ccTLDs vis-à-vis the changing Internet governance landscape

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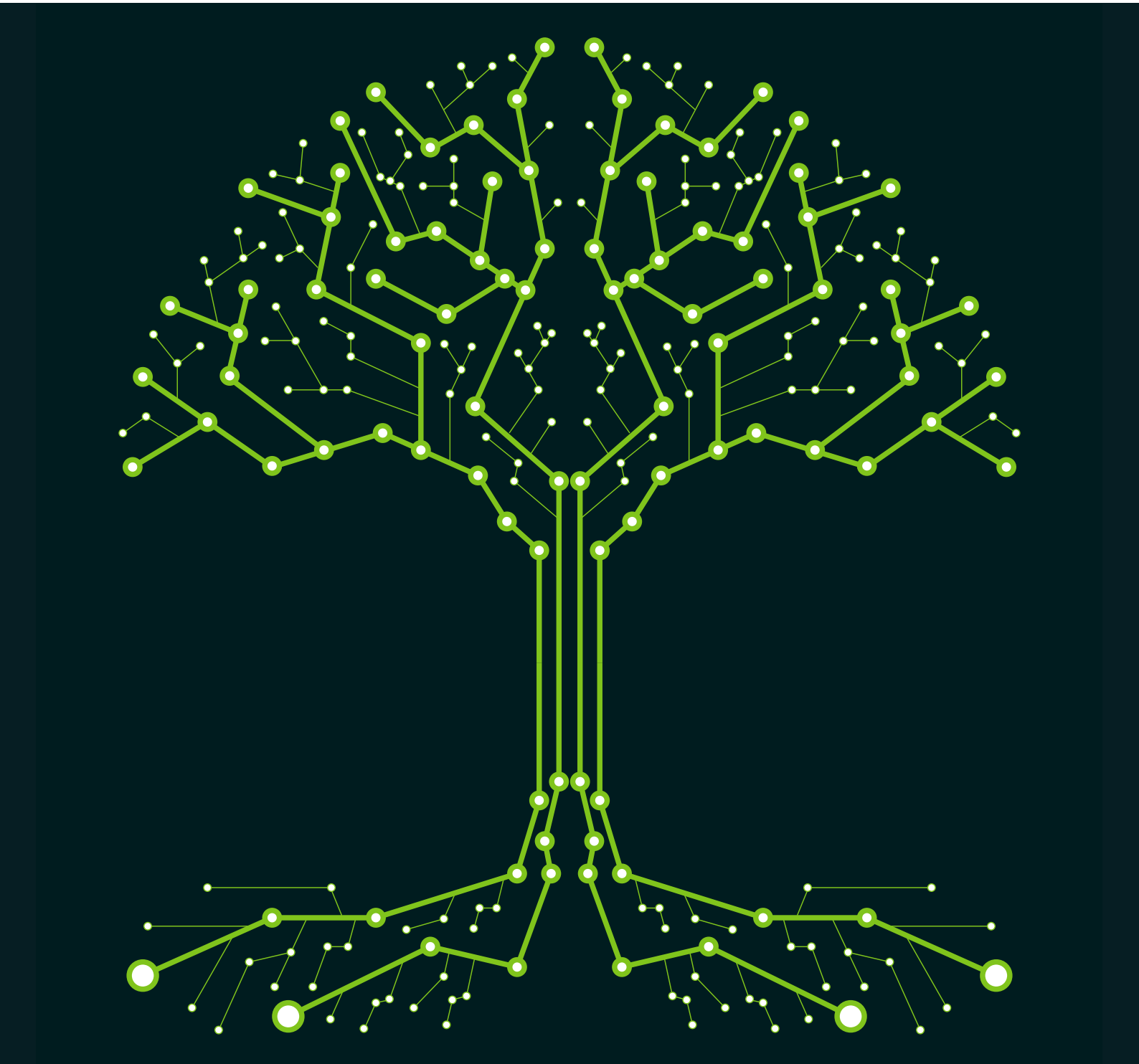

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In their origins, ccTLDs focused on running the DNS and often acting as network information centers (NIC), coordinating vital services in the emerging inter-networking experiences in the countries. They accomplished technical functions that were essential for the delivery of country / territory identifiers of the DNS infrastructure. With time, ccTLD functions began to diversify as the environment became more complex in dimensions other than purely technical, including the policy environment at the national, regional and global level for European registries.

