

# CHAPTER 8 Names and Numbers

11.30/2016.8.11/2019.6.17/2020.3.27/2024.11.16/2026.3.14

Kilnam Chon

The Internet Protocol (IP) addresses and other numerical parameters necessary for Internet operation became available outside the United States starting in the mid-1980s. Country code Top-Level Domains (ccTLDs), as part of the Domain Name System (DNS), were also deployed from the mid-1980s, beginning with .uk for the United Kingdom (UK), along with generic Top-Level Domains (gTLDs) such as .com in 1985. Initially, these were managed by Jon Postel and his team at the Internet Assigned Number Authority (IANA) of the ARPANET Project Office. As the Internet expanded rapidly and opened up to countries beyond the USA, UK, and Norway, it became necessary to delegate the assignment of names and number resources—including IP addresses and domain names—to other continents, including Asia, Europe, and North America.

Regional Internet Registries (RIRs) were established in the early 1990s, starting with Europe (RIPE NCC), followed by the Asia Pacific (APNIC), and later expanding to other regions—such as ARIN for North America, LACNIC for Latin America and the Caribbean, and AfriNIC for Africa. These RIRs later formed a global coordinating body called the Number Resource Organization (NRO). Both the RIRs and the NRO work closely with the Internet Corporation for Assigned Names and Numbers (ICANN).

ccTLD coordination followed the pattern of number resource assignment, starting with the first regional coordination body in Europe (CENTR), then Asia (APTLD) in the late 1990s, with other continents (AfTLD for Africa and LACTLD for Latin America and the Caribbean) following later. These regional TLD associations also work very closely with ICANN.

One notable organization, DotAsia, should be mentioned here. The top-level domain, .asia, was assigned to DotAsia, a private company, in 2006. Members of the company and the Internet community in Asia see the organization as an Internet community group rather than just a private company in Asia. DotAsia contributes to the Asia Internet community just as much as any other Asian Internet organization, including supporting the Asia Pacific Regional Internet Governance Forum (APrIGF) and the Asia Pacific Network Group Camp (APNG Camp), among others.

In this chapter, we provide an overview in Section 8.1. Section 8.2 offers a detailed description of the formation and early history of APNIC from 1992 to 1995. Then, Section 8.3 provides a detailed description of the formation and early history of APTLD from 1998 to 2003.

## 8.1 Overview

*Kilnam Chon*

The Internet Protocol version 4 (IPv4), along with the Transmission Control Protocol (TCP), was introduced to replace the Network Control Protocol (NCP) of ARPANET on January 1, 1983. The Domain Name System (DNS) was also introduced to the Internet in 1985,

beginning with generic top-level domain names (gTLDs) such as .com, .net, .org, and .edu, as well as country specific domains.

The top-level domain (ccTLD) for the United Kingdom is .uk. Other ccTLDs were introduced to the Internet starting in 1986. The Internet Assigned Numbers Authority (IANA) manages the allocation of globally unique domain names and numbers used on the Internet [Reynold 1990; Postel 1994]. These include top-level domain names, IP addresses, and Autonomous System (AS) Numbers, among others.

In 1992, the US National Science Foundation (NSF) awarded three five-year cooperative agreements, including Network Solutions, Incorporated (NSI), for registration services of domain names and numbers, including Internet Protocol version 4 (IPv4) [Adler 1994; Simon 2006]. The three awardees, including NSI, adopted the name InterNIC to describe their joint roles. InterNIC was operational from 1993 to 1998. Verisign acquired NSI in 2000.

When the first Regional Internet Registry (RIR), RIPE NCC, was established in 1992, the number registrations for IPv4 and AS Numbers in Europe were transferred from InterNIC to RIPE NCC. When the Asia Pacific Network Information Centre (APNIC) Experiment Project began in 1993, number registrations for Asia and the Pacific started being issued by APNIC [APNIC 1993]. The number registrations for North America and other regions, previously handled by NSI of InterNIC, were transferred to the American Registry for Internet Numbers (ARIN) when it was incorporated in 1997. More Regional Internet Registries (RIRs), including LACNIC in Latin America and the Caribbean, and AfriNIC in Africa, were founded in the 2000s. These five RIRs have collaborated on number registrations with the Internet Corporation for Assigned Names and Numbers (ICANN) as the Address Supporting Organization (ASO) since 1999. The first four RIRs decided to form the Number Resource Organization (NRO) in 2004, and AfriNIC joined the NRO in 2005 when it was founded [NRO 2012].

The Midterm Evaluation Meeting on InterNIC was held at the US National Science Foundation (NSF) in Washington, D.C., in November 1994. The review panel's recommendations included provisions for NSI to start charging for .com domain name registrations (which posed the biggest growth challenge) as soon as possible, and NSF accepted the recommendation. And the multibillion-dollar domain name industry was born.

The root server for domain names was another issue, especially regarding its control [Mueller 2004]. The Internet is distributed except for domain names, IP addresses, and other related numbers. These are centralized. Therefore, questions like "who shall control the root, and who shall decide on new top-level domains?" became significant in the 1990s and 2000s as the Internet gained popularity in the commercial sector and worldwide.

The International Ad Hoc Committee (IAHC) was among the first organizations to focus on the allocation of top-level domain names. IAHC was formed in 1996 with the following members:

- Federal Networking Council (FNC)
- Internet Architecture Board (IAB)
- Internet Assigned Numbers Authority (IANA)
- International Trademark Association (INTA)
- Internet Society (ISOC)
- International Telecommunications Union (ITU)

## World Intellectual Property Organization (WIPO)

IAHC delivered the generic Top Level Domain Memorandum of Understanding (gTLD MoU) in 1997, and then IAHC was dissolved. The MoU was signed by over 200 organizations, but none of the seven gTLDs proposed at IAHC was implemented.

Ira Magaziner, Chief Internet Policy Advisor for the U.S. President Bill Clinton, drafted a report titled “A Framework for Global Electronic Commerce,” which called for the development and commercialization of the Internet by an international corporation free from government control. The framework Magaziner proposed in the report led to the creation of a Green Paper, titled “Proposal to “Improve Technical Management of Internet Names and Numbers,”” issued on February 20, 1998. A White Paper, titled “Management of Internet Names and Numbers,” was published on June 5, 1998, calling for the establishment of the Internet Corporation for Assigned Names and Numbers (ICANN). An International Forum on the White Papers (IFWP) was organized in the following months (July and August 1998), featuring four meetings around the world—Reston, Geneva, Singapore, and Buenos Aires. Subsequently, ICANN was incorporated in the fall of 1998, and signed a Memorandum of Understanding (MoU) with the U.S. Department of Commerce in November 1998. As ICANN was being established, the consultation meetings of one of its supporting organizations, the Domain Name Supporting Organization (DNSO), met three times across the globe—October 1998, November 1998, and January 1999—to prepare for DNSO formation before the first official DNSO meeting took place in March 1999 during ICANN’s initial meeting in Singapore, following approval of DNSO by the first ICANN Board on March 4, 1999 [ICANN 1999].

Over 100 ccTLD registries worldwide joined together in 1999 to create the World Wide Alliance of Top Level Domains (WWTLD). It was initially formed during a Birds of a Feather (BoF) session at the IFWP Europe Meeting in Geneva on July 21, 1998, and was supported by a Position Paper presented on August 1998, 1998. The first WWTLD meeting took place during the IFWP-Asia Meeting in Singapore on August 11, 1998 [Chon 1998]. Its goals were similar to those of the Number Registry Organization (NRO) for IP addresses, established in 2004. However, the WWTLD for ccTLDs did not gain traction, unlike the NRO for IP addresses.

The Table 8-1 lists the meetings and events related to the formation of

### **APTLD. Table 8-1. List of Meetings and Events Related to Formation of**

#### **APTLD**

1985 DNS Deployment

1993-1998 InterNIC Project with Midterm Review in 1994

1996 IAHC

1997.6 Ad hoc meeting on DNS during Kuala Lumpur INET

1997.7 US President directed DoC to privatize management of DNS

1998.2 Green Paper

1998.2 BoF on DNS during APRICOT, Manila

1998.3 CENTR was formed (under development since 1996)  
1998.6 White Paper  
1998.7 IFWP-Americas, Reston, USA  
1998.7 IFWP-Europe, Geneva  
1998.7 APccTLD Meeting in Geneva during INET and IFWP-Europe  
1998.8 IFWP-Asia, Singapore  
1998.8 APTLD Meeting in Singapore during IFWP-Asia  
1998.8 IFWP-Latin America & Caribbean, Buenos Aires  
1998.10 DNSO Consultation Meeting, Barcelona  
1998.11 MoU between US DoC and ICANN  
1998.11 DNSO Consultation Meeting, Monterrey, Mexico  
1999.1 DNSO Consultation Meeting, Washington, D.C.  
1999.2-3 APTLD Meeting, Singapore (during APRICOT)  
1999.3 First DNSO Meeting, Singapore (during First ICANN Meeting)  
1999.5 APTLD Meeting, Berlin (during ICANN)  
1999.6 APTLD Meeting, San Jose (during INET)

## **8.2 The Asia Pacific Network Information Centre (APNIC) - *Formation and early operations (1992-1995)***

*Gerard Ross*

For the past twenty years, the Asia Pacific Networking Information Centre (APNIC) has served as the Asia Pacific's Regional Internet Registry (RIR), "charged with ensuring the fair distribution and responsible management of IP addresses and related resources... [which] are required for the stable and reliable operation of the global Internet" [APNIC 2013]. During this time, APNIC has also become an increasingly important hub for Internet community activity in the region and a prominent voice representing the Asia Pacific Internet community on the global stage.

