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Opening to competition the namespace infrastructure

a contribution to the

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General introduction.

Infrastructure of IP based network comprises both hardware and software components. One of the most critical software component are Name Resolving services translating a name into an IP address.

According to the recommendations of the Geneva action plan concerning the C2.Information and communication infrastructure action line *Governments should take action, in the framework of national development policies, in order to support an **enabling and competitive environment** for the necessary investment in ICT infrastructure and for the **development of new services.***

This presentation deals with the issue of enabling competition concerning Name Resolving services, by presenting a technical and legal solution towards this goal.

Introduction to *class* namespaces

It is important to underline that the current DNS system was designed from the outset as a naming tool available for networks other than the Internet, specifically the Chaosnet and Hesiod networks. These networks, now only of historical interest, were never under the governance of the IETF or ICANN.

Such a design is implemented with the help of a parameter named *class* that defines a network with its own specific and distinct namespace. *Classes* are defined by the RFC 2929. Each *class* is a autonomous namespace with its own DNS root servers and its own governance.

The Internet is using the *class* "IN" whose namespace is managed by ICANN. The Chaosnet and Hesiod networks *class* parameter value are respectively CH and HS. They are constituting very significant legal precedents.
For all practical purposes, the field *class* only currently takes the value "IN", but there are up to 65,000 classes available and unused.

The "**Net4D** (http://net4d.org) (ie Network for Development) proposal by Francis Muguet, is a proposal to open DNS services to competition, while relying on the opportunity being offered by this large number of unused *classes.* In other words, the goal of the Net4D project is to provide an enabling and competitive environment for naming services. There could be up to 65,000 competitors to ICANN.

An outline was presented for the first time (Net4D New classes to bind people and machines) at the Internet Governance Forum in Rio in 2007. The proposal was presented with more details (Towards an open governance of the DNS system) (Towards an open governance of the DNS system) at the Internet Governance Forum in Hyderabad in 2008.

For each internet user, the network software includes a DNS client software, also called "resolver" that is pointing to a DNS server that shall answer with an IP address to a request about a domain name. DNS clients appear in many applications (browser, ftp, email client, etc. ..). When a user accesses to the network, in most cases, the DNS server is determined by default by the ISP,. The DNS server, also by default, answers within the class "IN".

In the 90's, another approach to competition was attempted with the so-called alternative DNS roots , however as they were operating within the IN *class,* this approach resulted into a fragmented namespace. Therefore in 2001, ICANN itself recommended to make use of unused *classes,* especially one of the 256 classes for a "private use" for the purpose of an experimentation. Alternative DNS roots have been commercial and technical failures.

The RFCs (Request For Comments) are published by the Internet Engineering TaskForce (IETF) that "*develops and promotes Internet standards, cooperating closely with the W3C and ISO/IEC standard bodies and dealing in particular with standards of the TCP/IP and Internet protocol suite. It is an open standards organization, with no formal membership or membership requirements. All participants and leaders are volunteers, though their work is usually funded by their employers or sponsors; for instance, the current chairperson is funded by VeriSign and the U.S. government's National Security Agency.*" (from Wikipedia)

It is the RFC 2929 that take care of the question of *classes*. In addition to CH and HS classes and 256 classes that anyone can freely use them for "private

use", the other 65,000 classes are not yet assigned classes, and may be assigned by "IETF consensus". If IETF were to decide to block classes assignments to stifle competition, one could legitimately ask why the IETF , whose governance sphere is limited to the Internet, is entitled to assign a class to a network other than his own ie: the Internet. Under international public law, governance and arbitrage between networks should be the responsibility of an international organization such as the International Telecommunication Union, a situation that has been acknowledged by ICANN in its article 4 of incorporation: ICANN "*shall operate [...] its activities in conformity with relevant principles of international law and applicable international conventions and local law" and "shall corporate as appropriate with relevant international organizations.*" -

It is proposed to create other IP based networks, and thus using the same technical pipes as the Internet, but legally distinct precisely because they are using distinct namespace *classes*.

For a *class* to be usable in practice, it is required that the DNS client or "resolver" is able to receive from the DNS server the IP address corresponding to a domain name in this class. The BIND[1] software is the best known among DNS server software but there are a few others[2] .Most DNS clients and servers do not implement completely the RFCs, including RFC 2929. The field *class* is often considered as a fixed value with IN. Therefore, these software clients and servers shall have to be updated and that the *class* field must correspond to a real variable. This does not offer any particular technical difficulty.

There is no namespace fragmentation. The parallel use of several *classes*, is possible: users may use, at the same time, concurrent systems because they can be supported by the same DNS servers. It is transparent to the user, as shall be the transition from IPv4 to IPv6, which occurs at a different level. There is no conceptual problem.

In practice

Users are going to indicate the *class* with an extra field in front of the domain name. The syntax might be *class*% placed in front of the domain name. For example for *class* 4d (corresponding to the network Net4D) and CT class (corresponding to the Cyrillic network Сеть meanig network in Russian) could have the following URLs:

http://4d%fr.wikipedia.open

http://ст%Москва.po

In current browsers, there is no need to type http:// and therefore typing ст%Москва.po woukd suffice. For a person writing only Cyrillic, one may envision that she/he set in her/his browser the class CT as the class by default so that the person would have only to type Москва.po , without the need of any ASCII letters.

