The Future of the Internet

Paul Twomey
President and CEO

9 May 2007

IGF Internet Governance Workshop
Tokyo, Japan

What I want to share with you today

- Brief introduction to ICANN
- Personal view of future of the Internet
- Future issues for the DNS
  - Internationalised Domain Names
  - New Generic Top Level Domains
  - IPv4/IPv6 transition
- Invite you to be involved in creating the policy that sets how the Internet connects you to your customers
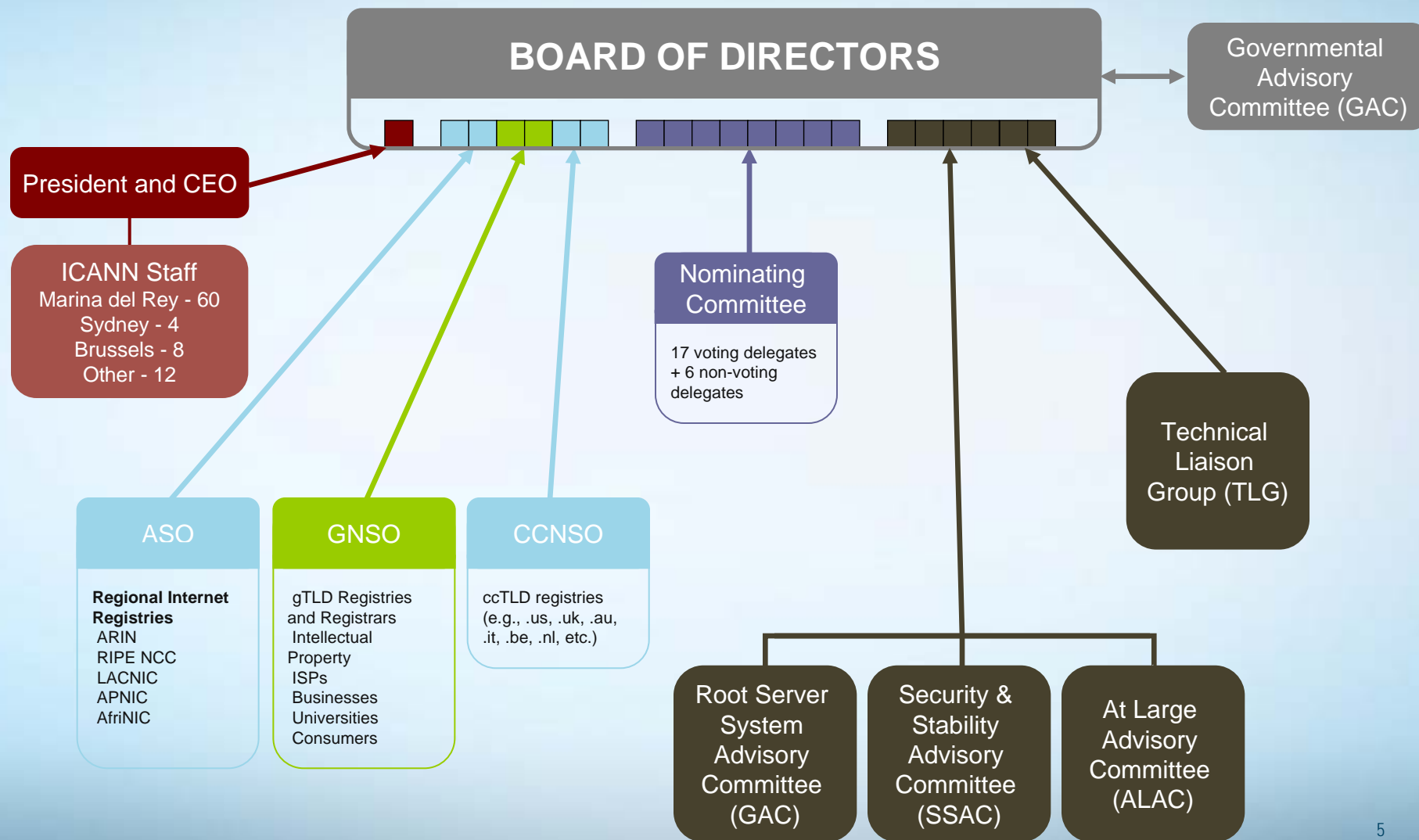
ICANN mission statement

- To coordinate, overall, the global Internet's system of unique identifiers, and to ensure stable and secure operation of the Internet's unique identifier systems. In particular, ICANN coordinates:

  1. Allocation and assignment of the three sets of unique identifiers for the Internet:
     - Domain names (forming a system called the DNS)
     - Internet protocol (IP) addresses and autonomous system (AS) numbers
     - Protocol port and parameter numbers

  2. Operation and evolution of the DNS root name server system

  3. Policy development reasonably and appropriately related to these technical functions

Principles of operation

1. Contribute to stability and security of the unique identifiers system and root management
2. Promote competition and choice for registrants and other users
3. Forum for multi-stakeholder bottom-up development of related policy
4. Ensuring on a global basis an opportunity for participation by all interested parties

ICANN multi-stakeholder model

BOARD OF DIRECTORS

Governmental Advisory Committee (GAC)

President and CEO

ICANN Staff
Marina del Rey - 60
Sydney - 4
Brussels - 8
Other - 12

Nominating Committee

17 voting delegates + 6 non-voting delegates

Technical Liaison Group (TLG)

ASO

Regional Internet Registries
ARIN
RIPE NCC
LACNIC
APNIC
AfriNIC

GNSO

gTLD Registries and Registrars
Intellectual Property
ISPs
Businesses
Universities
Consumers

CCNSO

ccTLD registries (e.g., .us, .uk, .au, .it, .be, .nl, etc.)

