

**Calendar No. 113**

115TH CONGRESS }  
*1st Session* }

SENATE

{ REPORT  
115-90

DEVELOPING INNOVATION AND GROWING  
THE INTERNET OF THINGS ACT

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 88



JUNE 5, 2017.—Ordered to be printed

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U.S. GOVERNMENT PUBLISHING OFFICE

69-010

WASHINGTON : 2017

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED FIFTEENTH CONGRESS

FIRST SESSION

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### DEVELOPING INNOVATION AND GROWING THE INTERNET OF THINGS ACT

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Mr. THUNE, from the Committee on Commerce, Science, and  
Transportation, submitted the following

### R E P O R T

[To accompany S. 88]

[Including Cost Estimate of the Congressional Budget Office]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 88) to ensure appropriate spectrum planning and interagency coordination to support the Internet of Things, having considered the same, reports favorably thereon without amendment and recommends that the bill do pass.

#### PURPOSE OF THE BILL

S. 88 would take steps to help develop a national strategy to encourage the development of the Internet of Things (IoT).

#### BACKGROUND AND NEEDS

IoT can be described as the widespread integration and proliferation of Internet-connected devices, such as home appliances, medical devices, remote sensors, and cars. It has been said that IoT brings the physical and digital world together.<sup>1</sup> Examples of IoT applications include the following: subcutaneous body sensors that provide a patient's real-time vital signs to medical providers; applications that allow users' phones to monitor and adjust household functions, from pre-heating an oven to running a bath and controlling smart lightbulbs; smart cities where ubiquitous sensors allow for smoother flow of traffic; and sensed roadways, buildings,

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<sup>1</sup>“Samsung CEO BK Yoon's Internet of Things Keynote at CES 2015” (Full Transcript), *The Sinju Post*, January 14, 2015, at <http://singjupost.com/samsung-ceo-bk-yoons-internet-of-things-keynote-at-ces-2015-full-transcript>.

bridges, and dams that automatically communicate their structural integrity to officials, providing alerts when repairs or upgrades are needed.<sup>2</sup>

IoT is still in its early stages, but is expected to impact every sector of the economy to varying degrees. Examples include the following: gains in health care through remote monitoring; improvements in manufacturing efficiency and supply chain tracking; reductions in peak electrical grid usage; traffic management that adjusts traffic light timing and bus routes; and improvements in agriculture through better water management and the ability to more closely track changes in soil temperature as well as levels of carbon and nitrogen.<sup>3</sup>

One analyst group, McKinsey & Company, has estimated that IoT could contribute \$2.7 trillion to \$6.2 trillion to the world economy annually by 2025.<sup>4</sup> Health care applications alone could have an economic impact of \$1.1 trillion to \$2.5 trillion per year by 2025.<sup>5</sup> Worldwide, the global market for IoT devices and services is expected to exceed \$7 trillion by 2020.<sup>6</sup> And an estimated 50 billion devices are expected to be connected by 2020.<sup>7</sup>

Estimates of the impact of IoT on the U.S. economy vary, but experts project the impact to be substantial. For instance, using the McKinsey & Company study as a base, the Progressive Policy Institute estimates the United States could realize one-third of total global IoT economic benefit, raising U.S. gross domestic product 2 to 5 percent by 2025.<sup>8</sup>

Some have argued, to fully realize the potential of IoT, countries should craft a national strategy to promote IoT development and adoption, which the United States has not done. Establishing such a national strategy to encourage the development of IoT has the support of a diverse set of stakeholders, including The App Association, the U.S. Chamber of Commerce, the Competitive Carriers Association, the Consumer Technology Association, Intel, the Information Technology Industry Council, the National Association of Manufacturers, the Tech CEO Council, the Telecommunications Industry Association, and the Semiconductor Industry Association.

#### SUMMARY OF PROVISIONS

S. 88, also known as the DIGIT Act, is intended to help create a national strategy for IoT. The bill would require the Secretary of Commerce (Secretary) to convene a working group of Federal agen-

<sup>2</sup>Pew Research Center, "The Internet of Things Will Thrive by 2025," May 4, 2014, at p. 8, at <http://www.pewinternet.org/2014/05/14/internet-of-things/>.

<sup>3</sup>McKinsey Global Institute, *Disruptive technologies: Advances that will transform life, business, and the global economy*, May 2013 at pp. 56-58, at [http://www.mckinsey.com/insights/business\\_technology/disruptive\\_technologies](http://www.mckinsey.com/insights/business_technology/disruptive_technologies).