The creation of ICANN marked a point of inflection for the institutional ecosystem around the DNS, and the discussions around the IFWP[1] that led to its creation showed that European ccTLDs registered these movements and responded to them with different approaches. The WSIS process (2003-2005) and one of its outcomes, the IGF, also marked another point of inflection for ccTLDs. The discussions about who, why and how the internet is operated became one of the salient features of the governance discussions around these times and ccTLDs expanded their work in developing a greater understanding of the functioning of the internet and the role of the DNS in the national communities where they had been traditional country players for over 15 years in most contexts.

This work seeks to map the evolution of the internet governance ecosystem vis-à-vis the development of ccTLD registries as organizational units that are embedded in both their national contexts as well as in the global internet, performing unique technical functions in the management of the DNS. To accomplish this, it will trace the creation rate of European ccTLDs; then it will address the development of the internet institutions that helped shaped the agenda of ccTLD policymaking, including ICANN. Finally, it will look at the expansion of internet governance beyond the institutional framework of "technical community" organizations, such as the WSIS process and the national IGFs. This mapping will serve to frame a typology around the emphasis of ccTLD policies, their sources and stages.

New organizational entities

With the birth of the internet 50 years ago when the first login was established between UCLA and SRI in California, a whole new set of organizational features, coordination mechanisms and normative capabilities were created and expanded over the years to accompany the expansion and evolution of the networking functions around TCP/IP protocols. From two networks and one organizational mechanism, the Arpanet Working Group, to hundreds of organizations involved in the daily functioning of the internet, the technical and institutional landscape has both diversified and become more complex. The intricacy of managing a growing network that, in the mid-1980s, encompassed over 300 Autonomous Systems and thousands of hosts, led to the development of the Domain Name System (DNS). The Root Zone file was first invented in 1983, and top-level domains began to be incorporated in it on the 1st of January 1985, with extensions such as .arpa, .com. .mil and .net, followed in the ensuing weeks by extensions such as .us (February), .uk (July) and .il (October).

In Fig.1 a mapping of the evolution of CENTR member ccTLDs shows their delegation rates. By 1993 over half of them had already been delegated by the IANA and a great portion of the continental European ccTLDs were already fully operating their zones[2].

1 International Forum on the White Paper.

2 In 1996 and 1997 a dozen ccTLDs belonging to islands and overseas territories in the Atlantic and Indian Ocean were delegated, accounting for the spikes of this years.