Root Server System Advisory Committee (GAC)

Security & Stability Advisory Committee (SSAC)

At Large Advisory Committee (ALAC)

Participation for everyone

- Advisory Committees
  - Governmental Advisory Committee
  - Security and Stability Advisory Committee
  - Root Server Security and Stability Advisory Committee
  - At-Large Advisory Committee
- Supporting Organisations
  - Address Supporting Organisation
  - Generic Names Supporting Organisation (including business, Intellectual Property, ISPs constituencies)
  - Country Code Names Supporting Organisation
- At-Large Organisations
  - Latin America-Caribbean
  - European
  - Africa
  - Asia/Australia/Pacific
  - (North American in planning)

What do we stand for?

- Single interoperable Internet
- All can express in their own language and identity BUT…
- All can communicate with all others
- Creativity and innovation is encouraged for the benefit of consumers
- Security of the network is maintained to ensure confidence in the model
- Stability of the experience for application development and consumer experience
- Growth is encouraged
- Resources are deployed efficiently in support of a global network
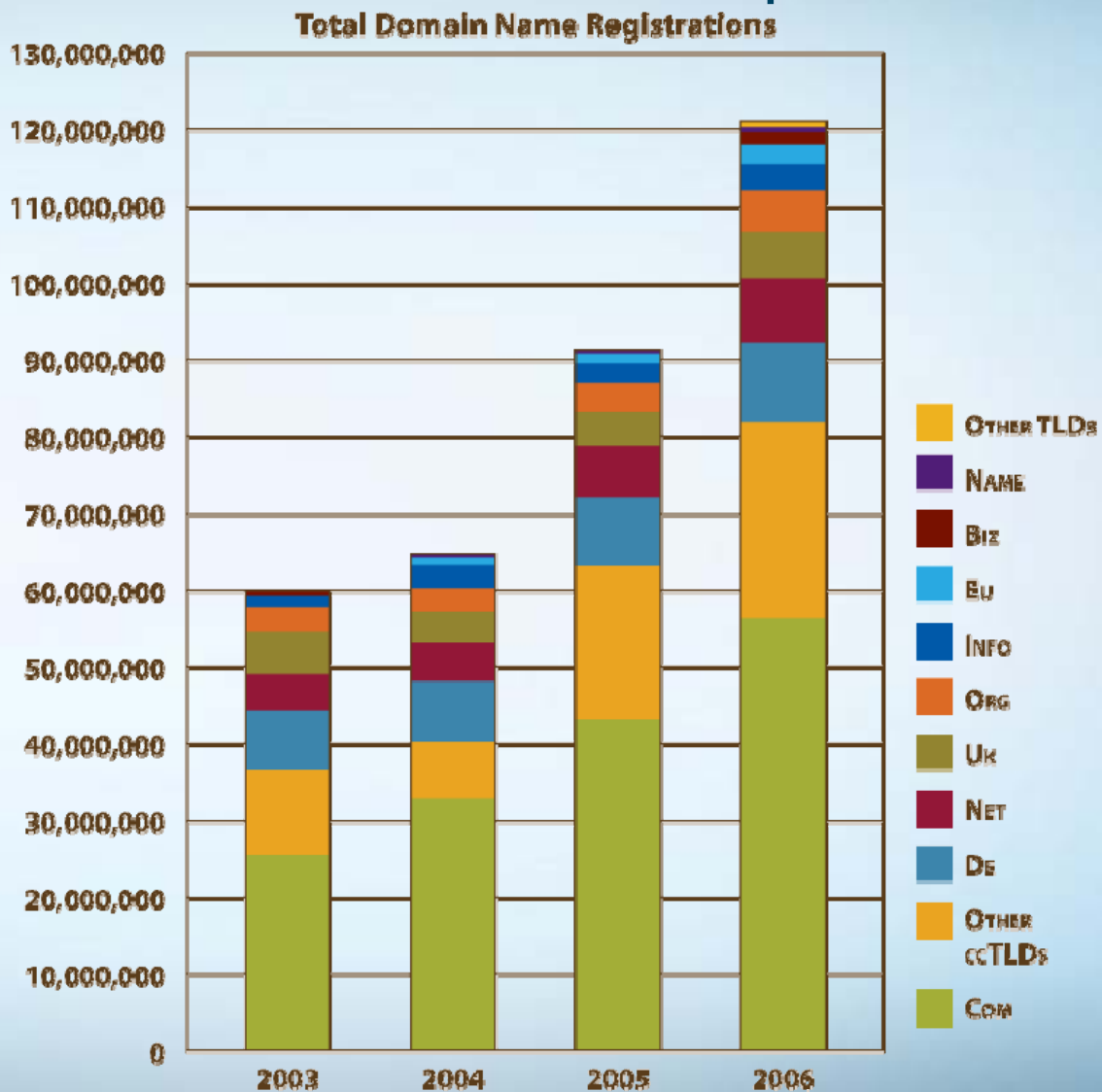- All relevant stakeholders have a voice and role