<sup>4</sup>McKinsey Global Institute Study, at pp. 51-55.

<sup>5</sup>O'Sullivan, Andrea; Thierer, Adam, *Projecting the Growth and Economic Impact of the Internet of Things*, Mercatus Center Policy Briefing, June 15, 2015, at p. 7, at <https://www.mercatus.org/publication/projecting-growth-and-economic-impact-internet-things>.

<sup>6</sup>Wood, Molly, "At the International CES, the Internet of Things hits home," *The New York Times*, May 4, 2014.

<sup>7</sup>Federal Trade Commission Staff Report, "Internet of Things: Privacy & Security in a Connected World," January 2015, at <http://www.ftc.gov/system/files/documents/reports/federal-trade-commission-staff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf>.

<sup>8</sup>Mandel, Michael, "Can the Internet of Everything Bring Back the High-Growth Economy?," *Progressive Policy Institute*, September 2013, at p.2, at <http://www.progressivepolicy.org/wp-content/uploads/2013/09/09.2013-MandellCan-the-Internet-of-Everything-Bring-Back-the-High-GrowthEconomy-1.pdf>.

cies, advised by a steering committee of nongovernmental stakeholders established within the Department of Commerce (DOC) to advise the Federal working group, to provide recommendations to Congress on how to plan and encourage the growth of IoT.

The bill is structured so that the nongovernmental steering committee would exist to do the following: (1) advise the working group; and (2) submit a report with recommendations to the working group. The working group, in addition to its duties and recommendations, would be required to assess recommendations made by the steering committee and comment on them in the report the working group sends to Congress. The working group would be required to submit its findings and recommendations to Congress no later than 18 months after the bill's enactment.

The bill also would direct the Federal Communications Commission (FCC or Commission), in consultation with DOC's National Telecommunications and Information Administration (NTIA), to complete a report summarizing notice of inquiry assessing the spectrum needs required to support IoT no later than 1 year after the bill's enactment.

#### LEGISLATIVE HISTORY

On January 10, 2017, Senator Fischer introduced S. 88 with Senators Booker, Gardner, and Schatz as cosponsors. On January 24, 2017, the Committee met in open Executive Session and, by voice vote, ordered the bill to be reported without amendment.

On January 24, 2017, Representatives Paulsen and Welch introduced H.R. 686, a House of Representatives companion bill that is identical to this bill. That bill was referred to the Committee on Energy and Commerce of the House of Representatives.

On April 27, 2016, in the 114th Congress, the Committee ordered S. 2607 to be reported favorably with an amendment (in the nature of a substitute). The reported text of that bill is substantially similar to this bill.

On February 11, 2015, the Committee, as the Senate committee with primary and general jurisdiction over Internet and IoT matters, held the first-ever congressional hearing examining the economic and policy implications of IoT. The Committee received testimony from a panel of five private sector witnesses.

#### ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

##### *S. 88—Developing Innovation and Growing the Internet of Things Act*

S. 88 would direct the Department of Commerce (DOC) to convene a working group of representatives from various federal agencies and a steering committee of private stakeholders to produce reports and recommendations to the Congress to improve intragovernmental coordination and to encourage the development of the Internet of things. (The Internet of things refers to the growing number of devices that connect to the Internet and interact

with one another.) The bill also would direct the Federal Communications Commission (FCC) to prepare a report assessing the need for spectrum to support such developments.

Based on an analysis of information from the affected agencies, CBO estimates that implementing S. 88 would require about sixteen employees and would cost \$4 million over the 2018–2022 period to convene the working group and to develop the reports required under the bill. Those costs would be spread among the federal agencies that would be a part of the working group and such spending would be subject to the availability of appropriated funds. Participating in the working group and completing the spectrum report would cost the FCC less than \$500,000. However, the FCC is authorized to collect fees sufficient to offset the costs of its regulatory activities each year; therefore, CBO estimates that the net effect on discretionary spending for those activities would be negligible, assuming appropriation actions consistent with that authority.

Enacting S. 88 would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply. CBO estimates that enacting S. 88 would not increase net direct spending or on-budget deficits in any of the four consecutive 10-year periods beginning in 2028.

S. 88 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would not affect the budgets of state, local, or tribal governments.

