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in the Converging Environment
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Ladies and gentlemen, fellow ICANN Board member and colleague Ramaraj, and Additional Secretary Shri R. Chandrashekhar of the Department of Information Technology of the Indian Government, thank you for welcoming me here today for this important discussion. This is a unique event, co-sponsored by the Department of Information Technology, the Ministry of Communication and Information Technology, the Internet and Mobile Association of India, and ICANN.

In the brief time I have today, I'd like to focus on a few key aspects of the Internet and the environment from my perspective, highlight some important areas of work ICANN is undertaking in this emerging environment — and the challenges that all that implies — and leave you with a few thoughts for our forthcoming discussion.

To start the discussion, I'd like to touch briefly on some areas of interest to us all:

- The rapidly evolving Internet and what its future holds

- The Internet in the converging environment
- Reflecting the values that enabled the Internet's development is important in developing policies

I'd also like to cover some specific areas ICANN is focused on, namely —

- Internationalized domain names, or IDNs
- What the newly streamlined application process for gTLDs means to business
- The state of Internet governance and the important of the multi-stakeholder model

The rapidly evolving Internet and what its future holds

In less than 40 years, we have seen the Internet burgeon from a means to transmit simple electronic messages — the old, reliable email we now take for granted for business and personal communications — to a complex network of networks, the infrastructure we've come to depend on for communicating, transacting business, transferring and storing data, and gathering together in virtual communities around the world.

Visualize with me for a moment the many layers of the Internet that enable us to accomplish all these activities. You'd see a very fat pipe, so to speak. However, being human, we continue to demand more of the Internet and its systems — we want an even fatter, faster pipe. Fortunately, the Internet's many stakeholders have anticipated this explosive growth. I'll talk about some specifics later, but here is my vision for what we can expect to see soon on the Internet.

While it's difficult to be definitive about the future, we can look for:

- Usage may continue to be limited by access to electricity. As many as 3 billion people may not be able to enjoy a truly global Internet.
- Many, perhaps most, will access the Internet by using mobile devices.
- We'll see a significant increase in broadband access (over 100 mb/sec). Many developing countries such as Morocco and Malaysia are adopting accelerated broadband distribution programs to deliver the Internet to their citizens.
- A machine-to-machine Internet will overtake today's person-to-person Internet.
- We will see billions of Internet-enabled appliances at home, at work, in the car, and in the pocket.
- Third parties will use the Internet to monitor all sorts of activities and utilities — from washing machines to cars to electricity meters.
- Geo-location and geo-indexed systems will be much more common and emergency services will be more precisely dispatched.
- There will be significant improvement in spoken interaction with Internet-based systems.
- We will see an even wider array of delivery methods for intellectual property (movies, sound tracks, books, etc.) than is available today. VoIP will be prevalent and SIP may be the

principal protocol means by which calls are set up. Voice communication will be essentially free except perhaps for calls that terminate on traditional PSTN devices including mobiles.

- Almost no industry will be offline since most will rely on the Internet for customer interaction, customer discovery, sales, service, advertising, and similar activities.

- Group interaction and collaborative support tools — including distributed games — will be very common.

- And last but certainly not least, internationalized domain names and new gTLDs will open up the Internet to much more multilingual content.

What will you be able to do in the future that you can't do now? Here are a few examples:

- Manage your appliances and home security systems through online systems.

- Use your mobile phones as remote controllers.

- Download videos, music, and books as a normal — even preferred — practice. Video on demand will focus on watching previously downloaded video rather than watching streaming, real-time video. This is really just an obvious extrapolation of the iPod/TiVo paradigm.

- You will be able to talk to the Internet itself to search for information and interact with various devices — and it will respond.

- Search systems will be more precise because meta-tagging of information will have become more common. This is part of the semantic web movement.

- Maintenance histories of products that can be serviced will be keyed to radio frequency IDs or bar codes associated with the devices. This is one potential use of Internet Protocol version 6, or IPv6, which is the natural extension of the original IPv4.

What will the technical underpinnings of the Internet look like by then?

- Terabit per second local networking will be available as backbones for local networks.

- The domain name system will operate in multiple language scripts. Again, a result of deploying IDNs and new gTLDs.

- IPv6 will be widely deployed, once the technical and financial issues have been worked out.

- Better confidentiality and authenticity will be provided through the use of a public key crypto. This will provide more authentication all along the network.

- Much more inter-device interaction will be common, incorporating position location, sensor networks, and local radio communications.

- Spam, phishing and various forms of denial of service attacks will continue a cold war-style arms race with defenses and better authentication techniques.

