# ICANN Shanghai

## Orientation Workshop

28 October 2002

*Your Friendly Host:*

Andrew McLaughlin

# 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>, <.areo>, <.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

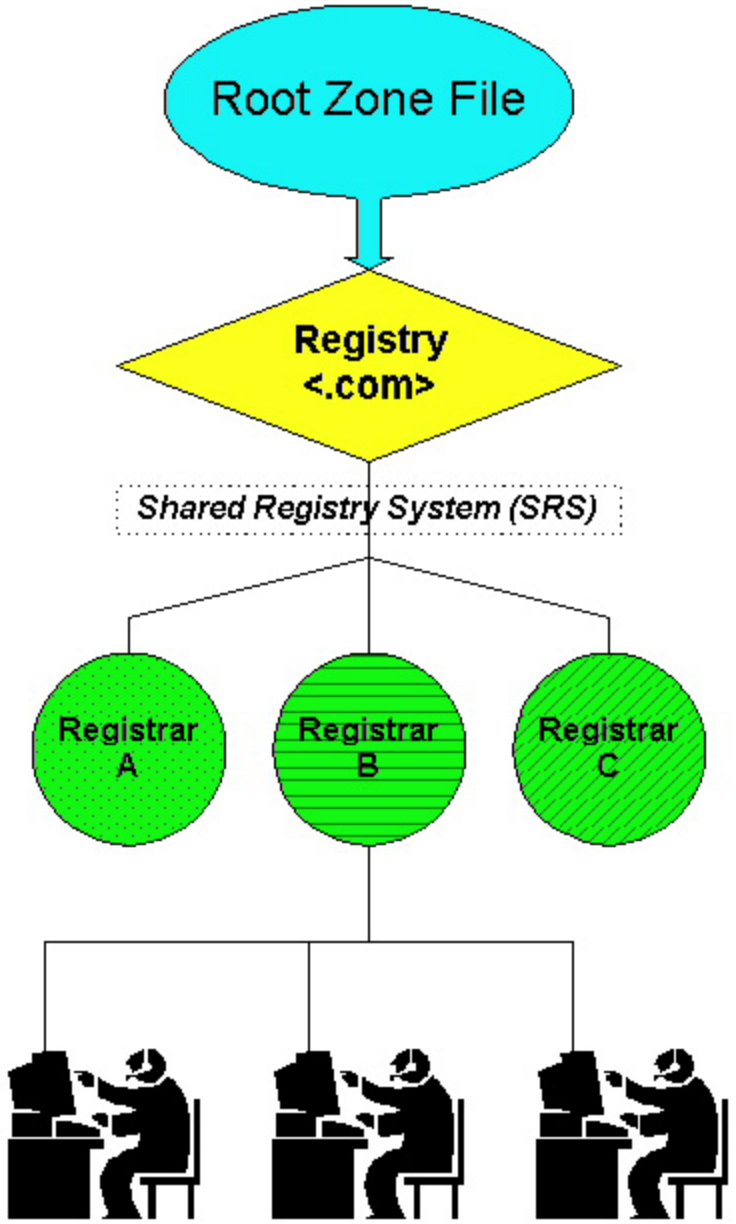
***Example: <.com>***

## ICANN
(= overalll coordinator)

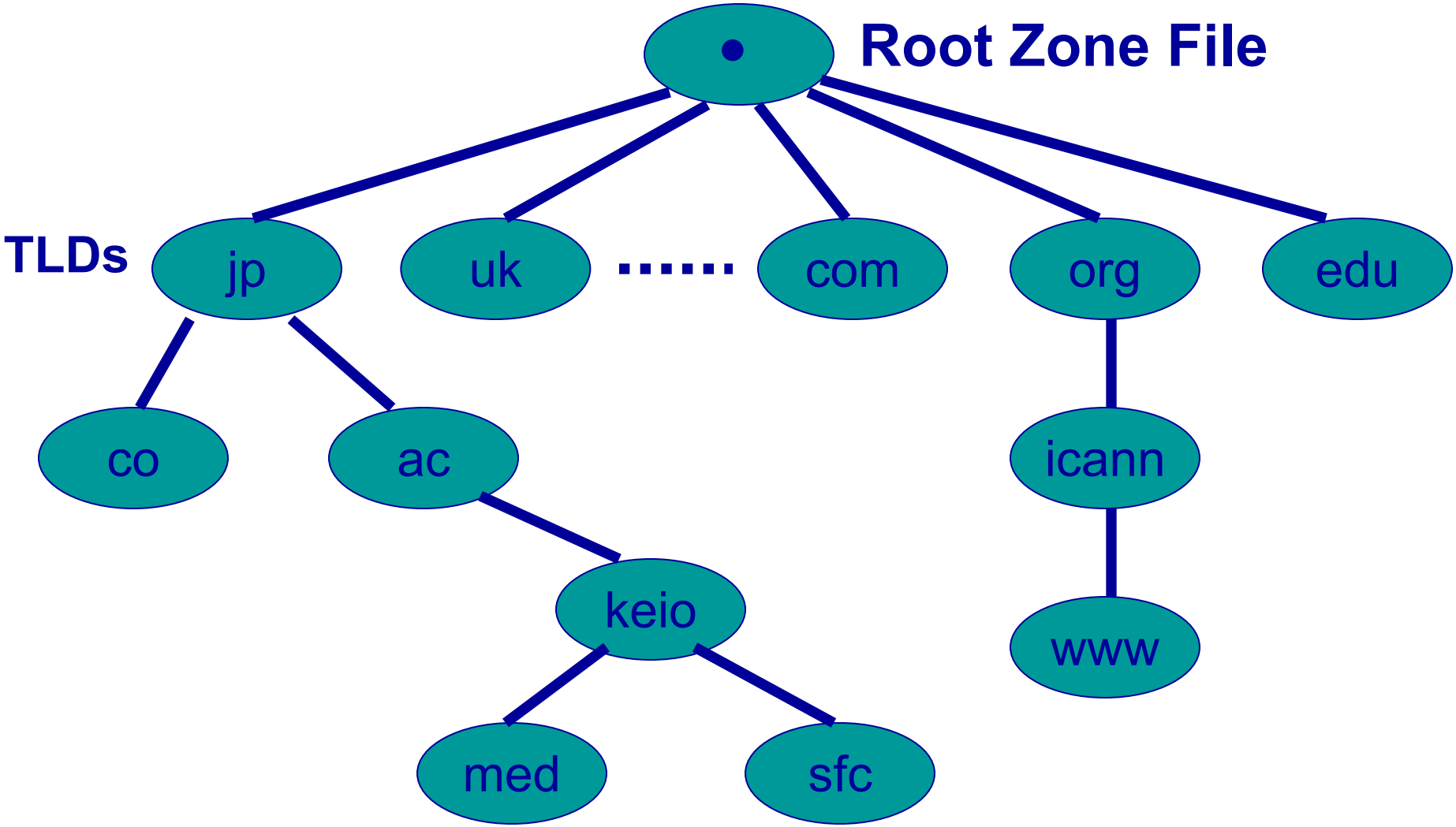
## Registry
(= authoritative database of domain names and corresponding IP addresses)

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

## Registrants
(= domain name holders)



# The DNS Tree


•
Root Zone File
TLDs
jp
uk
.....
com
org
edu
co
ac
icann
keio
www
med
sfc

# List of DNS Root Name Servers

| name | org | city |
|---|---|---|
| a | NSI | Herndon,VA, US |
| b | USC-ISI | Marina del Rey,CA, US |
