

ICANN Rio de Janeiro

Orientation

Workshop

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ICANN: The Basic Idea

ICANN =

An Experiment in
Technical Self-Management
by the global Internet
community

ICANN: The Basic Bargain

ICANN =

Internationalization
of Policy & Management 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 Addresses
- Protocol Port and Parameter Numbers

Coordinates the DNS Root Name 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.org.gh
- 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
 - *New:* **<.info>**, **<.biz>**, **<.name>**, **<.aero>**, **<.coop>**, **<.museum>**, **<.pro>**

More Types of Internet Domains

- **Country Code Top Level Domains (ccTLDs)**
 - <.gh>, <.hk>, <.jp>, <.ca>, <.br>, <.de>, <.tv>, <.cc> . . .
 - Imprecise name: ccTLD includes *countries* and *geographically distinct territories*
 - Derived from ISO 3166-1 list
 - Key feature: Service to local Internet community, which is responsible for making decisions
 - Registration requirements vary by domain:
 - Residency requirement
 - Price (or no charge)
 - Ability to transfer
 - Dispute resolution policy

Basic DNS Registry Structure

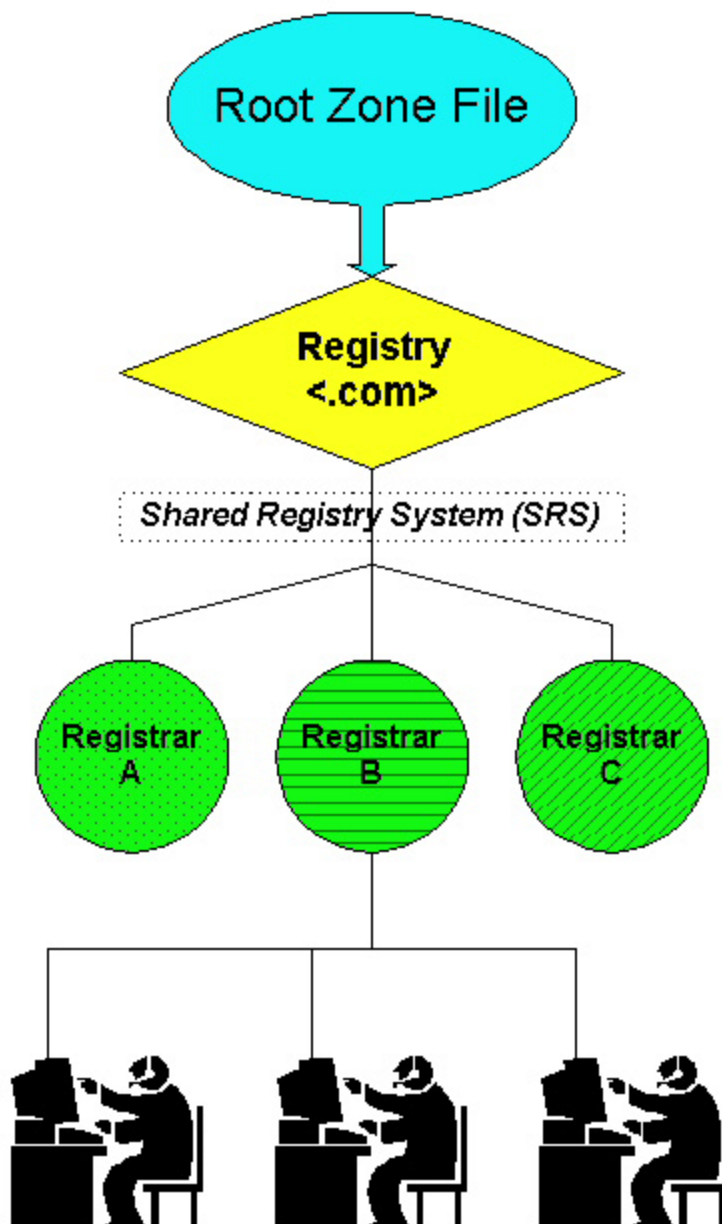
Example: <.com>

ICANN
(= overall coordinator)