- Operating systems will continue to be troublesome sources of vulnerability.

What will everyone —businesses, other organizations, and individual users alike — still need to worry about?

- Spam and phishing
- Attacks on the domain name system
- Attacks at routing
- Fraud/IP spoofing

Defense against these continuing threats is not just about technology. It's not that simple. Response planning is essential. Response planning that involves policies and practices, technologies, infrastructure security and information security measures, and education and training for everyone connected to the Internet. The costs of partial preparedness or lack of preparedness are already astonishing, and will only grow exponentially in the future. That's because the potential rewards for cyber criminal organizations and corporate espionage agencies are so great.

ICANN's responsibilities are global. As an essential part of its work, ICANN will continue to develop and improve processes and procedures to encourage enhanced transparency and accountability — as well as security and stability — in the adoption of policies related to its function. Along with the Internet, ICANN and its constituencies are maturing, adopting best practice business initiatives and planning strategically for the future.

In complementing this process, a recent report by ICANN's President Strategy Committee acknowledged ICANN's existing international character, and encouraged the Board to further explore with the international

community appropriate mechanisms for reviewing ICANN's legal identity and functions to potentially enhance this international character.

The Internet in the converging environment

What the Internet will look like in the future is for the innovators to determine, and for us, as respective stakeholders, to continue to enable. The traditional communications system and the regulations surrounding it are changing as the Internet becomes a medium that can facilitate phone calls, deliver communications traditionally offered by the postal system, transfer video and music data on media beyond CDs and tapes, and facilitate group communications at levels never before experienced. The Internet and the applications we run on it are a converging environment. With this ever more complex environment comes the need to manage the associated challenges through solutions that reflect the values that enabled the medium to develop as it has.

The transition from IPv4 to IPv6 may also give rise to some challenges in the area of convergence, as the issue of static IP addresses and the ability for multiple mediums to be connected constantly creates new challenges to and the implications of the term "being online."

The explosive expansion of the Internet is being driven by –

- The deployment of internationalized domain names.
- New gTLDs and ccTLDs, which are expected in the very near term.
- The very real expectation of greater multi-lingual access, content and business services on the Internet.

- The greater number of devices linking to the Internet — mobile phones, PDAs, pagers, and even appliances (refrigerators, televisions, windscreen wipers).

As you know, each of these billions of devices must have a unique numerical (IP) address. And the spectre of an bank completely barren of IPv4 addresses has loomed over the Internet community for many years now. In fact, as of June 2007, only 19 percent of IPv4 addresses remains. The 128-bit IPv6 technology solution — and there are 340 trillion trillion trillion of them — extends the current 32-bit IPv4 protocol, enabling continuing and future expansion.

Aside from allowing continued Internet expansion, IPv6 will —

- Allow every machine/device to have its own IP address, simplifying network design and facilitating remote configuration.
- Allow for very high bandwidth networks by making use of larger data packets, a benefit to academic, educational and scientific institutions.
- Open the door to next-generation devices we haven't even thought of yet — but will.
- Enable better connectivity worldwide, allowing remote operation of home and office appliances and devices.
- Increase the possibility of real-time data retrieval and transmission across the Internet.
- And a potential commercial advantage: gaining understanding of new technology sooner rather than later.

Is the move to IPv6 inevitable? The short answer is, Yes. But, IPv4 will not disappear any time soon, even in the face of the increasing urgency to adopt IPv6. Still, individual ISPs may not easily handle the increased network load. The increase in routing level loads is also of concern.

- IPv4 will continue, especially in developing countries which have yet to introduce IPv4 infrastructure.
- There is no cutoff date for IPv4 address block allocations, nor is there likely to be for the foreseeable future.
- Both systems will run in parallel for the foreseeable future.
- And the possible reintroduction of unused IP addresses into the system is under discussion.

The IPv6 allocation and transition policies have been drawn up. We are now focusing on resolving the technical and financial issues that have arisen in the technical community.

So, where are we now?

- The pool of unallocated IPv4 addresses is projected to be fully distributed in mere years.
- The perception of IPv6 deployment as merely a technical issue — and moderate disagreement within the technical community — have contributed to lack of movement to IPv6
- However, many organizations and governments are now stressing its importance publicly.
- ICANN is developing a communications strategy to raise awareness and achieve stakeholder agreement, covering —

- Why ISPs and others should move to IPv6, and the financial benefits of doing so.
- What happens if they don't move.
- The cost of moving and not moving to IPv6.
- How to transition to IPv6.

