CSCI 1800 Cybersecurity and International Relations

Internet Governance

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Outline

• Brief history of Internet governance (IG)?
• What models for Internet governance exist?
• The UN takes an interest in the Internet
• Internet layers shape governance
• An attempt by the ITU to control IG
• Snowden’s impact – US gives up control of ICANN
• A close look at multi-stakeholder governance
• How should the Internet be governed?
What is Internet Governance (IG)?

• The word governance derives from the Latin word “gubernare,” to steer a ship.
• IG is concerned with technology, social norms, decision-making procedures, and design of institutions to “steer” the Internet.
• IG participants are individuals, corporations, and nation states.
• Internet governance has been hotly debated.

Source: Internet Governance: A Primer, Akash Kapur, UN Development Programme, 2005
Early History of Internet Governance

• 1960s – ARPANET packet-based network developed
• 1970s – It is extended to universities, res. labs., etc.
• 1983 – Internet launches. By 1986 it is global.
• 1986 – Internet Engineering Task Force (IETF) starts*
  – “The IETF is a loosely self-organized group of people who contribute to the engineering and evolution of Internet technologies.”
  – IETF creates voluntary technical standards via RFCs†
  – Engage in open & consultative technical governance

• Now called multi-stakeholder governance

* See [http://www6.ietf.org/tao.html](http://www6.ietf.org/tao.html)
† Request for Comments** (RFCs)
A Quote from the TAO of the IETF

• So, why "the Tao"?
• Pronounced "dow", Tao is the basic principle behind the teachings of Lao-tse, a Chinese master. Its familiar symbol is the black-and-white yin-yang circle.
• Taoism conceives the universe as a single organism, and human beings as interdependent parts of a cosmic whole. Tao is sometimes translated "the way", but according to Taoist philosophy the true meaning of the word cannot be expressed in words.
Some History of the Technology

• The 1990s were exciting. In 1991 Tim Berners-Lee introduced the hypertext-based browser
• In ‘93 Mosaic* first graphical browser appeared
• Suddenly, useful web-based content emerged.
• High-tech companies formed & fortunes made
• The dot-com boom occurred, followed by bust in March 2000, and reality set in.

* Marc Andreessen, co-author of Mosaic, is founder of Netscape and VC firm Andreessen Horowitz
Domain Name System Governance

• ~1985s USG contracts with USC (John Postel) to run the Internet Assigned Numbers Authority (IANA).

• IANA controls master root zone file, maps Top Level Domains (e.g. .com) to IP addresses of name servers – 100s of copies of the root zone file distributed by 13 orgs.

• IANA also assigns numbers needed to identify each Autonomous System (AS) and protocol

• IANA allocates generic TLDs (e.g. .edu, .soccer) through a formal process to qualified organizations

• IANA assigns blocks of IP addresses to Regional Internet Registries (RIRs) that provide them to ASes.
DNS Governance Emerges

• In 1990s USG decides contracts must be open
  – USC competes with for-profit company for IANA contract
• 1994 – USG assigns IANA to Network Solutions
• 1998 Jon Postel of USC, fed up, tries to move IANA out of government hands & into a private company
  – This precipitates a government crisis. Clinton is president
  – Ira Magaziner, Brown ‘69, leads govt. discussions
• 1998 – USG contracts with new non-profit Internet Corporation for Assigned Names and Numbers (ICANN) to handle IANA functions.
  – Retains control over changes to the root zone file.
  – International backlash to Snowden revelations, leading in 2016 to USG giving control of root zone file to ICANN itself.
Historical Debate on IG

• Should IG focus only on technical matters?
  – Some say yes, others say it must include social, legal and economic consequences of technical decisions.

• What is the role of governments?
  – Some want it to retain its current form or increased
  – Others want it decreased or eliminated.