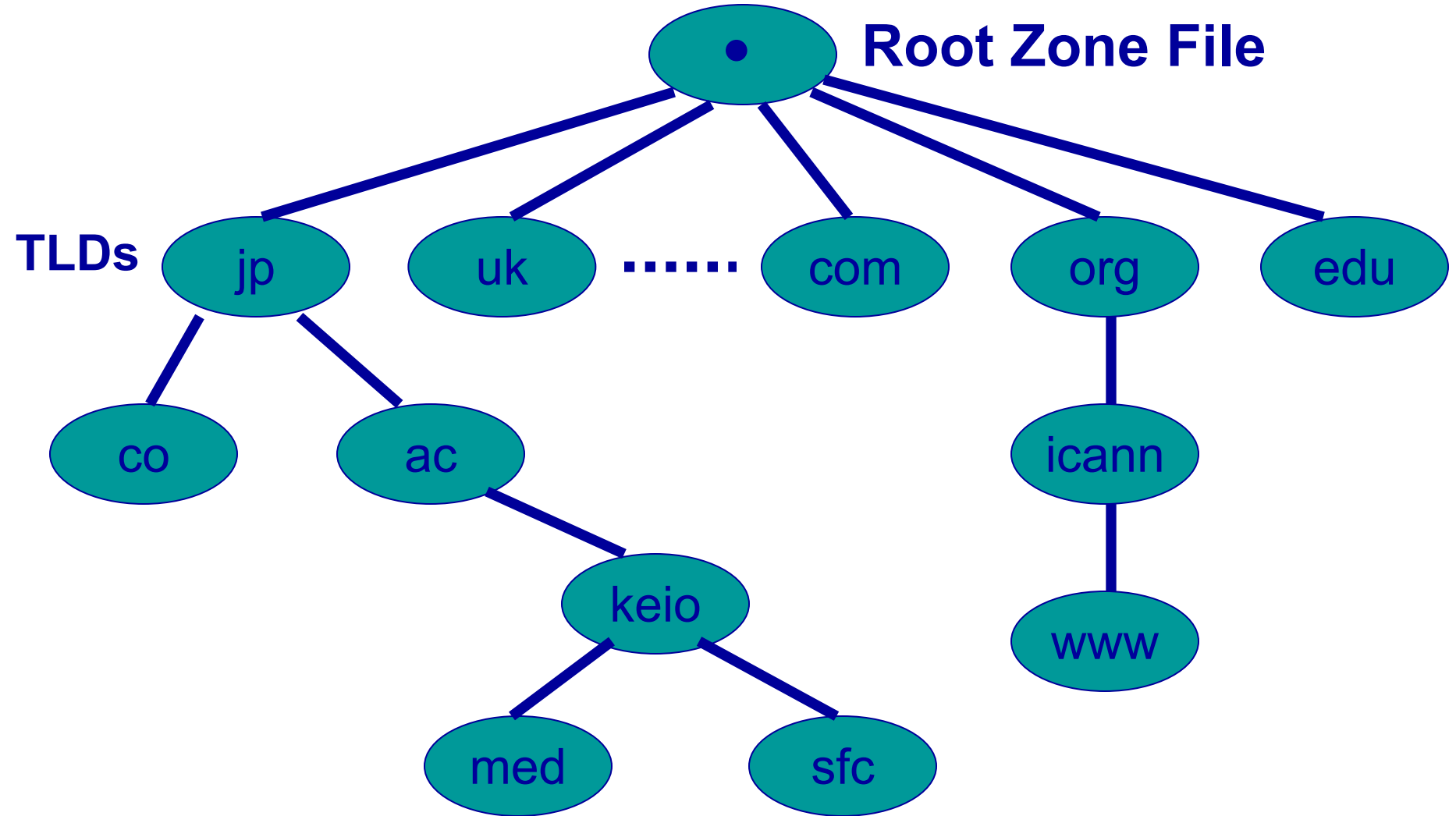
Registry
(= authoritative database of domain names and corresponding IP addresses)

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

Registrants
(= domain name holders)



The DNS Tree



List of DNS Root Name Servers

name	org	city
a	VeriSign	Herndon,VA, US
b	USC-ISI	Marina del Rey,CA, US
c	Cogent	Herndon,VA, US
d	U of Maryland	College Park,MD, US
e	NASA	Mt View, CA, US
f	Internet Software C.	Palo Alto, CA, US
g	DISA	Vienna, VA, US
h	ARL	Aberdeen, MD, US
i	NORDUnet	Stockholm, SE
j	VeriSign	Herndon,VA, US
k	RIPE	London, UK
l	ICANN	Marina del Rey,CA, US
m	WIDE	Tokyo, JP

Map of DNS Root Name Servers



Root server architecture of today

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

Internet Addressing - IPv4

- IP address = unique identifier for a node or host connection on an IP network
- IPv4 = 32 bit binary number
 - Usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) and separated by decimal points ("dotted decimal" notation)
 - Example: 192.0.34.64

In binary form:

192 . 0 . 34 . 64
11000000.00000000.00100010.01000000

IPv4 addressing: Classes

- Every IP address consists of two parts, one identifying the network and one identifying the node.
- Initially, 256 networks, then mix of 5 classes:
 - Class A (1-126)
 - 8 bits of network address, 24 bits of host address
 - 126 with 16M+ hosts
 - Class B (128-191)
 - 16 bits of network address, 16 bits of host address
 - 16,324 with 65K+ hosts
 - Class C <192-223>
 - 24 bits of network address, 8 bits of host address
 - 2M+ with 254 hosts
 - Class D <224-239> = multicast
 - Class E <240-255> = reserved for future use

IPv4 addressing: Classes

The Class determines which part of the IP address belongs to the network (N) and which part belongs to the node (n).

Class A (ex: 10.x.x.x):

NNNNNNNN.nnnnnnnn.nnnnnnnn.nnnnnnnn

Class B (ex: 130.1.x.x):

NNNNNNNN.NNNNNNNN.nnnnnnnn.nnnnnnnn

Class C (ex: 200.1.20.x)

NNNNNNNN.NNNNNNNN.NNNNNNNN.nnnnnnnn

Classes vs. CIDR

- Problem: Classful assignment can waste huge amounts of space
 - Anyone who could reasonably show a need for more than 254 host addresses got a Class B address block of 65,533 host addresses
- Solution: Classless Inter-Domain Routing (CIDR)
 - Basic idea: Accurately allocate only the amount of address space that is actually needed
 - CIDR allows variable-length network prefixes
 - Hierarchical allocation via ISPs enables more efficient routing – allocate & route in terms of address blocks
- 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
- Regional Internet Registries are now allocating IPv6; software being written; networks being built

Regional Internet Registries (RIR)

- **APNIC**

- Most of Asia
- Australia/New Zealand
- Pacific Islands

- **ARIN**

- North America
- Sub-Saharan Africa

- **LACNIC**

- Latin America
- Caribbean Islands

- **RIPE NCC**

- Europe
- Middle East
- North Africa
- Parts of Asia

Emerging RIR

AfriNIC → Africa

Status: Actively organizing, interim Board of Trustees, will begin by co-locate staff at RIPE.

Basic Address Policy

- Key values: Availability + conservation + aggregation
- RIRs allocate based on demonstrated need
 - Generally, RIRs allocate address blocks on the basis of immediate need and projected utilization rate within one year.