Understanding how APNIC was formed, the role it plays, and how it operates requires an overview of the architectural, operational, and administrative aspects of the Internet, along with the basic principles that support all areas of Internet development.

### **(1) Early evolution of IP addressing**

At its core, the purpose of the Internet is to transfer data packets from a source to a destination. To successfully deliver a packet, the Internet must know where the destination is (the address) and the best way to reach it (the route). Internet Protocol (IP) addresses facilitate this by identifying both the network and the host.

The original Internet addresses were 32 bits long, with the first 8 bits used for the network portion of the address, leaving 24 bits for local addressing. Although more than 4 billion addresses were possible, the fixed 8-bit network part limited the total number of networks to just 256.

By the late 1970s, although the total address space for the "Internet experiment" was

ample, it was evident that the time had come to “prepare for the day when there are more than 256 networks participating in the Internet” [Clark 1978].

So, in 1981, the Internet Engineering Task Force (IETF) updated the address architecture to include three classes of Internet addresses. “Class A” addresses supported 128 networks with 24 bits of local addressing; “Class B” addresses allowed for 16,384 networks with 16 bits of Local addressing; and “Class C” allowed 2,097,152 networks with 8 bits of local addressing [Postel 1981].

The new Internet Protocol version 4 (IPv4) immediately eased the restriction on new networks joining the Internet, but its “classful” addressing architecture (also referred to as “subnetting”) sowed the seeds for two new, interconnected problems that emerged as the Internet grew in popularity.

Using classful addressing, if a network operator needed to address 200 hosts, a single Class C network would efficiently meet the operator’s need. However, if the operator needed to address 2,000 hosts, they could either assign a single Class B network, which would waste over 63,000 addresses, or use eight separate Class C networks. While the latter solution would not waste addresses, it would add eight new entries to the global routing table.

In the early days of the Internet, these issues weren't critical, but as the Internet evolved and commercial interests emerged, the tension between the need to conserve addresses and the need to aggregate routing information led to the next step in the development of the addressing architecture, specifically the shift from subnetting to “supernetting”.

Supernetting became a standard in RFC 1519 [Fuller 1993] as “Classless Inter-Domain Routing (CIDR)”; however, the issue was first explored in detail in RFC 1338, published in June 1992, which warned:

“As the Internet has evolved and grown... in recent years, it has become painfully evident that it is soon to face several serious scaling problems. These include Exhaustion of the class-B network address space....

Growth of routing tables in Internet routers beyond the ability of current software (and people) to effectively manage.

Eventual exhaustion of the 32-bit IP address space [Fuller 1992].<sup>1”</sup>

RFC 1338 proposed eliminating classful addressing and instead using “variable length subnetting” to support networks of any size. In this approach, a variable-length subnet mask (commonly called the “prefix”) replaces the fixed-length network portion of the address. As a result, CIDR allocations can be customized to meet network operators’ address requirements efficiently and only require adding a single entry to the global routing table.

CIDR proved to be a timely and effective solution to what was then one of the Internet’s most serious challenges, extending the life of the IPv4 address pool by two decades while allowing the routing system to scale at a manageable rate. However, it is important to realize that CIDR’s success was not solely due to architectural developments but also relied heavily on responsible administrative practices and inclusive, community-based policy making.

<sup>1</sup> As an aside, RFC 1338 proposed solutions to only the first two of the three problems identified. The third problem, IPv4 exhaustion, was addressed much later with the specification of IPv6.

<sup>2</sup> The argument could well be made that most of the Internet's most serious problems are symptoms of its unprecedented popularity and success.

## **(2) Expansion of registration function**

The Internet relies entirely on the integrity of its addressing system. However, the system can only function if IP addresses are unique, and guaranteeing this uniqueness requires an effective registration system.

In the early days of the Internet, address registration was a straightforward function. Network operators—of which there were few, and all of which were (generally) known to each other—simply asked for addresses, the details of which were recorded by the Internet Assigned Numbers Authority (IANA).

The IANA function was, for many years, a manual task performed by one man – late Jon Postel [Wikipedia 2013]. Over time, as this task grew, the IANA responsibility for “numeric network and autonomous system identifiers” was formalized and “a single Internet Registry (IR) was designated: the Defense Data Net Network Information Center (DDN-NIC) at SRI International” [Cerf 1990].

By 1990, the IETF's Network Working Group noted:

“With the rapid escalation of the number of networks on the Internet and its concurrent internationalization, it is timely to consider further delegation of assignment and registration authority on an international basis. It is also essential to take into consideration that such identifiers, particularly network identifiers of class A and B type, will become an increasingly scarce commodity whose allocation must be handled with thoughtful care” [Cerf 1990].

RFC 1174 proposed that the IANA and the IR functions would remain centralized, but that “the IR would also allocate to organizations approved by the Coordinating Committee for Intercontinental Research Networking (CCIRN) blocks of network and autonomous system numbers, as needed, and delegate to them further assignment authority” [Cerf 1990].

General Internet growth and associated increases in demand were not the only factors that put pressure on the centralized registration function. The nature of a CIDR-based addressing scheme required far greater administrative oversight of address allocations. Because allocation sizes could be of any size, to fulfill the address conservation goal, it became necessary to analyze more carefully the requestors' needs. And because variable-length subnet masking allowed multiple contiguous ranges to be announced as a single route, allocation practices had to allow for networks to grow while fulfilling the address aggregation role [Karrenberg 2001]<sup>3</sup>. Furthermore, as the complexity of the request and registration process increased, so did the need for regionalized service with greater multilingual support.

## **(3) RIPE NCC emerges**

Meanwhile, in Europe, Internet Service Providers (ISPs) established Réseaux IP Européens (RIPE) as “a collaborative organization ... to ensure the necessary administrative and technical coordination to enable the operation of a pan-European IP network” [RIPE 1992]. The first

## RIPE

<sup>3</sup>This article – written by various RIR staff members – contains a more detailed overview of the RIR system in general; the establishment of APNIC, ARIN, and the RIPE NCC; and the emergence of AfriNIC and LACNIC. Meeting was held in Amsterdam in May 1989.

RIPE is a community and has no legal structure. However at the fourth RIPE Meeting in March 1990, Daniel Karrenberg presented on the community’s administrative needs. The minutes note that:

“A discussion followed on what model should be used, either a centralized or a distributed framework. What became clear from this was the need for some sort of formalized body for performing the functions of a NIC” [RIPE 1990].

By September that year, this discussion had become a formal proposal to create the RIPE Network Coordination Centre (NCC) to support the RIPE community and “function as a ‘Delegated Registry’ for IP numbers in Europe, as anticipated and defined in RFC 1174” [Blokzijl 1990]. The RIPE NCC formally commenced operation in April 1992 [Karrenberg 2001].

### **(4) The APNIC experiment**

The Internet’s distributed development model has always relied on inclusive collaboration and open sharing. Individuals and organizations have consistently come together and cooperated to handle the various operational and administrative tasks needed to develop and maintain core Internet functions.

One such forum for cooperation – more important in the early days of the Internet than now – is CCIRN, established to provide “a forum for members to agree and progress a set of activities to achieve interoperable networking services between participating international entities to support open research and scholarly pursuit” [CCIRN 2013].

On June 10, 1992, CCIRN held a meeting in Tokyo, Japan [CCIRN 1992], which is particularly notable as a convergence of several emerging factors. This was CCIRN’s first meeting in Asia, and those present included:

- Kilnam Chon<sup>4</sup>[Internet 2012c] of Korea Advanced Institute of Science and Technology (KAIST), a leading pioneer of Internet development in Asia.
- Jun Murai of Keio University, founder of the Widely Integrated Distributed Environment (WIDE) project, and commonly referred to as the “father of Japan’s Internet” [Wikipedia 2013b], and
- Several representatives of the RIPE community and RIPE NCC, which had been officially launched only two months earlier.

The minutes of the meeting note that Chon reported APCCIRN, the Asia Pacific member of CCIRN (then being formed under his leadership), had held three preliminary meetings but now needed to hold its first official meeting as soon as possible to begin coordinating networking activities in the region. Chon also mentioned that, at that time, there were ‘10-12 countries with network connection’ in the area and “two international networks”: PACCOM and CAREN [CCIRN 1992].

