ICANN: The Basic Idea

ICANN = An Experiment in Technical Self-Management by the global Internet community
ICANN: The Basic Bargain

ICANN =

Internationalization of Policy Functions for DNS and IP Addressing systems

+ Private Sector (non-governmental) Management
What does ICANN do?

Coordinates policies relating to the unique assignment of:

- Internet domain names
- Numerical IP Address
- Protocol Port and Parameter Numbers

Coordinates the DNS Root Server System
- through Root Server System Advisory Committee
Says *The Economist*:

- “ICANN is in many ways a completely new institutional animal.”
- “It is a hybrid between an online community and a real-world governance structure, an untested combination.”
- “It is also a new type of international organisation: an industry trying to regulate part of itself, across the globe, with little or no input from national governments.”

*(10 June 2000)*
Domain names & IP addresses

- **Domain names** are the familiar, easy-to-remember names for computers on the Internet
  - e.g., amazon.com, icann.org, nic.or.kr

- Domain names correlate to **Internet Protocol numbers** (IP numbers) (e.g., 98.37.241.130) that serve as routing addresses on the Internet

- The **domain name system** (DNS) translates domain names into IP numbers needed for routing packets of information over the Internet
Types of Internet Domains

- **Generic Top Level Domains (gTLDs)**
  - `<.com>`, `<.net>`, `<.org>` open to all persons and entities on a global basis
  - `<.int>` for international treaty organizations
  - `<.arpa>` for Internet Infrastructure purposes
- `<.gov>`, `<.mil>` for U.S. government, military
- `<.edu>` for US universities
More Types of Internet Domains

- **Country Code Top Level Domains (ccTLDs)**
  - `.cn`, `.hk`, `.jp`, `.uk`, `.ca`, `.br`, `.de`, `.tv`, `.cc` . . .
  - Imprecise name: ccTLD includes *countries* and *geographically distinct territories*
  - Derived from ISO 3166-1 list
  - Registration requirements vary by domain
    - Residency requirement
    - Price (or no charge)
    - Ability to transfer
    - Dispute resolution policy
Basic DNS Registry Structure

Example: <.com>

ICANN
(= overall coordinator)

Registry
(= authoritative database of domain names and corresponding IP addresses)

Registrars
(= interact with customers/registrants; handle billing; place data in registry database; provide WHOIS service)

Registrants
(= domain name holders)

Root Zone File

Registry
<.com>

Shared Registry System (SRS)

Registrar A

Registrar B

Registrar C
## List of the Root Servers

<table>
<thead>
<tr>
<th>name</th>
<th>org</th>
<th>city</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>NSI</td>
<td>Herndon, VA, US</td>
</tr>
<tr>
<td>b</td>
<td>USC- ISI</td>
<td>Marina del Rey, CA, US</td>
</tr>
<tr>
<td>c</td>
<td>PSI net</td>
<td>Herndon, VA, US</td>
</tr>
<tr>
<td>d</td>
<td>U of Maryland</td>
<td>College Park, MD, US</td>
</tr>
<tr>
<td>e</td>
<td>NASA</td>
<td>Mt View, CA, US</td>
</tr>
<tr>
<td>f</td>
<td>Internet Software C.</td>
<td>Palo Alto, CA, US</td>
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<tr>
<td>g</td>
<td>DISA</td>
<td>Vienna, VA, US</td>
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<tr>
<td>h</td>
<td>ARL</td>
<td>Aberdeen, MD, US</td>
</tr>
<tr>
<td>i</td>
<td>NORDUnet</td>
<td>Stockholm, SE</td>
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<td>j</td>
<td>NSI</td>
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<td>k</td>
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<tr>
<td>l</td>
<td>ICANN</td>
<td>Marina del Rey, CA, US</td>
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<tr>
<td>m</td>
<td>WIDE</td>
<td>Tokyo, JP</td>
</tr>
</tbody>
</table>
Map of the Root Servers
Root server architecture of today

- Change decision
  - ICANN/IANA
- Verification
  - US Department of Commerce
- Update of the zone file:
  - Zone file management (currently, at A)
  - Synchronized with the database
- Distribution of the zone information
  - To the rest of root servers
Improved root server architecture

• Dedicated primary to be responsible for the root zone
  – Will distribute to the 13 root servers
• Extensive technical deliberation and preparation
  – Improve system to be more secure, robust and reliable
  – Change will be transparent to users
• Existing root server operators have agreed
• ‘When’ is subject to operational readiness of the new structure
Internet Addressing - IPv4