Competition in the domain name space

- ICANN introduced competition to the domain name space – logarithmic growth
- Registrars now have a market **and** a business
- Consumers have greater choice in price and services
- Domain name marketplace is even driving how we search – contextually as well as topically – and the scale of sites that can be searched
- Total registrars = **888** and counting
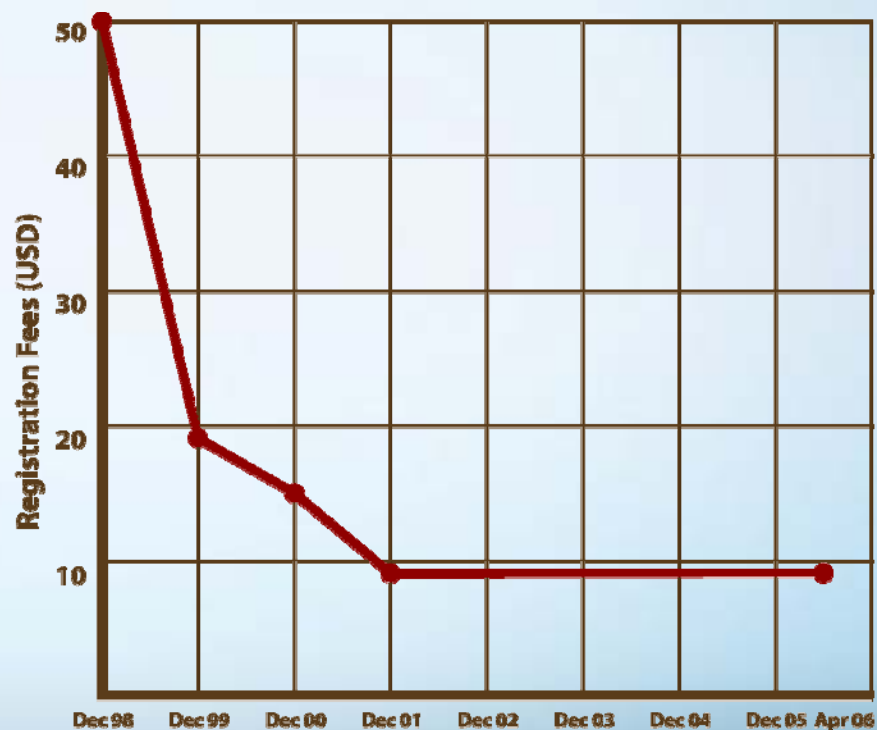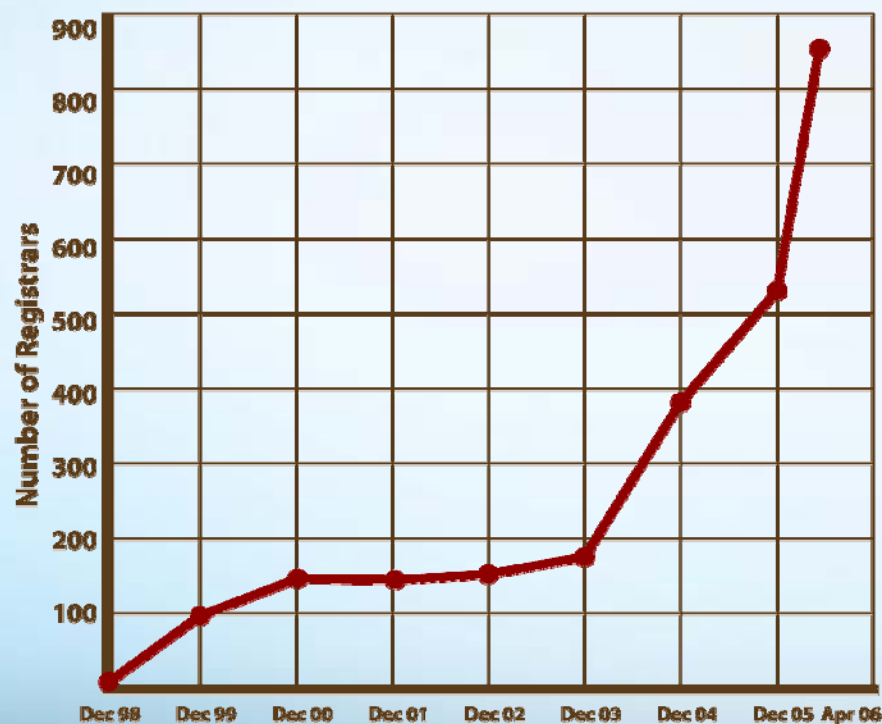
Snapshot of the domain name marketplace

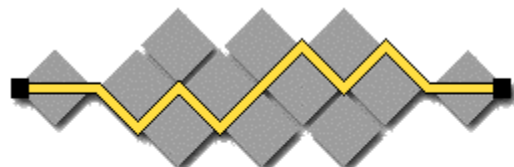More than **120 million** domain names registered globally today

Total Domain Name Registrations

Legend:
- Other TLDs
- Name
- Biz
- Eu
- Info
- Org
- Uk
- Net
- De
- Other ccTLDs
- Com

The Internet ecosystem

Some of the organisations concerned with the Internet

Internet Governance Forum

Difficult to define what the Internet will look like in ten years, but...