<sup>4</sup>In 2012, the Internet Society announced Professor Kilnam Chon as an inaugural inductee in the Internet Hall of Fame as a “Global Connector”.

The meeting heard reports from the RIPE community, including a full update on the fledgling RIPE NCC by its manager, Daniel Karrenberg. Steve Goldstein of the US National Science Foundation noted that RIPE NCC’s work was exceptional and set a standard for Network Information Centre (NIC) operations “for anywhere in the world” [CCIRN 1992].

Jun Murai also reported on the progress of the Japan NIC (JNIC, which was later renamed JPNIC) [JPNIC 2013]. In 1989, Murai received a large address block (43.0.0.0/8) from Jon Postel as an early test case for IP address delegation. Later, Murai established JNIC—drawing on support from WIDE, Todai International Science Network (TISN), and others—for domestic IP address and .JP namespace assignments. JNIC took over management of the delegated address block in 1992. Murai explained at the APCCIRN that it “would be possible to expand the [JNIC] role to cover the Asian Pacific, if desired” [CCIRN 1992].

From this meeting, the elements were in place for the birth of APNIC. Seven months later, in January 1993, APCCIRN and its engineering group, the Asia Pacific Engineering and Planning Group (APEPG), held its first official meeting in Honolulu, Hawaii. At the APCCIRN meeting,

“A Proposal for APNIC experiments” was explained by one of its proposers, Jun Murai [Murai 1993].

APCCIRN-020

1993.01.13

A Proposal for APNIC experiments

January 13, 1993

Jun Murai (WIDE Project/JNIC),

Masaki Hirabaru (WIDE Project/JNIC)

#### PURPOSE

This experiment is to investigate how APNIC (Asia and Pacific regional Network Information Center) should be formed and how it can be operated.

#### TIMEFRAME

January 15, 1993-January 1994

#### ITEMS

B: Guideline for establishment of Country NICs

A: APNIC database format

A: APNIC transactions

A: APNIC-CountryNICs transactions

A: APNIC-InternetNIC transactions

B: APNIC-NCC transactions

B: Services to access the database

B: Information archiving

B: Routing preference issues

B: Organizational issues

#### MEMBERS

Anybody including jp, au, kr, nz

#### TESTING MACHINE

nic.ad.jp (so far)

#### MAILING LIST

apnic-coop@nic.ad.jp

apnic-coop-request@nic.ad.jp

#### SCHEDULE

Priority A: by summer 1993

Priority B: by Jan 1994

The attendees of the first APCCIRN meeting in January 1993 discussed and accepted the proposal for the APNIC experiment to carry out resource registration, information provision, NOC support, and NIC cooperation [APCCIRN 1993]. The minutes noted that it “was decided for JNIC (Masaki Hirabaru and Jun Murai) to carry on [the] APNIC experiment with the cooperation of other countries, including Australia, South Korea, and New Zealand” [APCCIRN 1993; Chon 1993b]. The “APNIC experiment” also received a mention in the notes of the March 1993 IETF User Services Area meeting, along with the emergence of the new InterNIC [IETF 1993].

Then, at the second APCCIRN meeting—held on August 20-21, 1993, immediately following the INET’93 meeting in San Francisco—APNIC was discussed in detail. Murai presented an overview of the global and regional NIC situation and noted the new vision for a “global NIC with regional authority delegated to regional NICs, such as InterNIC in the Americas and RIPE NCC in Europe.” KRNIC and JPNIC each presented status reports of their domestic projects. Murai proposed changes to the original proposal and explained:

If approved by the APCCIRN, this pilot project would help determine how to meet the region's needs over the long term. During the pilot phase, the main focus would be on the Internet Registry and Routing Registry functions. Limited attention would be given to informational functions until a decision is made on a long-term approach for the region. JPNIC has agreed to provide resources for the pilot project” [Nakayama 1993] 5

The updated proposal was adopted [Murai 1993b], and the APNIC pilot project was chartered to begin operation on September 1, 1993, and end on June 30, 1994 [Nakayama 1993]. The APNIC pilot project goals were:

- determine the requirements for a regional NIC and the means to meet those requirements
- implement a regional IP address allocation strategy in accordance with RFC 1466
- provide a testbed for experimentation into network coordination in the Asia Pacific

5 The official minutes of this meeting could not be found. The exact nature of the source document used for this information is unclear, but it was provided by Professor Masaya Nakayama of Japan and appears to be a report of the APNIC discussion at the APCCIRN Honolulu meeting.

region

- coordinate with local, national, and regional NICs
- experiment with tools used to support NIC operations[Conrad 1994]

The approved document “Asia Pacific Network Information Center Pilot Project Proposal” became one of the first official APNIC documents (APNIC-003). In addition to the goals listed above, this document also notes that the APNIC pilot project would be fully funded by JPNIC, which had committed 10 percent of its own budget to the project. APNIC-003 also clarifies that the pilot project was to be “coordinated under the auspices of the APCCIRN” and that the project staff would submit a mid-term and final report to APCCIRN. At this stage, APNIC’s proposed staffing requirements included a quarter-time manager, a half-time technical support role, and a full-time administrative support role. Individuals interested in working on the project were:

- Masaya Nakayama, University of Tokyo
- Masaki Hirabaru, Kyushu University
- Taeha Park, KAIST
- David Conrad, Internet Initiative Japan [Murai 1993]

In the late 1980s and early 1990s, David “Randy” Conrad was a young staff member working at the University of Hawaii, Manoa, on the NASA/NSF-funded Pacific Communications (PACCOM) project, which interconnected the networks of universities and research institutions in Japan, South Korea, Hong Kong, Australia, New Zealand, and the US.

PACCOM held an annual meeting in Hawaii where the various researchers would meet to discuss Internet issues. It was at those meetings that Conrad met some of the Internet pioneers from the region, such as Jun Murai, Geoff Huston, John Houlker, Robin Erskine, and Kilnam Chon. From this contact, Murai invited Conrad to move to Japan to help launch the Internet Initiative Japan (IIJ). In 1991, Conrad accepted the invitation, moved to Japan, and became IIJ’s seventh employee. However, once there, Conrad found that IIJ was facing some delays getting the licenses it needed to provide Internet services. “I had spare time,” Conrad explains,

“and Jun Murai asked if I'd be interested in helping to start up APNIC” [Conrad 2012].

With Conrad as the manager, the APNIC pilot project began operations on

September 1, 1993 [APNIC 1994]. An email from Masaya Nakayama the next day

contains details of the first APNIC mailing lists:

apnic-all@apnic.net (for all those interested in the APNIC pilot project)  
apnic-member@apnic.net (for actual APNIC pilot project)

members)

apnic-staff@apnic.net (for the pilot project staff) [Nakayama 1993b]

In APNIC's early operations, most of its work was based on those lists (hosted on a computer at the University of Tokyo). In an article from 1994, Conrad explained how the work was coordinated:

“The staff mailing list implementing most of the APNIC functions currently consists of 25 people from the countries of Australia, China, Japan, South Korea, New Zealand, Singapore, Taiwan, Thailand, and the US. This informal group comes to a rough consensus on requests for information and/or address space assignment and fulfills those requests typically within one to two working days” [Conrad 1994].

A JPNIC newsletter article from late 1994 provides more detail about the breakdown of responsibilities, explaining that the “APNIC WG” (working group)—coordinated out of JPNIC and consisting of representatives from each national NIC—played the main role in allocating IP addresses. The South Korean NIC (KRNIC) was responsible for “information services.” The Australian NIC (AUNIC) handled APNIC's DNS-related services [JPNIC 1994].

This informal “staff” arrangement was driven by the “immense size of the Asia and Pacific Rim regions, from the Persian Gulf area to the island nations of the South Pacific, and the extensive diversity of cultures, religions, and economic situations in this area,” and therefore “one of the basic assumptions held by the members of the APNIC pilot project staff... was that the ultimate APNIC would need to be highly distributed” [Conrad 1994].

Regarding infrastructure, the equipment requirements for the pilot project were modest, with the proposal calling for “a single workstation class computer with sufficient disk and network capacity to fulfill the needs of the project” [Murai 1993]. JPNIC provided this machine in the form of a Sun Sparcstation, described as “fully connected to the Internet” [APNIC 1993]. The APNIC computer handled mailing lists, FTP, and Gopher archives, the Asia Pacific network database and whois server (which originally ran the InterNIC's rwhois server software), and a DNS server that provided referrals to APNIC services, including:

- in-addr.arpa (reverse delegation) services hosted at AUNIC, and
- an “experimental” website hosted by KRNIC

Again, as Conrad explained at the time, by “distributing the NIC services, the APNIC pilot project has been able to leverage the talents of personnel at the national NICs and thus does not require extensive expertise to be located centrally at an APNIC facility” [Conrad 1994].