| c | PSInet | 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 | NSI (TBD) | 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

# IPv 4 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.nnnnnnn.nnnnnnn

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

- Informational Session on IPv6 This Afternoon!

# 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

**LACNIC** → Latin America/Caribbean

Status: Provisional recognition by ICANN, executing transition plan, HQ in Montevideo, technical/operations in Saõ Paulo, currently handling assignments for the region, final recognition expected this week.

**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.

# Status Quo Ante ICANN

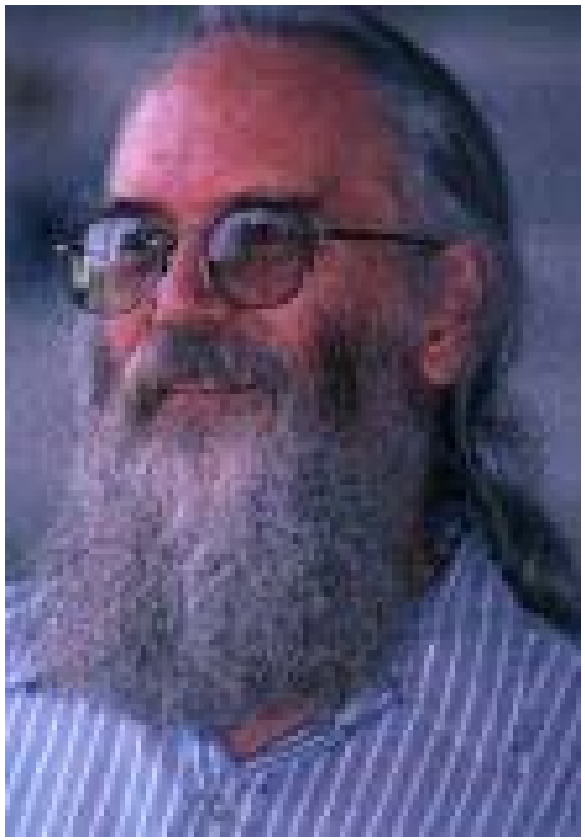
Most Internet DNS and IP Address coordination functions performed by, or on behalf of, the US government:

