CSCI 1800 Cybersecurity and International Relations

Internet Governance – Part I

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Outline

Part I
- Brief history of Internet governance (IG)?
- What models for Internet governance exist?
- The UN takes an interest in the Internet
- Internet layers shape governance

Part II
- 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, 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

A Quote from the TAO of the IETF
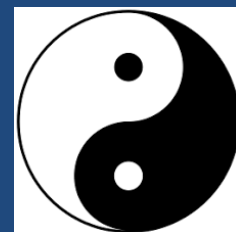
- So, why "the Tao"?
- Pronounced "dow", Tao is the basic principle behind the teachings of Lao-tse, a Chinese master. Its familiar symbol is the black-and-white yin-yang circle.
- Taoism conceives the universe as a single organism, and human beings as interdependent parts of a cosmic whole. Tao is sometimes 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

- ~1985 USG contracts with USC (John Postel) to run the Internet Assigned Numbers Authority (IANA).
- IANA controls master root zone file that lists IP addresses of top-level domains servers (e.g. .com)
  - 100s of copies of the root zone file distributed by 13 orgs.
- IANA also assigns ASNs, numbers identifying Autonomous Systems (ASes) and Protocol Numbers
- IANA adds generic TLDs (e.g. .edu, .soccer) through a formal solicitation to qualified organizations
- IANA assigns blocks of IP addresses to Regional Internet Registries (RIRs). They provide them to ASes.

DNS Governance Emerges

- In 1990s USG decides contracts must be open
  - USC competes with for-profit companies 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.
  - US retains control over changes to root zone file via Commerce D.
  - 2013 backlash to Snowden revelations, led 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 to retain engagement or increase it
  - Others want engagement 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)**
  - Governance should be open, transparent, and inclusive.
  - Some want decisions by "consensus." What it mean?
  - 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
  - Tunis Agenda – outline for Internet governance - more
  - 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

WSIS 2005 on IG (Tunis Agenda*)

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.

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Internet Governance – Part II

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IG Has Players at Many 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:
  - IETF, ITU, World Wide Web Consortium (W3C).

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
  - US CAN-SPAM Act of 2003 makes it a federal crime to send misleading commercial email.

- **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

International Telecommunications Union (ITU)
An Important IG Player

- ITU is a UN agency started in 1865
  - Coordinates use of radio spectrum, satellite orbits. It sets standards for telephony and telecommunications

- 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)

- WCIT is ITU treaty-level conference to revisit the International Telecommunications Regulations (ITRs), rules for telecom & set intl. tarrifs.

- 2012 WCIT in Dubai from December 3-14, 2012.

- Autocratic nations tried to use ITU to take control of Internet policy[1,2] such as ICANN
  - Proposed UN take regulatory oversight of Internet, e.g. security, IETF, ICANN, DNS, shutdowns, etc.

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
2. https://arstechnica.com/tech-policy/2012/12/the-uns-telecom-conference-is-finally-over-who-won-nobody-knows/

World Conference on International Telecommunications (WCIT)

- European parliament and US House of Representatives objected to the ITU proposals

- 1,600 diplomats from 152 countries attended!

- WCITs normally decide by consensus, not in '12
  - US, EU, Canada, India, etc. did not ratify treaty
  - 89 nations did ratify, 53 did not
  - Leaked contributions to 2012 WCIT here: http://wcitleaks.org/

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
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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?

- Hemmati[7]: 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.

7. Hemmati, M. Multi-stakeholder Processes for Governance and Sustainability: Beyond Deadlock and Conflict, Earthscan Publishing, 2002.

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."