The dominant thinking at this stage in APNIC's formation was that its future would be as a functionally distributed organization [Park 1993c], with a small central coordinating center ensuring consistency and continuity. The model envisioned was that APNIC's various operational functions would be contracted to national NICs for fixed periods and rotated through the region [Park 1993c]. Indeed, an article by Conrad noted that APNIC, “when it becomes permanently established in July of 1994, actually will consist of a group of semi,” independent cooperative organizations” [Conrad 1994b].

Explicitly, this approach was regarded as a method to build technical capacity throughout

the region while also offering a sustainable operational model in the absence of an alternative established funding source. However, this approach could also be viewed as a way to reduce potential political tensions that might arise from permanently locating such a critical function in one part of the region.

The appropriate scope of APNIC's functions was also an active area of discussion during the pilot project. On 10 December 1993, the APNIC staff published a proposal for APNIC to assume the following roles:

1. Allocate Class C network blocks to national registries and multi-national service providers
2. Provide an initial contact point for people interested in internetworking in the Asia Pacific region
3. Promote Asia Pacific internetworking
4. Provide NIC services for nations with no regional NIC
5. Promote the establishment of national NICs
6. Provide a top-level information repository
7. Delegate the 202, 203, and 204.in-addr.arpa reverse domain name trees
8. Provide a forum for coordination between regional NICs in the Asia Pacific region [APNIC 1993b]<sup>6</sup>

Of these proposed roles, the first and fourth are particularly noteworthy because they indicate a function that is considerably and specifically different from how APNIC's primary role ultimately developed.

Until the early 1990s, much of the Internet activity worldwide involved some form of national coordination by a NIC, whether formal or informal. This naturally aligned with the domain name system, which includes country code top-level domains (ccTLDs). However, as classless, CIDR-based IP addressing was introduced, national boundaries became less significant, and address management practices shifted toward network topology instead of physical geography. The topological approach to addressing remained throughout the IPv4 era and continues to be a key aspect of IPv6 addressing.<sup>7</sup>

Nevertheless, even by the end of the pilot project, APNIC maintained a strong focus on promoting the creation of national NICs to join the ranks of Australia (AUNIC), Japan (JPNIC), South Korea (KRNIC), and Taiwan (TWNIC) 8 National NICs were viewed as a way to address the "limits on APNIC's manpower, language, and budget resources, " and a growth of NICs across the region was seen as "better able to serve the end users in their particular countries, and also ease the operational burden on APNIC by distributing the workload. " The final pilot project report stated that "this promotion activity will remain one of the APNIC's primary objectives" [Gebes 1994].

Although the operational relationship between APNIC and national NICs eventually

<sup>6</sup> This, the KRNIC proposal, and the Mid-Term report were presented and discussed at the APCCIRN meeting in Taiwan in December, 1993.

<sup>7</sup> Unfortunately, the misunderstanding of the difference between national and topological addressing strategies persists

and remains at the heart of many Internet governance disputes today.

<sup>8</sup> Notably absent from this list is China, which in early 1994 still had very little TCP/IP networking in place, though momentum was rapidly building for its emergence as a major contributor to the Asia Pacific Internet community. emerged in quite a different form, these considerations can be seen as the root of the crucial, yet sometimes complex, role of National Internet Registries (NIRs) in the Asia Pacific region.<sup>9</sup> All other priorities notwithstanding, the central thing a regional Internet registry (RIR) needs to justify its existence is a pool of addresses. And so, on 1 April 1994, the IANA publicly recognized APNIC's status by delegating the IPv4 address ranges 202/8 and 203/8 [Gebes 1994].

## **(5) The end of the experiment – lessons learned**

The APNIC experiment officially ended on June 30, 1994. Shigeki Goto (NTT and JPNIC) reported to the CCIRN meeting in Amsterdam that month that APNIC was serving 27 members from 12 countries and had taken on authoritative delegation for the 202 and 203 Class C address blocks. Goto also mentioned that “unresolved issues include guidelines for establishing national NICs, additional service delegations, and especially funding” [Cozanet 1994].

Before IANA delegated address ranges to APNIC, the project typically received up to five inquiries per week. After the IANA delegation, that jumped to “5 to 10 email messages and 1 to 5 fax messages a day”, and it was clear that the work rate would grow quickly as the Internet

expanded in the region and that running a regional NIC permanently would require

“significant investments in both time and talent” [Conrad 1994].

Furthermore, as Conrad explained:

“ Since allocations of network addresses must be carefully considered, with special emphasis placed on... allocating the appropriate amount of address space in a way that conforms to the requirements of CIDR, the APNIC project staff has had to explain Internet addressing and the global routing table situation many times, sometimes more than once to the same individual. In the AP region, this sort of situation can have added complexity

due to language and cultural differences and typically must be handled with some care”

[Conrad 1994].

In his characteristically laconic style, Conrad concluded that “running a regional NIC is not for the weak of heart, shallow of mind, or shy of disposition” [Conrad 1994]. The more formally-worded final report of the APNIC pilot project was prepared by Vince Gebes of the AT&T Jens in Tokyo, covering all major aspects of the background and operational status of the project. However, the three most significant strategic areas of concern Gebes identified were the needs to:

- define the Asia Pacific region and ensure better coordination of responsibilities between

APNIC, RIPE NCC, and the InterNIC

- create guidelines for establishing new national NICs
- finalize funding models and future operations (which Gebes identified as “clearly the <sup>9</sup> An

issue beyond the scope of this article.

most important issue” facing APNIC) [Gebes 1994]<sup>10</sup>

These issues notwithstanding, the APNIC pilot project was considered a success and from 1 July 1994, the work continued as the “interim APNIC” until a more permanent model could be developed.

### **(6) Community engagement and the challenge of sustainability**

As with all major Internet forums and organizations, the founding of APNIC was a reflection of community collaboration, with stakeholders from many fields and nations contributing time, energy, resources, and talent. Building and maintaining such a community requires more than just mailing list activity, so in addition to ongoing registration and informational services, the interim APNIC started planning for its first major public event.

In late 1994, APNIC announced that the first APNIC meeting would take place at Chulalongkorn University in Bangkok, Thailand, on January 16 and 17, 1995. The announcement noted that “Service Providers, national NICs, and other interested individuals are invited to attend and participate” [APNIC 1994b]. That invitation is significant: while all RIRs now have fee-paying membership structures, their meetings for addressing issues have always been open to all interested participants. Openness and transparency are core values of the broader Internet development process and are fundamental to Internet address policy.

Furthermore, the first official APNIC address request form encouraged all network operators to get involved in the technical community and the address policy-making process [APNIC 1995b], a role for which APNIC would later become the regional forum.

The APNIC 1 meeting was well attended, with 60 registered participants. Some of the most notable attendees included:

- Masaki Hirabaru (JPNIC)
- Sanjaya (PT IndoInternet, Indonesia)
- Robin Erskine (Australian National University)
- Che-Hoo Cheng (Computer Services Center, The Chinese University of Hong Kong) •
- Tan Tin Wee (Technet Unit, Computer Centre, National University of Singapore) •
- Tommi Chen (Technet Unit, Computer Centre, National University of Singapore) •
- Shigeki Goto (JPNIC and NTT)
- Pindar Wong (Hong Kong Supernet)

- Masaya Nakayama (JPNIC)
- Xing Li (China Education and Research Network)
- Taeha Park (INET and KRNIC)
- Barry Raveendran Greene (Singapore Telecom and SingNet) [APNIC 1995]

<sup>10</sup> This report also contains an appendix listing the membership of all the APNIC mailing lists.

All of these individuals made significant contributions to APNIC's formation and establishment. Several have also maintained long and productive relationships with APNIC and, in some cases, have served on the Executive Council or taken on leadership roles within the APNIC staff.

At APNIC 1, Conrad reported on APNIC's status. At that time, APNIC had one part-time staff member (though part-time, in this case, meant at least 40 hours per week), supported by 44 others across 15 countries on the apnic-staff mailing list. The organization used office space provided by Keio University and IJ, along with computer hardware on loan from IJ, NTT, and WIDE. In its brief operational history, APNIC had processed 311 address requests, representing 1,082 networks [Conrad 1995].

However, one of the main issues discussed at this meeting was how APNIC should continue, especially regarding its funding. Conrad straightforwardly explained that the current operational model of APNIC had the benefit of being inexpensive but suffered from the associated “very poor quality control” and “highly variable services” [Conrad 1995].

Conrad analyzed the main options—a donation model (which was unpredictable) versus a fee-based model (charging for addresses, services, or time)—and compared the models used by RIPE NCC and InterNIC. Until then, although APNIC had encouraged donations from ISPs based on size (small US\$1,500, medium US\$5,000, and large US\$10,000), no ISPs had made such donations [APNIC 1995c].

Aside from inherent instability, the donation-based funding model emphasized the importance of APNIC's perceived independence. Because of this, APNIC clarified that it would “refuse to accept donations from an organization which [expected] preferential treatment” [Conrad 1995b].