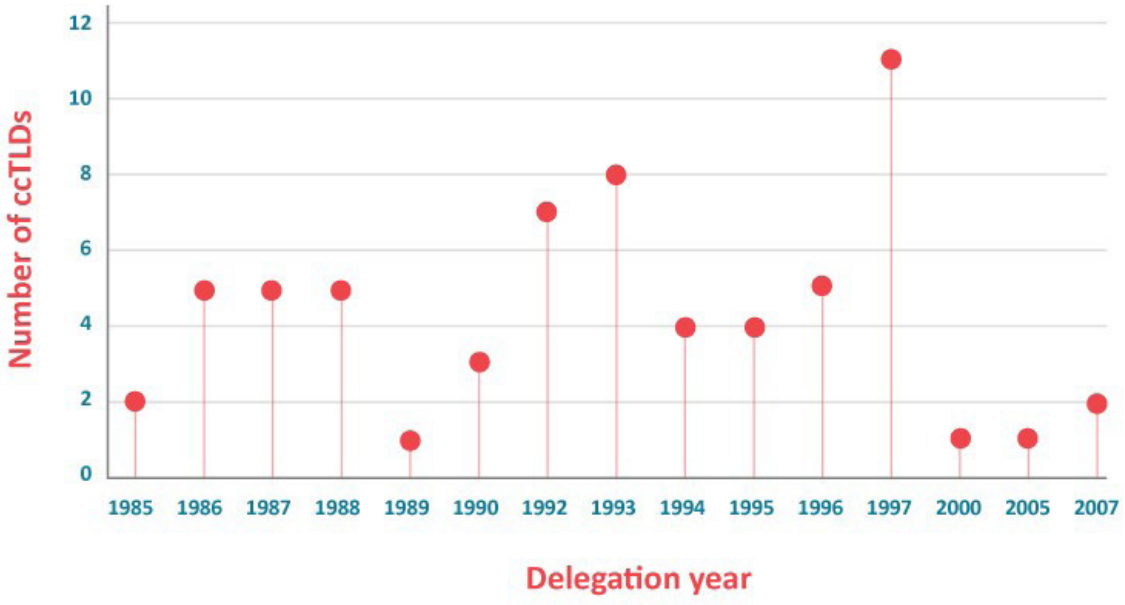

Fig. 1 Evolution of CENTR's full members' delegations

Eighteen European ccTLDs, i.e. one third of CENTR's members were delegated between 1985-1989 and 76% during the 1990s; 90% were already delegated before the creation of ICANN. But what do these dates imply in terms of internet times? Before the time of creation of most ccTLDs, there were only a handful of companies that could be identified with the internet and the digital ecosystem: Apple (founded in 1976), Microsoft (1975), Oracle (1977) and Cisco (1984). The largest internet businesses that for many users have become synonyms of the internet arrived much later in the scene than most ccTLDs: Amazon (1994), Google (1998), Facebook (2006) and Cloudflare (2009), to mention but a few. ccTLDs have been around for longer than many of the internet companies and organizations that appear prominently in the discussions of the public sphere.

What are the lessons learned from ccTLDs in a changing internet environment? What have been the milestones of the changes in the ecosystem for ccTLDs? How have these changes affected the work and strategic rethinking of ccTLDs?

ccTLDs in a maturing technical ecosystem

With respect to the definition of top-level domains, the recent RFC 8499 (January 2019) from the DNSOPS working group of the IETF states that: "TLDs are often divided into sub-groups such as Country Code Top-Level Domains (ccTLDs), Generic Top-Level Domains (gTLDs), and others; the division is a matter of policy and beyond the scope of this document". From the standpoint of a ccTLD, this statement addresses the policy dimension as a critical distinction of this type of registry from the gTLDs. There are thousands of pages, recordings and hours of discussions that have attempted to capture the intrinsic complexity of defining the work and scope of registries beyond their technical functions. While technically a ccTLD and a gTLD have the same value in the DNS, their widely different policy arrangements are openly recognized by all stakeholders in the internet ecosystem, including at ICANN[3] [4]. This distinction also points at one of the salient arguments of this work, that the defining attributes of ccTLDs go beyond the maintenance of core registry operational features; even those that may seem to be purely "technical" are embedded with values shaped by the expansion of the DNS as a key feature of the internet's "plumbing"[5], as an essential but not too visible function.

3 CENTR 20th Anniversary Paper: ccTLDs: autonomous but cooperative actors, Farzaneh Badiei

4 The distinction between generic gTLDs and ccTLDs would have inhibited unity of authority and jurisdiction at ICANN in its early days. (Hans Klein (2002) ICANN and Internet Governance: Leveraging Technical Coordination to Realize Global Public Policy, The Information Society, 18:3, 193-207).

5 F. Musiani, 2012. Caring about the plumbing: On the importance of architectures in social studies of (peer-to-peer) technology - Journal of Peer Production.

