in 2011 or 2012.)

With scarcity, comes struggle.

There are practical limits

An identifier can be:

- ▶ stable in time,
- ▶ resolvable to another, more concrete identifier (such as a domain name to an IP address, or an IP address to a route),
- ▶ nice to see and easy to remember,
- ▶ cheap or even gratis,

... but not all of them together!

People can fight for an identifier

As exemplified by the “sex.com” saga...

Whatever the technical system in use (DNS or any other), “meaningful” names (“business”, “hotels”, “coca-cola”...) will attract conflicts.

So...

We need a policy, a governance framework, for identifiers.

Managing identifiers is not purely technical.

Domain name standards and policies

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Is there something worth to add? Not sure.

A small diversion: standards

Technical standards model the landscape.
Sometimes, very strongly. “The code is the law”.

Who decides on standards?

SDO

There is not one unofficial Standards Definition Organization (SDO).

It is even quite doubtful that there are
« official » SDO.

Some SDOs

- ▶ ITU was created by an international treaty (but not ISO or IETF or IEEE),
- ▶ ISO is mentioned in an international treaty (the one creating the WTO, but the Internet is not only for Trade & Commerce!)
- ▶ Most Internet technical standards are created by organizations which were not sanctioned by a law (and which were much more efficient!): IETF, W3C, etc.

Open standards?

There have been a lot of discussions, talks, media interest for the free software movement.

Open standards got less political attention.

What is an open standard? There is no consensual definition?

- ▶ availability of the standard? (Most ISO documents are not available publically.)
- ▶ authorization to implement it? (Patents are a special problem.)
- ▶ openness of the process to develop it? (Many SDO are very closed.)

Technical standards on domain names

There are dozens of RFC on domain names and DNS, unfortunately. The first two are RFC 1034 and 1035. There is no synthesis of all of them.

The important points:

- ▶ Limit at 255 characters
- ▶ Hierarchical name space (something that the lawyers typically never get)
- ▶ Delegation across administrative borders
- ▶ The dot is the separator
- ▶ **Host** names are much more restricted than **Domain** names
- ▶ Since 2003, host names can be almost any Unicode characters

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The important points:

- ▶ Limit at 255 characters
- ▶ Hierarchical name space
- ▶ Delegation across administrative borders
- ▶ The dot is the separator
- ▶ **Host** names are much more restricted than **Domain** names: only letters, digits and hyphens.
- ▶ Since 2003, host names can be almost any Unicode characters

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- ▶ **Host** names are much more restricted than **Domain** names
- ▶ Since 2003, host names can be almost any Unicode characters so `www.müller.de` is legal.

Back from standards

But, however powerful the technical standards are, they don't rule everything.

And policy-makers often hide behind technical standards, saying "Don't criticize us, we are powerless".

So, time to focus again on policies.

Domain name policies

The technical standards do **not** state:

- ▶ How many TLD are possible
- ▶ If we can have TLD in Unicode
- ▶ Is the McDonald's corporation allowed to take the domain name of John McDonald

All this is a question of policy.

Domain names governance

The root of the DNS is officially the property of the US government (from the origins and the DNS and from the Clinton/Magaziner coup).

Some tasks are delegated to an US private organization, ICANN.

But the US government firmly holds the reins:

- ▶ ICANN has authority only through a contract with the US government (two, actually),
- ▶ direct contract between the US government and Verisign, bypassing ICANN, for the management of the root.

Domain names governance, gTLD

ICANN sometimes claim to have a “narrow technical mandate” but it really acts as a regulator for gTLD:

- ▶ prices,
- ▶ policies (for instance the extra-judicial system of the UDRP or the mandatory publication of contact details).

Domain names governance, ccTLD

Most have no contract with ICANN (sometimes just “mutual recognition”).

Policy is typically decided on a local basis.

Sometimes directly from the government (“.us”), sometimes indirectly and sometimes very indirectly.

The issue of internationalization

Should identifiers be internationalized?

No, they are technical references. Yes, they are visible by humans

IP addresses standards and policies

Unlike domain names, IP addresses are typically not considered policy-heavy.

Most political discussions stay in discreet circles.

But they are not less important.

Technical standards on IP addresses

All are set by the IETF.

- ▶ IP version 4: only four billion addresses, already too limited (ask two IP addresses to your Internet access provider, to see what it will respond),
- ▶ IP version 6: almost illimited but not significantly deployed. Standards are one thing, deployment are another!

Policies on IP addresses

These policies handle questions like:

- ▶ How many IP addresses can I have?
(Remember: IPv4 addresses are scarce and there is a huge inequality in their distribution)
- ▶ Can I sell/trade them?
- ▶ May be, in the future, how much money are they worth? (Bad addresses are those tainted by spam, for instance; they would be sold for less)

Who distributes IP addresses?

They are distributed by IANA/ICANN to the Regional Internet Registries (RIR) then to the Internet providers (Local Internet Registries, LIR) then to the end-user.

The rules evolved and the contracts too. Nobody really knows if Hewlett-Packard really “owns” 15.0.0.0/8 and 16.0.0.0/8. Interesting problem for the lawyers!

40 % of IPv4 addresses were distributed before the RIR system.

What are the current policies?

RFC 2050 for the technical basis. And RIR's various policies for the rest.

See <http://www.nro.net/> for a start.

Summary of RIR policies

1. Conservation of IPv4 addresses is essential,
2. Aggregation of nearby addresses is strongly favored (for IPv4 and IPv6),
3. Therefore, you have to demonstrate a need, by documenting it.

How are policies decided?

By RIR members. In practice, the RIR are the Internet operators.

Also, political influence requires time, dedication, attendance to the RIR meetings, etc. Not very different from other political circles.

Identities

Identifiers convey an identity.

Identity is sensible. It cannot be handled outside the normal field of politics.