- IPv4 = 32 bits
  - Example: <192.34.0.64>
- Initially, 256 networks … then mix of:
  - Class A (128 with 16 M hosts)
  - Class B (16,384 with 65K hosts)
  - Class C (2M with 256 hosts)
- Now, Classless Inter-Domain addresses
  - Theoretically, up to 4 Billion hosts, hundreds of thousands of networks
Next Generation Internet - IPv6

- IPv6 = 128 bits of addressing
- Theoretically, $10^{38}$ hosts
- Significant transition effort needed
  - (Sort of like changing engines on the aircraft while in flight)
- IANA officially announced first allocations to RIRs (July 14, 1999)
Regional Internet Registries (RIR)

- **ARIN**
  - North America
  - Latin America
  - Caribbean Islands
  - Sub-Saharan Africa

- **RIPE NCC**
  - Europe
  - Middle East
  - North Africa
  - Parts of Asia

- **APNIC**
  - Most of Asia
  - Australia/New Zealand
  - Pacific Islands
Emerging RIRs

AfriNIC  -  Africa

LACNIC  -  Latin America/Caribbean
Most Internet DNS and IP Address coordination functions performed by, or on behalf of, the US government:

- **Defense Advanced Research Projects Agency (DARPA)**
  - Stanford Research Institute (SRI)
  - Information Sciences Institute (ISI) of University of Southern California

- **National Science Foundation (NSF)**
  - IBM, MCI, and Merit
  - AT&T, General Atomics, Network Solutions, Inc. (NSI)

- **National Aeronautics and Space Administration (NASA)**

- **US Department of Energy**
IANA

- “Internet Assigned Numbers Authority”
- A set of technical management functions (root management; IP address bloc allocations) previously performed by the Information Sciences Institute (ISI) at the University of Southern California, under a contract with the U.S. Government
- Includes protocol parameter and port number assignment functions defined by the Internet Engineering Task Force (IETF)
- Now a part of ICANN
IANA

Jon Postel
1943-1998
Need for Change

- **Globalization** of Internet
- **Commercialization** of Internet
- Need for **accountability**
- Need for more **formalized management structure**
- Dissatisfaction with **lack of competition**
- Trademark/domain name **conflicts**
White Paper Principles

White Paper: new policy/management structure must promote 4 goals:

- Stability
- Competition
- Private, bottom-up coordination
- Representation
White Paper Implementation

- Internet community to form non-profit corporation meeting White Paper’s 4 criteria
- US Government (through Commerce Department) to transition centralized coordination functions
- Amendment of Network Solutions agreement to require competitive registrars in gTLD registries
- Request to WIPO to study & recommend solutions for trademark/domain-name conflicts
Status of Transition from USG

- 25 November, 1998 - ICANN recognized in MoU
- June, 1999 - Cooperative agreement among ICANN, US Government, root server operators
- 10 November, 1999
  - ICANN and Network Solutions sign gTLD registry and registrar agreements
  - DoC transfers root authority over gTLDs to ICANN
- 9 February, 2000
  - Contract with US Government to complete transfer of IANA functions
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  ✓ November - ICANN and Network Solutions (NSI) sign gTLD registry and registrar agreements; USG transfers root authority over gTLDs to ICANN
✓ 2000
  ✓ February - Contract with US Government to complete transfer of IANA functions
  ✓ November - Selection of 7 new Top-Level Domains
✓ 2001
  ✓ January - Transfer of InterNIC functions from NSI to ICANN
ICANN and Country TLDs

• Basic organizing principle: Local Internet communities make decisions about country code TLDs (ccTLDs)

• ICANN’s role
  – Very hands-off on policy
  – Basic responsibility to delegate ccTLD so as to serve the interests of the local and global Internet communities
  – Maintain stable root server system

• ccTLD managers’ role
  – Technically competent registry and nameserver operations
  – Commitment to administer as trustee for the local community (local laws, culture, customs, preferences, etc.)