The first core ccTLD policies emerged from the conformity with the IANA functions, served initially by Jon Postel at the ISI, University of Southern California. In the famous RFC 1591 of 1994 he settled in an ex-post manner the key features of ccTLDs. As noted earlier, by that time more than half of the ccTLDs had already been delegated and were functional registries. Some key distinctions of the text, such as "public service on behalf of the internet community" were considered a design feature and a safeguard against a variety of potential abuses[6]. In addition, this document set an important framing for the early days of ccTLDs with respect to the "responsibilities" and "service" to the community. Some of the first ccTLD policies were concerned with the assignation criteria of domain names to those that requested it. "The designated manager must be equitable to all groups in the domain that request domain names" was translated into the "first come, first served" rule that is still applied[7]. It was written before the introduction of the world wide web (WWW) where the rapid growth of the internet put significant market, social, and political pressure on domain name allocations.

The key policies and strategic positioning of some ccTLDs began to change with the emergence of ICANN in 1998. When ICANN was formed it was intended to work with three organizations, the Domain Names Supporting Organization (DNSO), the Address Supporting Organization (ASO) and the Protocol Supporting Organization (PSO). They were all going to be independent from ICANN, including the DNSO. But this changed during the first ICANN meeting in Singapore when Esther Dyson announced that the protocol functions would be run by the IETF, the W3C at the PSO, and that the number functions under the ASO would be comprised of the five Regional Internet Registries. The name functions, incorporated in the DNSO, became a part of ICANN, with no independent existence outside of it and with far-reaching consequences as shown by IANA Stewardship Transition (IST) and the creation of the PTI 18 years later[8]. These original decisions about ICANN and its scope had far-reaching implications for the whole internet regime and its governance, which will not be developed here as they go beyond the scope of this document. But this outcome was highly problematic for ccTLDs considering the status of ICANN as a Californian non-profit organization, while most of them pre-dated it and their legitimacy was in serving their communities.

When the DNSO was created as the constituency that addressed the domain names functions, both ccTLDs and gTLDs were placed together in the same group. The experience was short-lived, as it became clear that the interests, scope and source of legitimacy of both groups were different, and that the market stakes of the gTLDs were very high and ICANN's business model relied on the fees of these generic domain names. The creation of the country code Name Supporting Organization (ccNSO) in 2003 – and the Generic Name Supporting Organization (GNSO) - marked this necessary differentiation.

RFC 3071 (Klensin) from 2001 approaches a critical distinction that emerged during the early ICANN years with respect to the difference in the approaches of ccTLDs and gTLDs. There were already notable differences in terms of ccTLD policies where all sources of registrations were admissible and those that adopted a more restrictive policy for residents, or at least did not openly pursue registrations outside the country / territory with which their strings identified. "All current domains in this category are ccTLDs, but not all ccTLDs are in this category".

When the ccNSO was created, Giovanni Seppia[9] who was at CENTR at the time recalls that only ccTLDs who had signed exchange of letters or accountability frameworks were admitted by the ccNSO. This was a crucial mistake, for it spurred a general feeling of distrust10 during those early days from a community that had already been exercising its core functions for over a decade in many cases. The amendment of the ICANN bylaws to accept ccTLDs as ccNSO members without signing an accountability framework and the development of the exchange of letters as a lightweight instrument of accountability served to pave the way for an increased membership. But this took time to accomplish and it was particularly resented by the European ccTLDs. Although ccNSO

6 RFC 3071. John Klensin. Reflections on the DNS, RFC 1591, and Categories of Domains.

7 Though still applied, this rule has been shaped by the intellectual property industry and by 2000 WIPO had already set up a ccTLD program to address copyright conflicts in domain names with the UDRP.

8 During the IST the protocol community engaged in an MOU with PTI to cover these functions, and the RIRs through the Number Resource Organization with an SLA. The names community maintained the institutional inertia of the past original choices and proposed the creation of a new entity, PTI to contract with ICANN.

9 Interviewed for this work on 11 September 2019.

10 Poblete, Patricio ccNSO: founding, development and present functions of the ICANN Country Code Names Supporting Organization in LACTLD News. 11 December 2018. https://www.lactld.org/en/novedades/ccnso-founding-development-and-present-functions-icann-country-code-names-supporting.html

membership soared between 2006-2013[11], in relative terms Europe is still the region with the lowest number of ccNSO members, (46) with over 65 ccTLD extensions.