• Should governance be allowed to evolve?
  – Some say yes, others say it must be replaced.
Possible Roles for Internet Governance

• Share best security practices
• Develop acceptable norms of behavior in cyberspace
• Protect intellectual property and critical infrastructure
• Protect a nascent domestic computer industry
• Cooperate to reduce cross-border cyber crime
• Engage in trust building to reduce threat of conflict
• Ensure continued expansion of access and content
Competing Governance Models*

• **Multi-stakeholder governance (MSG)**
  – Open, transparent, and inclusive engagement.
  – Some want decisions to be made by “consensus.”
  – This model endorsed by many democratic governments

• **Multilateral Governance**
  – Illustrated by International Telecommunications Union (ITU)
  – An intergovernmental UN organization
  – One vote per nation – if they pay their dues 😊
  – Technical decisions can be changed at policy layer
  – Endorsed by governments concerned about state security

* Exploring Multi-Stakeholder Internet Governance, Savage & McConnell, EastWest Institute, 2015
Multi-Stakeholder Governance (MSG)

- Vague notion in 2003. Now widely accepted in IG.
- MSG is a framework for engagement:
  - Stakeholder is a person, group, organization or government with an interest in a matter.
  - All stakeholders participate on equal footing.
  - Open, transparent, accountable process.
  - Tries to use consensus-based decision making.
  - It motivates stakeholders to take responsibility!
- Now widely used on Internet, in civil society, UN.
MSG – ICANN Definition

- Involvement of stakeholders in the learning process
- Stakeholders work towards common goals
- Work involves different sectors and scale
- It is focused on effectuating change
- Agreements are created based on cooperation
- Stakeholders deal with power & conflict consciously
- Bottom-up and top-down strategies are integrated in governance and policy making
Two Visible Applications of MSG

- **ICANN** does consensus-based policy development
  - Approach based on global stakeholder input and **codified** in the White Paper* (USG, 1998, proposed by Magaziner ‘69)
  - ICANN implements MSG via board meetings, supporting organizations, and advisory committees

- **Internet Engineering Task Force (IETF)**
  - The Tao of IETF: A Novice’s Guide to the IETF**

- Markus Kummer, Exec. Coordinator, Internet Governance Forum (IGF): “all public policies pertaining to the Internet should be developed in a multi-stakeholder framework.”

* See https://www.icann.org/resources/pages/agreements-en
** See https://www.ietf.org/tao.html
UN Discussions of Internet Governance

• Russia put information security on UN agenda in ‘98
  – At first ignored by Western nations but
• In 2002 UN General Assembly called for a World Summit on the Information Society* (WSIS).
• WSIS convened in 2003 in Geneva and 2005 in Tunis
  – The “information society is seen as helping ... people achieve their potential, promote sustainable economic and social development, and improve the quality of life.”

* See http://www.itu.int/wsis/index.html
UN Internet Governance Meetings

• **WSIS summits**
  – Call for creation of Internet Governance Forum (IGF)
  – Subsequent WSIS forums held every few years.

• **First meeting of IGF**, a UN multi-stakeholder forum for IG policy discussions, held in **2006**.
  – IGF now holds annual meetings.

* See http://www.intgovforum.org/cms/*
IG Players & Function

• Actors include governments, private sector, and civil society (i.e. outside family, state, market).

• IG is more than DNS, BGP & technical decisions.

• WSIS launches Working Group on Internet Governance (WGIG) in 2003.

• In 2005 WGIG declared that IG “also includes other significant public policy issues, such as critical Internet resources, the security and safety of the Internet and developmental aspects and issues.”
Declaration of 2005 Tunis Agenda*

• 34. A working definition of 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.

• This definition is not binding on governments!

* See http://www.itu.int/net/wsis/docs2/tunis/off/6rev1.html
35. ... In this respect it is recognized that:

- **Policy authority for Internet-related public policy issues is the sovereign right of States.**

- The private sector has ... an important role in the development of the Internet, both in the technical and economic fields.

- Civil society has also played an important role on Internet matters, ... and should continue to play such a role.

- Intergovernmental organizations ... should continue to have, a facilitating role in the coordination of Internet-related public policy issues.