IP Address Tree

IANA

Status Quo Ante ICANN

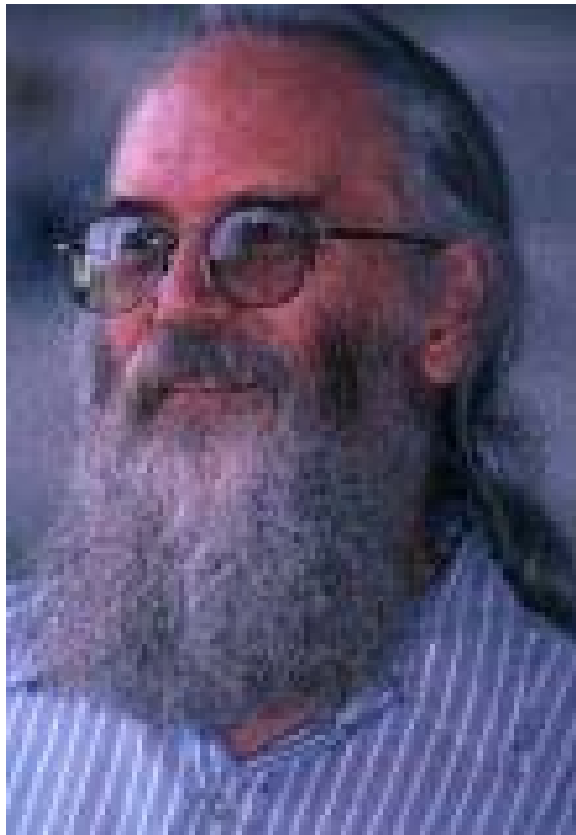
Most Internet DNS and IP Address coordination functions performed by, or on behalf of, the US government:

- **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
- Also: Protocol parameter and port number assignment functions defined by the Internet Engineering Task Force (IETF)
- Now performed by ICANN

IANA



Jon Postel
1943-1998

The Need for Change Circa 1996/97

- ◆ 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

USG White Paper: new DNS 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

ICANN's Job: Technical + Policy

USG White Paper:

- Why? “The development of policies for the addition, allocation, and management of gTLDs and the establishment of domain name registries and domain name registrars to host gTLDs should be coordinated.”
- ICANN “should have the authority to manage and perform a specific set of functions related to coordination of the domain name system, including the authority necessary to:
 - “1) **set policy** for and direct allocation of IP number blocks to regional Internet number registries;
 - “2) **oversee operation** of the authoritative Internet root server system;
 - “3) **oversee policy** for determining the circumstances under which new TLDs are added to the root system; and
 - “4) **coordinate** the assignment of other Internet technical parameters as needed to maintain universal connectivity on the Internet. “

Transition Milestones

- ✓ 1998
 - ✓ November - ICANN recognized in MoU with US Government
- ✓ 1999
 - ✓ June - Cooperative agreement among ICANN, US Government, root server operators
 - ✓ 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

Transition Milestones, cont'd

✓ 2001

- ✓ January - Transfer of InterNIC functions from NSI to ICANN
- ✓ September – Agreement with .au Registry
- ✓ Creation of ICANN Security & Stability Advisory Committee

✓ 2002

- ✓ Agreements with .jp, .bi, .mw, .la, .sd, .ke registries
- ✓ ICANN reform process
- ✓ September – Renewal of ICANN/USG MoU through 2003
- ✓ October – ICANN selects PIR as new .org registry operator
- ✓ November – LACNIC recognized as fourth RIR
- ✓ Plan for new sponsored TLDs

✓ 2003

- ✓ Agreement with .af
- ✓ Implementation of ICANN 2.0
- ✓ Publication of registry monthly reports
- ✓ New CEO: Paul Twomey

What are the IANA functions?

- Protocol parameter assignments
 - Under March 1, 2000 IETF/IAB/ICANN MOU
 - Documented through IETF's RFC series
 - Types of numbers range from unique port assignments to the registration of character sets.
 - List of IANA Protocol Numbers and Assignment services: <<http://www.iana.org/numbers.html>>
- IP Address Allocations
- DNS root zone file management

ICANN and ccTLDs

- Basic organizing principle: Local Internet communities make decisions about country code TLD Registries (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
 - Coordinate stable root server system
- ccTLD managers' role
 - Technically competent registry and nameserver operations
 - Administer ccTLD 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 (more than 200 accredited)
 - Uniform Dispute Resolution Policy (UDRP)
 - Data Escrow
 - Whois
 - Redemption Grace Period for Deleted Names

gTLD Policy: Registrar Competition

- Smashing success
- Over 150 registrars accredited globally
- Prices → lower (\$10, compared to \$50)
- Service → better
- Choices → more

gTLD Policy: UDRP

- Applies to: aero, .biz, .com, .coop, .info, .museum, .name, .net, and .org.
 - Not country-code TLDs, generally
- UDRP: domain name disputes to be resolved by courts, except for narrow band of abusive, bad-faith cybersquatting of trademarks
 - Registrars can't cancel, suspend, or transfer a domain name without a court order, except:
 - For bad-faith cybersquatting, a speedy (45-60 days), low-cost (\$1000-2000), global administrative procedure is available (UDRP)

UDRP – Part II

In order to have a challenged domain name transferred or cancelled, a trademark holder must establish:

(1) that he has a legally recognized trademark in a name that is identical or confusingly similar to the domain name;

(2) that the current registrant of the domain name has no legitimate rights in the name; and

(3) that there has been some evidence of bad faith or abuse (ex: extortion)

UDRP – Part III

- Enabled globally effective, speedy, relatively inexpensive resolution of the most egregious domain name registration abuses
- Over 5800 decisions rendered by 4 dispute resolution service providers
- Personal view: A small number of wrong decisions, but on the whole a very successful system