This section has portrayed how the decisions that were taken in the early days of the institutionalization and the coordination of functions related with the DNS and domain names were influential in framing some contours of ccTLD policymaking, both within their communities of users as well as in the incipient international ecosystem. Emily Taylor (OXIL Labs)[12] remembers that "RFC 1591 was quoted at least once by members at CENTR meetings. There were nods of reverence to these ideas and particularly to the concept that the real strength of ccTLD lies in the service to its community" during the early 2000s. This excerpt has also served to illustrate how top-down policy from ICANN did not work for ccTLDs, and that the governance authority sources for these registries were more complex and diverse than that of gTLDs since they were serving their communities (following RFC 1591), embedded in national contexts, where governments have the ultimate word. The creation of ICANN added another international layer to this debate[13].

Expansion of the internet governance agenda: governments and the broader ecosystem

"Over the next few years, the struggle for control of the DNS and ccTLD delegations is likely to continue, or perhaps even escalate. There is little doubt that the ccTLD policymaking story will still include ICANN, IANA, ccTLD managers, national governments, GAC, ITU, and WIPO. The story will also feature new, emerging players, such as CCNSO, CENTR (Council of European National Top-Level Domain Registries), 92 powerful individual ccTLD managers, 93 intellectual property rights holders, internet service providers, and major telecommunications and information technology companies. As a result, few can forecast how the future will unfold, and it can only become more intriguing"

(Yu, 2004: 407-408).

In the years following ICANN's creation, the internet ecosystem became more complex. ccTLD policymaking now included not just the technical community expectations and ICANN, but also international organizations and long-established incumbent telecommunication players and some governments who were beginning to push for redelegations, mostly of academic registries.

In addition, two forces converged: new players, including many governments who had not participated in the early days of the internet, started to become interested in internet governance issues and at the same time, the agenda of internet governance shifted from a narrow approach, mainly centred around the management of the so-called Critical Internet Resources to a broader one where human rights and development issues were also included.

Many European ccTLDs were quite informal at the time of the WSIS discussions and the Working Group on Internet Governance (WGIG). Emily Taylor recalls that Markus Kummer, then coordinator of the WGIG for the WSIS process, came to a CENTR meeting and encouraged members' participation. He mentioned that the WGIG was forming and everyone was talking about the DNS. These prompts encouraged members' participation during the WSIS process. Representatives from European registries such as AFNIC, Nominet, SIDN, NIC.CZ, NIC.AT and CENTR participated during the WSIS process and its culminating document, the Tunis Agenda.

While in principle the WSIS process (2003-2005) opened the internet governance agenda to development and human rights, encouraging a broad approach, in practice this agenda began to expand only with the development of the IGFs. As such, at WSIS, "the hilarious thing was that all the time we were chatting about the DNS" remembers Emily. This view is seconded by Giovanni Seppia (EURID) "human rights became a trendy topic, but until 2010 the main focus of internet governance discussions was focused on the technicalities of the internet and trying to simply understand how things worked". CENTR made an important effort during those years to try and get governments to understand the work of ccTLDs and how they serve their communities. Many of the European ccTLDs during the early years of the 21st century had an informal relationship with their governments.

11 When it incorporated 99 members, i.e. 58% of its current membership. Source ccNSO https://ccnso.icann.org/sites/default/files/field-attached/membership-18sep19-en.pdf

12 Interviewed for this work on 4 September 2019.

13 This claim is also developed by Hans Klein (2002) ICANN and Internet Governance: Leveraging Technical Coordination to Realize Global Public Policy, The Information Society, 18:3, 193-207.

One of the unintended consequences for ccTLDs from the WSIS process was that ICANN seemed a far more appealing focal institution than other alternatives that were discussed during those years. The WSIS enabled ccTLDs to search for a new position in the broadening expansion of the internet governance ecosystem, which was openly challenging the role of the US Government over the IANA functions. "I do think that WSIS was a defining moment, there was an external threat. Our community rebranded itself as multistakeholder when we described how we informed policy, we had never thought of ourselves as such, but it emerged as a plausible narrative, as embedded in the local community", adds Emily Taylor.