• Local government’s role
  – Depends on the local situation
ICANN and Global TLDs

• For the global TLDs (such as .com, .net, .org), ICANN serves as the vehicle for consensus policy development

• Examples of policies:
  – Competitive registrars
  – Uniform Dispute Resolution Policy
New Top-Level Domains

• First group chosen in November 2000
  – Global Open: <.info>, <.biz>
  – Individuals: <.name>, <.pro>
  – Specialized: <.museum>, <.aero>, <.coop>

• Proof of Concept - Launch with caution, observe carefully, learn from experience
  – Selection process was transparent & predictable

• If these are successful, there will be future rounds
  – Goal: Less burdensome, less expensive, more objective

• Biggest challenge: Launch phase
  – Intellectual Property & cybersquatting fears
  – Opening day rush; fairness to everyone

• Danger: Sleazy pre-registration offers (see FTC Warning)
Top Policy Objectives for Year 2001

• Successful introduction of New Top-Level Domains

• Completion of agreements:
  – ccTLD registry agreements
  – IP Address registry agreements
  – Root server operator agreements

• At Large Study
• DNSO Review
• UDRP Review
Structure of ICANN
ICANN Board of Directors

At Large Directors:
• Karl Auerbach (USA)
• Ivan Moura Campos (Brazil)
• Frank Fitzsimmons (USA)
• Masanobu Katoh (Japan)
• Hans Kraaijenbrink (Netherlands)
• Andy Mueller-Maguhn (Germany)
• Jun Murai (Japan)
• Nii Quaynor (Ghana)
• Linda S. Wilson (USA)

ASO Directors:
• Rob Blokzijl (Netherlands)
• Ken Fockler (Canada)
• Sang-Hyon Kyong (South Korea)

DNSO Directors:
• Amadeu Abril i Abril (Spain)
• Jonathan Cohen (Canada)
• Alejandro Pisanty (Mexico)

PSO Directors:
• Helmut Schink (Germany)
• Vint Cerf (USA) - Chairman
• Phil Davidson (U.K.)
ICANN Staff

New Model: Lightweight
(minimal staff = minimal bureaucracy)

Current Staff:

- President and CEO (Mike Roberts, soon Dr. Stuart Lynn)
- Vice President/General Counsel (Louis Touton)
- Chief Policy Officer/CFO (Andrew McLaughlin)
- Registrar Liaison (Dan Halloran & Ellen Sondheim)
- ccTLD Liaison (Herbert Vitzthum)
- IANA staff (Joyce Reynolds, Michelle Schipper, Bill Huang)
- Office Manager (Diane Schroeder)
- Network Administrator (Jim Villaruz)
- Technical Advisor (Suzanne Woolf)
Why Elect Directors?

- Accountability
- Transparency
- Representation
  - Geographic
  - Sectoral
- Diversity of views
- Distributed architecture of selection
At Large Elections 2000

• Free and open to anyone with a verifiable email address and physical address
• Over 158,000 registered to vote; over 70,000 voted
• 5 Directors elected from 5 different regions
  – North America, Latin America, Europe, Africa, and Asia/Australia/Pacific
• Problems: Nationalism, capture, outreach
At Large Study

• Next steps: Study the process, draw lessons, redesign for the future
  – Chair of study committee: Hon. Carl Bildt (Sweden)
  – Vice-chairs: Pindar Wong (Hong Kong S.A.R., China) and Charles Costello (USA, Carter Center)
ICANN = CyberGovernment?

• A: NO!

• ICANN has no inherent coercive power, only the ability to enter into contractual relationships through a process of consensus & consent

• Objectives: Network of agreements, that formalize and make transparent

• ICANN is not a substitute for the powers of governments (i.e., courts and laws)
Does ICANN = Cybergovernment?

• No: ICANN coordinates unique identifiers.
• But: technical coordination of unique values sometimes touches on non-technical policy interests:
  – Data privacy protection
    • (WHOIS database)
  – Intellectual property/trademark law
    • (UDRP)
  – Competition law
    • (Registrar accreditation for .com, .net, .org)
What ICANN doesn’t do

- Network security
- Financial transactions
- Data Privacy
- Internet Content
  - Pornography; hate speech
  - Copyright violations
  - Deceptive business practices / consumer protection
- Multi-national commercial disputes
- Definition of technical standards
  - Network surveillance and traceability
- Internet gambling
- Spam
What ICANN is NOT

- Technical Standard-Setting Body
- Internet Police Force
- Consumer Protection Agency
- Economic Development Agency
- Legislature or Court
What ICANN does do:

- Coordinate the availability of unique identifiers
  - And address directly related policy issues
Lessons from the Experiment?

- Private-sector self-management is possible, if narrowly chartered

- Global consensus on policy is difficult to define; even harder to achieve
  - Consensus is a tradition in the technical community in which ICANN is rooted, because you can test solutions & refer to objective data
  - Consensus on policy questions can be elusive, because it depends upon subjective values
Message to You:

(and to all Internet communities)

GET INVOLVED!!!

Consensus means you have to show up to be heard.

www.icann.org
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http://www.icann.org