Another fundamental obstacle to a sustainable model was APNIC's legal status, which had been informal and unincorporated so far [Conrad 1995b]. The meeting reached a consensus to develop a more stable funding model. RIPE meeting minutes from later that month report that Conrad explained, “APNIC raised the issue of charging for address space or leasing out address space to applicants, at a rate of approximately USD 0.10 per host address. If implemented, it would create pressures on other registries to do something similar” [RIPE 1995].

At the same RIPE meeting, Conrad mentioned APNIC's proposal to use ISO-3166 country codes for defining regions. This decision has stuck, and the ISO-3166 designations are now the standard for country identification among all current RIRs.

In February 1995, APNIC published a formal overview of its organizational structure and operations. The document explains that during the pilot project phase, APNIC derived its authority from APCCIRN (which was later renamed to APNG [Asia 2013]11). However, because APNG was an “informal group with no legal authority or claim to represent the entire AP region,” it could not provide the interim APNIC with an appropriate legal umbrella. “As such, it was felt by the members of the APNIC consultative committee that APNIC's authority should be

derived from the Internet Assigned Numbers Authority (IANA) [Conrad 1995b]. In 1994,

APCCIRN changed its name to Asia Pacific Networking Group (APNG).

The arrangement provided adequate legal protection but did not address the funding issue. Meanwhile, in response to the increasing workload, APNIC hired its first new employee, Yoshiko Chong Fong, a Japanese national and a Computer Science graduate from the University of New Mexico. Chong was hired just before the second APNIC meeting, held in Honolulu with the APNG meeting on July 2, 1995<sup>12</sup>. With limited practical experience in Internet addressing, Chong received intensive on-the-job training, starting with the “APNIC meeting in Hawaii,” followed by four weeks at InterNIC, one week at an IETF meeting in Stockholm, another two weeks at InterNIC, and four weeks at RIPE NCC in Amsterdam. This prepared me to become the first hostmaster of APNIC” [Conrad 2012c].

Throughout 1995, alongside regular operational activities, a significant portion of APNIC’s work focused on defining and establishing a new organizational structure and funding model. In September, this effort resulted in the release of a new funding plan, primarily modeled after the RIPE NCC. The plan included an initial account setup fee of US\$1,000 and several payment tiers.

- Internet Service Provider Registries:
  - Large – US\$10,000 per year
  - Medium – US\$5,000 per year
  - Small – US\$2,500 per year
- Enterprise Registries – US\$1,500 per year

Registries would be free to choose their own payment tier, and the plan clearly stated that APNIC was charging for service levels, not resources [APNIC 1995d]. The funding plan was initially scheduled to be implemented on September 1, 1995. However, because APNIC’s lack of legal status remained unresolved, the implementation was delayed until “after the third APNIC meeting to be held in Singapore in January, 1996,” by which time APNIC would have established “a clear and well-understood legal umbrella.” Until then, the Internet Society (ISOC) had agreed to act as a legal proxy able to receive funds on behalf of APNIC [APNIC 1995d].

By the end of 1996, APNIC’s operations – if not an organizational model – were solidly established. The staff, composed of David Conrad (half time), Masaya Nakayama (half time),

and Yoshiko Chong Fong (full time), had made 747 allocations for a total of 45,473 networks. APNIC forecast a 1996 budget of approximately US\$247,000, with most increases from the 1995 budget flagged for more staff resources to handle system administration, research and development, and administrative functions [APNIC 1996].

APNIC's other major achievement in 1995 was to lead the creation of the Asia Pacific Regional Internet Conference on Operational Technologies (APRICOT), which has now become the major Internet operators' forum for the region. According to the APRICOT website, "David Conrad... was the instigator and prime motivator to make APRICOT the Internet technical and operations meeting for the Asia & Pacific region" [APRICOT 2012]. From 1996

<sup>12</sup> Unfortunately, most official documentation from APNIC 2 appears to be lost. The only surviving document in the APNIC archive is a list of attendees. <ftp://ftp.apnic.net/apnic/meetings/Jul95/attendees>  
the first APNIC meeting of each year has been held with APRICOT, bringing together many of the region's operational and address policy community members.

Though much remained to happen before APNIC evolved into its current form and moved to its current location in Brisbane, Australia – the achievements of its first few years were significant. Many individuals made valuable contributions, many of which were voluntary<sup>13</sup>. However, in the words of Kyoko Day (who in 1996 became APNIC's next full-time employee):

"There is one thing I know for sure. Without David Conrad, APNIC did not have a ground base to start. He was only 28 when he took over the pilot project. He worked day and night. His devotion and commitment made a big difference. He took the time to listen to the voices of the key people in the community but maintained APNIC core values: neutrality and impartiality" [Conrad 2012b].

### **8.3 Asia Pacific Top Level Domain Consortium (APTLD)**

*Yumi Ohtashi*

#### **(1) Introduction**

In 1998, the International Forum on the White Paper (IFWP) was held worldwide to discuss creating an international body to coordinate Internet technical resources like domain names and root servers. This effort culminated in 1999 with the founding of the Internet Corporation for Assigned Names and Numbers (ICANN). During discussions, the operators of country code top-level domain names (ccTLDs) in Asia Pacific reached a consensus to form regional groups—such as for Asia-Pacific and later Europe—to mobilize ccTLDs in each region and ensure proper representation within ICANN for expressing their views. To support this goal, the Asia Pacific Top Level Domain Name Forum (initially called APccTLD but later renamed APTLD) was launched in 1998 through a voluntary effort by ccTLD community members in the Asia Pacific region.

The following describes the early days of APTLD, from its inception in 1998 to its incorporation in 2003.

## (2) Year 1998

In February 1998, a BoF on Top-Level Domain names was held during the APRICOT Manila Conference. The BoF was coordinated by Toru Takahashi from Japan (.JP) with the objective.

<sup>13</sup> Unfortunately, it is beyond the scope of this article to document details of the many contributions to APNIC's early history.

In private correspondence—while admitting the list is far from comprehensive—David Conrad has called particular attention to the work of: Adam Peake, Andy Linton, Barry Greene, Che Hoo Cheng, Erin Chen (Yu Hsuan Chen), Geoff Huston, Gopi Garge, Haruhisa Ishida, Hiroyuki Fukase, Izumi Aizu, Jin Ho Hur, John Houlker, Jun Murai, Kanchanna Kanchannasut, Kilnam Chon, Koichi Suzuki, Kyoko Day, Laina Raveendran Greene, Masaki Hirabaru, Masaya Nakayama, Mathias Koerber, Osamu Nakamura, Patrick Kelly, Pindar Wong, Qian Hualin, Rahmat Samik-Ibrahim, Robin Erskine, Sanjaya, Shigeki Goto, Suguru Yamaguchi, Taeha Park, Tan Tin Wee, Tommy Chen, Toru Takahashi, Toshifumi Matsumoto, Toshiya Asaba, Vince Gebes, Xing Li, Yoshiko Chong.

This created an informal environment where individuals interested in national top-level domain issues could share their viewpoints. During the meeting, it was suggested that those managing ccTLDs in the Asia-Pacific region should convene to discuss shared concerns [APTLD 1998; APTLD 1998b].

The next BoF was held during INET Geneva in July 1998, alongside the IFWP. At the BoF, attendees agreed to establish “APccTLD,” an organization to serve as a collective voice for the ccTLDs in the Asia-Pacific region and to participate in the ongoing process of setting up ICANN (which, at that time, was referred to by several names, including “newco” and “new IANA”). Kilnam Chon from South Korea (.KR) explained at the BoF that the idea of forming a regional ccTLD organization for the Asia-Pacific came from conversations he had with Jon Postel of IANA in 1997. During that time, IANA needed a central contact point for ccTLD administrators, and the ccTLDs were interested in voicing their opinions during IANA reform, which was underway following the acceptance of the White Paper on the topic. Toward the end of the session, it was agreed that the BoF be renamed the “APccTLD Inaugural Meeting,” and a task force was formed to lay the groundwork for APccTLD. Kilnam Chon and Toru Takahashi were elected as the interim co-chairs of the task force [APTLD 1998b].

The first APccTLD meeting took place in Singapore in August 1998 alongside IFWP. During the meeting, the organization's name was simplified to "APTLD," and its objectives were outlined; it was intended to serve as a forum to enhance participation in the Internet naming process with the following roles [APTLD 1998c]:

- Representation of the TLDs in the Asia-Pacific region
- Liaison with other bodies (as appropriate)
- Internet governance relevant to naming
- Maintaining stability and continuity of naming systems
- Skill development/Shared name services
- Harmonization of naming in the region
- Facilitation of dispute resolution

- Education
- Research and Development

Kilnam Chon was elected as the interim chair of APTLD to serve for six months until the next meeting planned for March 1999 [APTLD 1998c; APTLD 2000]. A series of meetings were held worldwide during 1998 and 1999, which led to the formation of ICANN, the Domain Name Supporting Organization (DNSO), which was one of ICANN's Supporting Organizations, and the ccTLD Constituency within DNSO. ccTLD registries, gTLD registry/registrars, intellectual property groups, and other interested parties participated in the debate, making the process heated and highly political. Initially, the ICANN Board was hesitant to establish two separate constituencies for both ccTLD and gTLD registries. However, ccTLD managers worldwide supported the idea that there should be a dedicated constituency for ccTLD registries, emphasizing the differences between ccTLD and gTLD. Negotiations continued for months and eventually led to the formation of the ccTLD Constituency and the gTLD Constituency within DNSO in March 1999.

