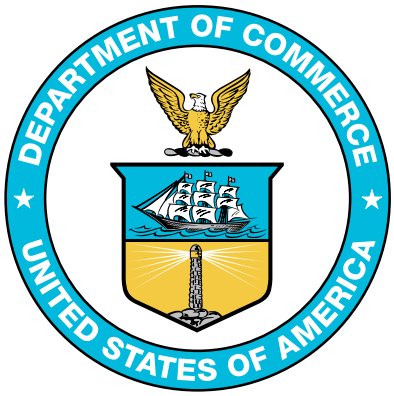

Enabling Growth and Innovation in the Digital Economy

U.S. Department of Commerce

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Message from
SECRETARY OF COMMERCE PENNY PRITZKER

Over the past seven years, we have witnessed unprecedented growth of the digital economy. The Internet has quickly become the place where people all over the world share ideas, learn new skills, and gain access to the storehouse of human knowledge. Digitization has become the means by which businesses increase productivity and spur innovation. That is why the U.S. Department of Commerce has made digital economy policy a top priority, working to empower U.S. businesses and the American people with the tools, education, and resources necessary to reap the countless benefits of digital technologies and services.

Enabling Growth and Innovation in the Digital Economy is a chronicle of the Commerce Department's efforts in support of the digital economy over the course of the Obama Administration. It describes not only *what* the Department has achieved over the last seven years, but also *why* it has pursued the policies and programs it has. The report articulates the Department of Commerce's philosophy for digital economy policymaking and demonstrates the many ways in which the Department has pursued its policy agenda consistent with that philosophy.

The Department of Commerce is proud of what it and its nearly 47,000 employees have been able to contribute to the digital economy over the past seven years. It has been my honor and pleasure to lead an organization committed to values and principles that are so essential to the development of a vibrant, dynamic, and innovative digital economy for all.

Penny Pritzker
U.S. Secretary of Commerce

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INTRODUCTION

The rise of the digital economy has fundamentally transformed the economic and social life of the United States and the world. Digital technologies have quickly become a key driver of jobs, business creation, and innovation. Today, economic growth and competitiveness increasingly depend upon a nation's ability to harness the transformative opportunities of the Internet, computers, and data.

In the United States, the digital economy has had a staggering impact on jobs and growth. In 2014 alone, the U.S. exported roughly $400 billion in ICT-enabled deliverable services, which accounted for more than half of U.S. services exports.[1] The digital economy has increased total U.S. real GDP by more than a percentage point annually and has added millions of new jobs.[2] Virtually all industry sectors, from manufacturing to financial services, education, agriculture and health care, have benefited from the adoption of digital technologies, applications, and services.

This remarkable expansion of the digital economy in the U.S. did not happen by chance. On the contrary, it is a direct result – first and foremost – of the ingenuity and inherent entrepreneurial spirit of the American people. The United States continually produces the most innovative companies, founded by the most creative minds in business and engineering. Yet the success of American entrepreneurship in the digital economy was not a foregone conclusion and did not occur in a vacuum. Indeed, for the digital economy to thrive, governments, working in concert with other stakeholders, must create a legal, policy, and diplomatic environment conducive to creativity, competition, and investment.

The U.S. Government's approach to developing global Internet policy is reflected in the Organization for Economic Cooperation and Development (OECD) *Principles for Internet Policy-Making* (OECD Principles).[3] The OECD Principles support a flexible, multistakeholder approach to Internet policymaking and strengthen international cooperation. They are the end result of a

[1] U.S. Department of Commerce, Economics and Statistics Administration, *Digitally Deliverable Services Remain an Important Component of U.S. Trade* (May 28, 2015), *available at* http://www.esa.doc.gov/economic-briefings/digitally-deliverable-services-remain-important-component-us-trade.

[2] U.S. International Trade Commission, *Digital Trade in the U.S. and Global Economies, Part 2* (Aug. 2014), *available at* https://www.usitc.gov/publications/332/pub4485.pdf.

[3] Organization for Economic Cooperation and Development (OECD), *Principles for Internet Policy-Making* (2014), *available at* http://www.oecd.org/sti/ieconomy/oecd-principles-for-internet-policy-making.pdf.

U.S.-initiated process at the OECD to establish guiding principles for the continued development of a vibrant and prosperous Internet for member states, and the broader world.[4]

The OECD Principles thus helped pioneer the concept of multistakeholder negotiated outcomes, and remain a relevant and guiding text for the development of the global digital economy. They have defined U.S. positions in international negotiations and served as a commonly accepted basis for further Internet governance and policymaking activity, including in the development of the 2014 NetMundial Internet Governance Principles.[5] At the domestic level, the U.S. Government – and specifically the Department of Commerce (Department) – uses the OECD Principles as a reference point in its approach to Internet policy development.

Indeed, all of the Department's efforts are firmly grounded in a core set of principles for policymaking in the digital economy, many of which echo, if not exactly mirror, those of the OECD Principles. They include:

- Multistakeholder Internet policymaking and standards development, in which all stakeholders may participate in open, transparent, and consensus-driven decision making processes;
- Strong protections for intellectual property, balanced with appropriate exceptions and limitations, such as fair use, which encourage investment and content creation in the digital environment;
- Open and voluntary technical standards, allowing for digital technologies and services to interoperate, and digital entrepreneurs to innovate more easily and to build off existing infrastructure;
- Focus on the user, ensuring that users' interests are paramount, and that users have the skills, education, and access necessary to reap the benefits of digital technologies;
- Public/private partnerships, which bring the resources and reach of the government to supplement private sector investments and activities;
- International engagement, recognizing that the Internet is truly global, and that for it to continue to serve as a source of economic growth and social development, the United States must actively promote a vision of the digital economy consistent with open and democratic values.

[4] *Id.* at 4, 16; United States Mission to the OECD, *United States Applauds OECD Adoption of Internet Policy Making Principles* (Dec. 13, 2011), *available at* http://usoecd.usmission.gov/june2011_internet2.html; The OECD IPP Principles were first developed as an outcome of the June 2011 OECD High Level Meeting on the Internet Economy, and issued as a Communiqué following negotiated input from the OECD's business, technical, and civil society community constituencies. In December 2011, the OECD Council formally adopted a Recommendation on Principles for Internet Policy-Making. While several members of the Civil Society Advisory Committee did not support the full text, other civil society members expressed gratitude for inclusion as a negotiating partner that helped to strengthen international acceptance of the multistakeholder approach at a critical historical moment. OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf; OECD, *Internet economy: New framework for an open Internet agreed at OECD*, http://www.oecd.org/newsroom/interneteconomynewframeworkforanopeninternetagreedatoecd.htm (last visited May 20, 2016).

[5] *See*, The NetMundial Multistakeholder (April, 2014), *available at*: Statement http://netmundial.br/wp-content/uploads/2014/04/NETmundial-Multistakeholder-Document.pdf.

Within the U.S. Government, the Department of Commerce has played a leading role in shaping the policies, initiatives, and strategies necessary to ensure continued American digital competitiveness. Its activities have focused on a number of areas, from protecting and preserving a free and open Internet, to promoting trust online, to ensuring that workers, families, and companies have broadband access to the Internet. The Department has worked to enable American businesses to reach customers and markets abroad, and to ensure that the American consumer has the opportunity to access the most innovative, reliable, and affordable digital products and services available. And the Department has focused on advancing the next generation of exciting technologies, such as driverless cars, facial recognition technologies, and unmanned aircraft to ensure that America will remain on the cutting edge of revolutionary inventions.

The Department of Commerce is composed of 12 bureaus and nearly 47,000 employees, located in all 50 states and territories, and in more than 86 countries worldwide. Although the bureaus have vastly different mandates, they work in concert to put these principles into practice, in order to create an enabling environment for America's digital economy. Indeed, an underlying strength of the Department is the ability of its various agencies and bureaus to collaborate and share their specialized expertise to promote growth in the digital economy.

In order to ensure effective cross-Department coordination on digital economy issues, the Department formed, in 2015, the Digital Economy Leadership Team (DELT), a council of senior-level Commerce Department officials who lead bureaus and departments that work on digital economy issues. This group meets regularly to set and advance the Department's digital economy agenda, a whole-of-Department strategy for digital economy policy focused on four[6] key pillars: protecting the free and open Internet, fostering trust and security online, helping to advance promising new digital technologies and services, and promoting Internet access and digital skills.[7]

This cross-Department coordination on digital economy issues is supported by the Internet Policy Task Force (IPTF), a team of experts who aim to identify leading public policy and operational challenges in the digital environment.[8] The IPTF leverages expertise from across the Department, including from those agencies responsible for domestic and international information and communications technology policy, international trade, cyber security standards and best practices, intellectual property, and business advocacy and export control. The IPTF has focused its work in four areas:

[6] *See*, The Commerce Department's Digital Economy Agenda (November 9, 2015), *available at*: https://www.commerce.gov/news/blog/2015/11/commerce-departments-digital-economy-agenda.

[7] For instance, the DELT in 2016 created a Digital Economy Board of Advisors (DEBA), comprised of 17 leading figures in academia, civil society, and industry, to help guide the Department's future work related to the digital economy. For more information on the DEBA, *see* U.*S. Secretary of Commerce Penny Pritzker Announces Appointees to Inaugural Digital Economy Board of Advisors* (March, 2016), *available at* https://www.commerce.gov/news/press-releases/2016/03/us-secretary-commerce-penny-pritzker-announces-appointees-inaugural.

[8] National Telecommunications and Information Administration (NTIA), *Commerce Secretary Locke Announces Public Review of Privacy Policy and Innovation in the Internet Economy, Launches Internet Policy Task Force*, (Apr. 21, 2010), *available at* https://www.ntia.doc.gov/press-release/2010/commerce-secretary-locke-announces-public-review-privacy-policy-and-innovation-in. For more information on the Internet Policy Task Force (IPTF), *see* Internet Policy Task Force, https://www.ntia.doc.gov/category/internet-policy-task-force (last visited May 12, 2016).

1. Privacy
2. Cybersecurity
3. Copyright
4. The Free Flow of Information

The IPTF seeks to develop policies and programs that advance the digital economy. The four lead bureaus of the IPTF are NTIA, NIST, USPTO, and ITA[9]:

The National Telecommunications and Information Administration (NTIA) is the principal Executive Branch agency responsible for advising the President on telecommunications and information policy issues. Its programs and policymaking focus largely on expanding broadband Internet access and adoption in America, expanding the availability of spectrum for mobile and fixed wireless broadband use, and ensuring that the Internet remains an engine for continued innovation and economic growth.

The National Institute of Standards and Technology (NIST) works to promote U.S. competitiveness by advancing measurement science, standards, and technology in ways that, among other things, enhance digital innovation and security. From the smart electric power grid and electronic health records to atomic clocks, advanced nanomaterials, and computer chips, NIST accelerates the development and deployment of digital systems that are reliable, usable, interoperable, and secure.

The U.S. Patent and Trademark Office (USPTO) is the federal agency responsible for granting U.S. patents and registering trademarks, and for advising the President, the Secretary of Commerce, and federal agencies on intellectual property policy, protection, and enforcement. The USPTO helps to ensure that U.S. digital innovators and creators both here and worldwide are able to reap the benefits of their ingenuity.

The International Trade Administration (ITA) leads the Department's export and investment activities and ensures fair trade through the rigorous enforcement of our trade laws and agreements, including for digital products and services, and as the lead negotiator for digital privacy and the EU-U.S. Privacy Shield agreement. It works directly with U.S. businesses to help them successfully engage in foreign markets, importantly through its newly created Digital Trade Officer (Digital Attaché) program.

[9] Several other bureaus within the Department play critical roles in support of the U.S. digital economy, as well. The Bureau of Industry and Security (BIS) advances U.S. national security, foreign policy, and economic objectives by ensuring an effective export control and treaty compliance system and by promoting continued U.S. strategic technology leadership and a strong defense industrial base. The Economics and Statistics Administration (ESA) provides timely economic analysis, disseminates national economic indicators, serves as the administrator of the Department's premiere statistical programs, the U.S. Census Bureau (Census) and the Bureau of Economic Analysis (BEA), and manages the Office of the Chief Economist (OCE). The National Technical Information Service (NTIS) serves as the largest central resource for government-funded scientific, technical, engineering, and business related information available today. The Economic Development Administration (EDA) helps individuals, firms, and communities to maximize the use of their talents and skills to support innovation, lower transaction costs, and responsibly produce and trade valuable goods and services. The Minority Business Development Administration (MBDA) works with minority-owned businesses to help them compete and innovate in the digital economy. The National Oceanic and Atmospheric Administration (NOAA) works to understand and predict changes in climate, weather, oceans and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources.

These bureaus work in close coordination with other parts of the Department that play crucial roles in support of its digital economy agenda, including bureaus such as the Economics and Statistics Administration (ESA) and the Bureau of Industry and Security (BIS), as well as lead staff across the Office of the Secretary.

Enabling Growth and Innovation in the Digital Economy canvasses eight cross-cutting areas and is the product of a Department-wide collaborative effort, organized around the Digital Economy Leadership Team's four policy pillars: I.) The Free and Open Internet; II.) Trust and Security Online; III.) Innovation and Emerging Technologies; and IV.) Access and Skills. It is an anthology of the major initiatives of the Commerce Department over the course of the past seven years in pursuit of a more inclusive, dynamic, and productive digital economy for the American people and the users of digital technologies around the world.

I. THE FREE AND OPEN INTERNET

The free and open global Internet, with minimal barriers to the flow of information and services across borders, is truly the lynchpin of the digital economy.[10] As such, the Department of Commerce works across its bureaus and with partners across the U.S. government to ensure that technical, policy, and legal environments around the world are as free and open as possible. The Department actively engages with the business community, civil society, and foreign governments to protect information flows, to strengthen the Domain Name System, a vital component of the Internet's technical infrastructure, and to further the multistakeholder approach to Internet governance, the approach best equipped to produce an open Internet system.

ENSURING THE GLOBAL FREE FLOW OF INFORMATION ONLINE

Recognizing the value of Internet openness and the free flow of information, and the risks that restrictions on Internet data flows present to innovation, economic growth, and social prosperity, the Department of Commerce has made it a top priority to ensure that information and data continue to flow freely and the Internet remains open and global. The Department has played a critical role in developing policies and initiatives that protect the "free flow" of information and foster a robust digital economy.

Recently, some governments around the world have explored and employed a variety of technical, legal, and administrative tools to restrict the "free flow" of data, limiting Internet routing and data storage to particular jurisdictions and limiting the kinds of content and data types that are permitted online. As a result, companies operating, or attempting to operate, in those jurisdictions face a host of barriers to information flows in the international marketplace. Examples of such barriers include forced localization requirements, market access limitations, censorship, legal liability rules, and customs measures. Such measures are ultimately self-defeating, because they raise costs, decrease competition, and disrupt the openness of the Internet and civil society. Accordingly, the Department has worked to ensure that the global exchange of information can continue to drive a global digital economy.

[10] Indeed, the OECD Principles for Internet Policy Making emphasize the importance of Internet freedom and openness in more than 5 of its 14 Principles. *Id.* OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf; *see* Principle #1, #2, #4, #5, and #11.

THE FREE FLOW WORKING GROUP OF THE INTERNET POLICY TASK FORCE

One of the working groups of the IPTF has focused on issues related to the global free flow of information, specifically on addressing policies in other jurisdictions around the globe that restrict information flows on the Internet.[11] This Free Flow Working Group works to examine why these restrictions have been instituted and to better understand the impact they have on innovation, economic development, global trade and investment, and how best to address negative impacts. The Free Flow Working Group leverages expertise across many bureaus of the Department and coordinates Department-wide responses to threats to U.S. competitiveness in the digital economy. It also consults with U.S. industry to solicit input to Department policies and activities.

DIGITAL TRADE OFFICERS

To respond to the challenges associated with the free flow of goods and services online, the Department launched a pilot program in March 2016 for Digital Trade Officers (also called "Digital Attachés") to facilitate U.S. private sector involvement in the global digital economy and to help U.S. companies reach markets worldwide.[12] The primary goals of the Digital Trade Officers – members of the U.S. Foreign Commercial Service of commercial diplomats – is to provide support and assistance to help U.S. businesses successfully navigate digital policy and regulatory issues in foreign markets, and to expand exports through global e-commerce channels.

This initiative will be led by the Department of Commerce's International Trade Administration (ITA), working with bureaus across the Department, in collaboration with the Department of State and industry stakeholders. The Digital Trade Officers will enhance efforts to advance commercial diplomacy, drive policy advocacy on technology issues, ensure linkages between trade policy and trade promotion efforts, and provide front-line assistance for U.S. small and medium enterprises to take advantage of the robust e-commerce channels. Training for the officers will be coordinated through ITA, with assistance from NTIA and agencies and bureaus across the Department. The pilot program was launched in Brazil, China, Japan, India, the European Union, and in the Association of Southeast Asian Nations (ASEAN) region.