During the WSIS phase and in the next years it was a time of discovery of the international environment for many ccTLDs. For Giovanni Seppia, the attendance of European ccTLDs to the first IGF in Athens implied a moment of discovery of their surroundings and the dawning of a new time whereby they had to engage with a broader context. Even though ccTLDs had been addressing their community of users in the past, they gradually became more involved with national policy making. "Registries now have a very different role in society and as an internet national player", mentions Luisa Gueifao (.pt)[14] who runs a registry that changed its structure and governance model in 2013 from an academic organization to an association comprised of academic, e-commerce and consumer protection sectors, incorporating the multistakeholder model in the design of ccTLD .pt.

Many European ccTLDs still play a key role in their local IGF editions. According to documentation of the NRI sector at the IGF, 43% of CENTR members are involved in national IGFs. These initiatives are led by governments in most cases. Nevertheless, over half of the ccTLDs do not engage in the IG ecosystem at local level, mainly because these initiatives have not yet been crystalized in the local community.

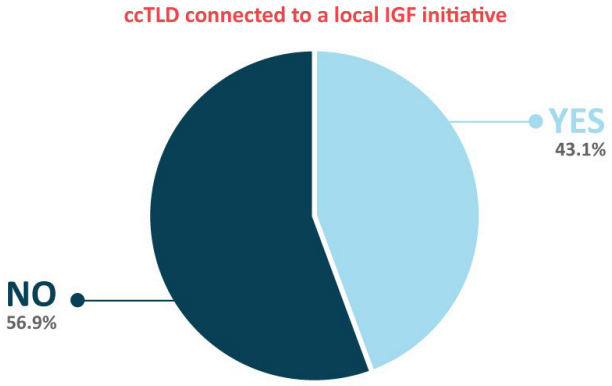

Figure 2. Source: NRI, IGF[15]

In the context of European ccTLDs, it is also imperative to address the increasing role of regional authorities over several issues of the internet and digital ecosystem. Although this might not seem to directly concern ccTLDs, it has certainly reshaped and refocused the conversations around internet policy-making in contemporary times. The focus on the protection of privacy and data in this region have affected ccTLD policies and operations. While some registries such as NIC.CZ recognize that privacy concerns have always been embedded in the technological design, the influence of GDPR has changed the practices of registries, acknowledges Ondrej Filip (NIC.CZ)[16].

A sustainable future for ccTLDs

One of the greatest challenges that has merged for many ccTLDs in Europe, and many other regions, is related with the slowing growth rates of the past years. Whilst for over a decade two-digit growth rates were the norm, in some cases negative growth figures are now showing up, and the trend of lower growth rates is expanding.

ccTLDs are not only a service to the community but a business that must survive, a fact which has pushed registries into looking at other value propositions. Most of the largest players in the market have become interested in other businesses, including businesses that have not been included in the DNS industry. According

14 Interviewed for this work on 12 September 2019.

15 https://www.intgovforum.org/multilingual/es/content/igf-regional-and-national-initiatives

16 Interviewed for this work on 27 September 2019.

to Emily Taylor, although ccTLDs are profitable and have legacy effects, the new gTLD program has provided a similar external shock as WSIS. Yet, this is not necessarily a shared view. According to Giovanni Seppia, the real shock is domain name saturation, which has spurred the need to diversify, adapt and re-adjust business models to the new uses. In his view, new gTLDs helped improve ccTLD performance metrics and to reflect on the current business models and practices. Ondrej Filip believes that sustainability and diversification of sources of income have become essential features of the new perspectives adopted by ccTLDs.

Using Gartner's terminology[17], ccTLDs could be at this moment in their "plateau of productivity" after over three decades of existence and in the context of alternative technologies and platforms. Although domain names play a unique role as part of the DNS, the competing forces of social networks, apps and the like are generating new avenues of thinking and solutions for ccTLDs.