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
- Planning for future rounds
 - Goal: Less burdensome, less expensive, more objective
 - Stuart Lynn proposal: Add more specialized TLDs
- Biggest challenge: Launch phase
 - *Intellectual Property & cybersquatting fears*
 - *Opening day rush; fairness to everyone*

Top Policy Objectives for Year 2003

- Progress toward formal agreements:
 - ccTLD registry agreements
 - IP Address registry agreements
 - Root server operator agreements
- gTLD Policies
 - UDRP Review
 - Whois Requirements
 - New TLD evaluation & future new TLD process
 - Domain name transfers among gTLD registrars
 - Policies for managing deleted domain names
- Support AfriNIC
- Internationalized domain name issues
- Creation At Large Advisory Committee regional structures

Internationalized Domain Names

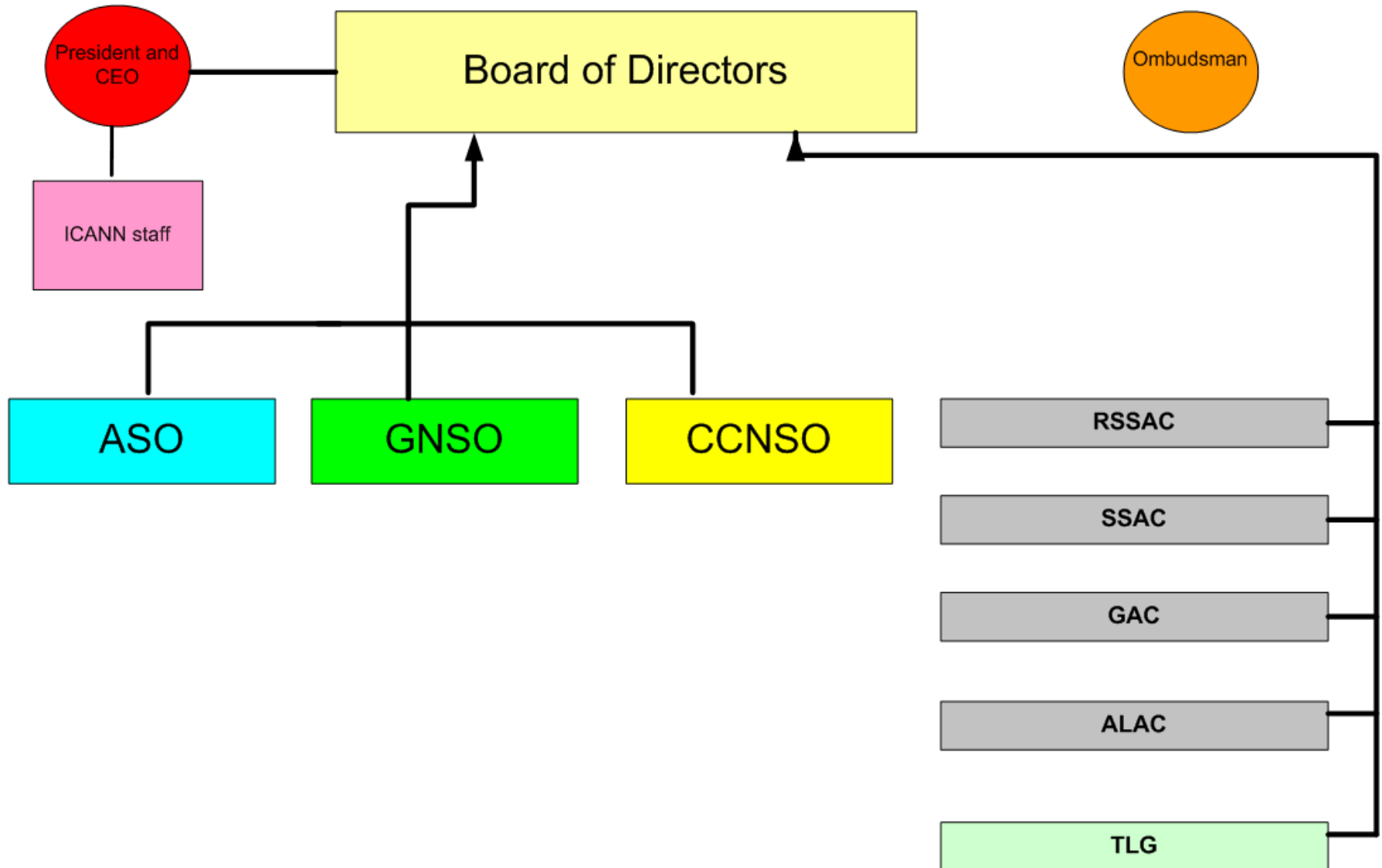
- Goal: make domain name system accessible to those who use non-ASCII characters
- Approach: Client-side ASCII-compatible encoding
 - Technical issues
 - IETF standards-track documents approved as RFCs by IETF's IESG
 - Implementation issues
 - Standards for ICANN approval for registries under contract
 - Registry-level policies for character equivalence & variants
 - Implications for UDRP? Whois?