TRANS-PACIFIC PARTNERSHIP

In October 2015, negotiations concluded on the Trans-Pacific Partnership (TPP), an agreement designed to address the 21st century needs of U.S. exporters in the global economy.[13] ITA, in partnership with the U.S. Trade Representative (USTR), worked to ensure that TPP includes strong commitments that open up trade opportunities in telecommunications services, including the underlying networks and services that provide access to the Internet. ITA negotiators also focused on issues that affect all companies seeking to leverage the Internet for the delivery of goods and services. To that end, the Electronic Commerce Chapter has commitments addressing barriers

[11] *See* Global Free Flow of Information, https://www.ntia.doc.gov/category/global-free-flow-information (last visited May 13, 2016).

[12] U.S. Department of Commerce, Secretary Penny Pritzker, *Commerce Launches Digital Attaché Program to Address Trade Barriers* (Mar. 11, 2016), *available at* https://www.commerce.gov/news/opinion-editorials/2016/03/commerce-launches-digital-attache-program-address-trade-barriers.

[13] U.S. ITA Trans-Pacific Partnership, http://www.ita.doc.gov/fta/tpp/index.asp (last visited May 13, 2016).

such as restrictions on data flows, server location requirements, discriminatory treatment of and duties on digital products, and forced disclosure of source code. In addition, the chapter provides consumer protection by creating country commitments on unsolicited messages (i.e., spam), online consumer protection, access to and use of the Internet, and personal information protection. TPP includes strong intellectual property protections, and also obligates countries to seek to achieve balance in their copyright systems by means of, among other approaches, limitations or exceptions that allow for the use of copyrighted works.

TRADE AGREEMENTS: LOOKING AHEAD

The Department is also involved in negotiations on two other agreements that have been launched: the Trade in Services Agreement (TiSA) and the Transatlantic Trade and Investment Partnership (TTIP).[14] With TiSA, a services-only trade agreement that includes the United States and 22 other Parties, the United States aims to recognize the importance of cross-border information flows. The potential for TiSA to eventually become "multilateralized" (i.e., become a World Trade Organization agreement) means that U.S. businesses will gain the benefits of our free trade agreement commitments on a global scale, further lowering unnecessary barriers in the digital economy. With TTIP, the United States seeks to further deepen the transatlantic ties and craft a free trade agreement that can become a gold standard for free trade agreements worldwide.

RESEARCH ON THE DIGITAL ECONOMY AND CROSS-BORDER TRADE

One of the greatest challenges facing the free flow of information is the lack of research quantifying the economic impacts of cross-border data flows. In 2016, the Department of Commerce's Bureau of Economic Analysis (BEA) built on previous work to further the evidence of the economic impact of cross-border data flows in its comprehensive study *Trends in U.S. Trade in Information and Communications (ICT) Services and ICT-Enabled Services*.[15] In the report, BEA estimated the total value of potentially ICT-enabled services exports was $385.1 billion in 2014, or about 54 percent of total services export value.[16] The report provides a framework for U.S. policymakers, academic researchers, and businesses to measure the size and assess the nature of cross border data flows. It and the previous DOC reports on this subject will continue to play an invaluable part in helping to persuade foreign governments not to interfere with the Internet's core infrastructure.

NTIA, in partnership with ESA, has been building on this work by continuing to study the impact of cross-border data flows on the U.S. and global economy. These cross-border data flows are an increasingly important component of international trade and a critical form of communication between individuals and businesses in both developed and developing economies. But there is relatively little data available to quantify these benefits. NTIA and ESA have been talking to

[14] *See* United States Trade Representative (USTR), Trade in Services Agreement (TISA), https://ustr.gov/TiSA (last visited May 20, 2016); USTR, Transatlantic Trade and Investment Partnership (T-TIP), https://ustr.gov/ttip (last visited May 20, 2016).

[15] U.S. Department of Commerce Bureau of Economic Analysis, *Trends in U.S. Trade in Information and Communications Technology (ICT) Services and in ICT-Enabled Services* (May, 2016), *available at* https://www.bea.gov/scb/pdf/2016/05%20May/0516_trends_%20in_us_trade_in_ict_serivces2.pdf.

[16] *Id.* at 3.

stakeholders, reviewing literature, and identifying the strengths and potential shortcomings of the existing data and research on cross-border data flows. In May 2016, NTIA and ESA co-hosted a conference with leading government and academic economists, statisticians, and policymakers to identify gaps in the measurement of cross border data flows and devise a way forward.[17]

ADVANCING THE MULTISTAKEHOLDER APPROACH IN GLOBAL INTERNET GOVERNANCE

The Department of Commerce has made the practice of multistakeholder policymaking a hallmark of its Internet-related activities. It has also prioritized the global proliferation of multistakeholder processes and the strengthening of multistakeholder organizations and events. Accordingly, the Department has been involved in critical debates over Internet governance and policymaking in a large variety of international organizations and settings over the course of the past several years. These debates have typically centered on the role of governments and intergovernmental organizations in the Internet's governance and management, and they have reflected disparate philosophical, political, legal, and economic perspectives among the world's governments.

WORLD SUMMIT ON THE INFORMATION SOCIETY (WSIS)

In 2015, the United Nations (U.N.) completed a review of the ten-year implementation of the outcomes from the World Summit on the Information Society (WSIS). WSIS was a landmark, head-of-state level summit held in 2003 and 2005, which enshrined existing Internet governance mechanisms and planned activity throughout the U.N. to spur the development of information and communications technologies (ICTs). NTIA played the leading role in the U.S. delegation to the review process on Internet governance related matters, which, despite strong opposition from more authoritarian countries, reaffirmed the importance and centrality of multistakeholder cooperation to the Internet's success and growth. The review process also extended the mandate of the Internet Governance Forum, another major Department priority.

INTERNET GOVERNANCE FORUM (IGF)

A key outcome of the original WSIS was the creation of the Internet Governance Forum (IGF). The IGF is considered the premier multistakeholder venue for exchanging information and sharing best practices on cross-cutting policy issues that affect the sustainability, robustness, security, stability, and development of the Internet. For ten years, NTIA has proactively engaged in this multistakeholder forum, and served on the IGF's Multistakeholder Advisory Group (MAG), the body that shapes the organization and program of the annual IGF event. In addition, NTIA's Administrator has delivered keynote remarks at the IGF's opening ceremonies. NTIA has

[17] NTIA, U.S. Department of Commerce Roundtable Measuring Cross-Border Data Flows: Unmet Data Needs (May 9, 2016), *available at* https://www.ntia.doc.gov/files/ntia/publications/commerce_cross-border_data_roundtable_final_agenda.pdf. *See also* Measuring Cross-Border Data Flows: Unmet Data Needs Roundtable, 81 Fed. Reg. 24067 (Apr. 25, 2016), *available at* https://www.ntia.doc.gov/files/ntia/publications/commerce_cross-border_data_roundtable_final_agenda.pdf.

participated in numerous workshops at the IGF over the years, and in 2015 organized a successful panel on the free flow of data online.[18]

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

The International Telecommunication Union (ITU) is a specialized agency in the United Nations system that coordinates the development and approval of international telecommunication standards, promotes infrastructure development, manages radio-frequency spectrum and satellite orbits, and provides a forum for countries to address policy and technical issues.

NTIA has successfully represented the Department as a member of U.S. delegations to several treaty-level meetings of the ITU including the 2010 and 2014 Plenipotentiary conferences and the 2012 World Conference on International Telecommunications (WCIT), and other high-level events such as the 2013 World Telecommunication Policy Forum (WTPF). NTIA negotiated text affecting global telecommunications and information technologies and networks and provided delegation policy and technical advice that has been instrumental in shaping the strategic direction of the ITU as well as preserving private sector leadership in the technical development and management of the Internet, in particular, in relation to the Internet's domain name system (DNS).

The ITU is not a multistakeholder organization; decision-making authority in the ITU is the exclusive right of its Member States. Because of this, the Department has worked to make the organization more inclusive of non-governmental stakeholders. For example, at the ITU's 2010 Plenipotentiary meeting, NTIA negotiated language in four Internet-related resolutions that called for collaboration and coordination with multistakeholder organizations, including ICANN, the Internet Engineering Task Force, the Regional Internet Registries, and the Internet Society.[19] This was a significant achievement not only for the activity it called for, but also because it represented the first time the ITU Membership recognized these multistakeholder bodies. Building on these successes, at the 2014 Plenipotentiary meeting, NTIA negotiated new opportunities for all interested stakeholders to submit contributions to an Internet policy working group, which had previously been an exclusive domain for governments.[20]

NTIA was also instrumental in the United States' successful negotiation of six official "Opinions" that emerged from the 2013 WTPF, an event centered on the ITU's role in Internet policy issues. NTIA served as the lead negotiator for the U.S. government delegation within the WTPF Informal Experts Group (IEG), a multistakeholder gathering that met several times to negotiate the draft opinions. In the face of calls from attendant governments to give the ITU a greater role in Internet governance, NTIA successfully negotiated opinions that supported multistakeholder

[18] In 2009, the national IGF initiative IGF-USA was launched by a multistakeholder steering committee that featured NTIA as the primary government representative. The IGF-USA has been held on an annual basis since then (with the exception of 2013) and has continued to grow in both popularity and impact. Various agencies from the Department have participated in the IGF-USA's workshops and panels. NTIA has delivered the keynote address on several occasions and continues to contribute to the organization of the event, alongside stakeholders from the private sector, the technical and academic community, and civil society. *See* IGF-USA | Internet Governance Forum USA, http://www.igf-usa.org/ (last visited May 13, 2016).

[19] *See* ITU Internet Policy and Governance, Internet-related Resolutions 101, 102, 133, and 180, *available at* http://www.itu.int/en/action/internet/Pages/default.aspx.

[20] *See* ITU, Final Acts of the Plenipotentiary Conference, http://www.itu.int/pub/S-CONF-ACTF-2014 (last visited May 13, 2016).

policymaking mechanisms. The final opinions were endorsed by governments at the WTPF itself without modification.

Finally, NTIA was an influential member of the U.S. delegation to the WCIT, a treaty-making conference in 2012 that became a significant event in the history of Internet governance and policymaking. The conference was convened ostensibly to update a treaty known as the International Telecommunication Regulations (ITRs), which had governed the provisioning of international telecommunication services since 1988. One of the United States delegation's primary goals for the conference was to ensure that the free and open Internet not be ensnared in ITU treaty obligations that would threaten the Internet with top-down government regulation at the expense of multistakeholder processes. Others, notably China, Russia, and certain countries from the Middle East, approached the conference as an opportunity to impose their agenda of greater regulation of Internet companies, regulation of content, and for a more prominent ITU role in Internet governance and cybersecurity. When faced with a final outcome document that reflected the priorities of these authoritarian states, which was orchestrated in backroom negotiations and presented at the conference's final evening, the United States opted not to sign the revised treaty. It was joined by 54 other countries that abstained. The WCIT was an important chapter in Internet governance history and demonstrated that the United States was firmly committed to preserving the Internet's multistakeholder governance.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

In 2011, the Department spearheaded a High Level Meeting on the Internet Economy at the Organization for Economic Cooperation and Development (OECD). The meeting was attended by global thought leaders from business, government, civil society, and the technical community, and culminated in a *Communiqué on Principles for Internet Policy-Making*. The Communiqué was adopted by all OECD economies plus business and technical constituent bodies.[21] The Communiqué, which encourages multistakeholder cooperation in Internet policy development processes, was a hallmark achievement in the Administration's international Internet policy agenda and served to define U.S. positions in subsequent international Internet negotiations.

In June 2016, the OECD will be holding a Ministerial meeting in Cancun, Mexico, entitled, "The Digital Economy: Innovation, Growth and Social Prosperity." The goal is to foster a common understanding on how to maximize the contribution of the digital economy to growth and well-being by building further capacity in Internet policy and governance; strengthening digital trust; and creating the enabling conditions for new jobs, appropriate skills and inclusion.[22] The Ministerial provides a venue to emphasize the importance of the continued implementation of the Internet Policy-making Principles (IPPs) and an opportunity to renew and reaffirm the mandate of the OECD to work on these digital economy issues for the years to come. The Department of Commerce has played a leading role in planning the event, and the Secretary of Commerce will participate along with a number of high-level Department officials.

[21] OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf.

[22] *See* OECD Committee on the Digital Economy, Meeting the policy challenges of tomorrow's digital economy, https://www.oecd.org/internet/ministerial/ (last visited May 20, 2016).

ASIA-PACIFIC ECONOMIC COOPERATION (APEC)

In addition to participating in the APEC e-Commerce Working Group, the Department is also an active participant in the APEC Telecommunications and Information (TEL) Working Group, where it advances U.S. priorities on Internet governance issues and helps to incorporate greater involvement of non-governmental stakeholders in the group's activities. NTIA served as Deputy Chairman of the TEL's Development Steering Group (DSG) from 2013-2016 and in this position helped develop a forward-looking agenda that focused on mobile broadband connectivity and Internet Protocol Version 6 (IPv6) deployment.

On the latter point, NTIA partnered with the Asia-Pacific Network Information Center (APNIC) to plan and execute a series of three multistakeholder workshops in 2009 and 2010 that focused on regional cooperation to expand the deployment of IPv6, a standard that is critical to the continued growth of the Internet. The workshops featured expert speakers from government, business, and the technical community, hailing from all levels of development in the APEC region. The practical lessons learned in the workshops were enshrined in the APEC TEL IPv6 Guidelines, a document that was negotiated in the TEL Working Group and later endorsed by a Ministerial-level meeting. The Guidelines detail practical steps that all stakeholders can follow to support the deployment of IPv6 and facilitate broadband infrastructure, ubiquitous network development, and economic growth.

PRIVATIZING THE MANAGEMENT OF THE DOMAIN NAME SYSTEM

The Domain Name System (DNS) is a critical component of the Internet's infrastructure that enables Internet users to identify websites, mail servers, and other Internet destinations by typing in easy-to-understand domain names in lieu of long Internet Protocol numbers. A 1997 Executive Memorandum directed the Secretary of Commerce to privatize the Internet domain name system (DNS) in a manner that increases competition and facilitates international participation in its management.[23] To accomplish this task the Department, through NTIA, has partnered with the Internet Corporation for Assigned Names and Numbers (ICANN) in a series of agreements as well as representing the United States in ICANN's Governmental Advisory Committee (GAC). During the Obama Administration, NTIA's relationship with ICANN has evolved significantly given the maturity of ICANN and growing global acceptance of the multistakeholder model.

AFFIRMATION OF COMMITMENTS

In the fall of 1998, NTIA entered into a *Memorandum of Understanding (MOU)* with ICANN to transition technical DNS coordination and management functions to the private sector. The MOU culminated in 2009 with the *Affirmation of Commitments* (Affirmation).[24] The Affirmation signified a critical step in the successful transition to a multistakeholder, private-sector led model

[23] President William J. Clinton, Memorandum for the Heads of Executive Departments and Agencies, Electronic Commerce, 1997 Pub. Papers 898 (July 1, 1997), *available at* http://clinton4.nara.gov/WH/New/Commerce/directive.html.

[24] Affirmation of Commitments by the United States Department of Commerce and the Internet Corporation of Assigned Names and Numbers (Sept. 30, 2009), *available at* https://www.ntia.doc.gov/files/ntia/publications/affirmation_of_commitments_2009.pdf.

for DNS technical coordination, while also establishing an accountability framework of ongoing multistakeholder reviews of ICANN's performance.

ICANN has made significant progress in fulfilling the commitments established by the Affirmation, including implementation of recommendations that resulted from a series of multistakeholder community reviews, such as those conducted by the Accountability and Transparency Review Team (ATRT). NTIA actively participated in two iterations of ATRT in 2010 and 2013. The ATRT reports, to which a broad array of international stakeholders from industry, civil society, the Internet technical community, and other governments contributed, have served as a key accountability tool for ICANN – evaluating its progress and recommending improvements to its operations. These efforts have further strengthened the resolve and influence of the multistakeholder community participating in ICANN.

IANA STEWARDSHIP TRANSITION

NTIA announced, in March 2014, its intent to transition stewardship of key Internet domain name functions to the global multistakeholder community and complete the privatization begun in 1997. NTIA asked ICANN to convene a multistakeholder process to develop a transition plan to complete this privatization, and set out clear criteria that must be met in order for the transition to be approved.[25] Specifically, NTIA said that the transition proposal must have broad community support and meet the following criteria:

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.

NTIA also stated it would not accept a proposal that replaces the NTIA role with a government-led or inter-governmental organization solution.

Two years have passed since the NTIA announcement, and much has happened. The multistakeholder community rose to the challenge and developed a transition plan that has broad community support. The community's efforts represent the largest multistakeholder process to date. Stakeholders have spent more than 26,000 working hours on the proposal, exchanged more than 33,000 messages on mailing lists, and held more than 600 meetings and calls. On March 10, 2016, the ICANN Board transmitted to NTIA the final proposal.[26]

[25] *See* Press Release, NTIA Office of Public Affairs, *NTIA Announces Intent to Transition Key Internet Domain Name Functions* (Mar. 14, 2014), *available at* https://www.ntia.doc.gov/press-release/2014/ntia-announces-intent-transition-key-internet-domain-name-functions. *See also* NTIA, *Report on the Transition of the Stewardship of the Internet Assigned Numbers Authority (IANA) Functions* (Jan. 2015), *available at* https://www.ntia.doc.gov/files/ntia/publications/iana_report_013015.pdf.