- Usage limited by access to electricity – 3 billion
- Many, perhaps most, will access by mobile devices
- Significant increase in broad band access (over 100 mb/sec)
- Machine-to-machine Internet will overtake person-to-person Internet
- Billions of Internet-enabled appliances at home, work, in the car, in the pocket
- Internet used by third parties to monitor all sorts of activities and utilities – washing machines to cars to electricity meters
- Geolocation and geo-indexed systems much more common and emergency services will be more precisely dispatched
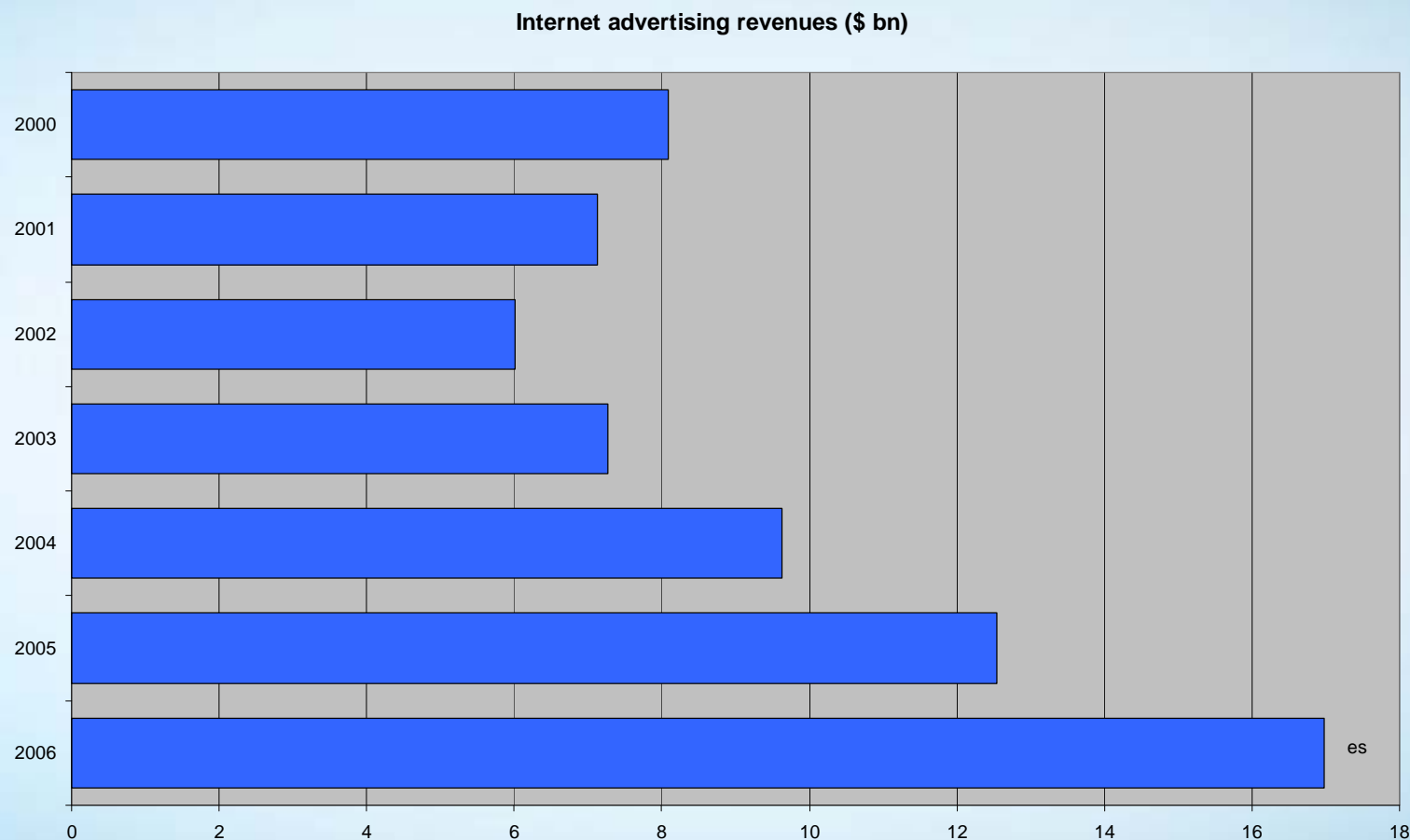
Difficult to define what the Internet will look like in ten years, but…

- Significant improvement in spoken interaction with Internet-based systems
- Wide range of delivery methods for intellectual property (movies, sound tracks, books, etc.). 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 – most will rely on the Net for customer interaction, customer discovery, sales, service, advertising, etc.
- Group interaction, collaborative support tools (including distributed games) will be very common.
- Internationalised Domain Names and much more multilingual Internet content

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

- Terabit-per-second local networking will be available – backbones and local nets.
- Domain name system will operate in multiple language scripts
- IPv6 will be widely deployed
- Better confidentiality and authenticity will be provided through the use of public key crypto – more authentication of the network
- Much more interdevice interaction will be common, incorporating position location, sensor networks, and local radio communication
- Spam and various forms of denial-of-service attacks will continue a "cold war" arms race with defences and better authentication techniques
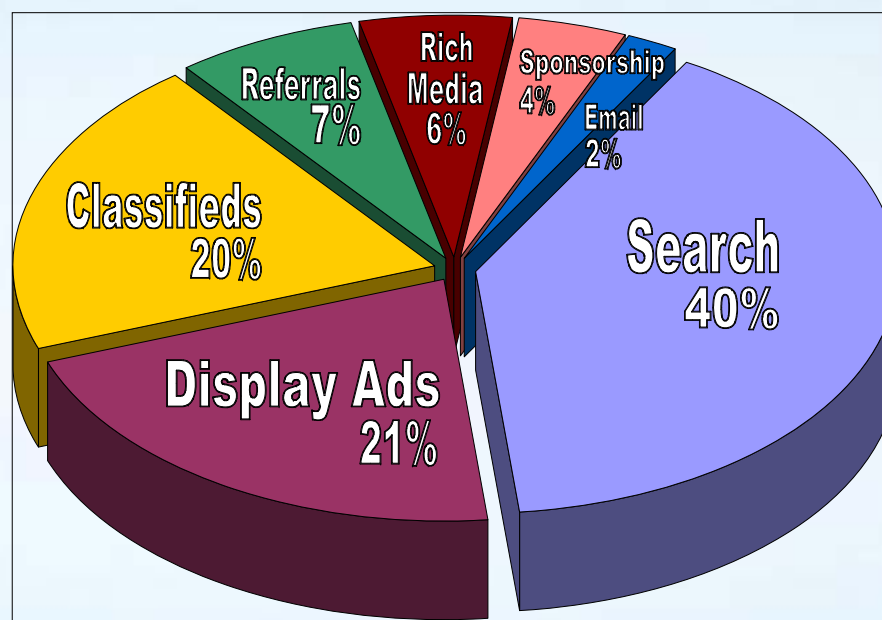- Operating systems will continue to be troublesome sources of vulnerability