ICANN and its supporting organizations aimed to involve various stakeholders in its policy coordination. In this context, APTLD members hoped to see a proper representation of the Asia-Pacific ccTLDs on relevant ICANN committees. Therefore, one of APTLD's main focuses during those years was how to secure their participation in these organizations within ICANN.

During the BoF on ccTLDs in Geneva on July 21, 1998, the formation of the World Wide Alliance of Top Level Domains (WWTLD) was discussed [Chon 1998]. The objectives of the WWTLD were

- Concerted action on common concerns,
- To represent interests and views of TLD registries,
- To serve as a channel of communications for liaison with other groups, and
- To facilitate liaison between regional TLD groups

A task force was established on July 25 with representatives from the Asia-Pacific, Europe, and Canada, and a position paper was published on August 5, 1998. The first WWTLD Meeting took place in Singapore on August 11, where over 100 TLD signatories from all five continents expressed their support for the WWTLD position paper. Ultimately, the WWTLD was never formed as an organization, and the ccTLD community chose to become a constituency of DNSO, which was established the following year. Regional Internet Registries (RIRs) took a different route. After forming the Address Supporting Organization (ASO) under ICANN, the RIRs later decided to create the Number Resource Organization (NRO).

APTLD Meetings held in 1998 are as follows;

- 1998.2.18 BoF on ccTLD in Manila [APTLD 1998]
- 1998.7.21 1st APTLD (APccTLD) Meeting in Geneva [APTLD 1998b]
- 1998.8.11-12 2nd APTLD Meeting in Singapore [APTLD 1998c]

### **(3) Year 1999**

In March 1999, during the ICANN Singapore Meeting, the DNSO, which included a separate constituency for ccTLD, was approved by the ICANN Board, and the ccTLD Constituency became an official organization within ICANN. The third APTLD Meeting was also held at the same venue. At that time, a broad framework for APTLD as an organization began to take shape, and Kilnam Chon agreed to serve another twelve months as its chair. Several committees, such as legal, finance, and technology, were formed, and approval was given for a full-time secretariat staff to be based in South Korea [APTLD 2000]. The legal committee was tasked with considering the possibility of incorporating APTLD.

At the fourth (ad-hoc) APTLD Meeting held in Berlin in May 1999, a few days before ICANN, one of the most discussed topics was participation in ICANN. Recognizing the importance of keeping up with the fast-moving consultative process involving wide-ranging groups of ICANN and DNSO [APTLD 1999], APTLD participants managed to attend every DNSO constituency meeting during ICANN Berlin and to share the trends of those discussions in detail with one another.

In June 1999, the fifth APTLD Meeting was held in San Jose, alongside INET. The decision to establish APTLD was made during that meeting. After that decision had been made, the APTLD Principles were developed during September-October 1999 [APTLD 2000]. The sixth APTLD meeting took place alongside the ICANN Los Angeles meeting in November 1999. At that meeting, the APTLD Principles were presented and approved. The members also discussed the APTLD Bylaws based on these principles [APTLD 2000; APTLD 2000b]. Participants reached a consensus that APTLD membership should include TLD registries as voting members and other entities as non-voting associate members [APTLD 1999c].

APTLD Meetings held in 1999:

1999.3.1 3rd APTLD Meeting in Singapore [APTLD 2000] 1999.5.24 4th (Ad Hoc) APTLD Meeting in Berlin [APTLD 1999] 1999.6.21 5th APTLD Meeting in San Jose [APTLD 1999b] 1999.11.5 6th APTLD Meeting in Los Angeles [APTLD 1999c]

#### **(4) Year 2000**

In 2000, a ccTLD held two roles within the ICANN structure: one as a member of the ccTLD Constituency within DNSO, and another as a delegate of a ccTLD directly recognized by ICANN. Regarding the latter role, ICANN expected ccTLDs to contribute financially for its IANA services, which sparked discussions about the importance of ICANN's activities and how to secure funding to cover expenses. In this context, APTLD members met at the Seoul Meeting in February 2000 to evaluate the appropriateness of such funding and the Asian-Pacific ccTLDs' share of it [APTLD 2000c]. Consequently, a letter proposing voluntary contributions from the respective ccTLDs was drafted and sent by APTLD to ICANN on March 1, 2000 [Chon 2000b].

The next, eighth, APTLD Meeting was held in Yokohama in July 2000, in conjunction with ICANN and INET 2000. At the meeting, APTLD formally defined itself as a forum for ccTLD registries in the Asia-Pacific region. It was also agreed that the gTLDs (net, org, com) present would be given non-voting associate membership status. According to that agreement, the 24 founding members signed a "Letter of Intent" to which the newly developed Articles of APTLD were attached [APTLD 2000d]. Hualin Qian from China (.CN) was elected as the

new chair of APTLD, and the members voted unanimously in appreciation of Kilnam Chon's chairmanship since the Geneva Meeting in 1998 [APTLD 2000e]. Then, in October 2000, the APTLD Board held its meeting in Bangkok and selected TWNIC as the APTLD Secretariat for the following two years [APTLD 2000f].

By the ninth APTLD Meeting, held alongside the ICANN Marina del Rey Meeting in November, some of the Asia-Pacific ccTLDs expressed their intention to formally join APTLD as members. To encourage more participation, all the board members submitted their ccTLD membership applications during the ninth APTLD Meeting in Marina del Rey [APTLD 2000g].

The following APTLD Meetings were held in 2000:

2000.2.29 7th APTLD Meeting in Seoul [APTLD 2000c]

2000.7.18 8th APTLD Meeting in Yokohama [APTLD 2000e]

2000.10.21-22 APTLD Board Meeting in Bangkok [APTLD 2000f]

2000.11.11 9th APTLD Meeting in Marina del Rey [APTLD 2000g]

## **(5) Year 2001**

At the February 2001 APTLD Board Meeting, the board held in-depth discussions on its contract with ICANN. Since ICANN's founding, clarifying the ICANN-ccTLD relationship has been one of the most significant issues among all ccTLDs. The board decided that APTLD should take steps to raise awareness of this matter among its members and concluded that APTLD should organize an “APTLD ccTLD-ICANN Contract Workshop” during the ICANN Melbourne Meeting in March 2001 [APTLD 2001]. The Melbourne workshop included tutorials on the contracts proposed by ICANN and the ccTLD community, followed by discussions. Participants compared the proposals and explored potential contract models.

The tenth APTLD Member Meeting took place in Stockholm in May 2001, just a few days before the ICANN Stockholm Meeting. During the members' meeting, discussions focused on how to build closer relationships with other regional ccTLD organizations. APTLD members and the Council of European National Top Level Domain Registries (CENTR) representative, who was invited to this meeting, shared their concerns about developing an ICANN-ccTLD contract and confirmed the need for cross-regional information sharing [APTLD 2001c].

Since the ICANN Yokohama Meeting in 2000, the demand for formation of a “ccSO”—a ccTLD-specific Supporting Organization independent of DNSO – had been increasing among ccTLD managers worldwide. In June 2001, the ccTLD Constituency agreed to propose such a ccSO to ICANN Board and to call for ICANN's cooperation to put the new structure into place [APTLD 2001d]. Reflecting this trend, APTLD had also been considering the ccSO issue around the same time. At the Ad Hoc APTLD Board Meeting held in Taipei in August 2001, and decided to support the formation of a ccSO and issued a statement setting forth its position [APTLD 2001e; APTLD 2001f].

APTLD Meetings held in 2001:

2001.2.24 APTLD Board Meeting in Kuala Lumpur [APTLD 2001]

2001.3.11 APTLD Board Meeting in Melbourne [APTLD 2001b]

2001.5.30 APTLD Member & Board Meetings in Stockholm [APTLD 2001c]

2001.8.26 APTLD Ad Hoc Board Meeting in Taipei [APTLD 2001f]

2001.9.5 APTLD Board Meeting in Montevideo [APTLD 2001g]

2001.11.10 APTLD (Informal) Meeting in Marina del Rey [APTLD 2001h]

## **(6) Year 2002**

At the eleventh APTLD Meeting (Annual General Meeting) held in Bangkok in March 2002, a new Board of Directors was appointed based on the results of the online member election conducted prior to the meeting. Ramesh Kumar Nadarajah from Malaysia (.MY) was selected as the new Chair [APTLD 2002].