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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

GLOBAL COMMISSION ON INTERNET GOVERNANCE PAPER SERIES: NO. 1 — MAY 2014

Figure 1: The Regime Complex for Managing Global Cyber Activities
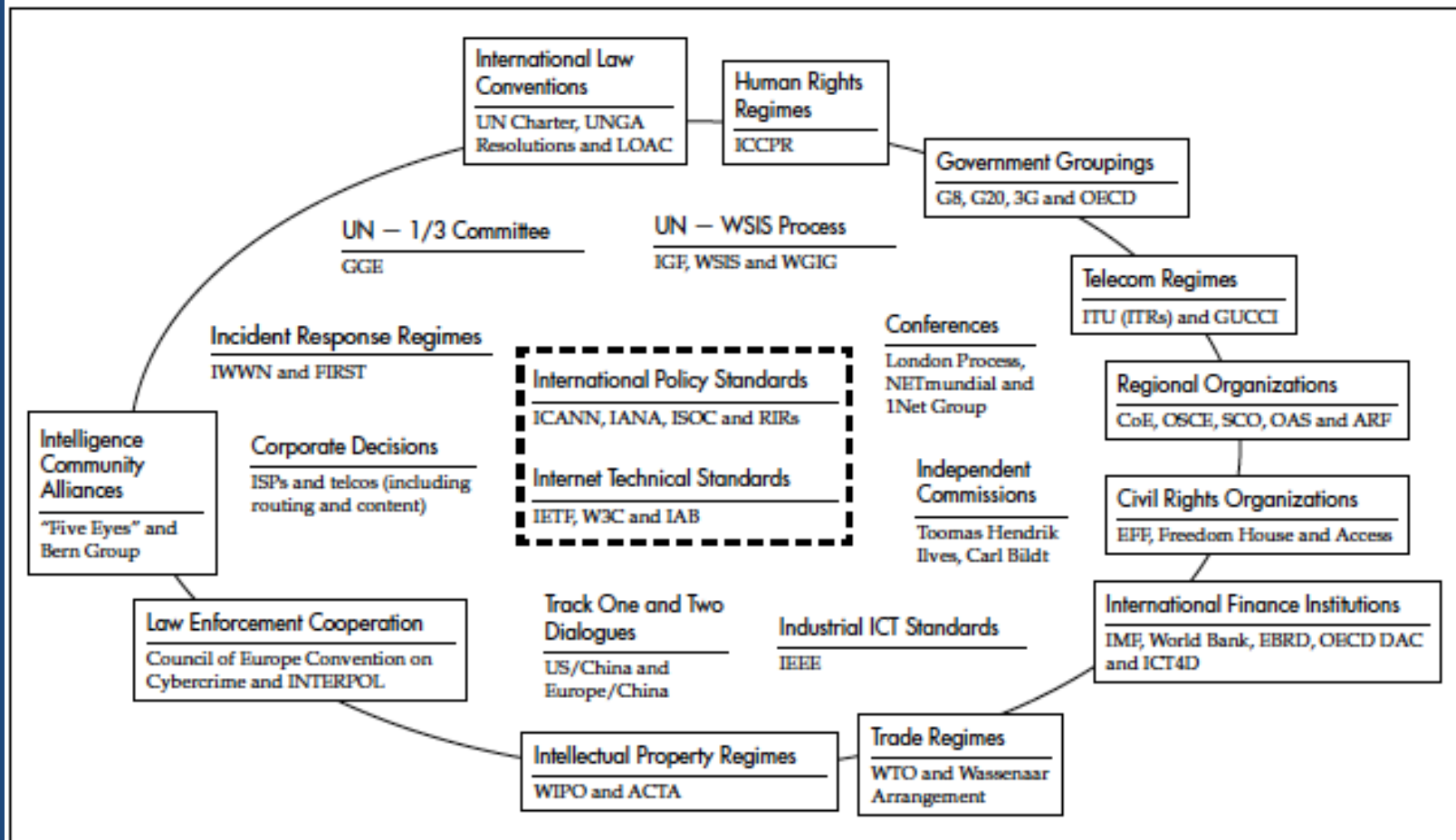
Additional Recommendations

- 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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