- International organizations ... should continue to have an important role in the development of Internet-related technical standards and relevant policies.

* See http://www.itu.int/net/wsis/docs2/tunis/off/6rev1.html
Why is IG Challenging?

• Open standards encourage innovation but also make the Internet hard to manage.
  – Consensus is needed to change standards.
• Internet operations lack central authority
• Nations have vested interests in use of Internet
  – They are economically dependent on it.
  – Some are threatened by uncontrolled content
  – All nations must combat cyber crime
Must the Internet be Governed?

• Many believe governance should be minimized
• Internet has depended on its free, open culture.
• But techno-nationalism is emerging
  – States want to control content and
  – Be players in 4th Industrial Revolution
    • Big data, machine learning, robotics, autonomous vehicles, biotech, additive manufacturing, quantum computing, 5G
• Balance needed between rules and freedom, control and anarchy, process and innovation.
IG Has Many Players and Levels

• Governance practiced by many organizations at many levels
• **Infrastructure Level**
  – Interconnections – telecoms, companies (e.g. Comcast, Google)
• ** Logical Level**
  – Domain Name System – ICANN including IANA
  – IP Allocation & Numbers – Regional Internet Registries, Registrars
  – Standards – many orgs. produce protocols, e.g. IETF, W3C, etc.
• **Content Level**
  – Pollution control – spam
  – Cybercrime – e.g. Budapest Convention, Shanghai Cooperation Org.
  – Intellectual Property Rights – WIPO, WTO
  – Control of Internet – many bodies involved, e.g. UN, ISOC, ICANN
• IG is multi-layered and multi-faceted!
Access – An Infrastructure Issue

• Large Internet Service Providers (ISPs) can dictate terms to smaller ones and to clients
  – Particularly problematic for developing countries.
  – Is net neutrality needed?
• Many developing countries go outside for content.
  – Seen a “reverse subsidy” of $Billions to US providers
• Universal access to Internet is desired by some.
  – Developing countries need help with access.
• Will developing countries not be able to keep up?
Some Logic Layer Issues

• **Standards** are essential to functioning of Internet.
  – E.g. TCP/IP, IPSEC, DNS, DNSSEC, HTML, HTTP, XML

• **Standards** are a form of *de facto governance*.
  – Attempt made in 2001 to introduce standards based on patents for which royalties required. The community got upset and they were withdrawn.

• As standards change, governance must adjust

• Standards bodies working at the Logic Layer:
More Logic Layer Issues

• Management of the Domain Name System (DNS)
  – Until 2000 .arpa, .com, .net, .org, .int, .edu, .gov, and .mil were the only top-level domains (TLDs)
  – There are now more than 1,500 generic TLDs
    • E.g. .academy, .coffee, .tokyo
  – Each TLD application to ICANN costs $185,000!
  – DNS recognizes country code TLDs (ccTLDs), e.g. .fr, .au

• Until 2016 ICANN was controversial because US had last word on changes to root zone file.
  – ICANN now independent
  – But it remains a US corporation
Issues at the Content Layer

• **Internet Pollution**: spam, malware, DDoS

• **Cybercrime**
  – Council of Europe Convention on Cybercrime* has guidelines to create domestic legislation that make following illegal: access to computers without legal approval, computer-based forgery or fraud, child pornography, infringement on copyrights, etc.

*See [https://rm.coe.int/1680081561](https://rm.coe.int/1680081561)
International Telecommunications Union (ITU)
An Important IG Player

• ITU is a UN agency started in 1865
  – Created to standardize telephone operations
  – It has Telecommunications (T), Radio (R), and Development (D) sectors

• ITU Governance
  – Only nations can introduce topics and vote
  – Corporations and organizations can attend meetings
  – Technical decisions can be revised by politicians
World Conference on International Telecommunications (WCIT)

- Run by ITU in Dubai from December 3-14, 2012.
- Autocratic nations tried to use ITU to take control of Internet policy\(^1,2\)
  - US, EU, Canada, India, etc. did not ratify treaty
  - 89 nations did ratify, 55 did not
- Although difficult to alter Internet governance, WCIT signaled that some nations wanted to try
- 1,600 diplomats from 151 countries attended!