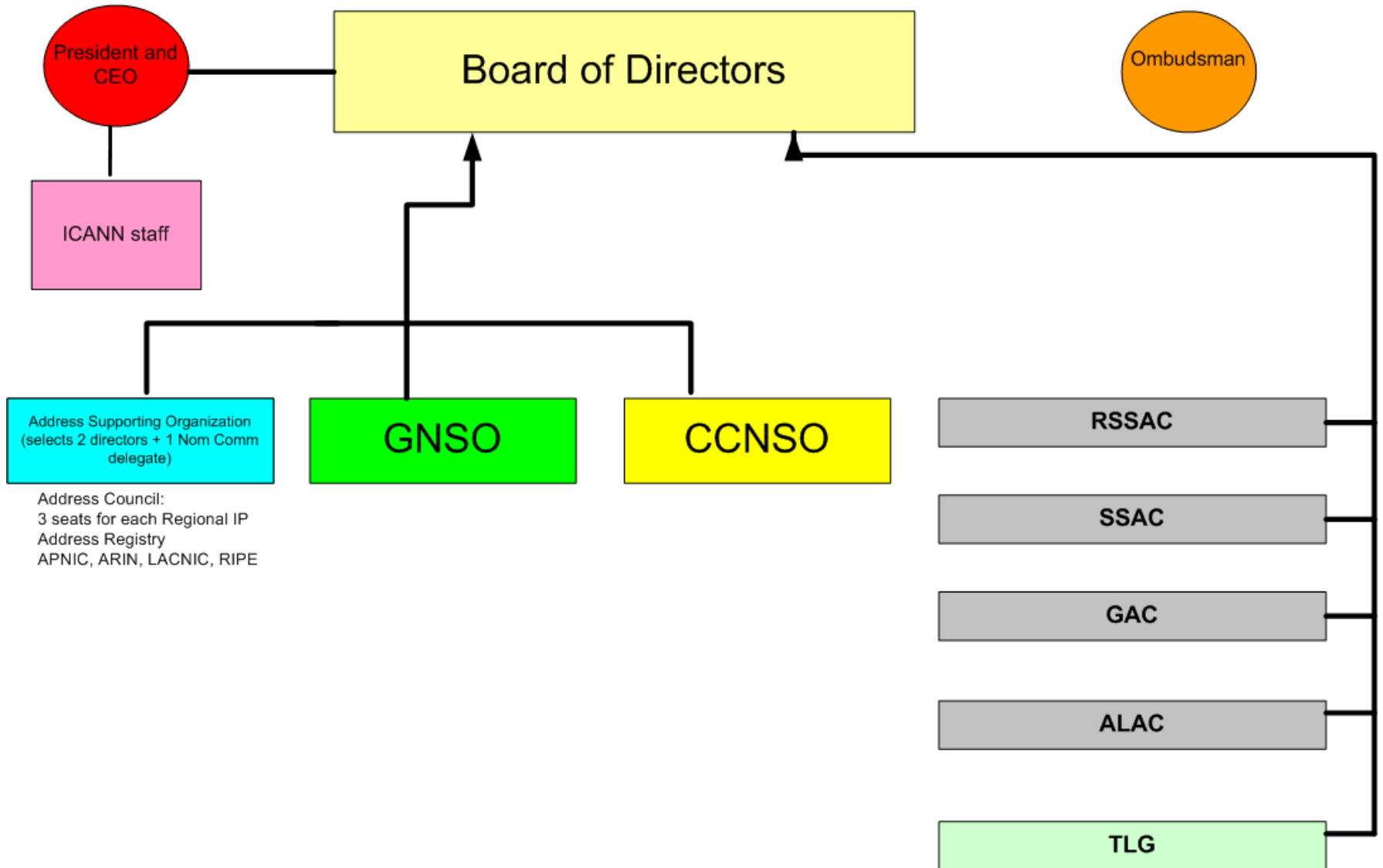
Structure of ICANN



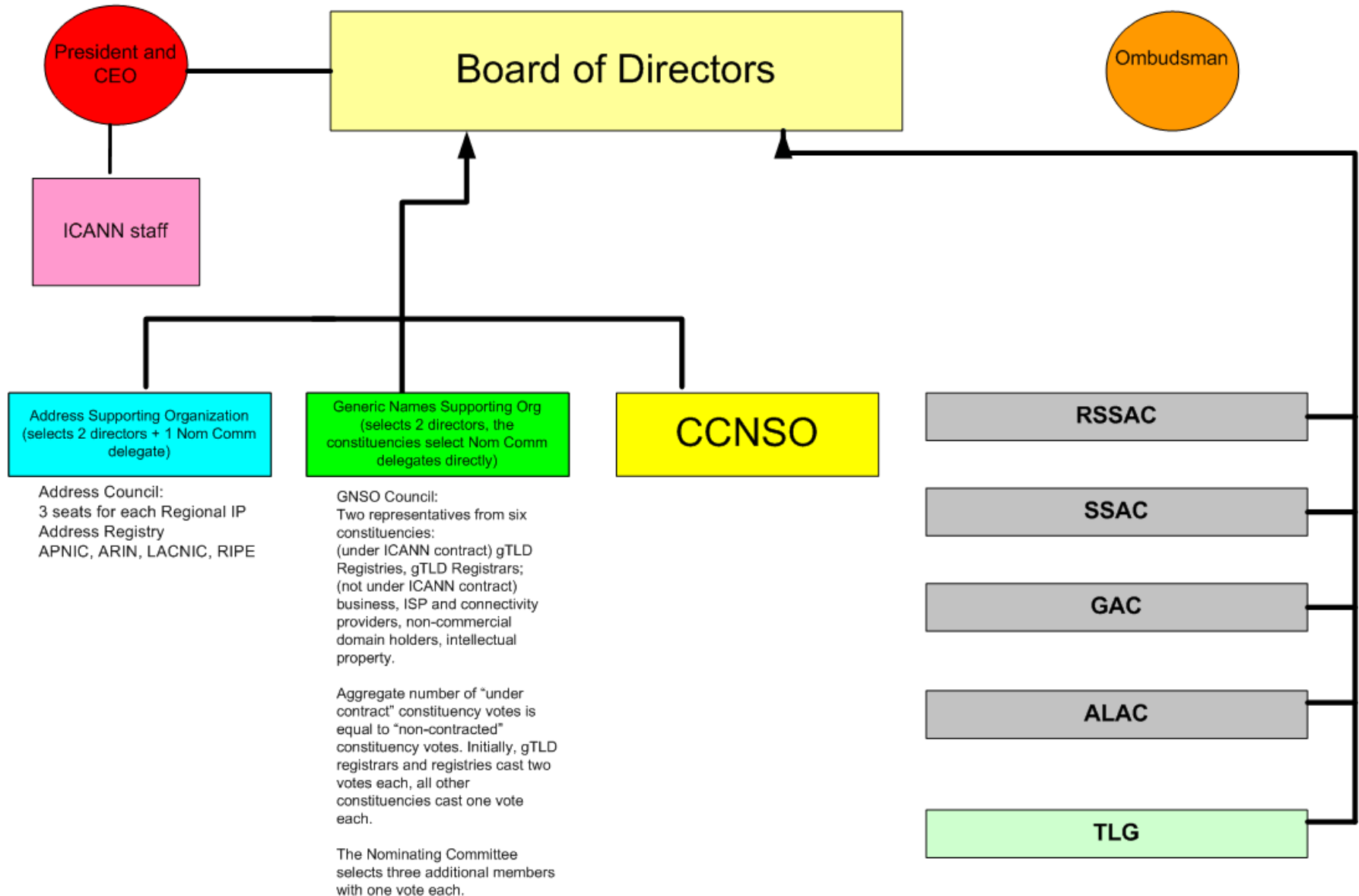
ICANN Organizational Chart



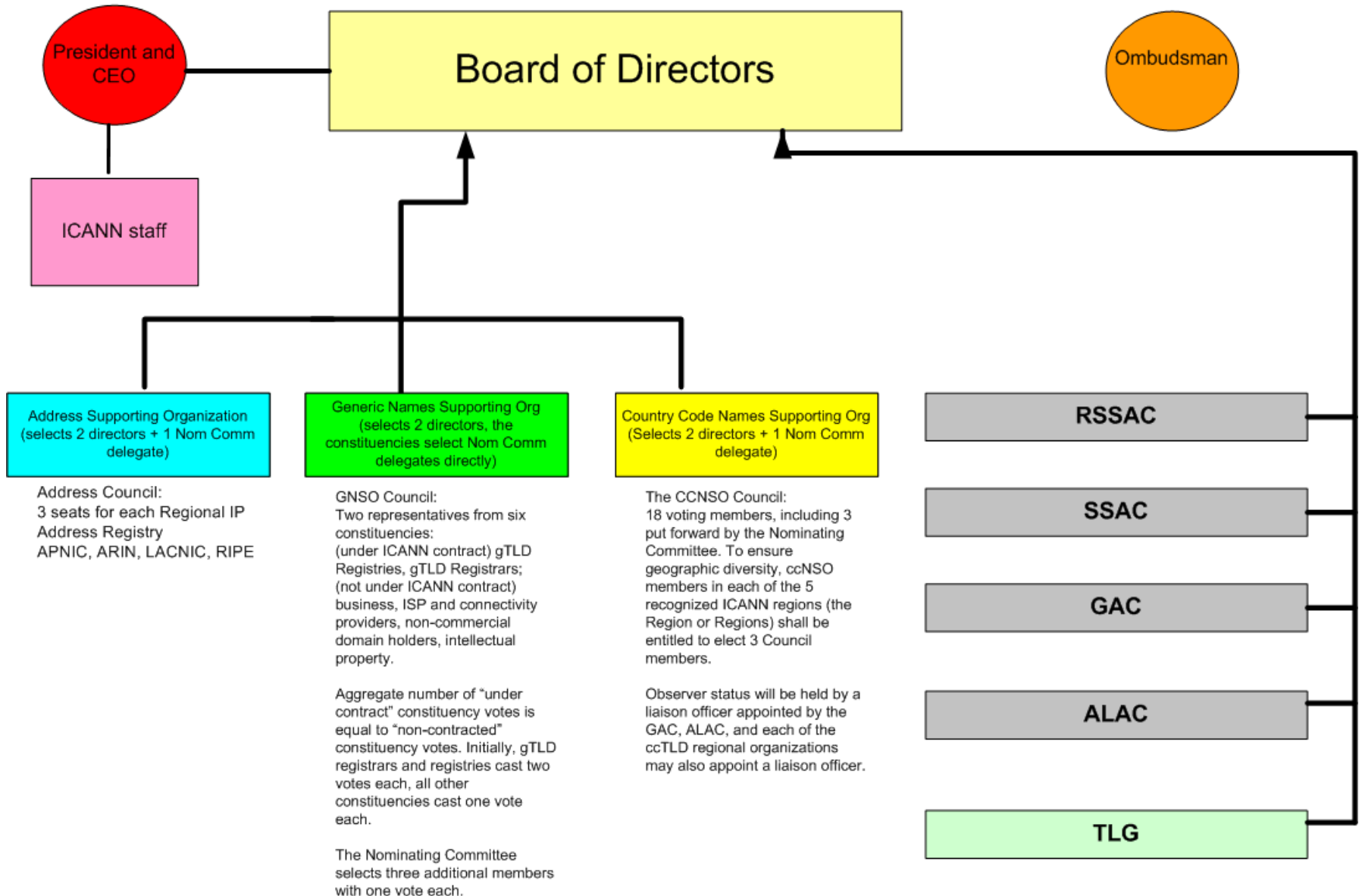
ICANN Organizational Chart



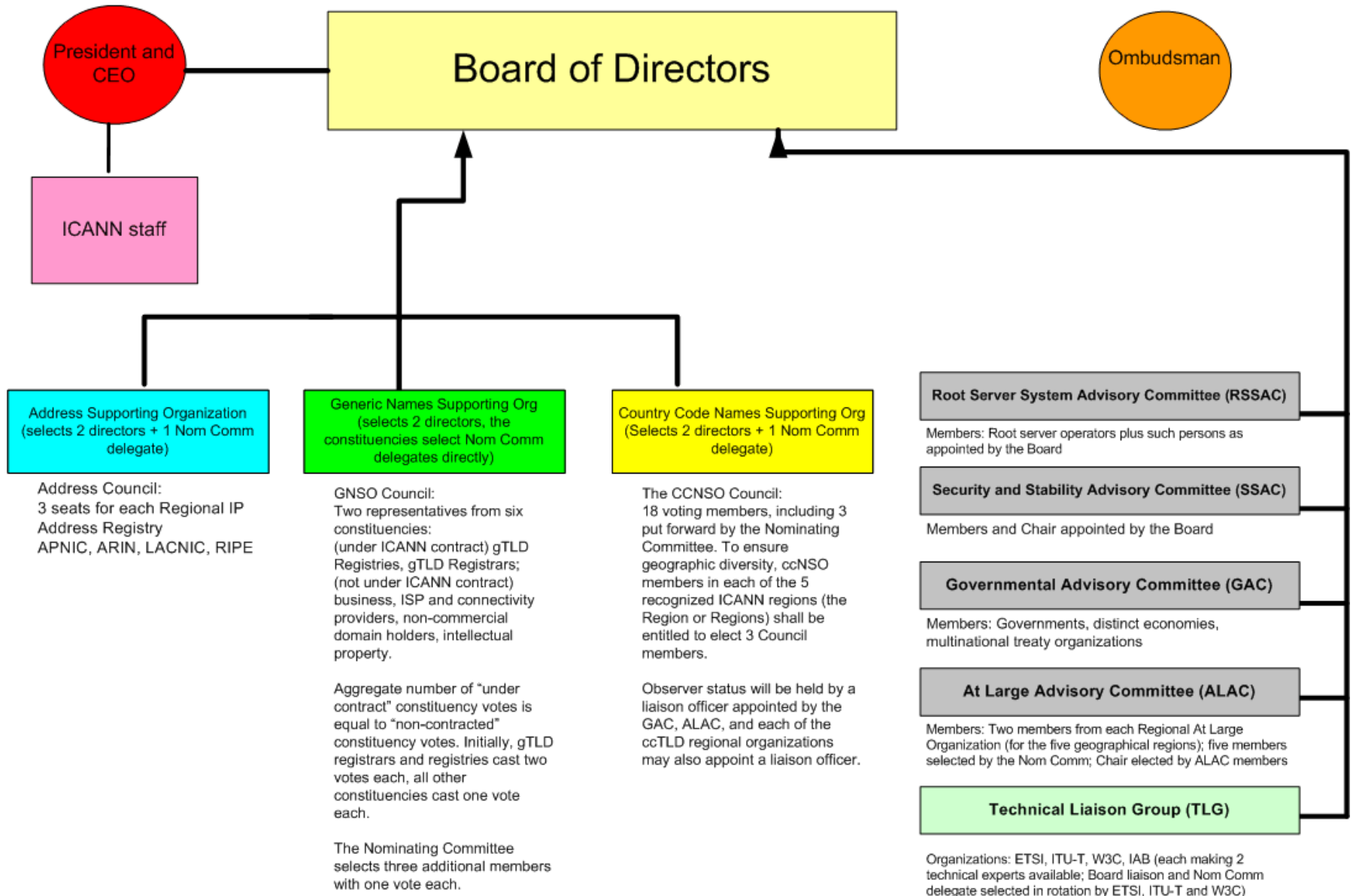
ICANN Organizational Chart



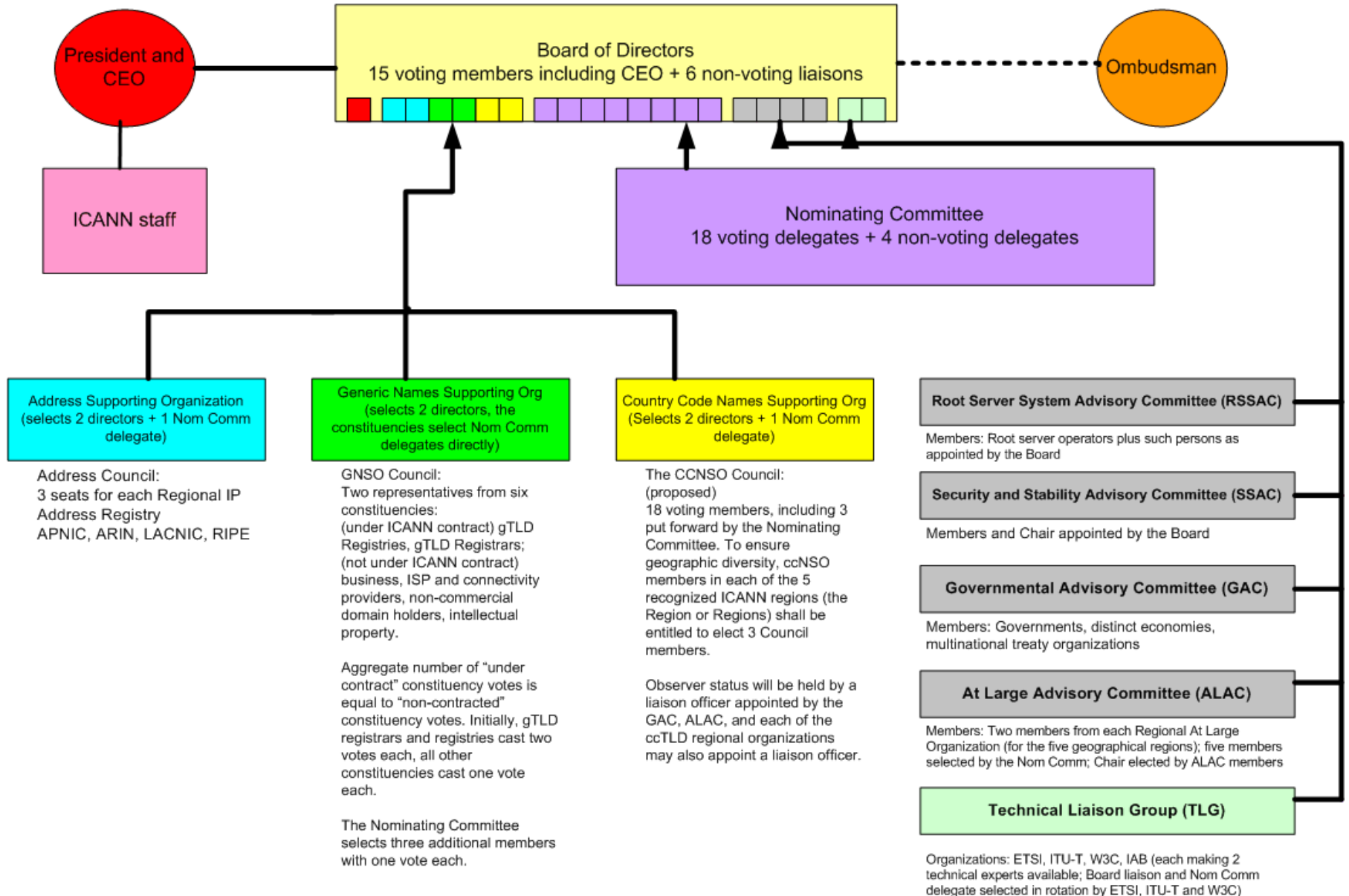
ICANN Organizational Chart



ICANN Organizational Chart



ICANN Organizational Chart



ICANN Board of Directors

Transition Board Directors:

- Vint Cerf (USA) – *Chairman*
- Alejandro Pisanty (Mexico) – *Vice-Chairman*
- Amadeu Abril i Abril (Spain)
- Karl Auerbach (USA)
- Ivan Moura Campos (Brazil)
- Lyman Chapin (USA)
- Jonathan Cohen (Canada)
- Mouhamet Diop (Senegal)
- Frank Fitzsimmons (USA)
- Masanobu Katoh (Japan)
- Hans Kraaijenbrink (Netherlands)
- M. Stuart Lynn (until 27 March, 2003)
- Andy Mueller-Maguhn (Germany)
- Jun Murai (Japan)
- Nii Quaynor (Ghana)
- Helmut Schink (Germany)
- Paul Twomey (begins 27 March, 2003)
- Linda S. Wilson (USA)
- Sang-Hyon Kyong (South Korea)

ICANN Staff

Lightweight Model