The ICANN President proposed a series of structural reforms for ICANN in February 2002, and that proposal became the focus of discussion at the APTLD Bangkok Meeting. At the conclusion of the meeting, APTLD issued a statement expressing its intention to participate in the consultation process for ICANN reform [APTLD 2002b]. At the next APTLD Meeting held in June 2002, the group issued a statement supporting the proposed ICANN reforms.

reform and the creation of the country code Name Supporting Organization (ccNSO) [APTLD 2002c].

At the next APTLD Members Meeting in Kuala Lumpur in September 2002, it was reaffirmed that Ordinary Membership of APTLD should be exclusive to ccTLDs in the Asia-Pacific region. Regarding incorporation, two ccTLDs (Malaysia and New Zealand) had proposed prior to the Kuala Lumpur Meeting to serve as the host country. An election took place in September-October 2002, resulting in Malaysia being selected as the location for incorporation [APTLD 2002d; APTLD 2002e; APTLD 2002f].

APTLD held its fourteenth meeting in Shanghai in October 2002 [APTLD 2002g; APTLD 2002h] and issued two position papers on the issues discussed at that time: an APTLD statement on ICANN Zone Access Policy and another on Internationalized Domain Names (IDN) [APTLD 2002i]. In the first statement, APTLD questioned IANA's TLD zone access policy and stated that any decision regarding methods of name server checking should be made with the approval of the ccTLD community. In the second statement, APTLD acknowledged the need for coordination in deploying IDNs. This was developed in a context where the IDN had been standardized by IETF. Additionally, a significant effort was underway in Asia to implement CJK (Chinese, Japanese, and Korean) IDNs, which led APTLD, an organization representing the Asia-Pacific domain name community, to strongly support the IDN initiative.

APTLD Meetings held in 2002 (with Board Meetings conducted online):

2002.3.3 11th APTLD Members and Board Meeting in Bangkok

[APTLD 2002; APTLD 2002b]

2002.6.23 12th APTLD Members and Board Meeting in Bucharest

[APTLD 2002c]

2002.9.14-15 13th APTLD Members and Board Meeting in Kuala Lumpur

[APTLD 2002d; APTLD 2002e; APTLD 2002f]

2002.10.26 14th APTLD Meeting in Shanghai

[APTLD 2002g; APTLD 2002h; APTLD 2002i]

## **(7) Year 2003**

APTLD's fifteenth Member Meeting took place in Taipei in February 2003. During the meeting, the newly elected board was installed. Ramesh Kumar Nadarajah was re-elected as Chair. The board also approved the results of the APTLD Secretariat election, which had been conducted online before the meeting. It was agreed that TWNIC would continue to serve as the secretariat for the next two years [APTLD 2003].

APTLD published a series of position papers on ICANN reform and ccNSO (Country Code Names Supporting Organization proposed by ICANN) before and after the Taipei meeting. The papers expressed APTLD's stance on the proposed policy development process of ccNSO [APTLD 2002j; APTLD 2003b; APTLD 2003c; APTLD 2003d].

In May 2003, APTLD held its sixteenth Members' Meeting in Kuala Lumpur and adopted its Constitution based on Malaysian law [APTLD 2003e]. Following the Members' Meeting, the Board Meeting marked the start of APTLD's first formal strategic planning. Additionally, with a view to advancing the APTLD membership drive, a special working group to develop an outreach strategy was formed under the direction of the Vice Chair for Membership. In this manner, reinforcement of the APTLD foundation was steadily carried on this year [APTLD 2003f].

The seventeenth APTLD Meeting took place in Busan in August 2003. A series of measures to strengthen the membership drive was approved at that meeting. The membership-related documents adopted included a guideline to help the Board make more informed and objective judgments on membership applications [APTLD 2003g]. In response to CENTR's invitation, it was resolved at the Board Meeting that APTLD would become an observer at CENTR. Simultaneously, APTLD decided to invite CENTR to APTLD meetings as an observer [APTLD 2003h]. With these resolutions, the relationship between APTLD and CENTR was enhanced.

During its eighteenth meeting held in Wellington in November 2003, APTLD organized for the first time a two-day technical workshop before the APTLD Member Meeting to share expertise on the registry management. The Members' Meeting noted with approval that the workshop had been a success [APTLD 2003j]. At the Wellington Board Meeting, the board completed strategic planning for 2004 and agreed to the financial plan, meeting schedule, committee structure, and the other work plans. Through these actions, APTLD consolidated its strategic planning cycle that continues until today [APTLD 2003k; APTLD 2003l]. In addition, members exchanged information on the status of ccNSO formation, in which APTLD continued to take part as the organization representing the Asia-Pacific ccTLDs.

Thus, APTLD has increased its level of activity and stepped up its presence in the global and regional Internet community, through vigilant advocacy from its inception to the present.

APTLD Meetings held in 2003 (with some Board Meetings conducted through online):

2003.2.24 15th APTLD Members Meeting in Taipei [APTLD 2003]

2003.5.30 16th APTLD Members Meeting in Kuala Lumpur [APTLD 2003f]

2003.8.23 17th APTLD Members Meeting in Busan

[APTLD 2003g; APTLD 2003h]

2003.10.30 (Ad Hoc) APTLD Board Meeting in Carthage [APTLD 2003i]

2003.11.23 18th APTLD Members and Board Meeting in Wellington  
[APTLD 2003j; APTLD 2003k; APTLD 2003l]

## References

- [Adler 1994] Prue Adler, et al., “InterNIC Midterm Evaluation and Recommendations—A Panel Report to National Science Foundation,” NSF, Dec. 1994.
- [APCCIRN 1993] APCCIRN, *Minutes of APCCIRN/APEPG Meeting*, Honolulu, 12-13 Jan. 1993.
- [APNIC 1993] APNIC, “Asia Pacific Network Information Center Pilot Project Midterm Status Report,” APNIC-006, 10 Dec. 1993.
- [APNIC 1993b] APNIC, “Various Proposals for the Asia Pacific Network Information Center,” APNIC-004, 10 Dec. 1993.
- [APNIC 1994] APNIC, *Announcement of First APNIC Meeting*, 1994.
- [APNIC 1995] APNIC, *Attendee List*, 16 Jan. 1995.
- [APNIC 1995b] APNIC, “IP Network Address Application Form Supporting Notes,” APNIC-001, 16 Feb. 1995.
- [APNIC 1995c] APNIC, “The APNIC Funding Plan and Current Status,” APNIC-013, 1 Sep. 1995
- [APNIC 1996] APNIC, “APNIC Status Report,” presented at 3rd APNIC Meeting, Singapore, Jan. 1996.
- [APNIC 2012] APNIC, *Timeline*, 2012.
- [APNIC 2013] APNIC, *About APNIC*, Feb. 2013.
- [APRICOT 2012] APRICOT, *About APRICOT*, Feb. 2012.
- [APTLD 1998] APTLD, “BIRDS OF A FEATHER SESSIONS,” 18 Feb. 1998.
- [APTLD 1998b] APTLD, “Draft Minutes of the APccTLD Inaugural Meeting,” 21 Jul. 1998.
- [APTLD 1998c] APTLD, “The Minutes of an APccTLD Meeting on 12 Aug. 1998,” 12 Aug. 1998.
- [APTLD 1999] APTLD, “Ad Hoc APTLD Meeting Minutes,” 24 May 1999.
- [APTLD 1999b] APTLD, “APTLD Member Meeting Agenda,” 21 Jun. 1999. [APTLD 1999c] APTLD, “APTLD Member Meeting Draft Minutes,” 5 Nov. 1999.
- [APTLD 2000] APTLD, “APTLD First Two Years,” 1 Aug. 2000.
- [APTLD 2000b] APTLD, “APTLD Principles,” posted 25 Oct. 1999, revised 9 Jun. 2000.
- [APTLD 2000c] APTLD, “APTLD Seoul Member Meeting Summary – Draft,” 29 Feb. 2000.
- [APTLD 2000d] APTLD, “APTLD Letter of Intent,” 1 Jul. 2000.
- [APTLD 2000e] APTLD, “Minutes of the Annual General Meeting of the APTLD Held in Yokohama on 18 July 2000,” 18 Jul. 2000.
- [APTLD 2000f] APTLD, “Minutes of the Meeting of the APTLD Board,” 20-21 Oct. 2000.
- [APTLD 2000g] APTLD, “Meeting Minutes of APTLD Board/Members Meeting,” 11 Nov. 2000.
- [APTLD 2001] APTLD, “APTLD Board Meeting Minutes 2001 in KL,” 24 Feb. 2001.
- [APTLD 2001b] APTLD, “APTLD Member Meeting Agenda in Melbourne,” 11 Mar. 2001.
- [APTLD 2001c] APTLD, “APTLD Board & Member Meeting in Stockholm,” 30 May 2001.
- [APTLD 2001d] APTLD, “Communique of the ccTLD Constituency – Stockholm,” 1 Jun. 2001.
- [APTLD 2001e] APTLD, “APTLD Statement on ccSO Principles,” 26 Aug. 2001. [APTLD 2001f] APTLD, “APTLD Ad Hoc Board Meeting & Joint Outreach Seminar in Taipei,” 26 Aug. 2001.
- [APTLD 2001g] APTLD, “APTLD Uruguay Meeting Minutes,” 5 Sep. 2001. [APTLD 2001h] APTLD, “APTLD Los Angeles (Informal) Meeting Minutes (Draft),” 10 Nov. 2001.
- [APTLD 2002] APTLD, “APTLD Board Meeting and AGM Minutes (Draft),” 3 Mar. 2002.
- [APTLD 2002b] APTLD, “Statement from APTLD Members Meeting in Bangkok,” Thailand, 3 Mar. 2002.