[26] ICANN, IANA Stewardship Proposal and Enhancing ICANN Accountability Recommendations (Mar. 10, 2016), *available at* https://www.icann.org/en/system/files/files/iana-stewardship-transition-package-10mar16-en.pdf.

On June 9, 2016, NTIA announced that the multistakeholder community developed IANA Stewardship Transition Proposal meets the criteria NTIA outlined in March 2014. NTIA also evaluated the proposal against relevant principles in the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Framework related to internal controls, as recommended by the U.S. Government Accountability Office (GAO), and finds that the proposal adequately addresses those principles. Lastly, an expert panel of corporate governance experts reviewed the ICANN Accountability proposal and concludes the proposal is "consistent with sound principles of good governance." For these reasons, NTIA found that the IANA Stewardship Transition Proposal meets the criteria necessary to complete the long-promised privatization of the IANA functions.[27]

Implementation of the transition plan and completion of the transition will help ensure the continued leadership of the private sector in making decisions related to the technical underpinning of the Internet. It also will counter attempts by some foreign governments that have used the U.S. government's legacy role related to the DNS to argue that governments should control the Internet domain name system.

ICANN GOVERNMENTAL ADVISORY COMMITTEE (GAC)

As the overall coordinator of U.S. government positions related to ICANN and the DNS, NTIA represents U.S. interests in ICANN's Governmental Advisory Committee (GAC). In this capacity, the Department has not only promoted the interests of the United States, it has also supported the multistakeholder approach to Internet governance by actively promoting the participation of governments within ICANN's multistakeholder structure. NTIA has strongly advocated for maintaining the GAC's advisory – non-decisional – role in the face of calls from other governments to give GAC authority over all other stakeholders.

Of particular note, the Department successfully coordinated the development and advocacy of U.S. government proposals related to the introduction of new generic top level domains (new gTLDs) between 2010 and the present, which represents the most significant expansion of the domain name space since ICANN's creation. Working with its counterparts in the GAC, the Department played a leading role in developing consensus GAC positions to inform ICANN's implementation of the new gTLD program. These consensus positions, the majority of which were adopted by the ICANN Board, were oriented toward ensuring the inclusion of adequate safeguards to promote consumer trust and protection, competition, the protection of intellectual property rights, and respect for law enforcement efforts to mitigate abuse and criminal activities.

In addition to the substantive improvements noted above, the Department has actively and successfully supported the progressive adoption of greater transparency procedures for GAC meetings, such that all GAC sessions are now open to the public. The USPTO has supported NTIA within the GAC since its inception, providing intellectual property guidance and advice on the various intellectual property issues arising within ICANN, and playing a key role in the development of the Rights Protection Mechanisms (RPMs), mechanisms to help trademark owners address problems that may arise in connection with the new generic top-level domains (new gTLDs).

[27] See IANA Stewardship Transition Proposal Assessment Report (June 9, 2016), *available at* http://www.ntia.doc.gov/report/2016/iana-stewardship-transition-proposal-assessment-report

As ICANN makes plans for a possible second round of new gTLDs, the USPTO will continue to support NTIA on issues arising within the GAC related to intellectual property as well as, in general, serve as an advocate for the intellectual property stakeholders within ICANN.

II. TRUST AND SECURITY ONLINE

The digital economy thrives when businesses and consumers can trust that their security and privacy are protected online. It struggles when businesses and consumers worry about their data and their privacy. As the voice of American business in policymaking for the U.S. government, the Commerce Department plays an important role in cybersecurity and digital privacy policymaking by facilitating dialogue between the government and industry. Through a variety of multistakeholder processes and diplomatic engagements, the Department has helped establish best practices for protecting consumers and their data from abuse online, while avoiding overly burdensome regulation that might stifle innovation.[28]

STRENGTHENING CONSUMER PRIVACY PROTECTIONS

The Department of Commerce is committed to strengthening commercial data privacy protections for the American consumer. Consumers should feel confident that personal information collected online will be used consistently with clearly stated purposes, in ways that match their expectations and is protected from misuse. Building consumer trust is fundamental to maintaining and increasing commercial activity on the Internet, and thus to the long-term success of the digital economy. Throughout the Obama Administration, the Department has played an instrumental role in developing policies that promote consumer trust by protecting consumer privacy on the Internet and across the digital economy. Such work is vital not only to helping consumers avail themselves of the full use of the Internet, but also to ensuring that the Internet remains a dynamic political, educational, cultural, and social medium.

Over the course of the past seven years, the Department has undertaken a number of initiatives, described further below, designed to promote meaningful privacy safeguards for consumers, as well as greater certainty for businesses by increasing consistency between global privacy frameworks.

CONSUMER PRIVACY – DOMESTIC POLICY

During the Obama Administration, the Department led or co-led three major domestic policy initiatives regarding consumer privacy. First, in 2010, the *Privacy Green Paper* explored U.S. privacy

[28] This mission is consistent with the OECD Internet Policymaking Principle #6, "Foster voluntary developed codes of conduct," #9, "Strengthen consistency and effectiveness in privacy protection at a global level," #13, "Encourage cooperation to promote Internet security," as well as others indirectly. *Id.* OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf

laws, identified emerging issues, and recommended that the Administration articulate high-level principles and a path forward for updating U.S. privacy safeguards.[29]

Building on the *Privacy Green Paper*, the Administration's 2012 *Privacy Blueprint* developed a *Consumer Privacy Bill of Rights*, which called for comprehensive privacy legislation to codify a set of high level and enforceable privacy principles, created multistakeholder processes to help stakeholders apply those principles to codes of conduct governing particular business sectors, and supported increased international consistency between different countries' privacy frameworks.[30]

In 2014, the report *Big Data and Privacy: A Technological Perspective* led by the White House in close collaboration with the Department analyzed current and near-term uses of big data analysis. The report recommended steps to embrace the benefits of big data technologies while also protecting fundamental values like privacy, fairness, and self-determination.[31] The report identified six discrete policy recommendations, including a call for circulation of an Administration draft privacy bill, a recommendation to extend privacy protections to non-U.S. persons, and an expansion of federal agencies' technical expertise.

The Obama Administration is also the first U.S. Administration to call for a comprehensive privacy law, and the first to circulate a draft bill.[32] In its 2012 *Privacy Blueprint*, the Administration called on Congress to draft and pass a comprehensive consumer privacy law that would apply to industries that are not subject to sector-specific federal privacy laws.[33] The Commerce Department was instrumental in crafting that recommendation, which states that a privacy bill should articulate high-level principles based on the aforementioned *Consumer Privacy Bill of Rights*, empower the Federal Trade Commission (FTC) to enforce those principles, and provide incentives for stakeholders to create enforceable codes of conduct for specific business sectors. In the absence of congressional action, the Department led the Administration's effort to craft and publicly release, in 2015, a discussion draft for a baseline privacy bill and urged Congress to act on this important issue.

MULTISTAKEHOLDER PROCESSES

As noted above, a central tenet of the OECD Principles is the use of "multistakeholder" approaches to policymaking, which the Department uses in a range of areas. The Department has moved forward in efforts to promote consumer privacy, convening three multistakeholder processes on important privacy issues.[34] "Multistakeholder" policymaking processes generally involve all

[29] U.S. Department of Commerce IPTF, *Commercial Data Privacy and Innovation in the Internet Economy: A Dynamic Policy Framework* (Dec. 16, 2010), *available at* https://www.ntia.doc.gov/files/ntia/publications/iptf_privacy_greenpaper_12162010.pdf.

[30] The White House, *Consumer Data Privacy in a Network World: A Framework for Protecting Privacy and Promoting Innovation in the Global Digital Economy* (Feb. 2012), *available at* https://www.whitehouse.gov/sites/default/files/privacy-final.pdf.

[31] The White House, Executive Office of the President, *Big Data and Privacy: A Technological Perspective* (May 2014), *available at* https://www.whitehouse.gov/sites/default/files/docs/big_data_privacy_report_may_1_2014.pdf.

[32] The White House, *Administration Discussion Draft: Consumer Privacy Bill of Rights Act of 2015*, *available at* https://www.whitehouse.gov/sites/default/files/omb/legislative/letters/cpbr-act-of-2015-discussion-draft.pdf.

[33] The White House, Office of the Press Secretary, *Fact Sheet: Plan to Protect Privacy in the Internet Age by Adopting a Consumer Privacy Bill of Rights* (Feb. 23, 2012), *available at* https://www.whitehouse.gov/the-press-office/2012/02/23/fact-sheet-plan-protect-privacy-internet-age-adopting-consumer-privacy-b.

[34] *See* NTIA Privacy, https://www.ntia.doc.gov/category/privacy (last visited May 12, 2016).

parties interested in a given issue working together in an open, transparent, and consensus-driven manner to develop flexible and innovative solutions to their mutual benefit. These processes give stakeholders an opportunity to improve safeguards for consumers, create greater clarity for industry, and help establish a culture of collaboration in policy development.

In the first of the three multistakeholder processes, stakeholders reached consensus on a code of conduct on mobile application privacy disclosures.[35] Privacy notices are an important way for consumers to understand how mobile apps collect and use personal data, but small screens present challenges when app developers need to effectively communicate complex information to users. The multistakeholder-developed privacy notices are currently used in apps that reach more than 200 million consumers. Two leading trade associations have made open source computer code available to all app developers, enabling small developers to include enhanced notices in their products without incurring significant legal costs or dedicating substantial engineering and design resources.

The Department is also currently convening a multistakeholder process to establish a code of conduct for commercial use of facial recognition technology, which holds substantial promise in a range of contexts, such as for biometric security, tailored marketing, and social networking, but raises privacy concerns for many users.[36] The process seeks to provide privacy protections for consumers while avoiding government action that might threaten innovation. The goal is to create the right balance where trust enables the emerging technologies to flourish.

Finally, commercial and private unmanned aircraft systems (UAS) can improve a wide range of services, from aerial mapping to pipeline inspection to package delivery. At the same time, however, the idea of widespread UAS flight raises privacy concerns for individuals, property owners, and businesses. Therefore, as directed by President Obama, the Department convened another multistakeholder process in which a diverse group of stakeholders worked to help build trust by developing best practices regarding privacy, transparency, and accountability in commercial and private UAS use.[37] After 10 months of work, participants finalized a best practices document aimed at building consumer trust, giving users the tools to innovate in this space in a manner that respects privacy, and providing accountability and transparency.[38]

INTERNATIONAL ENGAGEMENT ON CONSUMER PRIVACY

Divergent cross-border privacy principles and regulations create challenges to electronic commerce because they confuse consumers, raise barriers to cross-border data flows, and generate significant

[35] *See* NTIA, *Privacy Multistakeholder Process: Mobile Application Transparency* (Nov. 12, 2013), *available at* https://www.ntia.doc.gov/other-publication/2013/privacy-multistakeholder-process-mobile-application-transparency.

[36] *See* NTIA, *Privacy Multistakeholder Process: Facial Recognition Technology* (Mar. 28, 2016), *available at* https://www.ntia.doc.gov/other-publication/2016/privacy-multistakeholder-process-facial-recognition-technology.

[37] *See* The White House, *Presidential Memorandum: Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems* (Feb. 15, 2015), *available at* https://www.whitehouse.gov/the-press-office/2015/02/15/presidential-memorandum-promoting-economic-competitiveness-while-safegua. *See also* NTIA, *Multistakeholder Process: Unmanned Aircraft Systems* (Apr. 4, 2016), *available at* https://www.ntia.doc.gov/other-publication/2016/multistakeholder-process-unmanned-aircraft-systems.

[38] See NTIA, *Voluntary Best Practices for UAS Privacy, Transparency, and Accountability* (May 18, 2016), available at https://www.ntia.doc.gov/files/ntia/publications/voluntary_best_practices_for_uas_privacy_transparency_and_accountability_0.pdf

compliance costs for companies. A greater degree of consistency in global approaches to data privacy should foster international trade and investment, improve the efficiency of businesses' global operations, and strengthen consumer trust in cross-border transactions.

SAFE HARBOR FRAMEWORKS

The Safe Harbor Frameworks that the United States developed with the European Union and Switzerland are early examples of global interoperability that have had a meaningful impact on transatlantic data flows. The Commerce Department, in consultation with the European Commission and the Federal Information and Data Protection Commissioner of Switzerland, developed these frameworks.

The U.S.-EU Safe Harbor Framework and the U.S.-Swiss Safe Harbor Framework, which became operational in 2000 and 2009 respectively, were developed to accomplish the objectives of protecting personal information, while also ensuring that companies could transfer such information in a way that did not disrupt their global business operations.[39] These frameworks enabled more than 5,000 companies to make voluntary but enforceable self-certifications to the Department that they comply with privacy policies consistent with relevant EU and Swiss data protection requirements. Given that more than half of Safe Harbor participants were Small and Medium Enterprises (SMEs), the program helped raise privacy awareness among smaller enterprises that might not have otherwise been as actively engaged in protecting privacy in their daily business operations.

EU-U.S. PRIVACY SHIELD

After more than two years of intensive consultations with the European Commission, the Department reached an agreement with the Commission on a new EU-U.S. Privacy Shield Framework to replace the U.S.-EU Safe Harbor Framework.[40] The EU-U.S. Privacy Shield is a significant accomplishment for privacy, individuals, and businesses on both sides of the Atlantic. Underpinning hundreds of billions in transatlantic digital services trade, the modernized framework will yield significant benefits for both individuals and businesses by providing meaningful privacy

[39] *See* Welcome to the U.S.-Swiss Safe Harbor, http://www.export.gov/safeharbor/swiss/index.asp (last visited May 20, 2016); U.S.-E.U. Safe Harbor Overview, http://www.export.gov/safeharbor/eu/eg_main_018362.asp (last visited May 20, 2016).

[40] *See* U.S. Department of Commerce, *Statement from U.S. Secretary of Commerce Penny Pritzker on EU-U.S. Privacy Shield* (Feb. 2, 2016, 2:35 PM) https://www.commerce.gov/news/press-releases/2016/02/statement-us-secretary-commerce-penny-pritzker-eu-us-privacy-shield. *See also* U.S. Department of Commerce, *EU-U.S. Privacy Shield Fact Sheet* (Feb. 2, 2016, 6:30 PM), https://www.commerce.gov/news/fact-sheets/2016/02/eu-us-privacy-shield; 2000/520/EC: COMMISSION DECISION of 26 July 2000 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the safe harbour privacy principles and related frequently asked questions issued by the US Department of Commerce, Official Journal of the European Communities, (July 26, 2000), *available at* http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32000D0520&from=en. Following the release in November 2013 of the European Commission's report on the U.S.-EU Safe Harbor Framework, the Commerce Department initiated consultations with the Commission to address the Commission's 13 recommendations to strengthen the Safe Harbor program. The Department worked extensively throughout the consultations across the U.S. government with the business community to obtain relevant insight and support. Even greater urgency was injected into consultations by the European Court of Justice's judgment in October 2015, declaring as invalid the European Commission's July 2000 decision, which had recognized adherence to the provisions of U.S.-EU Safe Harbor Framework by participating U.S. companies as ensuring adequate data protection for personal data transferred from the EU to the United States.

safeguards and greater certainty.[41] The transparent, robust, and enforceable data protection demanded by the Privacy Shield aligns with individual expectations and business realities in today's digital economy. The Privacy Shield supports shared privacy principles, bridging the differences in legal approaches, while furthering trade and economic objectives of both Europe and the United States.

The Department will continue to lead U.S. Government efforts to finalize and implement the EU-U.S. Privacy Shield Framework. The European Commission is working to complete a formal process, which includes review by EU data protection authorities and consideration by Member States, to approve the Privacy Shield Framework as a mechanism to transfer personal data from the EU to the United States. The Department, with ITA in the lead, will then administer the program and engage the private sector on the implementation of the Framework, to ensure individuals and businesses receive its important benefits and to foster the transatlantic exchange of information that drives the global digital economy.

APEC CROSS BORDER PRIVACY RULES

In order to help achieve consistency of privacy rules globally, the Commerce Department helped lead an initiative of the Asia-Pacific Economic Cooperation (APEC) to facilitate transnational mutual recognition of company privacy practices. APEC developed a voluntary, enforceable system, known as the Cross Border Privacy Rules (CBPR) System, to promote mutually recognized data privacy practices for companies doing business in participating APEC economies.[42] This system, which is effectively an enforceable code of conduct based on the APEC Privacy Principles, aims to streamline the data privacy policies and practices of companies operating throughout the vast APEC region.[43] The CBPR System requires participants to demonstrate that they comply with CBPR program requirements based on the APEC Privacy Framework. Moreover, the commitments an applicant makes during this process, while voluntary, must be enforceable under laws in participating economies. Successful CBPR certification entitles participating companies to represent to consumers that they are accountable, and that they meet stringent and globally recognized standards, thereby facilitating the transfer of personal data throughout the APEC region.[44]

The Commerce Department, along with the FTC, was instrumental in the development of the CBPR System, and leads U.S. Government efforts to implement it. The goal of the system is to facilitate trade and strengthen consumer privacy protections across the Asia Pacific region, where

[41] *See* Joshua P. Meltzer, The Brookings Institution, *The Importance of the Internet and Transatlantic Data Flow for U.S. and EU Trade and Investment* (Oct. 2014), *available at* http://www.brookings.edu/~/media/research/files/papers/2014/10/internet-transatlantic-data-flows-meltzer/internet-transatlantic-data-flows-version-2.pdf.