U.S. Internet advertising revenue, 2000–2006 (in billions)

Internet advertising revenues ($ bn)

Source: e-marketer.com

U.S. online ad revenue distribution

Online ad revenues 2007

- Referrals 7%
- Rich Media 6%
- Sponsorship 4%
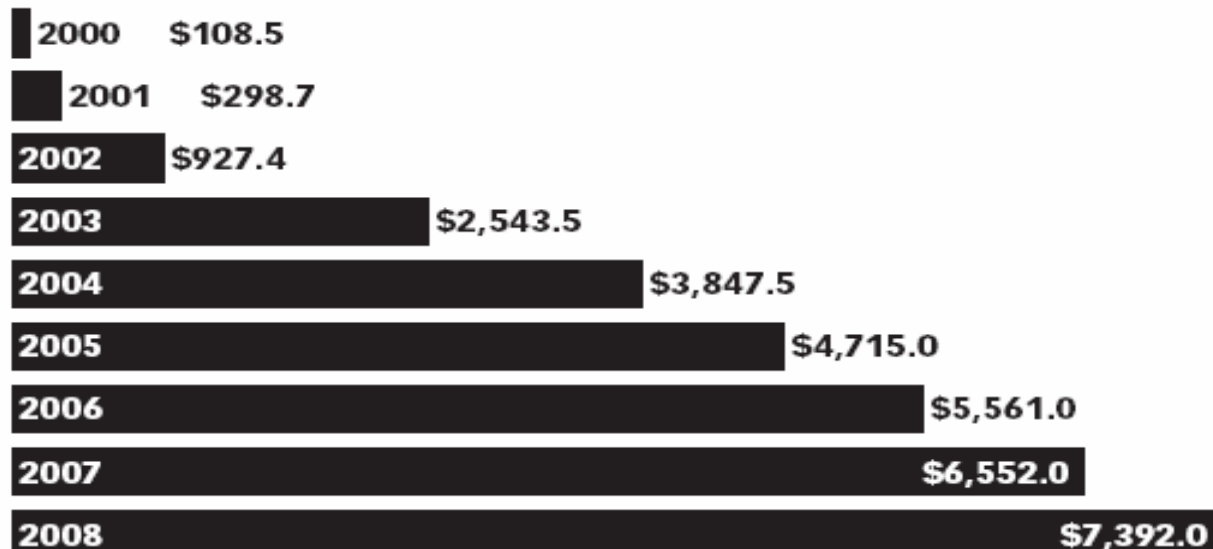- Email 2%
- Classifieds 20%
- Search 40%
- Display Ads 21%

100% = $19.5 billion

Source: e-marketer.com

Paid search ad spending 2001–2010

Paid Search Ad Spending in the US, 2000-2008 (in millions)

Year	Spending
2000	$108.5
2001	$298.7
2002	$927.4
2003	$2,543.5
2004	$3,847.5
2005	$4,715.0
2006	$5,561.0
2007	$6,552.0
2008	$7,392.0

Note: includes paid search, paid inclusion and contextual search; eMarketer benchmarks its US online ad spending projections against the Interactive Advertising Bureau (IAB) - PricewaterhouseCoopers (PwC) data, for which the last full year measured was 2003
Source: eMarketer, January 2005

062497 ©2005 eMarketer, Inc.   www.eMarketer.com

Paid search analysts expect the industry to grow to over $7 billion in 2008

PPC spending growth

Paid Search Ad Spending Growth in the US, 2001-2008 (as a % increase vs. prior year)

Year	% increase
2001	175.3%
2002	210.2%
2003	174.3%
2004	51.3%
2005	22.5%
2006	17.9%
2007	17.8%
2008	12.8%