1. [http://www.slate.com/blogs/future_tense/2012/12/14/wcit_2012_has Ended did the u n internet governance summit accomplish anything.html](http://www.slate.com/blogs/future_tense/2012/12/14/wcit_2012_has Ended did the u n internet governance summit accomplish anything.html)
Another Important Event

• 2013 – Snowden revelations of NSA secrets caused governments to demand
  – Data localization – i.e. local data stored locally
  – Prevent their Internet traffic passing through US
  – Have a voice on top level domains, such as .vin (France)
  – Reduce US surveillance
  – Reduce influence of large US Internet companies*

• The Europeans are now closely supervising Amazon, Apple, Google, Facebook and Microsoft

* See https://en.wikipedia.org/wiki/List_of_largest_Internet_companies
Impact of Snowden on IG

• Montevideo Statement*, October 7, 2013
  – Reinforced need for globally coherent Internet
  – Identified need to address IG challenges
  – Accelerated globalization of ICANN, IANA, i.e.
    remove US control over the DNS root zone file.

• Global Multistakeholder Meeting on the Future of the Internet – Brazil, April 23-24, 2014
  – MSG endorsed by govts except China, India & Russia

* Signed by leaders of AFRINIC, ARIN, APNIC, IAB, ICANN, IETF, ISOC, LACNIC, RIPE NCC, W3C.
A Major Internet Governance Decision

• 2014 – USG announced* “its intent to transition key Internet domain name functions to the global multi-stakeholder community” if following goals are met:
  1. “Support and enhance the multistakeholder model,
  2. Maintain the security, stability, and resiliency of the Internet DNS,
  3. Meet the needs and expectation of the global customers and partners of the IANA services; and
  4. Maintain the openness of the Internet.”

• No transition to occur if USG is replaced by another government or an intergovernmental organization.

* https://www.inta.org/intabulletin/pages/usdepartmentofcommerceannouncesintenttotransitionkeyinternetdomainnamefunctions.aspx
What is Good About MSG?

• Hemmati⁷: for decades multi-stakeholder processes (MSPs) were used to address issues such as biotechnology, corporate conduct, energy, labor, gender inequality, tourism, mining, paper, sustainability, etc.

• MSPs inform and support decision makers, identify solutions, and encourage stakeholders to take ownership of issues.

• Effective in social, political, economic and technical contexts, when problems are new, fast changing, and complex with important social and cultural dimensions, especially when governments are slow to act.

What is Bad About MSG?

• Hemmati (2002) calls MSG a “new form of communication, decision-finding (and possibly decision-making)” but “not a universal tool”.

• It is “suitable for ... situations where dialogue is possible and where listening, reconciling interests and integrating views ... [is] within reach.”

• “More often [than not] the process becomes a messy, loose-knit, exasperating, sprawling cacophony”
Weighing the Good and Bad of MSG

• MSG stimulated Internet development and web content.
  – IETF, W3C and ICANN employ some form of MSG
  – Unwise to abandon the MSG approach.

• But **MSG has no universally accepted definition.**
  – While all agree it should be open, transparent, and inclusive
  – There are no rules for holding meetings and making decisions

• Opinion of Ambassador Phillip Verveer (2013):
  – “I tend to think of it as a kind of ethos of inclusivity, which doesn’t provide much other than guidance in terms of the notion.”

• **Dangerous to use MSG exclusively for Internet governance!**
  – But it is a powerful mediating mechanism
What’s Wrong With IG Today?

• **IG defined too broadly**, making it hard to manage, as agreed by leading experts:
  – Vint Cerf, ‘05; Castro & Atkinson, ‘14, DeNardis, ‘14

• For example, **2014 IGF topics** included:
  – Internet access, freedom of expression, child safety, privacy, cyber economics, IPv6 deployment, right to be forgotten, gender issues, climate change.
Is There More?