For example, the role of security emerges clearly as a new value proposition. "We think that people now look at .pt as the symbol of Portugal and security online. And we must have these roles in perspective when we run the ccTLDs" comments Luisa Gueifao. Giovanni Seppia underscores quality over quantity as a strategic positioning at EURID and Emily Taylor reflects on the role of single unique identifiers based on the DNS for the Internet of Things. These are all new value propositions and business models that reflect the evolution of Internet protocols and technology, platform-based models particularly at the content layer and shifting user preferences. Despite these changes and declining growth rates, the DNS is still a binding glue of the Internet and the fact that the overall volume of domain names continues to grow18 is a sign of economic and social embeddedness of this technology.

A framework for mapping ccTLD policies

Based on the evolution of the issues and sources of ccTLD policies in the last three decades, Figure 3 provides a model that attempts to visually represent and organize the progression of ccTLD policy orientations, concerns and sources. Although the role played by ccTLDs in each country is unique, this does not preclude the tracing of a pattern to develop a model that illustrates core themes, stages and policy sources. The issues are in the innermost circle, identified as technical and operational; regulatory and governance; community and ecosystem; sustainability.

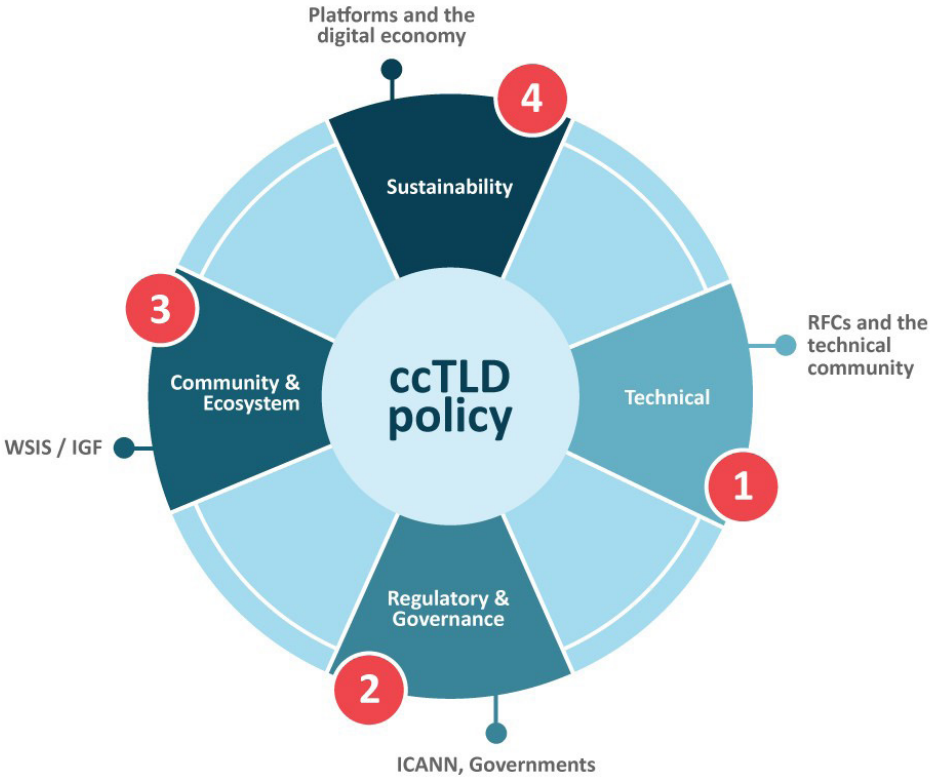

Figure 3. A framework for ccTLD policy-making

17 Gartner "2017 Hype Cycles Highlight Enterprise and Ecosystem Digital Disruptions."

18 CENTRStats TLD Global Report 2019/2 shows the declining growth rates, even negative in some cases, but with an increased growth among European ccTLDs on a quarterly basis.