[42] For an overview of the APEC CBPR System, *see* About the APEC CBPR System, http://www.cbprs.org/GeneralPages/About.aspx (last visited May 12, 2016). To view documents (e.g., policies, rules, and guidelines) relating to the CBPR system, *see* APEC CBPR System Documents, http://www.cbprs.org/GeneralPages/APECCBPRSystemDocuments.aspx (last visited May 12, 2016).

[43] The APEC member economies are Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; The Philippines; Russia; Singapore; Republic of Korea; Chinese Taipei; Thailand; the United States of America; and Vietnam. *See* APEC Member Economies, http://www.apec.org/about-us/about-apec/member-economies.aspx (last visited May 12, 2016).

[44] There are currently 14 participating companies, including Apple, Hewlett Packard, and IBM. *See* Cross Border Privacy Rules System, http://www.cbprs.org/ (follow "APEC CBPR Compliance Directory") (last visited May 12, 2016).

the 21 member economies of APEC comprise a market of 2.7 billion consumers and account for 55 percent of world real gross domestic product, as well as 44 percent of world trade. The Department continues to actively encourage companies and additional APEC economies to join the CBPR System.[45]

PRIVACY RECOGNITION FOR PROCESSORS SYSTEM

The Department also worked with a team of experts from across APEC economies to create the Privacy Recognition for Processors (PRP) System to expand the benefits of the digital value chain to data processors in the APEC region.[46] The PRP System is designed to complement the CBPR System.[47] It helps controllers identify trusted processors and enables processors to demonstrate their ability to comply with a controller's requirements.[48]

APEC-EU

In 2012, the APEC Data Privacy Subgroup and European Union Article 29 Working Party, which is made up of representatives from data protection authorities from EU member states, created the EU/APEC BCR-CBPR Joint Working Team to explore the interoperability of the EU System of Binding Corporate Rules (BCRs) and the APEC CBPR System. The Commerce Department, working together with the French Data Protection Authority (DPA), led work to develop "the Referential," released in 2014, which maps the requirements of the BCR and CBPR systems.[49] The Referential identified common and divergent requirements under the two systems to inform companies seeking to develop policies and practices in compliance with both systems. groups

As companies began using the Referential and considered pursuing approval or certification under both systems, they suggested that the Joint Working Team develop additional products. The Department is now leading the Joint Working Team's effort to develop a common application form, which could be completed by companies and other organizations and submitted to both

[45] There are currently four participating APEC CBPR System economies: the United States, Mexico, Japan, and Canada, with more expected to join soon. About the APEC CBPR System, http://www.cbprs.org/GeneralPages/About.aspx (last visited May 12, 2016).

[46] To view an overview of the APEC PRP, *see* About the APEC CBPR System, http://www.cbprs.org/GeneralPages/APECCBPRSystemDocuments.aspx (last visited May 12, 2016). To view APEC PRP policies, rules, and guidelines, *see APEC Privacy Recognition for Processors System Policies, Rules, and Guidelines*, *available at* http://www.apec.org/_/media/Files/Groups/ECSG/2015/APEC%20PRP%20Rules%20and%20Guidelines.pdf.

[47] The PRP system was endorsed by APEC in 2015. *See* Electronic Commerce Steering Group, http://www.apec.org/groups/committee-on-trade-and-investment/electronic-commerce-steering-group.aspx (last visited May 12, 2016).

[48] *See* Glossary for the APEC CBPR System, http://www.cbprs.org/GeneralPages/Glossary.aspx (last visited May 12, 2016). The term "personal information controller" refers to: A person or organization who controls the collection, holding, processing or use of Personal Information. It includes a person or organization who instructs another person or organization to collect, hold, process, use, transfer or disclose Personal Information on his or her behalf, but excludes a person or organisation that performs such functions as instructed by another person or organisation. It also excludes an individual who collects, holds, processes or uses Personal Information in connection with the individual's personal, family or household affairs. The term "personal information processor" refers to "An organisation that, at the instruction of a Personal Information Controller, collects, holds, processes, uses, transfers or discloses Personal Information on the controller's behalf."

[49] APEC, *Referential BCR CBPR Requirements* (Mar. 7, 2014), *available at* http://www.apec.org/_/media/files/groups/ecsg/20140307_referential-bcr-cbpr-reqs.pdf.

national DPAs in the EU and APEC Accountability Agents to facilitate double certification.[50] The goal is to reduce the administrative burden that companies face in pursuing approvals under both the EU's and APEC's data protection systems. This work has received significant interest from industry and regulators due to its potential to serve as a bridge between the privacy frameworks in the two regions.[51]

SUPPORTING SECURITY IN THE DIGITAL ECONOMY

The digital ecosystem can present challenges to security and the trust of consumers online. Over the past seven years, cybersecurity threats have expanded and diversified. In response, the Department of Commerce has worked to enhance the security and resilience of the digital ecosystem in order to maintain a digital environment that encourages efficiency, innovation, and economic prosperity, while also promoting security, consumer trust, business confidentiality, privacy, and civil liberties.

Within the Department, the National Institute of Standards and Technology (NIST) researches, develops, and deploys information security standards and technology to protect information systems and services. NIST accomplishes this mission through internal research and collaborative partnerships with a wide range of domestic and foreign stakeholders. Over the course of the Obama Administration, the NIST cybersecurity portfolio has expanded with new initiatives, including the National Strategy for Trusted Identities in Cyberspace and the National Cybersecurity Center of Excellence. New initiatives also emerged from the implementation of the Obama Administration's Executive Order 13636, Improving Critical Infrastructure Cybersecurity.

In addition, the National Telecommunications and Information Administration (NTIA) also advances a range of cybersecurity initiatives as part of its statutory mission to advance Internet policies that serve to protect, promote, and reinforce an open, innovative Internet ecosystem and digital economy. In particular, NTIA led the U.S. government's efforts to foster the adoption of the Domain Name System Security Extensions (DNSSEC), one of the most important cybersecurity technologies for the Internet's naming system, and has convened a series of multistakeholder meetings to address challenges surrounding the disclosure of software vulnerabilities.

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[50] The APEC-EU Working Group consists of interested APEC Economies and representatives from data protection authorities in the European Union Article 29 Working Party and from the European Commission. *See* Electronic Commerce Steering Group, http://www.apec.org/groups/committee-on-trade-and-investment/electronic-commerce-steering-group.aspx (last visited May 12, 2016).

[51] A common "Referential", which serves as an informal, pragmatic checklist of the respective requirements of the APEC CBPR system and EU BCRs, was released in 2014. *See* Article 29 Data Protection Working Party, *Opinion 02/2014 on a referential for requirements for Binding Corporate Rules submitted to national Data Protection Authorities in the EU and Cross Border Privacy Rules submitted to APEC CBPR Accountability Agents* (Feb. 27, 2014), *available at* http://ec.europa.eu/justice/data-protection/article-29/documentation/opinion-recommendation/files/2014/wp212_en.pdf. In 2015, both sides explored the possibility of further cooperation to foster interoperability. The EU agreed, in the short to medium term, to work with the APEC on a joint application form for the BCRs and CBPR System, and a mapping of policies, practices, tools that are to be submitted as part of applications under both systems. In the longer term, the EU agreed to work on a common referential for processor recognition, mapping the requirements of the BCRs for processors and the APEC PRP. A discussion was also held in 2015 with private sector stakeholders who provided views on the functionalities and important elements of a common questionnaire. *See* Electronic Commerce Steering Group, http://www.apec.org/groups/committee-on-trade-and-investment/electronic-commerce-steering-group.aspx (last visited May 12, 2016).

NATIONAL STRATEGY FOR TRUSTED IDENTITIES IN CYBERSPACE

The National Strategy for Trusted Identities in Cyberspace (NSTIC) is an initiative to address the inadequacy of passwords - one of the most commonly exploited vulnerabilities in cyberspace.[52] Under this initiative, NIST collaborates with the private sector to catalyze a marketplace for better identity and authentication mechanisms – an "Identity Ecosystem" – that raises the level of trust associated with the online identities of individuals, organizations, networks, services, and devices. As part of this effort, NIST funded 15 pilot programs to test new approaches to overcome barriers to identification and authentication in cyberspace, such as usability, privacy, and interoperability, which have hindered market acceptance and wider use of stronger authentication technologies.[53] NSTIC exemplifies NIST's robust collaboration with industry; the private sector is to lead implementation of the initiative. As part of the NSTIC, NIST partnered with the privately led Identity Ecosystem Steering Group to craft better standards and tools to improve authentication online.[54]

NATIONAL CYBERSECURITY CENTER OF EXCELLENCE

In 2012, NIST established the National Cybersecurity Center of Excellence (NCCoE) to bring together experts from industry, government, and academia to develop and disseminate practical cybersecurity standards, technologies, and best practices for the American business community.[55] The NCCoE is a unique partnership among three levels of government: NIST at the federal level, the State of Maryland, and Maryland's Montgomery County. In 2014, NCCoE established the first Federally Funded Research and Development Center dedicated to cybersecurity. The NCCoE responds to national priorities and critical security concerns that affect critical infrastructure, e-commerce, and privacy. NIST built partnerships with 23 industry organizations who have pledged to maintain a continuous presence at the center. More than 25 other technology companies are working on projects at the NCCoE under Cooperative Research and Development Agreements, including programs involving the health care, energy, financial services, and retail sectors, which address cross-cutting issues such as mobile device security, software asset management, cloud security, identity management, and secure email.[56]

FRAMEWORK FOR IMPROVING CRITICAL INFRASTRUCTURE CYBERSECURITY

In 2014, NIST issued the *Framework for Improving Critical Infrastructure Cybersecurity* (Framework) in accordance with Executive Order 13636.[57] The Framework, created through collaboration with industry, government, and academia, consists of international standards and

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[52] *See* National Strategy for Trusted Identities in Cyberspace, http://www.nist.gov/nstic/index.html (last visited May 12, 2016).

[53] *See* Catalyzing the Marketplace: NSTIC Pilot Programs, http://www.nist.gov/nstic/pilots.html (last visited May 12, 2016).

[54] *See* The Identity Ecosystem Steering Group, https://www.idesg.org/ (last visited May 12, 2016).

[55] See NIST National Cybersecurity Center of Excellence, https://nccoe.nist.gov/ (last visited May 12, 2016).

[56] For further information on these agreements, *see* NIST Technology Partnerships Office, http://www.nist.gov/tpo/collaborations/crada.cfm (last visited May 12, 2016).

[57] The White House, Office of the Press Secretary, *Executive Order -- Improving Critical Infrastructure Cybersecurity* (Feb. 12, 2013), *available at* https://www.whitehouse.gov/the-press-office/2013/02/12/executive-order-improving-critical-infrastructure-cybersecurity.

practices to promote cybersecurity risk management. Since its release, NIST has strengthened its collaborations with critical infrastructure owners and operators, industry leaders, government partners, and other stakeholders to raise awareness; encouraged use of the Framework by organizations supporting the critical infrastructure; and developed implementation guides and resources, all of which contribute to reducing cyber risks to U.S. critical infrastructure. And while the Framework was born through U.S. policy, it is not a "U.S. only" framework; many countries and international entities are adopting an approach that is compatible with the Framework.

In addition to the initiatives discussed above, NIST also supported cybersecurity research and standards for national priority issues such as the Department of Energy's "Smart Grid" initiative, where cybersecurity was identified as a priority area. To support this, NIST established the Smart Grid Interoperability Panel to work with stakeholders in specific areas, including cybersecurity, and also created a test-bed of interconnected and interacting labs that will perform research on smart grid system measurements, characterization of smart grid protocols, and validation of smart grid standards.[58]

MULTISTAKEHOLDER COLLABORATION ON VULNERABILITY RESEARCH DISCLOSURE

The Department utilizes the multistakeholder model of policymaking in a range of areas. In 2015, NTIA launched a multistakeholder process to foster collaboration between security researchers and software and system developers on the issue of vulnerability research disclosure. This is not a new question: all complex software products will have flaws, and how researchers should handle these vulnerabilities, and how software vendors should work with researchers, has been a matter of active debate. Researchers have expressed concerns that vendors do not respond in a timely fashion, leaving users at risk. Vendors worry about the time, expense, and added complexity of addressing vulnerabilities, as well as the risks introduced by potentially disclosing vulnerabilities before they can be patched or mitigated. These questions are more important as the digital economy develops and represents a greater share of the overall economy, with companies ranging from the retail to the automotive sector now finding themselves responsible for developing and maintaining software.

NTIA's goal in the vulnerability research disclosure multistakeholder process is "to bring together security researchers, software vendors, and those interested in a more secure digital ecosystem to create common principles and best practices around the disclosure of and response to new security vulnerability information."[59] The goal is not to dictate a single way that organizations and researchers must interact, but to establish a path to increased and more effective collaboration between the two. Stakeholders have identified several important issues, including how to foster awareness and adoption of existing best practices, and how to handle disclosure in safety-critical products and industries.

[58] *See* NIST Smart Grid Interoperability Panel (SGIP), http://www.nist.gov/smartgrid/sgipbuffer.cfm (last visited May 12, 2016).

[59] Angela Simpson, Deputy Assistant Secretary for Communications and Information, NTIA, *Enhancing the Digital Economy Through Collaboration on Vulnerability Research Disclosure* (July 9, 2015), http://www.ntia.doc.gov/blog/2015/enhancing-digital-economy-through-collaboration-vulnerability-research-disclosure.

INTERNET OF THINGS WORK STREAM

The Internet of Things (IoT) work stream is led by NTIA on behalf of the Department. IoT is the broad term that describes the connection of physical objects, infrastructure, and environments to various identifiers, sensors, networks, and/or computing capabilities. While potential health, safety, environmental, commercial, and other benefits of IoT are enormous, IoT also presents novel challenges to consumer privacy, cybersecurity, and government engagement. NTIA published a Request for Comment (RFC) in April 2016, with the goal of using stakeholder comments to write an agenda-setting and issue-spotting "green paper" for the Department of Commerce.[60] The RFC covers a range of subjects from privacy and cybersecurity to economic impact and proposed international engagement.

FACILITATING ENHANCED DNS SECURITY

In 2008, technical experts discovered an easily-exploitable security vulnerability in the protocol of the domain name system (DNS). NTIA and NIST worked together to address this issue in an effort to enhance the security and stability of the DNS. This multi-year effort included input from technical experts and the broader global multistakeholder community. In July 2010, a security technology – Domain Name System Security Extensions (DNSSEC) – was deployed at the authoritative root of the DNS to help protect Internet users against various types of cyber-attacks.[61] DNSSEC is a suite of specifications from Internet Engineering Task Force (IETF) that secure information provided by the Internet's domain name system. This effort marked the most significant technical change to the DNS since its inception and created a more secure user experience on the Internet.[62]

DNSSEC essentially gives a "tamper proof seal" to the address book of the Internet, and in so doing, gives Internet users greater confidence in their online experience. As a result, Internet users will have greater confidence that when they visit a particular website – whether it be their bank, retailer, or doctor – they are not seeing a spoofed copy that cybercriminals can use to perpetuate identity theft or other crimes using the DNS.

DNSSEC deployment at the authoritative root was an important step toward protecting the integrity of DNS data and mitigating attacks such as cache poisoning, which allows an attacker to redirect traffic to fraudulent sites, and other data modification threats. It was an important milestone in the ongoing effort to increase Internet security and build a safer online environment for users. The deployment of DNSSEC at the root is the linchpin to facilitating its deployment throughout the world and enabling the current domain name system to evolve into a significant new trust infrastructure for the Internet.

[60] *See* NTIA Internet of Things, http://www.ntia.doc.gov/category/internet-things (last visited May 12, 2016).

[61] *See* NTIA DNSSEC, https://www.ntia.doc.gov/category/dnssec (last visited May 12, 2016).

[62] ICANN, VeriSign, *Final Report on DNSSEC Deployment Testing and Evaluation in the Root Zone* (May 26, 2010), *available at* https://www.ntia.doc.gov/files/ntia/publications/dnssec_05282010_0.pdf.