Note: includes paid search, paid inclusion and contextual search; eMarketer benchmarks its US online ad spending projections against the Interactive Advertising Bureau (IAB) - PricewaterhouseCoopers (PwC) data, for which the last full year measured was 2003
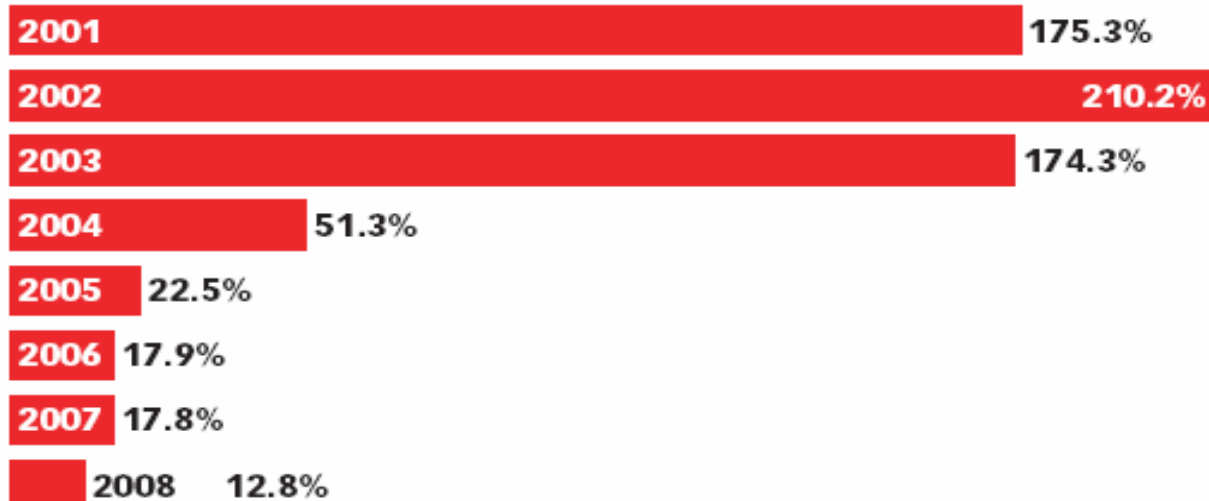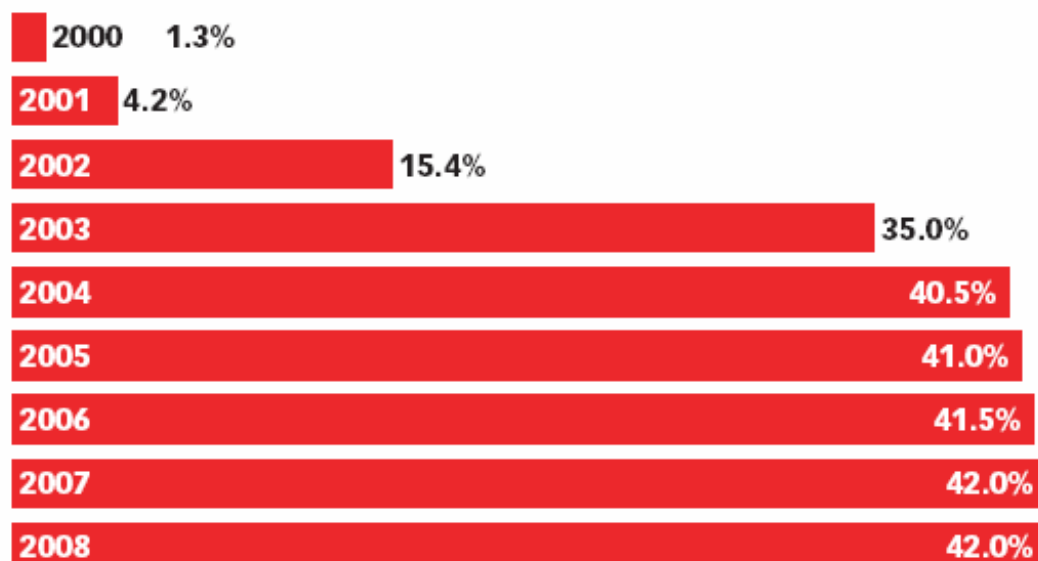Source: eMarketer, January 2005

062498 ©2005 eMarketer, Inc.   www.eMarketer.com

The search industry is stabilising. In the post Bubble-Boom-Bust era, this flattening of the growth rate is considered by analysts to be a very healthy sign.

PPC in the online media mix

Paid Search Ad Spending in the US, 2000-2008 (as a % of total online ad spending)

Year	Percentage
2000	1.3%
2001	4.2%
2002	15.4%
2003	35.0%
2004	40.5%
2005	41.0%
2006	41.5%
2007	42.0%
2008	42.0%

Note: includes paid search, paid inclusion and contextual search; eMarketer benchmarks its US online ad spending projections against the Interactive Advertising Bureau (IAB) - PricewaterhouseCoopers (PwC) data, for which the last full year measured was 2003
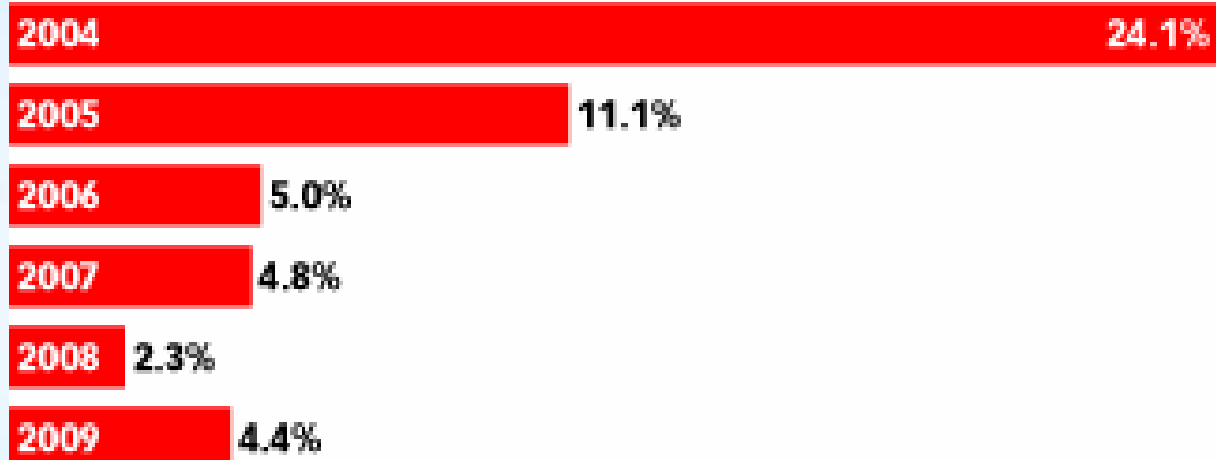*Source: eMarketer, January 2005*

062499 ©2005 eMarketer, Inc.   www.**eMarketer**.com

Paid search dominates all other forms of interactive marketing, including email, banner ads, rich media.