The CBO staff contact for this estimate is Stephen Rabent. The estimate was approved by H. Samuel Papenfuss, Assistant Director for Budget Analysis.

#### REGULATORY IMPACT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported:

##### NUMBER OF PERSONS COVERED

The bill does not authorize any new regulations and would not subject any individuals or businesses to new regulations.

##### ECONOMIC IMPACT

The bill would not have an adverse economic impact on the Nation.

##### PRIVACY

The bill would not have any adverse impact on the personal privacy of individuals.

##### PAPERWORK

The bill would require three reports from the Federal Government. The first report would be submitted by the steering committee to the working group within 1 year after the date of enactment. The second report would be submitted by the working group to Congress no later than 18 months after the date of enactment. The third report would require the FCC to submit to the appro-

appropriate committees of Congress no later than 1 year of enactment a report summarizing the comments submitted in response to the notice of inquiry seeking public comment on the current, as of the date of enactment, and future spectrum needs of IoT.

#### CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

#### SECTION-BY-SECTION ANALYSIS

##### *Section 1. Short title.*

This section would establish the bill's short title as "Developing Innovation and Growing the Internet of Things Act" or the "DIGIT Act."

##### *Section 2. Findings; sense of Congress.*

This section would set out findings and express the sense of Congress that IoT policies would maximize the potential and development of IoT to benefit all stakeholders, including businesses, governments, and consumers.

##### *Section 3. Definitions.*

This section would establish definitions for terms used throughout the bill.

##### *Section 4. Federal working group.*

This section would require the Secretary to convene a working group of Federal entities to study and make recommendations on various IoT matters. It also would establish a steering committee within the DOC comprised of a wide range of stakeholders outside the Federal Government to make recommendations to the working group.

The Secretary would have discretion in forming the Federal working group, but would be required to consider seeking representation from the DOC and other departments and agencies as follows: NTIA; the National Institute of Standards and Technology; the National Oceanic and Atmospheric Administration; the Departments of Transportation, Homeland Security, and Energy; the Office of Management and Budget; the National Science Foundation; the FCC; the Federal Trade Commission; and the Office of Science and Technology Policy.

The section would require the working group to do the following: (1) identify any Federal regulations, statutes, grant practices, budgetary or jurisdictional challenges, and other sector-specific policies that are inhibiting or could inhibit the development of IoT; (2) consider policies or programs to encourage and improve coordination among Federal agencies with jurisdiction over IoT; (3) consider any findings or recommendations made by the steering committee and, where appropriate, act to implement those recommendations; and (4) examine how Federal agencies use and can benefit from IoT, including preparedness to adopt IoT.

The working group would be required to consult with various nongovernmental stakeholders, including, among others, the steering committee and subject matter experts representing a variety of industry and civil society stakeholders, including small business and rural stakeholders.

The steering committee, which would be appointed by the Secretary, would advise the working group on the following: (1) potential regulatory, statutory, grant, programmatic, budgetary, and jurisdictional challenges to development of IoT; (2) spectrum availability to support IoT; (3) policies and programs relating to privacy, security, or coordination among Federal agencies with jurisdiction over IoT; (4) the use of IoT by small businesses; and (5) international proceedings affecting IoT. The steering committee, within 1 year of the bill's enactment, would be required to submit its findings and recommendations to the working group; the working group would be required to consider and comment on any recommendations made by the steering committee within 1 year of the bill's enactment.

The section would further provide that the steering committee would be required to set its own agenda in carrying out its duties, but that the working group could suggest topics or items for steering committee consideration. It also would state that the steering committee's report must be the result of the independent judgment of the steering committee. The steering committee would terminate on the date on which the working group submits its report to Congress as required by this section, unless the Secretary files a new charter for the steering committee.

The working group would be required to submit its findings and recommendations to Congress, along with the steering committee's findings and recommendations, no later than 18 months after the bill's enactment.

*Section 5. Assessing spectrum needs.*

This section would require the FCC, in consultation with NTIA, to issue a notice of inquiry seeking public comment on the current and future spectrum needs of IoT. Specifically, the inquiry would seek comment on the adequacy of available spectrum, what regulatory barriers exist to accessing sufficient spectrum, as well as the role of licensed and unlicensed spectrum to support the proliferation of IoT. The Commission would be required to submit to the appropriate committees of Congress, as defined in section 3, within 1 year of enactment a report summarizing the comments submitted in response to the notice of inquiry.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee states that the bill as reported would make no change to existing law.