(minimal staff = minimal bureaucracy)

Current Staff (23):

- ◆ President and CEO (Dr. Paul Twomey effective 27 March 2003)
- ◆ V.P./General Counsel (Louis Touton)
- ◆ Counsel for Int'l Legal Affairs (Theresa Swinehart)
- ◆ C.F.O. (Diane Schroeder)
- ◆ IANA Manager (Michelle Cotton)
- ◆ Outreach Coordinator (Anne-Rachel Inné)
- ◆ Manager, Technical Operations (John Crain)
- ◆ Manager, Technical Systems (Kent Crispin)
- ◆ Director of Communications (Mary Hewitt)
- ◆ Registrar Liaison (Dan Halloran & Ellen Sondheim)
- ◆ Webmaster (Terri Irving)
- ◆ Network/Systems Administrators (Jim Villaruz, Steve Conte)
- ◆ Admin (Monique West, Lauren Graham, Tanzanica King, Jennifer Rodriguez)

Funding

- ICANN Budget 2003-4 = ~\$8 million US
- Sources of funding: Registry & Registrar agreements
 - gTLD Registries (com, net, org, info, biz, etc.)
 - gTLD Registrars (accreditation fees)
 - ccTLD Registries (voluntary contributions, pending formal agreements)
 - Regional Internet Registries (voluntary contributions pending finalization of agreements)