18

Average cost-per-click

Average Price per Click for Paid Search in the US, 2004-2009 (as a % increase vs. prior year)

Year	% increase
2004	24.1%
2005	11.1%
2006	5.0%
2007	4.8%
2008	2.3%
2009	4.4%

Source: JupiterResearch, August 2004 appeared in Morgan Stanley presentation, September 2004; eMarketer calculations, January 2005
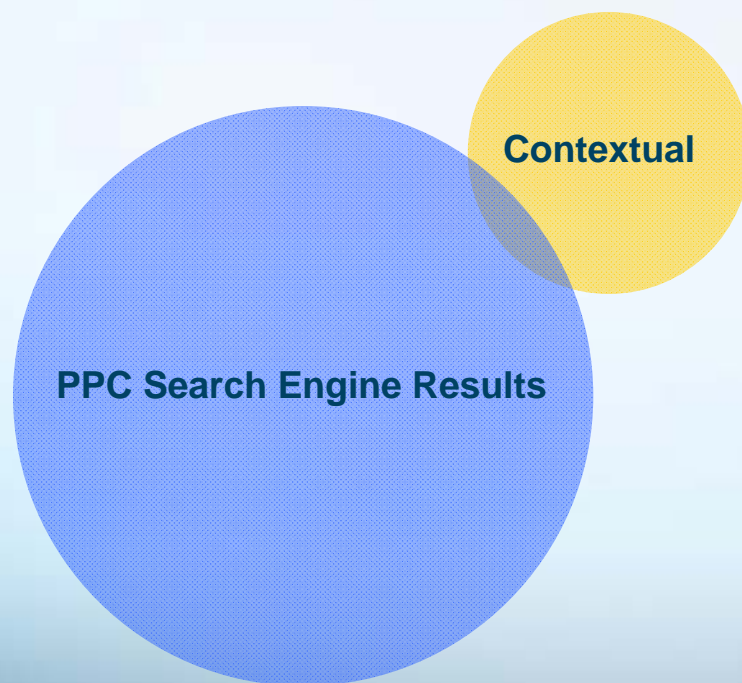
062512 ©2005 eMarketer, Inc.   www.eMarketer.com

Average CPCs are stabilising
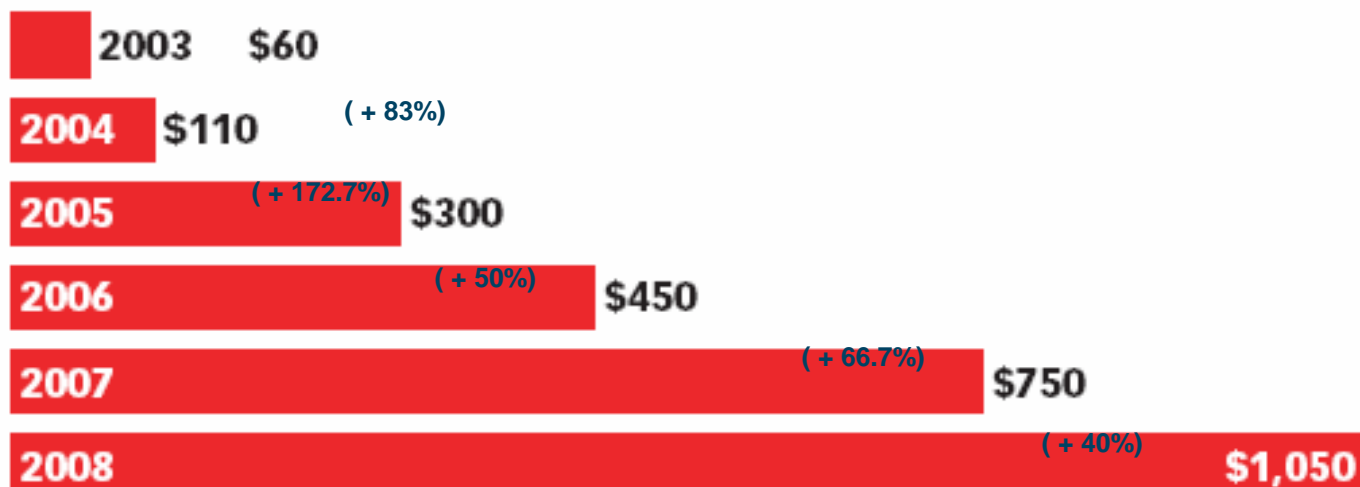
19

What is contextual search?

- Contextual search advertising is the syndication of text-based search ads into new channels beyond the search engine
- Contextual advertising is not really searching

Contextual

Type-in domains are the only true search placement in the contextual channel

PPC Search Engine Results

U.S. online contextual ad spending, 2002–2008

Online Contextual Ad Spending in the US, 2003-2008 (in millions)

Year	Spending	Growth
2003	$60	
2004	$110	(+ 83%)
2005	$300	(+ 172.7%)
2006	$450	(+ 50%)
2007	$750	(+ 66.7%)
2008	$1,050	(+ 40%)