III. INNOVATION AND EMERGING TECHNOLOGIES

The Department of Commerce works to enable innovators and entrepreneurs to test new ideas, take risks, find financing and customers, and ultimately thrive. Towards that end and with the understanding that innovators need and deserve to have their creations protected, the Department leads the U.S. government's efforts incentivize innovation, investment, and risk-taking by protecting intellectual property and by assisting with technological standardization.[63]

PROTECTING INTELLECTUAL PROPERTY FOR CREATORS, CONSUMERS, AND INNOVATORS

The U.S. intellectual property system works to ensure balanced and meaningful protection for intellectual property in the digital age. Patents promote investment and competition in high-speed networks and services, software, and Internet-related business methods. Trademarks, including within domain names, protect product identification and provide consumer information in a rapidly expanding electronic marketplace. Finally, the copyright system provides incentives for creators to produce and distribute their works. It also incorporates exceptions and limitations to accommodate appropriate uses of those works in a dynamic and rapidly evolving technological landscape.

COPYRIGHT

A healthy copyright system strikes an important balance between rights and exceptions to rights. This balance must be reviewed regularly to ensure that the system continues to function well as a foundation for America's creative culture and economy. During the course of the Administration, the Department of Commerce has undertaken significant work in this regard, as described below.

Green Paper on Copyright Policy, Creativity, and Innovation in the Digital Economy

The USPTO and NTIA, on behalf of the Internet Policy Task Force (IPTF), conducted a review of copyright law in the context of innovation and the Internet economy.[64] In July 2013, they published a *Green Paper on Copyright Policy, Creativity and Innovation in the Digital Economy* (Green Paper), the most comprehensive assessment of digital copyright policy issued by any

[63] These goals are in line with the OECD Internet Policymaking Principles #7, "Develop capacities to bring publically available, reliable data into the policymaking process," #11, "Promote creativity and innovation," and #14,"Give appropriate priority to enforcement efforts." *Id.* OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf

[64] *See* Internet Policy Task Force, https://www.ntia.doc.gov/category/internet-policy-task-force (last visited May 13, 2016).

administration since 1995.[65] The Green Paper underscored that effective and balanced copyright protection need not be antithetical to the free flow of information, nor does encouraging the free flow of information undermine copyright. It identified certain areas for further work, which subsequently launched three corresponding initiatives.

White Paper on Remixes, First Sale, and Statutory Damages

One of these initiatives focused on three important copyright policy issues and culminated, after extensive public consultation, in the January 2016 publication of the *White Paper on Remixes, First Sale, and Statutory Damages* (White Paper).[66] The White Paper summarizes stakeholder comments and testimony and sets forth conclusions and recommendations for lawmakers. The recommendations in the White Paper include: amending the Copyright Act to provide more guidance and greater flexibility to courts in awarding statutory damages for copyright infringement; making it easier for those looking to remix digital content into something new to understand when their use of protected works is fair, and to obtain licenses when appropriate; and the multistakeholder development of best practices designed to improve consumer understanding of online transaction terms governing the "purchases" of creative works. The White Paper was mindful of the need to protect copyrights effectively, while also promoting innovation on the Internet.

Multistakeholder Forum on the Operation of the DMCA Notice and Takedown System

The second initiative flowing from the Green Paper dealt with the establishment of a multistakeholder forum to improve the operation of the Digital Millennium Copyright Act's (DMCA) notice and takedown system.[67] The Department held meetings and workshops across the country, incorporating feedback from academics, legal professionals, content creators, producers, intermediaries, and consumer and public interest groups. This initiative resulted in the publication of a document entitled *DMCA Notice-and-Takedown Processes: List of Good, Bad and Situational Practices*.[68] This document aims to improve the efficiency of the handling and processing of DMCA copyright infringement notices by both senders and recipients.

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[65] U.S. Department of Commerce Internet Policy Task Force, *Copyright Policy, Creativity, and Innovation in the Digital Economy* (July 2013) (Green Paper), *available at* http://www.uspto.gov/sites/default/files/news/publications/copyrightgreenpaper.pdf.

[66] U.S. Department of Commerce Internet Policy Task Force, *White Paper on Remixes, First Sale, and Statutory Damages* (Jan. 2016) (White Paper), *available at* http://www.uspto.gov/sites/default/files/documents/copyrightwhitepaper.pdf. "Remixes" are described in the Green Paper as "works created through changing and combining existing works to produce something new and creative—as part of a trend of user generated content (UGC) that has become a hallmark of the Internet." *Id.* at 6.

[67] The DMCA's notice and takedown system provides copyright owners with a process for requesting that Internet intermediaries take down content posted by a third party that infringes the copyright owner's rights. Provided that the intermediary adheres to the process outline in law, it is shielded from financial liability from the copyright owner. *See* 17 U.S.C. § 512.

[68] U.S. Department of Commerce DMCA Multistakeholder Forum, *DMCA Notice-and-Takedown Processes: List of Good, Bad, and Situational Practices* (Apr. 7, 2015), *available at* http://www.uspto.gov/sites/default/files/documents/DMCA_Good_Bad_and_Situational_Practices_Document-FINAL.pdf.

Online Licensing Environment

The third initiative involved determining an appropriate role for the government in facilitating the further development of the online marketplace for licensing of copyrighted works. In April 2015, USPTO convened a day-long public roundtable.[69] Based on the input received, current work is focusing on the development and use of standard identifiers (such as the International Standard Book Number (ISBN) for books and the International Standard Recording Code (ISRC) for sound recordings) for all types of works of authorship, interoperability among databases and systems used to identify owners of rights and terms of use, and a possible portal for linking to such databases and to licensing platforms.[70] This work is expected to continue through 2016.

DMCA Section 1201 Rulemaking

Every three years, NTIA fulfills its statutory obligation to share its views with the United States Copyright Office regarding proposed exemptions from the DMCA's prohibition against circumventing technologies that control access to copyrighted works.[71] These exemptions are vital to enabling innovation and free expression in the digital age. Granted exemptions have, for example, helped students learn by making fair use of clips from movies, made e-books accessible to the print-disabled, and allowed changing the settings on mobile phones so that they can be used with different wireless carriers. During rulemakings in 2009, 2012, and 2015, NTIA provided extensive input in this process, grounded in a belief that the potential of information technology is maximized in part when the legal environment simultaneously protects intellectual property rights, facilitates a competitive marketplace, and enables all Americans to exercise their right to make non-infringing use of lawfully obtained works.

PATENTS

Over the course of the Obama Administration, the USPTO has contributed to the development of the digital economy by working to promote more efficient patent systems around the world, including by working with other intellectual property offices to develop common rules and practices, achieving efficiencies through cooperative work sharing programs, and conducting training programs to promote rules that foster innovation and investment in the digital economy.

Requirements for patent protection across the world, while similar, are not fully aligned. As a result, international applicants must revise their applications for each patent office to meet laws and procedures in that jurisdiction, leading to decreased certainty and increased costs that may limit product expansion into new markets. The USPTO therefore has worked with other

[69] Public Meeting on Facilitating the Development of the Online Licensing Environment for Copyrighted Works, 80 Fed. Reg. 13325 (Mar. 13, 2015), *available at* https://www.gpo.gov/fdsys/pkg/FR-2015-03-13/pdf/2015-05765.pdf.

[70] U.S. Patent and Trademark Office, *Facilitating the Development of the Online Licensing Environment for Copyrighted Works* (Apr. 1, 2015), *available at* http://www.uspto.gov/learning-and-resources/ip-policy/copyright/facilitating-development-online-licensing-environment.

[71] 17 U.S.C.§ 1201(a),(c).

Intellectual Property offices around the world to simplify the patent application process, lower costs, and improve access to technology.[72]

The Obama Administration has improved the protection and enforcement of patents domestically as well, and these improvements benefit all fields of technology, including those related to the digital economy.

America Invents Act

On September 16, 2011, President Barack Obama signed the Leahy-Smith America Invents Act (AIA), the most significant reform to the U.S. patent system in 60 years. The USPTO has fully implemented the AIA provisions designed to spur innovation and economic growth by streamlining the patent application process and enhancing patent quality. The USPTO successfully implemented the AIA provisions, established the required programs, and carried out the required studies. These were done with transparency and significant stakeholder and public involvement, and as demonstrated, for example, through the successful:

- Transition to First Inventor to File in the United States;
- Establishment of a new process for a third-party to challenge the patentability of granted patents outside the federal court system;
- Creation of a prioritized examination mechanism for inventors to have their patent applications examined in one-third the average time; and
- Setting of a new patent fee schedule and Fee Reserve Fund.[73]

The AIA promotes a system of clearer and more enforceable patent rights by adopting a common standard for determining rights to a patent. By transitioning to a simpler, more objective, and more transparent system for determining rights to a patent, the AIA helps ensure that independent inventors and small entities are able to navigate the patent system on a more equitable footing with larger enterprises.

Patent Trial and Appeal Board (PTAB) and Post-Grant Trial Proceedings

The AIA established a new process before the USPTO's Patent Trial and Appeal Board (PTAB) for a third-party to challenge the patentability of granted patents outside the federal court system.[74] These post-grant proceedings were designed to be a faster and less expensive alternative

[72] For example, USPTO has collaborated with Group B+ to develop a paper that memorializes principles and objectives for globally harmonized patent laws, which was formally agreed to an October 2015 meeting of the group. With this document as a foundation, the USPTO and its partner offices have engaged in studies and consultations with industry representatives to determine best practices for a modern patent system. "Group B+" is made up of the United States, the contracting states of the European Patent Convention, Canada, Australia, New Zealand, Japan, Korea, Singapore, the European Commission, and the European Patent Office. The membership is generally based on the membership of the WIPO "Group B" industrialized countries, hence the name. The "+" signifies that some members are not members of WIPO Group B. *See* B+ Sub-Group, *Objectives and Principles, With Commentary on Potential Outcomes* (May 27, 2015), *available at* http://documents.epo.org/projects/babylon/eponet.nsf/0/A3EB2FE2F8A5AD71C1257E6D0057194A/$File/b+_sub-group_objectives_and_principleswith_commentary_may_2015_en.pdf.

[73] USPTO Study and Report on the Implementation of the Leahy-Smith America Invents Act (September, 2015) *available at*: http://www.uspto.gov/sites/default/files/documents/Report_on_Implementation_of_the_AIA_September2015.pdf.

[74] *Id.* pp. 33-37.

to district court litigation for resolving patentability. The PTAB has done admirable work in developing, implementing and administering the post-grant review proceedings intended by Congress to provide faster, lower-cost alternatives to district court litigation in challenging the validity of issued patents. The PTAB judges base all of their decisions solely upon the facts and law as it applies to each particular case.

Based on the number of filings, the PTAB review proceedings have proved popular. To date, almost 5,000 AIA petitions have been filed and that number is more than three times what was anticipated. Despite this higher than expected number, the PTAB has complied with all of the strict statutory deadlines. Further, the great majority of PTAB final rulings have been affirmed by the Court of Appeals for the Federal Circuit. For the first time, the AIA provided the USPTO with the authority to set all its fees to recover the aggregate costs of the services it provides, and to access all the fees it collects.

Patent Quality

Improving patent quality has been a top priority for the USPTO. To ensure that high-quality patents are issued, the USPTO established the Enhanced Patent Quality Initiative (EPQI) to strengthen its work products, processes, services and the measurement of patent quality at all stages of the patent process.[75] The USPTO established a division to focus exclusively on patent quality, headed by the first Deputy Commissioner for Patent Quality in the agency's history.

In addition, the USPTO held an all-day Patent Quality Community Symposium on April 27, 2016, bringing together a broad range of stakeholders – patent prosecutors, litigators, inventors, academics, and patent examiners – for a public discussion about patent quality.[76] More than 2,200 individuals attended, including in-person at USPTO headquarters in Alexandria, Virginia, at the USPTO Regional Offices (in Detroit, Denver, Dallas, and San Jose), and online. The USPTO will continue outreach efforts and seek stakeholders' input and comments on these initiatives and any other patent quality-related issues.

TRADE SECRETS

President Obama signed the Defend Trade Secrets Act (DTSA) on May 11, 2016.[77] The DTSA provides a federal private right of action for the misappropriation of trade secrets and provides businesses with a more uniform, reliable, and predictable way to protect their valuable trade secrets. The Administration has placed high priority on mitigating and combating the theft of trade secrets, as exemplified in the Administration's Joint Strategic Plan on Intellectual Property

[75] USPTO, Enhanced Patent Quality Initiative, *available at:* http://www.uspto.gov/patent/initiatives/enhanced-patent-quality-initiative-0.

[76] USTPO, Enhanced Patent Quality Initiative event materials and presentations, *available at*: http://www.uspto.gov/patent/initiatives/enhanced-patent-quality-initiative-event-materials-and-presentations.

[77] Remarks by the President at Signing of S. 1890 - Defend Trade Secrets Act of 2016 (May 11, 2016), *available at*: https://www.whitehouse.gov/the-press-office/2016/05/11/remarks-president-signing-s-1890-defend-trade-secrets-act-2016.

Enforcement[78], the Administration's Strategy on Mitigating the Theft of U.S. Trade Secrets[79], and Executive Order 13694[80] authorizing sanctions on those who perpetrate cyber-enabled trade secret theft.

Prior to the DTSA, companies were previously only able to bring civil actions for trade secret protection in state court under various state laws. Under the new law, trade secret owners can pursue claims in federal court. The DTSA also provides for remedies including injunctive relief and damages for actual loss, unjust enrichment and a reasonable royalty amount. The USPTO provided technical advice during the development of the legislation, and the Department played a critical role in preparing the Statement of Administration Policy that was issued in connection with the legislation.

TRADEMARKS

The ongoing growth of the Internet has exacerbated the problem faced by trademark owners of what is known as "trademark registry squatting" or bad faith filings in trademark offices. Because business is online and global, opportunists are racing to foreign trademark offices to register brands before the true owner begins exporting and seeks protection in overseas markets. To respond, the USPTO advanced an international dialogue with the "TM5," a forum that brings together the world's five largest trademark offices to promote cooperation and collaboration on this issue.[81] Since 2010, the TM5 has held four seminars to discuss best practices and to highlight the tools needed to combat this growing practice, which inhibits businesses' expansion into new global markets. In addition, the USPTO has trained trademark offices around the world on ways to prevent and address this behavior.

DOMAIN NAMES

As explained above, the U.S. Government engages on issues related to domain names, including intellectual property issues, through its participation in the Internet Corporation for Assigned Names and Numbers (ICANN).[82] The USPTO has played an active role in responding to intellectual property issues related to the expansion of generic Top Level Domains (gTLDs) through

[78] U.S. Intellectual Property Rights Enforcement Coordinator, "2013 Joint Strategic Plan on Intellectual Property Enforcement," (June, 2013), *available at* https://www.whitehouse.gov/sites/default/files/omb/IPEC/2013-us-ipec-joint-strategic-plan.pdf.

[79] *See*, "Administration Strategy on Mitigating the Theft of U.S. Trade Secrets," February 2013), available at: https://www.whitehouse.gov/sites/default/files/omb/IPEC/admin_strategy_on_mitigating_the_theft_of_u.s._trade_secrets.pdf.

[80] See Statement by the President on Executive Order "Blocking the Property of Certain Persons Engaging in Significant Malicious Cyber-Enabled Activities (April 2, 2016), available at https://www.whitehouse.gov/the-press-office/2015/04/02/statement-president-executive-order-blocking-property-certain-persons-en.

[81] The TM5 partners are the USPTO, the State Administration for Industry and Commerce of the People's Republic of China (SAIC), the Office for Harmonization in the Internal Market of the European Union (OHIM), the Japan Patent Office (JPO), and the Korean Intellectual Property Office (KIPO). *See* USPTO Office of Policy and International Affairs: TM5, http://www.uspto.gov/learning-and-resources/ip-policy/office-policy-and-international-affairs-tm5 (last visited May 13, 2016).

[82] *See infra* discussion on Privatizing The Management Of The Domain Name System, p. 27. ICANN is the organization that coordinates and manages policy for the global domain name system. *See* ICANN, https://www.icann.org/ (last visited May 13, 2016). As described below, the Department engages actively with ICANN on a number of issues.

ICANN's new gTLD Program, including developing a strategy to respond to brand owner requests for effective and inexpensive rights protection mechanisms (RPMs).[83]

The Department, working through an NTIA-led U.S. Government interagency working group on domain name related issues, has coordinated with stakeholders to: (1) support U.S. intellectual property owners' efforts within ICANN, resulting in a tool kit of RPMs to respond to intellectual property infringement, along with a built-in review mechanism; (2) contain efforts by some governments to claim sovereignty over geographic names and to create special enforcement mechanisms for them; and (3) develop safeguard language requiring registry operators to mitigate fraud and abuse in domain name registrations, including those relating to counterfeiting and piracy. This language was ultimately adopted by the ICANN Board.

Finally, in 2014, USPTO and NTIA collaborated to develop a narrowly tailored policy regarding the registration of trademarks for established brand owners who have already been awarded the TLD Registry operator contract. In this way, brand owners interested in offering their goods and services in a controlled TLD could ensure protection for their brands, but would not be able to use their trademark registration as leverage in the ICANN application process or to otherwise create an ownership interest in the TLD registry, apart from their trademark rights.