Technical, since the main concerns at the time emerged from the need to deliver stable and reliable operations to its community (ca. 1990-1998). Ondrej Filip remembers that "we came with the view that we had to develop the core business in-house, we needed in-house knowledge and to promote a technically advanced registry rather than an administrator" when he joined it in 2003[19]. Although there is a conflation of technical with technology, operational efficiency was key in these early years to gain trust and loyalty from its users, as well as respect and recognition from outside actors such as the IANA administrators. The main policy sources for this phase come from the RFCs and other technical community organizations (such as the RIRs).

A second stage that added an extra layer to the policy options for ccTLDs has a regulatory and governance focus and is centred around the creation of ICANN, a policy source that began to shape the discussions on the nature of ccTLDs from an international regime perspective (1999-2003). This new phase squarely placed ccTLDs in the framework of a global organization and a governance regime that had become increasingly institutionalized by private sector forces. The creation of ICANN and the role of the name functions in this organization placed the registries under the spotlight of governments and an additional layer of national regulation that ensued in many contexts. The ICANN regime did not bind ccTLDs who were not aligned with this new governance structure (other than through the strict adherence to the IANA functions), but the effects of the evolution of this regime have been felt since 2014 with the announcement of the IST.

The community and ecosystem process happened in parallel with the WSIS developments and the first generation of IGFs (2003-2015). These events helped to shape the conversations with governments and other national stakeholders, including the private sector, civil society and universities. For approximately half of the European ccTLDs, this phase has implied re-thinking and adapting the concept of multistakeholder governance to their national communities in different ways. It has also enabled ccTLDs to develop a role in developing capacity building and education about the DNS and as catalysts for local projects concerning the Internet.

Finally, the last stage labelled sustainability (2015 and ongoing) is the last phase that has been added to the framework and it emerges in the evolving discussions about models for success in the "digital economy". Clearly domain names are not the only form of online identification in the new Internet environment, but there are bundled services and platform-based models (in two/multi-sided markets) that are receiving increased attention by ccTLDs. The influence of industry and private sector actors is a feature of this.

Although there are exceptions to the sequences and the timing proposed in Figure 3, it attempts to provide a complete picture of the different processes and factors that have been included in the repertory of ccTLD policy choices in the last decades. It should also be interpreted as a layered model, together with the sources and institutional factors. The progression of stages does not mean that the previous one was discarded or overcome with final solutions, but rather that there is a new horizon of challenges and/or opportunities to attend. "I believe that the ccNSO and CENTR have greater challenges than what we had in the beginning, since the Internet has changed so much", comments Luisa Gueifao. Part of these changes and tests are precisely derived from the expansion of issues, institutions, proliferation of venues and diversification of stakeholders.

This work has sought to map some of the key milestones that have affected ccTLD policy making, particularly in the European context with the hope it triggers discussions about the future of ccTLDs and their strategies. One of the central pieces of this examination has been to frame Internet governance and the role of ccTLDs beyond the scope of institutions and instead incorporate other dimensions such as the interplay between technical features, the evolving socio-technical and institutional ecosystem and national and international regulations. The first three decades of the existence of ccTLDs have been marked for their evolution and transformations. It is critical for ccTLDs to include and acknowledge their background and lessons learned as firm roots that will allow them to grow in the future ecosystem of the Internet and its governance schemes.

19 This ccTLD is now a global reference for projects such as FRED and DANE.

Council of European National Top-Level Domain Registries

CENTR is the association of European country code top-level domain (ccTLD) registries, such as .de for Germany or .si for Slovenia. CENTR currently counts 54 full and 8 associate members – together, they are responsible for over 80% of all registered domain names worldwide. The objectives of CENTR are to promote and participate in the development of high standards and best practices among ccTLD registries. Full membership is open to organisations, corporate bodies or individuals that operate a country code top level domain registry.

This paper is part of a series of articles covering industry research, historical data analysis and the future of technologies such as digital IDs, published over the course of 2019 to mark CENTR's 20th Anniversary. These publications do not necessarily present the views of CENTR or of the CENTR community.

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