- Absence of rules for running MSG meetings
  - TAO of IETF vs ICANN – Nominations Comm. apptd by Board
- A perceived lack of accountability
  - ICANN commissioned study of its accountability
- When ICANN’s legitimacy challenged after Snowden,
  - USG responded by proposing to spin off control of root zone
- Important stakeholders were not participating in governance discussions.

- MSG has weaknesses. It must be carefully crafted before used for global Internet governance.
How Should Internet Be Governed?

• If neither the status quo nor ITU is satisfactory, how should the Internet be kept open, inclusive and secure?
• Is there a middle ground between government control and laissez-faire form of governance?
• Let’s first ask what topics should be included in the term “Internet governance.”
Internet Governance Topics

1. **Network Architecture**, e.g. naming & routing, traffic management, network security, standards

2. **Content Control**, e.g. privacy, data filtering, data security, freedom of expression, information security

3. **Human Rights**, e.g. freedom of expression, economic, social and cultural rights, privacy, surveillance

4. **Cyber Crime**, e.g. identity and IP theft, fraud

5. **Cyber Attacks**, e.g. actions via networks causing serious harm to a nation, its interests, or infrastructure.

* Exploring Multi-Stakeholder Internet Governance, Savage & McConnell, EastWest Institute, 2015
A Middle Ground Recommendation*

- We echo others who recommend simplification of Internet governance by assigning governance roles to relevant international bodies such as
  - Human Rights Commission (HRC)
  - World Intellectual Property Organization (WIPO)
  - World Trade Organization (WTO)
  - International Telecommunications Union (ITU)
  - Council of Europe (CoE)
  - Shanghai Cooperation Organization (SCO)
  - See Joe Nye’s Regime Complex for others (next slide)

* Exploring Multi-Stakeholder Internet Governance, Savage & McConnell, EastWest Institute, 2015
Joe Nye’s Regime Complex

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Figure 1: The Regime Complex for Managing Global Cyber Activities

International Law Conventions
UN Charter, UNGA Resolutions and LOAC

Human Rights Regimes
ICCPR

Government Groupings
G8, G20, 3G and OECD

UN — 1/3 Committee
GGE

UN — WSIS Process
IGF, WSIS and WGIG

Incident Response Regimes
IWWN and FIRST

Corporate Decisions
ISPs and telcos (including routing and content)

Law Enforcement Cooperation
Council of Europe Convention on Cybercrime and INTERPOL

Local Community Alliances
“Five Eyes” and Bern Group

International Policy Standards
ICANN, IANA, ISOC and RIRs

Internet Technical Standards
IEEE, W3C and IAB

Track One and Two Dialogues
US/China and Europe/China

Industrial ICT Standards
IEEE

Intellectual Property Regimes
WIPO and ACTA

Trade Regimes
WTO and Wassenaar Arrangement

Telecom Regimes
ITU (ITRs) and GUCCI

Regional Organizations
CoE, OSCE, SCO, OAS and ARF

Conferences
London Process, NETmundial and 1Net Group

Independent Commissions
Toomas Hendrik Ilves, Carl Bildt

Civil Rights Organizations
EFF, Freedom House and Access

International Finance Institutions
IMF, World Bank, EBRD, OECD DAC and ICT4D

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Additional Recommendations

• Attach a multi-stakeholder consultative group to international bodies dealing with IG issues
  – They bring in the expertise and motivation

• Proposed new Principle:
  – Policymakers do not make or modify technical decisions but may reject them.

• This principle currently applies to the International Civil Aviation Authority (ICAO), a UN agency!
Our Conclusions

• Internet governance is too important to be left to the Internet designers, operators and telecommunications ministers alone

• Both users and governments also need to work together to safeguard the operation of the Internet while ensuring that the vitality of the Internet is not lost.
Review

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