[1] http://fr.wikipedia.org/wiki/BIND

[2] http://en.wikipedia.org/wiki/Comparison_of_DNS_server_software

Potential Uses of Classes

Implementation of *classes* should facilitate the emergence of new ways to a different use of the Web. More oriented towards new developments, this new network fabric shall be more dynamic, shall provide a new frontier to innovations, and shall be open to civil society and to linguistic diversity, developments, as well as meeting the expectations of innovative industries and emerging countries

Use of new *classes* can be the vehicle for a different approach of the Web in emerging countries, with costs that are directly determined by the governing body of the *class*, and therefore potentially much lower.

This could be achieved through the semantic web, using markups and tags of content according metadata and logic languages schemes (ontologies), allowing for far more relevant access to data than in full text. It is therefore proposed to implement *classes,* called *semantic classes* , where the legal and technological innovation lies in the fact that owners of domain names are contractually obliged to follow a specific ontology, or to lose their domain names. It would be therefore possible to create namespaces as zones where metadata may be trusted.

As an important consequence, this would redefine the search engines' market, which is currently almost a monopoly, to allow the emergence for new search engines.

Last but not least, *classes* could use UTF8 encoding, allowing a natural, simpler and more efficient implementation of multilingualism, instead of the current system, whose progress is very slow, which is based on ASCII and transcription UTF8 - ASCII.

Applications to explore: :

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- ✓ *Class* namespaces would offer alternatives to new ICANN extensions (new gTLDs) that would be technologically and economically attractive and would allow creation of a space of trust.
- ✓ Implementation of the Internet of Things, with the creation of M2M software, using semantic tags recognition and automated processes operation;
- ✓ Creating cityTLD or regionTLDs in multilingual *semantic classes*, without the financial and technical constraints imposed by ICANN, in order to empower communities to implement societal strategies.
- ✓ Implementation of multilingualism based on both UTF8 and metadata resulting into much more efficient[3] automatic

[3] Whenever a given text is available in several language versions, the translation could use the various versions to clarify and remove ambiguity. For example, the translation of the French “société” that could

translations.

- ✓ and the possibility of using UTF8[4] encoded emails. *Classes* may be the avenue toward for a real “Babel Web”.
- ✓ Using a trusted semantic web in order to cross-reference information enabling the creation of databases, e-market places and thus empowering far more efficient price comparators. Use of price comparison combined with e-market places would allow automatic or assisted e-transactions;
- ✓ Content marking would also enable construction of trade-related specific thesauri (aeronautics, health, logistics, etc.).
- ✓ Creating DNS *classes*, under the governance of WIPO in direct relationship with 45 classes of trademarks of the International Classification under the Nice agreement, enabling a trusted namespace for brands, either alone or in combination with other DNS *classes* ensuring legal and commercial security, vehicle for economic growth.
- ✓ Creating a DNS *class*, under the governance of the United Nations or ITU, its specialized Telecom agency, concerning the namespace of entities under international public law.
- ✓ Creating DNS classes related to Education, Culture and Science under the governance of UNESCO.

From a political point of view, the existence of new *classes* is a kind of revolution in the governance of the namespace of IP-based networks. It is a constructive revolution however, because related governances may co-exist technically.

Concerning DNS security, a centralized security could then be replaced by distinct decentralized security systems related to each *class*, offering a commercial and political independence for all players. In the DNSSEC system the root signing authority may be distinct according to each *class*.

Concerning economics, *classes* are opening the namespace market to competition between potentially 65,000 players and would end the monopoly of the first operator.

At the scientific and technological level, the classes allow for innovation (eg semantic web, Multilingualism, M2M; ...) to flourish.

Implementation of *Classes*

Experiments

If the the general deployment of *classes* cannot be considered immediately - except in areas under centralized governance – one should consider experimental periods in various areas having an interest in the project, either

be translated either into "company" and "society" in English. The availability of a Spanish version where the term is translated as “sociedad” would help to make the right choice.

[4] http://en.wikipedia.org/wiki/UTF-8

for political or economical reasons or for local reasons (language, cultural diversity,etc.)..

Experiments may be performed at the level of a country, a region, a city, using one of the 256 classes scheduled for private use.

In the experimental area, implementation of *classes* shall be ensured in :
1) all DNS servers of all major ISPs operating in the area ;
2) servers and DNS clients, servers and other web applications, at, local or remotely located companies, operating in the area;
3) servers and DNS clients, servers and other web applications, at local (or even national) authorities, associations as well as individuals operating in the area :
4) DNS clients and browsers of users participating in the experiment .

The participation of major ISPs in the area should a contractual requirement in order to start an experiment, the participation of other players will be implemented be on a voluntary basis, while a website would feature a dynamic list of current participants.

Conclusions

Naming services are key components of the software infrastructure of IP based network. The use of Namespace *classes* is in a position to provide an enabling and competitive environment for such services, in accordance with the recommendations of the WSIS C2.Information and communication infrastructure action line; facilitated by ITU, and APC.