- No funding from governments

At Large Advisory Committee

- Goal: Enable meaningful, informed participation in ICANN by individual Internet users
- 31 October 2002, the ICANN Board adopted New Bylaws that establish the ALAC and authorize its supporting At-Large organizations.
- 5 Regional At-Large Organizations (one in each ICANN region – Africa, Asia-Pacific, Europe, Latin America/Caribbean, and North America).
- The Regional At-Large Organizations manage outreach and public involvement and are the main forum in each region for public participation.

ICANN Reform

- Launched by CEO Stuart Lynn in February 2002
- New Bylaws adopted December 2002
- Generated tons of input from all over
- Goal: Effective ICANN, focused on a well-defined mission, representative of the global Internet's diversity
 - ICANN as technical coordinating body, not a market regulator or an experiment in global online democracy.

Elements of Reform

- **Core Values**
- **Structure**
 - Board composition & selection
 - Nominating committee
- **Policy-development process**
 - Generic TLDs & Country-code TLDs
 - Address Supporting Organization
 - Advisory Committees: At-Large, Governmental, Security, Technical Liaison Group, Root Name Server Operators
- **Funding**
- **Participation**
 - Manager of Public Participation
 - Regional At-Large Organizations
- **Openness and Transparency**
 - Ombudsman
 - Independent Review
- **Governments & The Public Interest**

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)

ICANN = CyberGovernment?

- No: ICANN coordinates unique identifiers.
- **But:** Technical coordination of unique values sometimes entails non-technical policy issues:
 - 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 Internet's systems of unique identifiers
 - And address **directly** related policy issues
- Plus: Set policies for the gTLD registries

Message to You:

GET INVOLVED!

It's an open process – your views are
important!

www.icann.org

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For Further Information:

<http://www.icann.org>