KEEPING RIGHTS MEANINGFUL THROUGH TRAINING AND ADVOCACY

The USPTO actively engages in training programs around the world aimed at ensuring that intellectual property rights remain meaningful in the online environment. In particular, USPTO worked closely with governments and other stakeholders to provide technical assistance to address the challenging problems of enforcing intellectual property rights on the Internet.

Through its Intellectual Property Attaché Program, USPTO has worked to improve the intellectual property systems of U.S. trading partners for the benefit of U.S stakeholders. Based in 10 cities around the world, Intellectual Property Attachés work to support intellectual property in the digital economy by, among other things, advocating for Internet-related U.S. intellectual property policy interests and initiatives; assisting U.S. business with obtaining, enforcing, and licensing intellectual property rights in the online environment; and conducting training activities with host governments.[84]

The USPTO's Global Intellectual Property Academy (GIPA) offers programs on a full range of intellectual property topics including the protection of patents, trade secrets, trademarks, and

[83] *See* New Generic Top-Level Domains, Glossary: Terms Applicable to the Application Process, https://archive.icann.org/en/topics/new-gtlds/glossary-30aug11-en.pdf (last visited May 13, 2016). Top-Level Domains (TLDs) are the names at the top of the DNS naming hierarchy. They appear in domain names as the string of letters following the last dot, such as "NET" in www.example.net. The TLD administrator controls what second-level names are recognized in that TLD. The administrators of the root domain or root zone control what TLDs are recognized by the DNS.

[84] USPTO IP Attachés are based (or about to be based) in Rio de Janeiro and Lima (covering South America); Moscow and Kyiv (covering CIS region); New Delhi (covering South Asia); Beijing, Guangzhou, and Shanghai (covering China); Mexico City (covering Central America and the Caribbean); Bangkok (covering Southeast Asia); Kuwait City (covering the Middle East and North Africa); Brussels (covering the EU and its Member States); and Geneva (U.S. Mission to the WTO and U.S. Mission to the U.N.). *See* USPTO Intellectual Property Attaché Program, http://www.uspto.gov/learning-and-resources/ip-policy/intellectual-property-rights-ipr-attach-program/intellectual (last visited May 13, 2016).

copyright.[85] The programs are offered in the United States, abroad, and over the Internet through webcasts and e-learning initiatives in several languages. Training for foreign government officials and for U.S. small to medium sized enterprises is a high priority for GIPA. Over the last ten years, GIPA training programs have increasingly focused on intellectual property issues in the digital economy.

The USPTO has also been actively involved in efforts to foster voluntarily developed codes of conduct for improving online enforcement. In particular, the Office of the U.S. Intellectual Property Enforcement Coordinator's 2013 *Joint Strategic Plan for Intellectual Property Enforcement* provided that "[a]s part of the effort to determine whether voluntary initiatives have had a positive impact on reducing infringement, USPTO will solicit input from the public and other parts of the U.S. Government and will initiate a process to assess the effectiveness of voluntary initiatives."[86] USPTO has received input and is currently considering strategies for evaluating the effectiveness of voluntary initiatives.

FACILITATING OPEN DATA AND TECHNOLOGY STANDARDS FOR INTEROPERABILITY

Data powers economic activity and growth. As noted in the 2013 Executive Order *Making Open and Machine Readable the New Default for Government Information*:

> Decades ago, the U.S. Government made both weather data and the Global Positioning System freely available. Since that time, American entrepreneurs and innovators have utilized these resources to create navigation systems, weather newscasts and warning systems, location-based applications, precision farming tools, and much more, improving Americans' lives in countless ways and leading to economic growth and job creation.[87]

The Department of Commerce is both an advocate of American businesses and a data provider. The Department assumed a prominent role in the government-wide effort to manage federal government data as an asset, with the aim to "increase operational efficiencies, reduce costs, improve services, support mission needs, safeguard personal information, and increase public access to valuable government information."[88]

[85] USPTO Global Intellectual Property Academy, http://www.uspto.gov/learning-and-resources/global-intellectual-property-academy (last visited May 13, 2016).

[86] U.S. Intellectual Property Enforcement Coordinator, *2013 Joint Strategic Plan on Intellectual Property Enforcement* (June 2013), *available at* https://www.whitehouse.gov/sites/default/files/omb/IPEC/2013-us-ipec-joint-strategic-plan.pdf.

[87] Exec. Order No. 13642, 78 Fed. Reg. 28111 (May 9, 2013), *available at* https://www.gpo.gov/fdsys/pkg/FR-2013-05-14/pdf/2013-11533.pdf.

[88] Executive Office of the President Office of Management and Budget, Memorandum for the Heads of Executive Departments, *Open Data Policy-Managing Information as an Asset* (May 9, 2013), *available at* https://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf (Open Data Memorandum).

At the same time, the Obama Administration recognized the value to the government of using voluntary consensus standards.[89] Voluntary consensus standards have many benefits, for example, eliminating the cost to the federal government of developing its own standards; providing incentives and opportunities to establish standards that serve national needs; encouraging long-term growth for U.S. enterprises; and promoting efficiency, economic competition, and trade. Importantly, they ensure stakeholder buy-in and technical quality.

The Department's open data efforts are built upon a foundation established by international agreements, Obama Administration policies, and a long history of enabling economic activity by providing data to the public.

OPEN DATA

Obama Administration policies that have guided the Department's Open Data efforts have been stated in various memoranda and orders.[90] In 2013, data became one of the five priority areas of the Department's *Open for Business* strategic plan, with the goal of maximizing the positive impacts of the Department's data on society.[91] The Department produces vast quantities of data – economic and demographic data; technical standards; patent and trademark data; and climate, weather, and fisheries data.[92] Making such data resources easy to find, accessible, and usable is difficult due to the sheer volume and diversity of the data produced. However, advancements in big data techniques, as well as increasing collaboration in data initiatives across the Department, are leading to improvements in open data at the Department. Examples include:

Commerce Data Advisory Council

This Federal Advisory Committee was established in 2014 to provide guidance for the Department in areas such as data management practices; common, open data standards; policy issues related to privacy, latency, and consistency; effective models for public-private partnership; external uses of Commerce data; and, methods to build new feedback loops between the Department and data users.[93]

Commerce Data Service

The Commerce Data Service, created in November 2015, will develop cutting-edge software products and web services to improve access to and use of data resources of the Department's

[89] Executive Office of the President, Office of Management and Budget, *OMB Circular A-119: Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities* (Jan. 27, 2016), *available at* https://www.whitehouse.gov/sites/default/files/omb/inforeg/revised_circular_a-119_as_of_1_22.pdf.

[90] *See, e.g.*, The White House, Memorandum for the Heads of Executive Departments and Agencies, *Transparency and Open Government* (Jan. 21, 2009), *available at* https://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment; Open Data Memorandum.

[91] U.S. Department of Commerce, Office of Public Affairs, *The 'Open for Business' Agenda* (Nov. 14, 2013, 11:45 AM), https://www.commerce.gov/news/secretary-speeches/2013/11/open-business-agenda.

[92] "On any given day, the Department will generate in excess of 20 terabytes of data, and sometimes much more." *See* Mark Doms, Under Secretary for Economic Affairs, *Big Data is Big Business for Commerce* (Apr. 8, 2014, 6:15 PM), https://www.commerce.gov/news/blog/2014/04/big-data-big-business-commerce.

[93] U.S. Department of Commerce Economic and Statistics Administration Commerce Data Advisory Council, http://www.esa.doc.gov/content/commerce-data-advisory-council-cdac (last visited May 13, 2016).

12 bureaus.[94] Activities will include developing user interfaces to make navigating online resources and databases easier, creating tools to enhance data sharing and dissemination, and maximizing the value of Commerce data through collaborations across federal agencies and with public and private sector partners.[95]

Commerce Data Usability Project

One such public-private partnership is the Commerce Data Usability Project, created in January 2016, to focus on the usability of data products at the Department.[96] It does this by illustrating robust uses of the Department's data assets, and making basic code available to help data scientists get started on new innovative projects. To illustrate the utility of the data, the Commerce Data Service is working with internal staff of the Department (e.g., our technologists and scientists) and external collaborators (e.g., companies and academia) to create tutorials and user stories, focused on high-value datasets from NOAA, Census, USPTO, and BEA.

In addition to the Department-wide activities, the diverse bureaus of the Department have undertaken numerous data initiatives to advance their individual missions. Highlights include:

NOAA's Big Data Project

Five data alliances between NOAA and private sector companies (Amazon Web Services, Google Cloud Platform, IBM, Microsoft Corp., and the Open Cloud Consortium) will create open platforms where private industry, academia, and individual innovators can access NOAA data through the cloud on a completely new scale.[97]

NIST Public Access Plan

NIST developed a NIST Public Access Plan to increase access to the results of federally funded research, in response to an Administration memorandum[98]. NIST created a new role of Open Access Officer to assist in the implementation of its plan, which was approved by the White House in December 2014. New data management plan requirements took effect in October, 2015, and NIST has made foundational improvements to its data infrastructure to enable staff to store,

[94] Press Release, U.S. Department of Commerce Office of Public Affairs, *U.S. Secretary of Commerce Penny Pritzker Announces First-Ever Commerce Data Service* (Nov. 9, 2015), *available at* https://www.commerce.gov/news/press-releases/2015/11/us-secretary-commerce-penny-pritzker-announces-first-ever-commerce-data.

[95] U.S. Department of Commerce Data Service, https://www.commerce.gov/dataservice/ (last visited May 13, 2016).

[96] *See* Jeffrey Chen, Tyrone Grandison, and Kristen Honey, The White House, *Moving from Open Data to Open Knowledge: Announcing the Commerce Data Usability Project* (Jan. 29, 2016, 9:59 PM), https://www.whitehouse.gov/blog/2016/01/29/moving-open-data-open-knowledge-announcing-commerce-data-usability-project; Commerce Data Usability Project, https://www.commerce.gov/datausability/ (last visited May 13, 2016).

[97] *See* Press Release, U.S. Department of Commerce Office of Public Affairs, *U.S. Secretary of Commerce Penny Pritzker Announces Collaboration to Unleash the Power of NOAA's Data* (Apr. 21, 2015), *available at* https://www.commerce.gov/news/press-releases/2015/04/us-secretary-commerce-penny-pritzker-announces-new-collaboration-unleash. *See also* U.S. Department of Commerce Secretary Penny Pritzker, *Commerce Secretary Pritzker Delivers Keynote Address at the American Meteorological Society's Washington Forum* (Remarks as Prepared for Delivery) (Apr. 21 2015), *available at* https://www.commerce.gov/news/secretary-speeches/2015/04/commerce-secretary-pritzker-delivers-keynote-address-american. For more information about NOAA's Big Data Project, *see* NOAA Data Alliance, https://data-alliance.noaa.gov/ (last visited May 13, 2016).

[98] *See* Memorandum from the Executive Office of the President for the Heads of Executive Departments and Agencies: Increasing Access to the Results of Federally Funded Scientific Research, dated February 22, 2013, *available at* https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

exchange, and disseminate their research data to external stakeholders and the public. NIST has partnered with the National Institutes of Health (to use the existing PubMed Central repository system), the Internet Archive (under an arrangement with the Library of Congress), and the Government Printing Office's Federal Digital System to make technical publications and other archival records widely available.

NIST Office of Data and Informatics

In early 2014, NIST established the Office of Data and Informatics (ODI), a service-oriented organization to provide guidance, assistance and resources for optimizing NSIT data products all in anticipation of "big data" becoming the norm. Helmed by a veteran of the Space Telescope Science Institute with deep expertise in providing open access of large datasets, ODI is instituting a data-aware culture at NIST and driving international efforts in data discovery and access. A key activity of ODI has been to initiate a modernization of NIST's collection of Standard Reference Data, consisting of about 100 databases that stakeholders depend upon to provide critically evaluated values of chemical, physical, and biological data.

NIST Big Data Interoperability Framework

The NIST Big Data Public Working Group was established to develop a consensus-based Big Data Interoperability Framework. The framework is a vendor-neutral, technology- and infrastructure-independent ecosystem that promotes the use of standard interfaces and that will allow data scientists and researchers to use the best available analytics tools to process and derive knowledge from data sets.[99]

NIST Global City Teams Challenge

The NIST Global City Teams Challenge (GCTC) encourages collaboration and the development of standards, bringing together two key groups—communities with challenges and innovators with the technology to overcome them. The second GCTG was announced in September 2015 at the White House Smart Cities Forum. The new challenge will bring communities and innovators together to encourage collaboration on a range of issues from disaster response to energy management to mass transit improvement. The goal is to help communities and businesses connect to improve resource management and quality of life by using effective networking of computer systems and physical devices, often called the Internet of Things.[100]

U.S. Patent and Trademark Office's Open Data Roadmap

USPTO's Open Data Roadmap is a multi-year plan to uncover the value hidden in the patent and trademark data that USPTO takes in and disseminates.[101] This Roadmap included creating the USPTO Open Data website; launching the affinity group Club for Open Data Enthusiasts (C.O.D.E.); and delivering on a White House Executive Action to improve transparency of

[99] *See* NIST Big Data Information, http://www.nist.gov/itl/bigdata/bigdatainfo.cfm (last visited May 13, 2016).

[100] *See* NIST Global City Teams Challenge, http://www.nist.gov/cps/sagc.cfm (last visited May 13, 2016).

[101] *See* Thomas A. Beach and Scott Beliveau, *USPTO CDAC Presentation* (July 2015), *available at* http://www.esa.gov/sites/default/files/cdac/july-2015/cdac-july-2015-presentation-pto-open-data-roadmap.pdf.

ownership of patents with a new, award receiving Assignment Search website. The flagship deliverable is the USPTO Developer Hub, a portal to harness the power of data. Launched on April 25, 2016, this hub establishes a sharable, "social" platform for anyone in this community to showcase the unique ways they're using our data, combining it with other data sets, such as economic and geographic data.

U.S. Census Bureau's City Software Development Kit

U.S. Census Bureau has begun providing data via an application programming interface for developers. In this context, the Census Bureau recently launched its City Software Development Kit (City SDK), which provides a user-friendly "toolbox" for civic "hackers" to connect local and national public data.[102] Tools already on the City SDK include code that converts latitude/longitude to Federal Information Processing System (state and county) codes; the ability to request GeoJSON (an open source geographic shapefile/boundary format) right along with data from Dataweb (for mapping); a modular architecture that makes mashing up Census data with third-party data a snap; and more.[103]

The Bureau of Economic Analysis' Big Data and New Data Sources

The Bureau of Economic Analysis (BEA) continues to explore the use of big data to increase the quality of economic statistics, develop new statistical products, and enhance the detail and timeliness of existing statistical products. To that end, the BEA is engaging in public-private partnerships with data vendors to learn about their data and to develop computer algorithms that will enhance the usefulness of their data for improving national accounts.[104] The BEA has also convened experts (such as a workshop at the National Academies on exploring the potential value added and obstacles to using credit card company, retail sales, and other commercial information to improve national accounts), and continues to participate in and monitor the work of external committees and groups currently studying these issues (like the OECD, a UN Global Working Group, and the Committee on National Statistics at the National Academies).

International Trade Administration Trade Developer Portal

The portal is a collection of Application Program Interfaces (APIs) that allow software developers to create web and mobile applications using information produced by ITA and other trade promotion agencies.[105]

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[102] U.S. Census Bureau CitySDK, http://uscensusbureau.github.io/citysdk/index.html (last visited May 13, 2016).

[103] Avi Bender, *Challenge to Hackers: Use New Software Kit to Create Apps that Benefit Cities* (May 26, 2015), *available at* http://blogs.census.gov/2015/05/26/challenge-to-hackers-use-new-software-kit-to-create-apps-that-benefit-cities/.

[104] *See, e.g.*, Dennis Fixler, BEA Advisory Committee Meeting, *Big Data: Tackling New Projects and Exploring New Sources* (Nov. 13, 2015), *available at* https://bea.gov/about/pdf/acm/2015/november/big-data-tackling-new-projects-and-exploring-new-sources.pdf. *See also* Committee on National Statistics, *BEA Expert Meeting on Exploiting Commercial Data for Official Economic Statistics* (Nov. 19, 2015), *available at* http://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_169224.pdf.

[105] *See* U.S. International Trade Administration's Data Service Platform, http://developer.trade.gov/ (last visited May 13, 2016). *See also* Kimberly Becht, Deputy Program Manager for Web Presence in the International Trade Administration, *Introducing ITA's Trade Developer Portal* (July 14, 2014, 5:42 PM), https://www.commerce.gov/news/blog/2014/07/introducing-itas-trade-developer-portal.

STANDARDS

Standards are the building blocks for the nation's technological and innovative leadership and competitiveness; they enable interoperability, ensure health and life safety, and facilitate the development and deployment of new technologies and products. Standards play a particularly important role in the nation's digital economy, and the Department of Commerce plays a unique role among federal agencies vis-à-vis its close association with many aspects of standards. The Department's National Institute of Standards and Technology (NIST) is charged by law and policy with the role of coordinating standards related information exchange and activities among federal agencies.[106] More than 400 NIST employees participate in over 1,000 consensus standards development activities, where they contribute their technical knowledge and expertise in the development of consensus standards, working in collaboration with industry, academia, and government experts.