Reflecting the values that enabled the Internet's development is important in developing policies

Since the domain name system's beginnings in the early 1980s, cooperation and consensus building through a multi-stakeholder model have successfully guided the Internet's rapid evolution and innovation while maintaining its global interoperability, security and stability.

A continuation of this global approach — based on the 35 years of the experience and values of technologists that created the Internet of today so as to ensure redundancy and resiliency — would, in my opinion, deliver the most satisfactory results for the interests of all users of the Internet.

As an internationally organised, multi-stakeholder non-profit organization, ICANN seeks to reflect these values of coordination, cooperation and collaboration.

Some Specific Areas ICANN Is Focused On

Internationalized Domain Names

One topic receiving particular scrutiny by the global Internet community is the development and implementation of internationalized domain names, or IDNs. It was the subject of many discussions at the

ICANN meeting in Puerto Rico earlier this year. I'd like to give you a brief overview of where IDNs stand at this juncture.

First, the IDN protocol being finalised by the IETF and others will define the characters that can be used to register domain names. It will, in effect, become the basis for a vast extensible set of characters that can be deployed safely across the Internet. Hundreds of thousands of characters could be included in this set — every character written in every language script in the world. Therefore, we consider the recommendations from the technical community essential to introducing IDNs at the top level in a manner that ensures the continued security, stability, and interoperability of the Internet.

To illustrate the attendant problems, think of the implications of supporting all languages that use a particular language script at exactly the same level. Take the Arabic script languages for example. We must understand and accommodate all the elements of Arabic, Farsi, Urdu, and the other Arabic script languages before we can support any of them. Right now, the domain name system cannot recognise the language that a name is intended to represent. Surely, all communities sharing a basic script must recognise the need for close coordination to ensure that the system works equally well for all their languages.

ICANN is entering into the next phase of technical testing steps to enable this implementation. In fact, ICANN's Board has just approved the release of a facility to evaluate at least 11 top-level domains having internationalised labels live in the DNS root zone.

What that means is that the name example.test will be inserted into the root in 11 languages to evaluate their impact on the root zone. Users will be

able to establish their own temporary pages from example.test with their name in their language. Then we'll see what happens.

These domains will not have any economic value and will be for technical testing purposes only — but they will be a significant step towards full implementation of global resolution of IDN top-level domains.

At ICANN's meeting in San Juan — attended by over 1000 people from 115 countries — ICANN's Governmental Advisory Committee and Country Code Names Supporting Organization extensively discussed an interim approach to IDN ccTLDs associated with the ISO 3166-1 two-letter codes to meet near-term demands. They also discussed ways to gain experience with mechanisms for selection and authorization of such top-level domains that can inform a policy development process aimed at creating an overall long-term policy.

Consequently, ICANN's Board will request that its community and respective supporting organizations, including the Governmental Advisory Committee, continue to work collaboratively, considering the technical limitations and requirements, to explore both an interim and an overall approach to IDN ccTLDs associated with the ISO 3166-1 two-letter codes. Their purpose will be to recommend a course of action to the Board in a timely manner.

This collaborative effort is a practical illustration of governments, country code operators, technical experts, and the ICANN Board members working together in a spirit of enhanced cooperation to address a complex but important technical challenge for the global Internet.

ICANN's work is progressing rapidly in this area, and input and participation by governments and country code operators in all regions is

critical in this process. All of our work together for IDN deployment is intended to maintain global uniqueness together with continued interoperability of the domain name system — unique domain names with the same functionality regardless of the geographic point of access.

However, the implementation and deployment of IDNs cannot take place in a vacuum. Several related technologies and policies that are intended to ensure the continuing stability and interoperability of the Internet are being reviewed and tested even now. They include streamlining the process for awarding new gTLDs, improvements to registry and registrar contracts to protect registrants, contingency plans in the event of a registry failure, domain name marketing, continuing improvements in ICANN's transparency and accountability, as well as IPv4 address exhaustion and the implementation of IPv6 addresses. And, as always, we strive for increased participation by all Internet sectors and stakeholders.

All these issues were discussed extensively at our Puerto Rico meeting and will see continuing discussion at our Los Angeles meeting this November.

What the newly streamlined application process for gTLDs means to business

These prospective new gTLDs — and there could dozens of them — are about choice. Choice for all in selecting market niches and identities. Choice for business owners in associating their domain name with the best top level domain. Choice for end users in searching for knowledge, products, services, social networks, communications, and exchange of information. Perhaps most important, choice for multicultural, multilingual content and access across the globe.

ICANN is developing a new application and approval policy that aims at streamlining gTLD applications and minimizing the time to approval and launch of new top level domains. This streamlined process is also designed to be more transparent, enabling applicants to see the steps in the application approval process and the status of their applications.