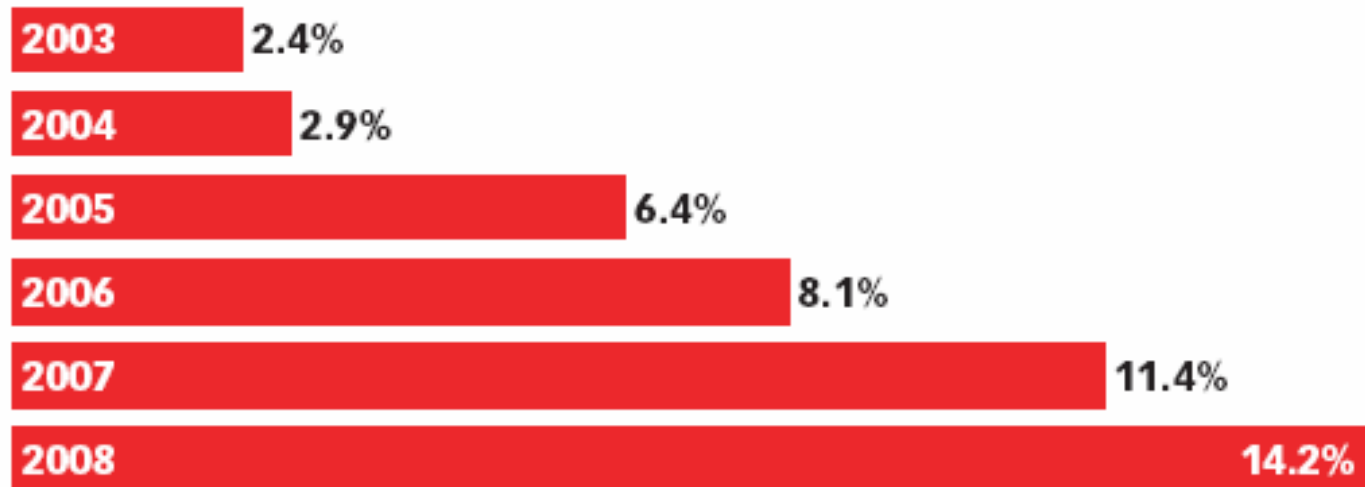Source: eMarketer, January 2005

062503 ©2005 eMarketer, Inc.   www.**eMarketer**.com

Projected to reach over $1 billion per year in ad spend by 2008

Contextual ad spending
(as a % of paid search)

Online Contextual Ad Spending in the US, 2003-2008 (as a % of total paid search ad spending)

Year	%
2003	2.4%
2004	2.9%
2005	6.4%
2006	8.1%
2007	11.4%
2008	14.2%

Source: eMarketer, January 2005

062505 ©2005 eMarketer, Inc.

www.**eMarketer**.com

Contextual spending and distribution is still growing by leaps and bounds.
Part of the driving of Domainers

What do we need to worry about?

– Spam and Phishing

– Attacks at DNS level

– Attacks at routing level

– Fraud/IP spoofing

– Defence is not just technology – response planning is essential

DNS infrastructure – threats

Threats

- Loss of Service
    - Network outage
    - Machine or site failures
    - Overwhelming traffic (denial of service attack)
    - Business failure

- Hijacking
    - Cache poisoning
    - False registration
    - Fake zone transfer
    - Fake registrar-registry interaction
    - Private roots

- Loss of coherence
    - Unauthorised roots and TLDs
    - Private character set extensions

Countermeasures

- Excess capacity
- Distribution, replication
- Strong connectivity
- Multiplicity of businesses
- DDoS counters (long term)

- Protocol changes, DNSSEC
- Tight registrar controls
- TSIG (crypto)
- Crypto authentication
- DNSSEC

- DNSSEC; policy/political pressure
- DNSSEC; policy/political pressure

**Lots of work is under way. But threats are growing
and this will take more time and money than many expect**

ICANN's policy development role

- Safeguard an open, fair and equitable policy development process
- Be receptive to all stakeholders, public and private
- Be responsive to stakeholders who provide input and communicate next steps
- Communicate timely and useful information about the issue and the policy process

Internationalised domain names (IDNs)

- One of the most challenging issues to security, stability and growth of the Internet
- Recognises that –
  - ASCII characters now used exclude entire communities
  - People familiar with other languages and other scripts will never become familiar with Latinate alphabet
  - Need for growth in multilingual Internet access (local script domains)
  - Need for growth in multilingual Internet content
  - **Will cause an explosion in registered domain names – far beyond today's 120+ million domains**
- Encompasses –
  - Other alphabets (Cyrillic)
  - Right-to-left based scripts (Arabic)
  - Non-alphabet scripts (Mandarin Chinese)

IDN development principles

- Global uniqueness and interoperability of the domain name system
  - Unique and unambiguous domain names with same functionality regardless of geographic placement of access
- Promote "future-proof" solutions
  - Define characters that are allowed and an ability to add new ones
- Not all characters used in the worlds' languages will be available for use in domain names
- Reduce user confusion as much as possible via technical development and implementation requirements, registry policies and user education
  - IDNA protocol standard in implementation
  - Promote multi-stakeholder involvement
- Role of ICANN Supporting Organisations and Advisory Committees

New generic top-level domains (gTLDs)

- Introducing new gTLDs has been part of ICANN's work since 1999
  - 2000 – .biz, .info, .name, .pro, .aero, .coop, .museum
  - 2004 – .jobs, .mobi, .cat, .travel, .asia
- Deployment has attracted much attention –
  - TLD space is small with many perceived business advantages
  - Sponsored TLDs increasing in their appeal to cultural communities, organisations and industry sectors
  - Conduct of process by ICANN and its community

New gTLD policy development process

- Much input from wide range of global stakeholders covering
  - IDNs
  - String criteria
  - Applicant criteria
  - String contention
  - Contractual requirements
  - Dispute resolution
- Focused on lessons learned and creating a process for introducing new gTLDs
- ICANN mission and core values are guiding the work
- Next round of new gTLDs expected in early 2008

Emerging and evolving issues

- Security and stability of the Internet overall
- Initial and expanded deployment of IDNs
- Stability of current Internet governance model
- Migration from IPv4 to IPv6
  - Individual ISPs may not easily handle increased network load
  - Routing level loads also of concern
- Introduction of new TLDs
- Organised cyber crime will demand increased focus on cyber security
  - All levels of the Internet
  - All linked networks

Why should we care?

- The Internet is the most powerful and pervasive technology for empowering individuals

- Being part of the glue which ensures a rapid unleashing of humanity's knowledge and possibilities for all persons no matter what age, sex, creed, class, ethnicity or (at least to some degree) wealth

- Radically reducing transaction costs and barriers to markets across a globalised economy

But this is a **global business** issue

- Business leaders must understand that this is a **global** issue – private-sector led, **not** command and control

- Business leaders must help **stand up** for some key principles for private-sector leadership in Internet governance

- We would like you to help us sell this message and **coordinate the voice** of the private sector beneficiaries of the Internet as we have it now

- Others participating stakeholders represent the technical communities, governments, civil society, academia, and end users

To subscribe to our business e-newsletter

- Go to http://www.icann.org/business/

Thank You

www.icann.org