- [APTLD 2002c] APTLD, "APTLD Bucharest Meeting Minutes," 23 Jun. 2002.
- [APTLD 2002d] APTLD, "APTLD Member Meeting Minutes," 14 Sep. 2002.
- [APTLD 2002e] APTLD, "APTLD Board Meeting Minutes," 15 Sep. 2002.
- [APTLD 2002f] APTLD, "Communique," 15 Sep. 2002.
- [APTLD 2002g] APTLD, "APTLD Members' Meeting Minutes," 26 Oct. 2002.
- [APTLD 2002h] APTLD, "APTLD Board Meeting Minutes," 26 Oct. 2002.
- [APTLD 2002i] APTLD, "Communique," 26 Oct. 2002.
- [APTLD 2002j] APTLD, "APTLD Response to the ccNSO Assistance Group's Preliminary Recommendation on Policy-Development Process," 2002.
- [APTLD 2003] APTLD, "Communique of APTLD Meeting in Taipei," 24 Feb. 2003.
- [APTLD 2003b] APTLD, "APTLD AGM's Response to the ccNSO Assistance Group's Recommendations," 24 Feb. 2003.
- [APTLD 2003c] APTLD, "Comments of APTLD on the Latest ERC Report," 16 May 2003.
- [APTLD 2003d] APTLD, "APTLD Response to ERC's Response to Comments Received on ccNSO Recommendations," 29 May 2003.
- [APTLD 2003e] APTLD, "Constitution of Asia Pacific Top Level Domain Association," 30 May 2003.
- [APTLD 2003f] APTLD, "APTLD Members Meeting Minutes," 30 May 2003.
- [APTLD 2003g] APTLD, "APTLD Busan Members' Meeting Minutes," 23 Aug. 2003.
- [APTLD 2003h] APTLD, "APTLD Board Meeting Minutes," 23 Aug. 2003.
- [APTLD 2003i] APTLD, "ADHOC APTLD Board Meeting Minutes," 30 Oct. 2003.
- [APTLD 2003j] APTLD, "APTLD Wellington Members' Meeting Minutes," 23 Nov. 2003.
- [APTLD 2003k] APTLD, "APTLD Wellington Board Meeting Minutes," 23 Nov. 2003.
- [APTLD 2003l] APTLD, "APTLD Wellington Communique," 23 Nov. 2003.
- [APTLD 2012] APTLD, "APTLD Meetings," 2012.
- [Blokzijl 1990] R. Blokzijl, Y. Devillers, D. Karrenberg, and R. Volk, "RIPE Network Coordination Center (RIPE NCC)," RIPE-019, Sep. 1990.
- [CCIRN 1992] CCIRN, "Minutes of CCIRN Meeting," Tokyo, Jun. 1992.
- [CCIRN 2013] CCIRN, *CCIRN Website*, Feb. 2013.
- [Cerf 1990] Vint Cerf, "IAB Recommended Policy on Distributing Internet Identifier Assignment and IAB Recommended Policy Change to Internet 'Connected' Status," IETF, RFC 1174, Aug. 1990. [Chon 1993] Kilnam Chon, "Description of Work Items," ANC-93-085, Mar. 1993.
- [Chon 1993b] Kilnam Chon, "Area of Work for APCCIRN (Draft)," ANC-93-086, Mar. 1993.
- [Chon 1993c] Kilnam Chon, "Agenda of Seoul APCCIRN Meeting in 1993.5.31-6.1(Third Draft)," ANC-93-087/APCCIRN-024, Apr. 1993.
- [Chon 1998] Kilnam Chon, "World Wide Top Level Domain Alliance (WWTLD)," 1998.
- [Chon 2000] Kilnam Chon, *Asia-Pacific Top Level Domain (APTLD) First Two Years*, 2000.
- [Chon 2000b] Kilnam Chon, "A Letter from Prof. Kilnam Chon, APTLD Chair to Mr. Mike Roberts, ICANN CEO," 1 Mar. 2000.
- [Clark 1978] D. Clark and D. Cohen, "A Proposal for Addressing and Routing in the Internet," IEN 46, Jun. 1978.
- [Conrad 1994] D. Conrad, "The Asia Pacific Network Information Center, Present and Future", *Connect*, 1994.
- [Conrad 1994b] D. Conrad, "A NIC for the Asia-Pacific Region," *NSF Network News*, 22 April 1994. [additional publication in *CINET-L Newsletter*, no. 17, Saturday, Apr. 30, 1994]

- [Conrad 1995] D. Conrad, "APNIC FOO (Funding, Organization and Operation)," presentation, Jan. 1995.
- [Conrad 1995b] D. Conrad, "Asia Pacific Network Information Center Organizational Details," APNIC-012, Feb. 1995.
- [Conrad 2012b] D. Conrad, Personal correspondence, 12 Nov. 2012.
- [Conrad 2012c] D. Conrad, Personal correspondence, 24 Nov. 2012.
- [Cozanet 1994] Anne Cozanet, "Minutes of CCIRN Meeting," Amsterdam, 21 Jun. 1994. [Fuller 1992] v. Fuller, T. Li, J. Yu, and K. Varadhan, "Supernetting: An Address Assignment and Aggregation Strategy," IETF, RFC 1338, Jun. 1992.
- [Fuller 1993] v. Fuller, T. Li, J. Yu, and K. Varadhan, "Classless Inter-Domain Routing (CIDR): An Address Assignment and Aggregation Strategy," IETF, RFC 1519, Sep. 1993.
- [Gebes 1994] V. Gebes, "Asia Pacific Network Information Center Pilot Project Final Report," APNIC-009, 1994.7.1.
- [ICANN 1999] ICANN, *Domain Name Supporting Organization Formation Concepts*, 1999.3.4.
- [IETF 1993] IETF, "Meeting notes of March 1993 IETF User Services Area Meeting," Mar. 1993.
- [JPNIC 1994] JPNIC, "Relation to International NIC Activities," *JPNIC Report 7*, Mar. 1994.
- [JPNIC 2013] *JPNIC*, 2013.
- [Karrenberg 2001] Daniel Karrenberg, Gerard Ross, Paul Wilson, and Leslie Nobile., "Development of the Regional Internet Registry System," *The Internet Protocol Journal*, vol. 4, no. 4, Dec. 2001.
- [Mueller 2004] Milton Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*, MIT Press, 2004.
- [Murai 1993] Jun Murai and Masaki Hirabaru, "Proposal for APNIC Experiment," APCCIRN-020, 13 Jan. 1993.
- [Murai 1993b] Jun Murai and David Conrad, "Asia Pacific Network Information Center Pilot Project Proposal," APNIC-003, 1993.9.1.
- [Nakayama 1993] Masaya Nakayama, "APNIC/APCCIRN Report," Sep. 1993.
- [Nakayama 1993b] Masaya Nakayama, *Archived Email*, 2 Sep. 1993.
- [NRO 2012] *Number Resource Organization (NRO)*, 2012.
- [Park 1993b] Taeha Park, "APCCIRN/APEPG Meeting Minutes (1993.12.10-11, Taipei)," ANC-93- 118/APCCIRN-041, Dec. 1993.
- [Park 1993c] Taeha Park, "Proposal for Distributed APNIC Operations," APNIC-007, 8 Dec. 1993. [Postel 1981] Jon Postel, "Assigned Numbers," IETF, RFC 790, Sep. 1981.
- [Postel 1994] Jon Postel, "Domain Name System Structure and Delegation," IETF, RFC 1591, Mar. 1993.
- [Reynolds 1990] J. Reynolds and J. Postel, "Assigned Numbers," IETF, RFC 1060, Mar. 1990.
- [RIPE 1990] RIPE, "Minutes of RIPE 4," 22-23 Mar. 1990.
- [RIPE 1992] RIPE, *RIPE NCC Quarterly Report*, Issue 2, Sep. 1992.
- [RIPE 1995] RIPE, "Minutes of RIPE 20 Meeting," Amsterdam, Jan. 1995.
- [Simon 2006] Craig Simon, "Launching the DNS War: Dot-Com Privatization and the Rise of Global Internet Governance," Ph.D. dissertation, University of Miami, Dec. 2006.