Under the Obama Administration's leadership, NIST initiated work on "Big Data" to maximize the ability and efficiency of users to extract knowledge from big data through the use of standards, measurements, and interoperability frameworks. As part of the standards related efforts and to help catalyze development of standards to address interoperability between big data sets, NIST established the Big Data Public Working Group, and has also assumed a leadership role by chairing the Working Group on Big Data within Joint Technology Committee of the International Organization for Standardization and the International Electrotechnical Commission (IEC), ISO/IEC JTC1. The efforts of the Big Data Public Working Group have resulted in the publication of a seven-volume NIST *Big Data Interoperability Framework* (NBDIF) in September 2015. The NBDIF was submitted to ISO/IEC JTC1 for further development as an international standard serves as a foundational document for two international Big Data standard development projects: the *Big Data Overview and Vocabulary* and the *Big Data Reference Architecture*.

Standards are an integral element of a comprehensive approach to cybersecurity. Many federal agencies are engaged in cybersecurity-related standards development. Also, many standards organizations facilitate cybersecurity-focused standards development. This creates a pressing need for a well-coordinated approach within the federal government to ensure that agencies share information relating to cybersecurity standards activities and priorities.

The Obama Administration led the establishment of an International Cybersecurity Standardization Working Group within the National Security Council's Cyber Interagency Policy Committee. This group developed a comprehensive strategy for U.S. government engagement in international standardization to achieve U.S. objectives for cybersecurity.[107] The strategy identified four inter-

[106] *See* National Technology Transfer and Advancement Act of 1995, Pub. L. No. 104-113 (1996). *See also* The White House, Office of Management and Budget, Circular No. A-119 Revised (Feb. 10, 1998), *available at* https://www.whitehouse.gov/omb/circulars_a119/.

[107] This strategy is presented in two reports. *See* International Cybersecurity Standardization Working Group of the National Security Council's Cyber Interagency Policy Committee, *Interagency Report on Strategic U.S. Government Engagement in International Standardization to Achieve U.S. Objectives for Cybersecurity* (NISTIR 8074 Vol. 1) (Dec. 2015), *available at* http://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.8074v1.pdf; International Cybersecurity Standardization Working Group of the National Security Council's Cyber Interagency Policy Committee, *Supplemental Information for the Interagency Report on Strategic U.S. Government Engagement in International Standardization to Achieve U.S. Objectives for Cybersecurity* (NISTIR 8074 Vol. 2) (Dec. 2015) *available at* http://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.8074v2.pdf.

related strategic objectives that are tied to U.S. government's participation in the development and use international standards for cybersecurity.

As part of the strategy, NIST experts undertook a comprehensive scan of standards organizations involved in the development of cybersecurity standards and mapped key standards and standards organizations to core areas of cybersecurity standardization that are of interest to the U.S. government. By identifying key challenges relating to cybersecurity standardization, the strategy lays out eight recommendations to leverage standards to meet cybersecurity related goals and objectives.

In addition to NIST staff contributing their technical expertise to the development of consensus standards and specifications developed in industry-led efforts, under the Obama Administration, NIST was tasked to convene stakeholders to identify standards-related needs, and to develop corresponding solutions. The Obama Administration identified early on that standards-based approaches for addressing public policy related Administration priorities held a strong appeal for industry and the private sector. As the private sector and industry already participate in the development of these standards and use many of them, the use of these standards does not create any significant burdens on industry, thus precluding the need for top-down approaches. During the course of the Obama Administration, NIST in a convener's role helped facilitate significant progress in a range of digital economy-related technologies such as Smart Grid,[108] Cloud Computing, and Cyber Physical Systems.

Standards for Smart Grid Interoperability

In 2009, NIST initiated the development of a *Smart Grid Interoperability Framework* by coordinating input from more than 1,500 stakeholders representing more than 20 stakeholder categories. This resulted in the release of the first version of the framework in 2010, which has been updated twice. The NIST Framework and *Roadmap for Smart Grid Interoperability Standards*, Release 3.0 (and Release 2.0 and 1.0), *NIST Special Publication 1108R3* is the primary reference document for interoperability protocols and standards, not only for the United States, but also internationally.[109] It has been used by Japan, Korea, China, and the EU in developing their smart grid roadmaps, and by utilities and vendors as overall guidance to support interoperability of systems and devices.[110] In the United States, both federal and state regulators have recommended their stakeholders to participate in NIST/Smart Grid Interoperability Panel smart grid framework process.[111]

To provide a forum for smart grid interoperability stakeholder coordination, in November 2009, NIST established the Smart Grid Interoperability Panel (SGIP) with an initial membership of over 370 organizations. By 2012, the SGIP membership had grown to over 800 organizations with more

[108] NIST was assigned the responsibility of facilitating the development of standards for an end-to-end, nationwide, interoperable Smart Grid by the Energy Independence and Security Act of 2007.

[109] Christopher Greer, et al., *Framework and Roadmap for Smart Grid Interoperability Standards, Release 3.0* (Oct. 1, 2014), *available at* http://www.nist.gov/manuscript-publication-search.cfm?pub_id=916755.

[110] *Id.* at 34-36.

[111] *Id.* at 172-173.

than 2,000 volunteer representatives, and in April 2013, SGIP was successfully transitioned into the private sector as an independent, membership-supported nonprofit 501(c)(3) organization.

NIST also provided leadership to the standards development work in the White House-inspired and industry-led *Green Button Initiative*, which enables consumers to obtain and share their own energy usage information in a standardized electronic format.[112] Working closely with the SGIP, industry, and other federal agencies, NIST led the development of the technology for Green Button, including standards, testing, developer tools, and technical support for implementation. NIST has also encouraged the formation of the new Green Button Alliance, a non-profit organization dedicated to advancing *Green Button* and supporting *Green Button* testing and certification.[113] Based on significant nationwide voluntary adoption by utilities, and with support by NIST, more than 100 million U.S. consumers (and more than 8 million Canadian consumers) now have *Green Button* data access to help them better understand and manage their energy usage.[114]

Cyber-Physical Systems

Following a similar approach, in 2014, NIST established the Cyber-Physical Systems (CPS) Public Working Group (PWG), bringing together a broad range of experts from industry, academia, and government in an open public forum to help define and shape key characteristics of CPS, sometimes also referred to as the Internet of Things, the growing ecosystem of Internet connected objects and devices.[115] The objective was to develop a shared understanding of CPS and its foundational concepts and unique dimensions. Based on work in the CPS PWG and its five subgroups (led by co-chairs from NIST, industry, and academia), the draft *Cyber-Physical Systems Framework (CPS Framework)* was released in late September 2015, and is currently undergoing revision based on public comments received.[116] The CPS Framework presents a set of high-level concepts and their relationships, as well as a vocabulary for clear communication among stakeholders. The goal of the CPS Framework is to provide a common language for describing and analyzing interoperable CPS architectures in various domains so that these CPS can interoperate within and across domains and form systems of systems.

Cloud Computing Program

Finally, the NIST Cloud Computing Program was initiated in early 2011 and was charged with the mission of developing a USG roadmap for *Cloud Computing Technology and Standards* that would identify the requirements for security, interoperability and portability in cloud computing to facilitate adoption of cloud computing by the USG.[117] There are currently six active Public Working Groups within the cloud computing program. The program initiated a series of Public Working

[112] *See* NIST Green Button Initiative, http://www.nist.gov/smartgrid/greenbutton.cfm (last visited May 13, 2016).

[113] Green Button Alliance, http://www.greenbuttonalliance.org/ (last visited May 13, 2016).

[114] U.S. Department of Commerce, *Open Government Plan, Version 3.5* (Sept. 2015), *available at* http://open.commerce.gov/sites/default/files/Commerce%20Open%20Government%20Plan%20Version%203_5%20%289-28-15%29%20Final.pdf.

[115] NIST CPS Public Working Group, https://pages.nist.gov/cpspwg/ (last visited May 13, 2016).

[116] Cyber Physical Systems Public Working Group, DRAFT Framework for Cyber-Physical Systems, Release 0.8 (Sept. 2015), *available at* https://s3.amazonaws.com/nist-sgcps/cpspwg/pwgglobal/CPS_PWG_Draft_Framework_for_Cyber-Physical_Systems_Release_0_8_September_2015.pdf.

[117] *See* NIST Cloud Computing Program, http://www.nist.gov/itl/cloud/ (last visited May 13, 2016).

Groups that are composed of industrial, academic and other government partners. This program has resulted in a roadmap,[118] a *Reference Architecture and Taxonomy for Cloud Computing*,[119] a standards inventory,[120] and a draft security reference architecture.[121] The effort has also resulted in a widely recognized definition for Cloud Computing.[122] Lastly, the program works closely with the ISO to develop international standards for cloud computing.[123]

[118] *See* Lee Badger, et. al., *U.S. Government Cloud Computing Technology Roadmap, Volume 1, Release 1.0 (Draft), High-Priority Requirements to Further USG Agency Cloud Computing Adoption* (Nov. 2011), *available at* http://www.nist.gov/itl/cloud/upload/SP_500_293_volume1-2.pdf.

[119] *See* Fang Liu, et. al., *NIST Cloud Computing Reference Architecture Recommendations of the National Institute of Standards and Technology* (Sept. 2011), *available at* http://www.nist.gov/customcf/get_pdf.cfm?pub_id=909505.

[120] *See* NIST Cloud Computing Roadmap Working Group, NIST Cloud Computing Program, Information Technology Laboratory, *NIST Cloud Computing Standards Roadmap* (July 2013), *available at* http://www.nist.gov/itl/cloud/upload/NIST_SP-500-291_Version-2_2013_June18_FINAL.pdf.

[121] *See* NIST Cloud Computing Roadmap Working Group, NIST Cloud Computing Program, Information Technology Laboratory, *NIST Cloud Computing Security Reference Architecture* (May 5, 2013), *available at* http://collaborate.nist.gov/twiki-cloud-computing/pub/CloudComputing/CloudSecurity/NIST_Security_Reference_Architecture_2013.05.15_v1.0.pdf.

[122] Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models. Peter Mell & Timothy Grance, *The NIST Definition of Cloud Computing, Recommendations of the National Institute of Standards and Technology* (Sept. 2011), *available at* http://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf.

[123] *E.g.*, ISO/IEC 17788:2014 Information technology Cloud computing -- Overview and vocabulary, *available at* http://www.iso.org/iso/catalogue_detail?csnumber=60544; ISO/IEC 17789:2014 Information technology Cloud computing -- Reference architecture, *available at* http://www.iso.org/iso/catalogue_detail?csnumber=60545. These standards were produced jointly with the International Telecommunications Union's standards development organization (ITU-T) and finalized in September 2014.

IV. ACCESS AND SKILLS

Businesses and consumers both depend on fast, reliable, and pervasive digital infrastructure to succeed in the 21st century economy. But infrastructure alone is insufficient. Individuals need digital skills and education to take advantage of that infrastructure; businesses need customers for their digital products and services. Over the past seven years, the Department of Commerce had spearheaded U.S. government efforts to expand Internet access and education across the country. Through innovative grant-making programs and authorities, the Department has helped to dramatically improve broadband Internet penetration rates and strengthened the digital skills of America's workforce.[124]

SUPPORTING INTERNET ACCESS AND ADOPTION ACROSS AMERICA

Broadband has become a cornerstone of the nation's economy and has changed the way Americans learn, innovate, communicate, and do business. Connectivity has become so essential for daily life that broadband has been referred to as "the electricity of the 21st century."[125] As such, expanding access to broadband was a pillar of the Administration's economic recovery plan and has continued to be a Commerce Department priority.

The Department, through NTIA, was tasked by the *American Recovery and Reinvestment Act of 2009* (Recovery Act) to expand broadband access and adoption as a means of promoting economic growth, creating jobs and laying the foundation for long-term prosperity for all Americans. Through the *Broadband Technology Opportunities Program (BTOP)* and the *State Broadband Initiative (SBI)*, NTIA helped the nation make significant strides in broadband availability, access, adoption and awareness.[126] NTIA continues its leadership in this field by helping communities overcome challenges in expanding broadband networks and promoting broadband adoption through *BroadbandUSA* and the *Broadband Opportunity Council*.[127]

[124] Infrastructure and skills development are enshrined in the OECD Internet Policymaking Principles #3, "Promote investment and competition in high speed networks and services," *Id.* OECD, *Communiqué on Principles for Internet Policy-Making* (June 29, 2011), *available at* https://www.oecd.org/internet/innovation/48289796.pdf

[125] The White House, *Broadband: The Electricity of the 21st Century* (Jan. 15, 2015, 10:20 AM), https://www.whitehouse.gov/blog/2015/01/15/broadband-electricity-21st-century.

[126] *See* NTIA, About BroadbandUSA, http://www2.ntia.doc.gov/about (last visited May 13, 2016). For information on the State Broadband Initiative, *see* NTIA, State Broadband Initiative, http://www2.ntia.doc.gov/SBDD (last visited May 13, 2016).

[127] NTIA, Broadband Opportunity Council, https://www.ntia.doc.gov/category/broadband-opportunity-council (last visited May 13, 2016).

BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM

Through BTOP, NTIA distributed $4 billion in Recovery Act grants targeted to increasing access to high-speed broadband in unserved and underserved regions across the United States; providing access, education, training, and support to community anchor institutions (CAIs);[128] and stimulating the demand for, access to, and use of broadband.

NTIA awarded the following grants to recipients in three project categories:

- Comprehensive Community Infrastructure (CCI) projects: $3.48 billion to 123 recipients[129]
- Public Computer Center (PCC) projects: $201 million to 66 recipients[130]
- Sustainable Broadband Adoption (SBA) projects: $250.7 million to 44 recipients[131]

BTOP's infrastructure projects focused on laying a foundation for private-sector investment by supplying essential middle-mile networks in unserved or underserved areas of the country that local providers can use to deliver affordable broadband to more homes and businesses. These grants also promoted projects that connected key CAIs in unserved or underserved communities in order to make Internet access available to the largest number of people while simultaneously addressing the robust bandwidth needs of schools, libraries, and hospitals.

Through its adoption (SBA) and computer center (PCC) programs, NTIA sought to address the other key barriers that have been identified as hurdles to connectivity – availability, cost, perception, relevance and skills. One of the most fundamental barriers for many citizens is simply the lack of access to a computer. BTOP PCC grants supported the establishment or upgrading of neighborhood computer centers, helping to meet the demand for public broadband access in communities that need it most.[132] Job seekers, high school students, adult learners, and seniors now have places where they can procure the skills and connectivity to participate in the digital economy, narrowing the digital divide.

Even where there is access to broadband, however, it is essential that citizens have the skills they need to use this technology and understand the opportunities that connectivity can provide to improve their lives. In communities across the country, PCC and SBA recipients reached out to people who may never have used a computer—a group that includes a disproportionate number of low-income Americans, senior citizens and members of minorities—and taught them how to use a mouse, navigate the Internet and set up an email account. Grantees taught citizens how to write resumes, find Internet job postings and even apply for jobs over the Internet—helping overcome the perception in some communities that Internet access is not relevant to their daily lives. Other

[128] CAIs include schools, libraries, medical facilities and public safety organizations, vital institutions that need broadband access to better serve and meet the needs of their communities.

[129] *See*, NTIA, Grants Awarded: Broadband Infrastructure Projects, http://www2.ntia.doc.gov/infrastructure (last visited May 13, 2016).

[130] *See*, NTIA, Grants Awarded: Public Computer Center Projects, http://www2.ntia.doc.gov/computercenters (last visited May 13, 2016).

[131] *See*, NTIA, Grants Awarded: Sustainable Broadband Adoption Projects, *available at*: http://www2.ntia.doc.gov/sustainableadoption?page=1 (last visited May 13, 2016).

[132] See, BTOP Reporting and Open Data: PCC Data Dictionary with Open Data, *available at*: http://www2.ntia.doc.gov/files/PCC_Data_Dictionary_with_Data_Open_Data.xlsx.

grantees helped teachers learn how to use broadband technology in their classrooms and adapt their curriculum to prepare their students for the digital age, and taught job-seekers skills that helped them get back to work.

Over the past six years, NTIA has worked closely with BTOP recipients to help them deliver projects that maximized the benefits to the communities they serve while protecting the federal government's investment in these efforts. As a result, BTOP recipients have:

- Built or upgraded more than 116,000 network miles, enough to wrap around the Earth approximately four and a half times.
- Connected more than 25,000 CAIs to high-speed broadband networks, including more than 12,000 educational institutions. Of those CAIs, more than 9,500 received new service and 15,000 received upgraded service.
- PCC and SBA grant recipients provided nearly 21 million hours of training to users.[133]
- Established 886 new and upgraded 2,496 public computer centers throughout the country.