- **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. "

# Status of Transition from USG

- ✓ 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
- ✓ 2001
  - ✓ January - Transfer of InterNIC functions from NSI to ICANN
  - ✓ September – Agreement with .au Registry
- ✓ 2002
  - ✓ Agreements with .jp, .bi, .mw registries
  - ✓ ICANN reform process
  - ✓ September – Renewal of ICANN/USG MoU through 2003
  - ✓ October – ICANN selects new .org registry operator

# 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
  - 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 (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 200 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
- If these are successful, there will be future rounds
  - Goal: Less burdensome, less expensive, more objective
  - Stuart Lynn proposal: Add 3 more specialized TLDs
- Biggest challenge: Launch phase
  - *Intellectual Property & cybersquatting fears*
  - *Opening day rush; fairness to everyone*

# Top Policy Objectives for Year 2002

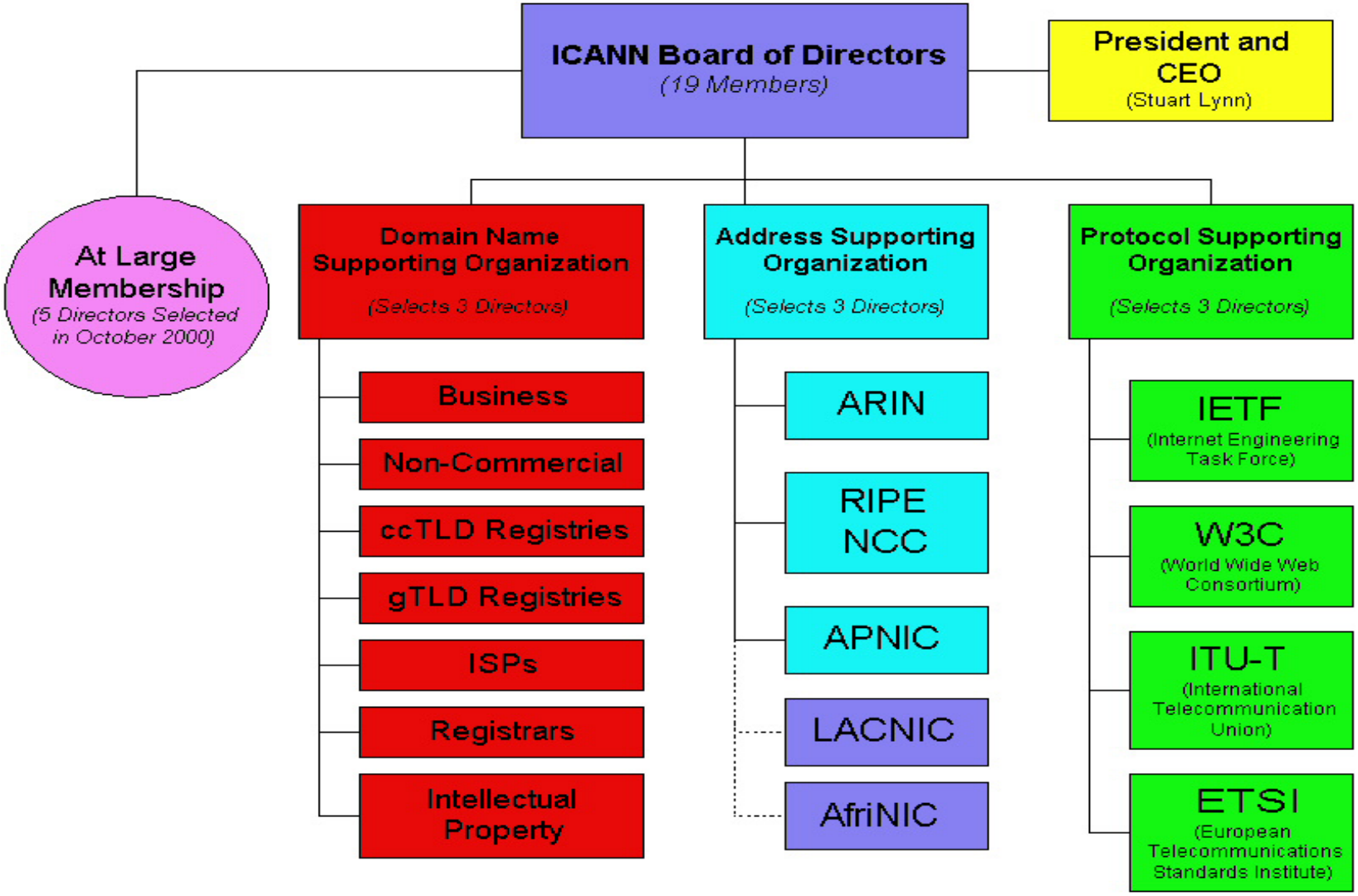
- ICANN Reform & Restructuring!
- Progress toward formal agreements:
  - ccTLD registry agreements
  - IP Address registry agreements
  - Root server operator agreements
- Mechanism(s) for Individual Participation & Representation of Public Interest
- gTLD Policies
  - UDRP Review
  - Whois Requirements
  - Handling of deleted domain names
- Support LACNIC and AfriNIC
- Successful migration of .org registry to new operator
- Internationalized domain name issues