Although there still will be an application round, the new system will be standardized for all future applications and approvals.

One of the greatest benefits of this opening up the gTLD marketplace is that they could work in tandem with progress on IDNs for the introduction of new TLDs in new character sets — driving the Internet closing to becoming truly global.

The state of Internet governance and the important of the multi-stakeholder model

ICANN plans to participate at November's Internet Governance Forum meeting in Rio, both in the discussions surrounding critical Internet resources and in several workshops.

However, as was revealed in a panel discussion at ICANN's latest international meeting in Puerto Rico, defining those critical Internet resources involves a range of perspectives. A corollary issue involves which elements would be most usefully addressed at the IGF. Many of those critical Internet resources are outside ICANN's narrow remit. May I remind you of ICANN's mission and its four closely linked goals?

ICANN is the international multi-stakeholder organization responsible for the technical management and oversight of the coordination of the Internet's domain name system and its unique identifiers. It is responsible for coordinating the Internet's —

- Internet Protocol address space allocation;
- Protocol identifier assignment;
- Generic and country code top-level domain name system management; and
- Root server system management functions.

In fulfilling its mission, ICANN is guided by four founding principles:

- To preserve the operational stability and security of the Internet, particularly the domain name system;
- To promote competition and choice for registrants, especially in the generic top-level domain arena;
- To achieve broad representation of global Internet communities;
- And, to develop policy appropriate to its mission through bottom-up, consensus-based processes.

So there is much about Internet governance that ICANN cannot directly manage or even influence. However, in our role as consensus-builder of policies and protocols affecting the security, stability, and interoperability of the global Internet, we fully endorse the WGIG's working definition of Internet governance. That is —

> Internet governance is the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet.

We also agree that the field of critical Internet resources is much broader than merely ICANN's area of responsibility. The WGIG report — specifically, paragraphs 12 and 13(a) — noted that:

> It should be made clear, however, that Internet governance includes more than Internet names and addresses, issues dealt with by the Internet Corporation for Assigned Names and Numbers; it also includes other significant public policy issues, such as critical Internet resources, the security and safety of the Internet, and developmental aspects and issues pertaining to the use of the Internet.
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> Issues relating to infrastructure and management of critical Internet resources, including administration of the domain name system and IP addresses, administration of the root server system, technical standards, peering and interconnection, telecommunications infrastructure, including innovation and convergent technologies, as well multilingualization. These issues are matters of direct relevance to Internet governance and fall within the ambit of existing organizations with responsibility for these matters.

ICANN welcomes the opportunity to continue to participate in the IGF, but remains concerned that the forum continue to be a platform focused on issues of interest to developing countries — including access, security, diversity, and openness — and such things as national examples and best practices on how to ensure access to the information society for all.

It also bears repeating that the U.S. Department of Commerce continues to support private sector leadership in the coordination of the technical functions related to the management of the domain name space as

envisioned in the ICANN model. The Department also continues to support the work of ICANN as the coordinator for the technical functions related to the management of the domain name space.

Conclusions — Observations —

Internet users around the world are relying increasingly on the Internet's global system of unique identifiers, including the domain name space, to communicate, transact business, transfer and store data, and gather together in virtual communities. Users demand greater functionality and more multilingual content and access, wherever we are.

This growth will become even more dynamic with the deployment of top level internationalized domain names — that is, domain names using characters other than a through z and 0 through 9 and the hyphen — and the transition from IPv4 to IPv6. These and other initiatives that are intended to improve openness, accessibility, diversity, and security demonstrate that the Internet stakeholders — including the stakeholders in this audience — are working hard to make the Internet truly global.

The Internet is the most powerful and pervasive means of empowering individuals in recent human history. It is becoming part of the glue that ensures a rapid unleashing and sharing of humanity's knowledge and possibilities for all persons no matter their age, sex, class, ethnicity and — at least in some degree — wealth. And it is radically breaking down the obstacles to a global community.

It requires the continuing efforts of all stakeholders, from governments, the business and private sectors, academia, and civil society to preserve and strengthen this model. By doing so, we can ensure the resiliency and utility of the Internet — and guarantee the rapid and

successful development of a secure, stable, and globally interoperable Internet.

I would like to conclude with my strong recognition and continued welcoming of the participation by everyone here in ICANN and its processes. I am confident that the effective participation of all Internet communities will greatly and positively contribute to the ICANN process, and will bring valuable and novel views to the dialogue from which the global community can benefit.

Finally, allow me once again to express my personal delight at being invited to this meeting of distinguished representatives.

Thank you.