All of these efforts have advanced the goals of the Recovery Act by creating jobs, helping people get back to work and preparing America's infrastructure and workforce for the digital economy. One study estimated the economic impact of the BTOP investment to include:

- Producing a short-term Gross Domestic Product increase of $7 billion[134]
- Generating approximately 79,000 year-long jobs and creating more than 22,000 long-term jobs[135]
- Producing $2.81 in total output for every $1 spent by a BTOP grantee[136]
- Generating a 2% increase in broadband availability in areas served by BTOP[137]
- Producing a 95 percent decline in broadband prices for many CAIs served by BTOP infrastructure projects.[138]

STATE BROADBAND INITIATIVE

Through its State Broadband Initiative, NTIA provided nearly $300 million to state designees from the 56 states and territories to collect data on broadband availability to help community leaders make informed broadband planning decisions. Using this information, NTIA and the Federal Communications Commission (FCC) worked together to build the National Broadband Map –

[133] Press Release, NITA, *NTIA Broadband Adoption Toolkit Shares Best Practices Across U.S.* (May 2, 2013), *available at:* https://www.ntia.doc.gov/press-release/2013/ntia-broadband-adoption-toolkit-shares-best-practices-across-us.

[134] Stephen Rhody, ASR Analytics, *The Economic Impacts of the BTOP Program* (Apr. 14, 2014), *available at:* http://www.bbcmag.com/2015s/ppt/ASR-Conference-Presentation-04142014.pdf.

[135] Broadband Communities, *New Research on Economic Development* (Nov./Dec. 2015), *available at* http://www.bbcmag.com/2015mags/Nov_Dec/BBC_Nov15_NewResearch.pdf.

[136] ASR Analytics, National Telecommunications and Information Administration Broadband Technology Opportunities Program Evaluation Study, *Short-Term Economic Impact Report* (Sept. 30, 2013), *available at* http://www2.ntia.doc.gov/files/short-term_economic_impacts_report.pdf.

[137] *Id.*

[138] ASR Analytics, National Telecommunications and Information Administration Broadband Technology Opportunities Program Evaluation Study, *Final Report: Social and Economic Impacts of the Broadband Technology Opportunities Program* (Sept. 15, 2014), *available at*: http://www2.ntia.doc.gov/files/asr_final_report.pdf.

the first searchable public map on broadband speeds and availability.[139] The National Broadband Map is an extremely valuable tool for community leaders and policymakers alike in understanding broadband availability across the nation, identifying unserved and underserved communities, and understanding the factors that drive and impede broadband deployment.

THE BROADBAND OPPORTUNITY COUNCIL

In March 2015, President Obama created the Broadband Opportunity Council, made up of over twenty federal agencies and directed it to determine what actions the federal government could take to eliminate regulatory barriers to broadband deployment, promote broadband adoption, and encourage investment in broadband networks and services. NTIA co-chairs the Council on behalf of the Secretary of Commerce.

Many of the agencies involved in the Council had not considered broadband to be part of their core missions. NTIA briefed the Council on typical barriers to broadband deployment and adoption, and led the interagency survey process to explore whether there was flexibility within existing agency authorities to take actions to remove barriers or increase funding support for broadband programs.

Through NTIA's strategic leadership, the Council also engaged with industry and other stakeholders to understand ways the Executive Branch could better support the needs of communities seeking broadband investment, and how the federal government could incentivize broadband investment, drive competition and remove regulatory and policy barriers at the community level. NTIA led the development of a public Request for Comment process and received over 200 responses.

On August 20, 2015, the Council delivered to the President a report outlining steps that the agencies shall take over the next two years to fulfill its mandate. The report describes 36 concrete steps that federal agencies will take to eliminate barriers and promote broadband investment and adoption. Agencies committed to 13 actions that clarify or open up additional options for federal funding for broadband in programs totaling $10 billion. Examples include the Department of Housing and Urban Development's Community Development Block Grant, the Department of Labor's Workforce Investment and Opportunity Act, and the Department of Commerce's Economic Development Assistance Programs. Agencies also committed to removing permitting barriers, issuing guidance regarding "dig-once" policies, addressing connectivity challenges in Tribal nations, and creating a comprehensive broadband research agenda.

Taken together, the Council's actions are making a difference to communities seeking to expand and enhance their broadband capacity. The Council will continue to identify ways to advance broadband deployment, competition, and adoption across the country, and NTIA will continue to lead its efforts to promote interagency coordination and alignment.

[139] National Broadband Map- How connected is my community?, http://www.broadbandmap.gov/ (last visited May 13, 2016).

LOOKING FORWARD – BROADBANDUSA

Applying the lessons learned from its administration and oversight of the $4 billion in BTOP grants, NTIA launched BroadbandUSA in January 2015 to help satisfy a demand from communities that realize broadband access and use are vital to their economic development, innovation, education and healthcare needs. BroadbandUSA is helping communities nationwide ensure they have the broadband infrastructure, digitally literate workforce and engaged citizens to thrive in the 21st Century digital economy.

Despite dramatic improvements over the past seven years, there remains a persistent digital divide that breaks down along socio-economic, racial, geographic and other demographic lines. Thousands of communities throughout the country still remain without adequate access to high-speed broadband and are searching for guidance on how to connect their citizens. Community leaders are beginning to understand the benefits that broadband access brings, but planning and building broadband networks is complicated and costly. BroadbandUSA provides guidance, tools, insights and thought leadership that help communities manage costs and get the connectivity they need, faster.

NTIA helps communities assess local broadband needs, identify funding and other resources, engage critical partners, and plan network infrastructure projects and digital inclusion programs. Since the launch of the program in mid-2015, BroadbandUSA has:

- Provided direct technical assistance to customers in 30 states, including local, state and federal officials, non-profit and for-profit entities, and an institution of higher education;
- Hosted six regional events focusing on connecting more than 800 community leaders with peers, industry experts, and timely guidance to advance their broadband efforts;
- Published guides focused on broadband planning for local and tribal governments, building public private partnerships, and federal funding opportunities for broadband;
- Developed publications to raise awareness of BroadbandUSA's services and promote understanding of broadband's critical role in community prosperity;
- Worked with federal, state and local officials to better integrate broadband into policy and program efforts; and,
- Engaged with government, community and industry leaders to build tools and a research agenda that will improve the quality of broadband-related data, enhance understanding of community readiness for broadband, and provide access to federal broadband programs, policies and resources

As part of these efforts, NTIA's BroadbandUSA team is implementing two recommendations of the Council's Report. One is the development of a portal to house information on federal broadband funding and loan programs to help communities easily identify resources as they seek to expand access to broadband. This will help communities find broadband-related policy guidance, key agency points-of-contact and best practices. The second is the creation of a "Community

Connectivity Initiative," which will support community leaders in developing a comprehensive approach to community connectivity through a strategic planning framework, online self-assessment tool, and a report with recommendations for each participating community.

SPECTRUM ALLOCATION FOR BROADBAND

In June 2010, the President directed the Secretary, working through NTIA, to collaborate with the FCC to make available at least 500 megahertz of federal and nonfederal spectrum over the next 10 years for mobile and fixed wireless broadband use.[140] NTIA, in consultation with federal agency members of the Policy and Plans Steering Group (PPSG), immediately began work to devise a ten-year plan to select and prioritize bands for study, including a subset to be fast tracked, in order to identify the ones most likely to help achieve the goal as rapidly as possible.

Even without factoring in the FCC's ongoing incentive auction for television band spectrum, NTIA and the FCC have made significant progress toward the 500 megahertz goal, realizing nearly half of it by making 245 megahertz available. This included the auction of AWS-3 licenses that netted over $41 billion, far exceeding projections and fully funding congressional priorities such as the mobile broadband-based First Responder Network (FirstNet). Collaboration was a key element of the success of this auction. NTIA's Commerce Spectrum Management Advisory Committee (CSMAC) led groundbreaking work to explore relocation alternatives and spectrum sharing arrangements between federal agencies and commercial mobile broadband systems in the 1695-1710 MHz and 1755-1850 MHz spectrum bands.

Another important band that is being made available is 3550-3650 MHz (3.5 GHz band). This 100 megahertz of spectrum was first identified for potential federal/non-federal shared use in NTIA's *Fast Track Report*.[141] Subsequently, the President's Council of Advisors on Science and Technology (PCAST) recommended shared use of the band for systems employing small cell and related technologies.[142] Based on innovative NTIA technical studies conducted in collaboration with the Department of Defense (DOD) and the FCC, new rules were established that significantly increased commercial access to the 3.5 GHz band in geographic areas near federal radars. This joint effort between NTIA, the FCC and DOD led to a groundbreaking approach in the creation of a three-tiered spectrum licensing and access scheme that will be managed by a dynamic database.

Efforts continue to examine and make available additional spectrum bands. For example, NTIA, the FCC, and other stakeholders continue to conduct studies to uncover techniques for achieve compatibility between unlicensed devices and incumbent federal and non-federal systems in the proposed 5350-5470 MHz and 5850-5925 MHz (5.9 GHz) bands. These bands offer the

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[140] *See*, Memorandum for the Heads of Executive Departments and Agencies, *Unleashing the Wireless Broadband Revolution* (rel. June 28, 2010), *published at* 75 Fed. Reg. 38387 at § 1(d) (July 1, 2010), *available at* http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution (*2010 Presidential Memorandum*).

[141] NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz,4380-4400 MHz Bands* (Oct. 2010), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf

[142] PCAST, Report to the President: *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth*, (July 20, 2012), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

single best opportunity for addressing the demand for unlicensed spectrum and ensuring high-quality Internet access for the American public, particularly in light of the wide channels that could be employed for gigabit Wi-Fi and similar operations. Meanwhile, both NTIA and the FCC recognize the commercial need for low, mid and high band spectrum, with the latter the missing piece. Spectrum in the so-called millimeter wave range is critical to propel the widespread deployment of fifth generation (5G) technologies. To this end, the FCC is expected to act this year, in coordination with NTIA, to authorize the use of frequency bands above 24 GHz for mobile broadband and other flexible uses.

NTIA has set its long-term sights beyond the 500 megahertz goal and seeks to create a sustainable spectrum pipeline. It will improve its processes to identify spectrum, accounting for all possible repurposing options, and will foster R&D investments by ensuring the right decisions are made as to where to target investment dollars. NTIA is working with the federal agencies to complete quantitative assessments mandated in a *2013 Presidential Memorandum*[143] that will provide more transparency of spectrum usage within five identified bands that total 960 megahertz of spectrum and that could lead to detailed study of additional spectrum repurposing opportunities. NTIA is also collaborating with its federal partners and non-federal interests to align international frequency allocations to best accommodate mobile broadband services while at the same time protecting important U.S. Government missions.

In related activities, as also recommended by the PCAST Report, NTIA and the FCC are collaborating on engaging with interested cities and stakeholders in a joint effort to establish Model Cities for demonstrating and evaluating advanced spectrum sharing technologies. Meanwhile, NTIA's Institute for Telecommunication Sciences (ITS) performs and publishes technical studies that assess the impact of sharing spectrum in specific bands. Among its initiatives, ITS is conducting innovative spectrum monitoring of the 3.5 GHz band. ITS also co-directs with NIST the Center for Advanced Communications (CAC), established as a cooperative research effort that aligns the world-class advanced communications capabilities of both organizations. The CAC is responsive to the direction in the *2010 Presidential Memorandum* to facilitate research, development, experimentation, and testing by researchers to explore innovative spectrum-sharing technologies.

The Digital TV Converter Box Coupon Program

In 2006, through the *Digital Television Transition and Public Safety Act*, part of the *Deficit Reduction Act of 2005*, Congress set a deadline of February 17, 2009 for television stations to end their analog broadcasting services. One key outcome of this digital television (DTV) transition was a reorganization of the spectrum band such that frequencies would be made available for commercial wireless services. Wireless providers that acquired licenses in the 2008 auction put this 700 MHz spectrum to use by deploying fourth generation (4G) LTE networks.

[143] Memorandum for the Heads of Executive Departments and Agencies, *Expanding America's Leadership in Wireless Innovation* (rel. June 14, 2013), *published at* 78 Fed. Reg. 37431 (June 20, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-americas-leadership-wireless-innovatio.

With the DTV transition, consumers would have to ensure that each television set in their home could receive digital TV signals as most Americans had analog sets that could not receive digital signals over the air. To do so, they could buy a new digital television; subscribe to cable, satellite, or other pay television service; or purchase a digital-to-analog converter box. Congress established the Digital TV Converter Box Coupon Program (Coupon Program) to provide financial assistance to help consumer defray the costs of purchasing such converter boxes and directed NTIA to implement the program with $1.5 billion in funding.

NTIA's Coupon Program provided information about the DTV transition and distributed up to two $40 coupons to each requesting household to offset the cost of the converter boxes. Over a two-year period, the Coupon Program educated millions of Americans about how to get ready for the transition and helped reduce the cost of purchasing a converter box for millions of households.

Subsequently, the *DTV Delay Act of 2009* moved the analog to digital TV transition deadline to June 12, 2009; gave consumers four more months to request coupons, until July 31, 2009; and authorized the program to issue replacement coupons. Additionally, the *American Recovery and Reinvestment Act of 2009* provided NTIA with $650 million to cover additional coupons, administrative costs, and consumer education activities.

Between January 1, 2008 and July 31, 2009, NTIA approved more than 34.8 million applications from American households for over 64.1 million coupons. Of those coupons, consumers redeemed almost 35 million to purchase converter boxes – a 54.4 percent redemption rate.[144]

The Coupon Program effectively employed public-private partnerships. In creating the Coupon Program, NTIA sought advice from broadcasters, consumer electronics manufacturers and retailers, public interest groups, and the American public. NTIA adopted technical standards and worked with manufacturers to certify equipment – more than 190 converter boxes – giving consumers a wide selection of affordable products, priced between $40 and $70, with state-of-the-art technology. NTIA designed the Coupon Program to make it easy and worthwhile for retail stores to participate such that more than 2,300 national and other retailers with more than 34,000 locations voluntarily joined. NTIA partnered with the broadcasting and electronics industries, community organizations, and other federal agencies to educate consumers about the program through public service announcements; TV, radio, and newspaper advertising; conference calls; webinars; and newsletters. NTIA's Coupon Program was a tremendous success and played a pivotal part in assisting the nation's smooth conversion from analog to digital television.

DIGITAL NATION SURVEYS AND RESEARCH

Since 1994, NTIA has regularly sponsored a supplement to the Census Bureau's Current Population Survey (CPS). This is one of the largest surveys in the world, including approximately 53,000 household interviews every month. The CPS is primarily used to produce the nation's labor force statistics, but agencies can sponsor supplements on a wide range of subjects. In 2009, 2010, 2011, 2012, 2013, and 2015, NTIA commissioned the CPS Computer and Internet Use Supplement,

[144] NTIA, *Outside the Box: The Digital TV Converter Box Coupon Program*, (Dec. 2009), at 21.

which included a range of questions about the devices people use, locations of Internet use, online activities, and challenges that inhibit some Americans from taking full advantage of these technologies.

NTIA's *Digital Nation* reports draw on the collected data and enable policymakers to craft programs that better serve Americans who find themselves on the wrong side of the digital divide, while also shedding light on current challenges in related policy areas like online privacy. Moreover, the datasets generated from these surveys are freely available to external researchers and members of the general public who wish to use them in their own studies or to calculate their own statistics. In 2015, NTIA dramatically enhanced the accessibility of *Digital Nation* data by launching NTIA Data Central, an online portal that includes the *Digital Nation* blog, an easy-to-use Data Explorer visualization tool, and a Research Center containing sample statistical code, extensive technical documentation, and links to download raw datasets in multiple formats.[145]

[145] *See* NTIA Data Central, *available at*: https://ntia.doc.gov/data.

Looking Ahead

Over the past seven years, the digital economy has played an increasingly vital role in the economic and social life of the United States and the world. Digital technologies today hold the promise of increased productivity, innovation, jobs, and growth, and are likely to continue to do so in the future.

The question before us is this: In the years to come, will the United States be ready and equipped to harness advances in digital technologies and services for the continued benefit of American industry and the American people? The answer will ultimately depend on how effectively government, the private sector, and civil society as well as the American worker and the American consumer can coordinate and adapt to rapid changes in technology.

The Department of Commerce stands ready to assist with this transformation. As it has done over the past seven years, the Department will continue to work to empower American businesses, consumers, and entrepreneurs with the tools and resources necessary to compete in an ever-digitizing world. Domestically, the Department will continue to work to facilitate widespread broadband Internet access; it will engage with businesses and innovators to enable the development and adoption of new technologies, such as the Internet of Things, autonomous vehicles, and unmanned aircraft; it will work to protect consumer privacy and security; and it will work to foster a culture and climate of innovation across all sectors of the digital economy.

Overseas, the Department will likewise continue to advocate for a free and open Internet, for a global intellectual property regime that incentivizes creation and innovation, for a system of trade that is fair and equitable and promotes new digital products and services, and for improved privacy and cybersecurity standards across all sectors of the economy.

The mission of the Department of Commerce is to create the conditions for economic growth and opportunity. The digital economy is and will remain central to that mission. The Department looks forward to partnering with businesses, civil society, and consumers to realize the full potential of the digital economy in the years to come.

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