# Internationalized Domain Names

- Very tough problem
- Goal:  make DNS accessible to those who use non-ASCII characters
  - Technical issues
    - ASCII (or “LDH”) restriction embedded in Internet protocols
    - User interface
  - Policy issues
    - Types of non-ASCII TLDs & registry selection
    - Confusion & abuse
- Proposed standards documents approved by IETF’s IESG last Friday
- Some existing ASCII registries working to enable IDNs at second-level and below
- Informational Session This Afternoon!

# Structure of ICANN

# ICANN Organizational Chart



# 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:**

- Vint Cerf (USA) – *Chairman*
- Helmut Schink (Germany)
- [Vacant]

# ICANN Staff

Lightweight Model

(minimal staff = minimal bureaucracy)

Current Staff (18):

- President and CEO (Dr. Stuart Lynn)
- 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)
- ccTLD Liaison (Herbert Vitzthum)
- Network/Systems Administrators (Jim Villaruz, Steve Conte)
- Admin (Monique West, Lauren Graham, Tanzanica King, Jennifer Rodriguez)

# Funding

- ICANN Budget 2001-02 = ~$4.5 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 Membership

- Goal:  Enable meaningful, informed participation in ICANN by individual Internet users
- At Large Study Committee (chaired by Carl Bildt) proposed a set of mechanisms for meaningful, informed participation
- ICANN Board endorsed them in March
- Now needed:  Self-organization
  - At Large Organizing Committee

# Membership Elections in 2000

- Problems:
  - Highly distorted registration distribution
    - Ex: More from Brazil than rest of Latin America combined
  - Voting patterns closely matched nationality
  - Anemic levels of interest
  - Fears of fraud and capture
  - Expensive to verify physical address
  - Difficulties for non-English speakers
- Successes:
  - Free, open & transparent process
  - Increased awareness and participation
  - Used online voting mechanism
  - ~158,000 registered to vote; ~70,000 activated memberships; ~34,000 voted

# ICANN Reform

- Hot topic in recent months
- Launched by CEO Stuart Lynn in February
- 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.

# Stuart Lynn's Critique

- Lack of *full participation* by key stakeholders
  - Only *real* measure of legitimacy
- Overburdened by process
  - At expense of *effectiveness*
  - Government-like layers of process
    - Without government legitimacy, resources
  - Too many distractions
- Inadequate, unreliable, US-centric funding
  - With no clear path to solution
- Not seen as credible by key stakeholders
  - Instead:  A (*loud*) debating society

# Needed: Fundamental Reform

- Not tinkering - Requires radical change & new mindset
- ***Effectiveness*** as key goal
  - Accomplishment
  - Credibility
  - Confidence
  - Participation
- ***Public/private*** partnership
  - Rely on governments to help represent public interest
  - Only other workable alternative:  International treaty organization

# Elements of Reform

- **Core Values**
- **Structure**
  - Board composition & selection
  - Nominating committee
- **Policy-development process**
  - Generic TLDs & Country-code TLDs
  - Address Supporting Organization
  - Advisory Committees: Technical, Root Name Server, Governmental, Security
- **Funding**
- **Participation**
  - Manager of Public Participation
  - Membership & participation mechanism
- **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 indentifiers.
- **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
  - (Thank-you, US government!)

# Message to You:

GET INVOLVED!!!

www.icann.org

# For Further Information:

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http://www.icann.org