



# A Federal Chief Technology Officer in the Obama Administration: Options and Issues for Consideration

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## Summary

In November 2007, Senator Barack Obama announced his intention, if elected president, to appoint a federal chief technology officer (CTO). He also identified several specific areas of responsibility of the CTO including transparency of government operations, computer and network security (sometimes referred to as cybersecurity), identification and adoption of best technologies and practices by federal agencies, and interoperability of emergency communications technologies for first responders.

On April 18, 2009, President Obama appointed Virginia Secretary of Technology Aneesh P. Chopra to serve in the newly created position of federal chief technology officer. In announcing the appointment, the president indicated that Mr. Chopra would undertake roles beyond what might be considered traditional CTO responsibilities. As the president described them, these roles include promoting technological innovation to help the United States create jobs, reduce health care costs, protect the homeland, and address other national goals. Mr. Chopra serves as assistant to the president and chief technology officer, as well as associate director for technology in the White House Office of Science and Technology Policy. Under a provision of Executive Order 13500, issued on February 5, 2009, he also serves as a member of the White House Domestic Policy Council in his capacity as assistant to the president and CTO.

The CTO may face a variety of challenges in executing the mission envisioned by the President. Among the early challenges will be negotiating domains of responsibilities within the White House and with executive branch agencies that have overlapping missions. Some commentators have expressed concerns about the impact the creation of a CTO might have on existing offices and agencies with respect to the allocation and coordination of authorities and responsibilities. Other commentators have asserted that a high-level CTO could serve as an advocate for technological innovation and foster increased knowledge sharing among federal agencies to more effectively implement information technology solutions to meet disparate mission requirements. Mr. Chopra's appointment as both CTO and associate director for technology at OSTP may address, in part, questions related to mission alignment, coordination, and integration. Since assuming his dual roles, Mr. Chopra has publicly engaged in discussions covering a wide range of technology policy-related areas, including research and development, innovation, open government, government performance, education, science and engineering workforce, health care information technology, broadband, patent reform, and net neutrality.

Congress faces President Obama's appointment of Mr. Chopra and the president's stated plans for the federal CTO. There is currently no formal position description for the CTO. Accordingly, the official duties of the CTO remain largely undefined. Congress may elect to provide a statutory foundation for the CTO, define the roles and authorities of the CTO, authorize and appropriate funds, provide for oversight, and address other aspects of the position.

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## Overview

In November 2007, Senator Barack Obama announced his intention, if elected president, to appoint a federal chief technology officer (CTO). On April 18, 2009, President Obama appointed Virginia Secretary of Technology Aneesh P. Chopra to serve as “America’s Chief Technology Officer.”<sup>1</sup>

Mr. Chopra serves as assistant to the president and CTO, and holds the position of associate director for technology in the White House Office of Science and Technology Policy.<sup>2</sup> In his capacity as assistant to the president and CTO, Mr. Chopra also serves as a member of the White House Domestic Policy Council under a provision of Executive Order 13500 (amending Executive Order 12859) issued by President Obama on February 5, 2009.<sup>3</sup> In announcing the appointment of Mr. Chopra, President Obama broadly defined the role of the CTO as promoting “technological innovation to help achieve our most important priorities—from creating jobs and reducing health care costs to keeping our nation secure.”<sup>4</sup>

This paper presents President Obama’s vision for the CTO position put forth during his campaign for the presidency and during the presidential transition. It also discusses the potential scope of duties and authorities of the CTO, articulates organizational precedents and challenges for the CTO, reviews some of the activities undertaken by Aneesh Chopra during his tenure as CTO, and identifies issues Congress may choose to consider if it opts to exert oversight or to develop legislation to create the position and/or office of the CTO.

## Background

In 2008, Barack Obama’s presidential campaign issued a position paper on the issue of technology and innovation which included the following description of the role envisioned for a CTO:

Bring Government into the 21<sup>st</sup> Century: Barack Obama will use technology to reform government and improve the exchange of information between the federal government and citizens while ensuring the security of our networks. Obama believes in the American people and in their intelligence, expertise, and ability and willingness to give and to give back to make government work better.

Obama will appoint the nation’s first Chief Technology Officer (CTO) to ensure that our government and all its agencies have the right infrastructure, policies and services for the 21<sup>st</sup> century. The CTO will ensure the safety of our networks and will lead an interagency effort,

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<sup>1</sup> *Remarks of President Barack Obama*, Weekly Address, April 18, 2009, The White House, available at [http://www.whitehouse.gov/the\\_press\\_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/](http://www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/)

<sup>2</sup> Personal communication with the White House Office of Science and Technology Policy, April 20, 2009.

<sup>3</sup> “Federal Register,” *Executive Order 13500, February 5, 2009*, vol. 74, no. 27 (February 11, 2009), p. 6981.

<sup>4</sup> *Remarks of President Barack Obama*, Weekly Address, April 18, 2009, The White House, available at [http://www.whitehouse.gov/the\\_press\\_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/](http://www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/).

working with chief technology and chief information officers of each of the federal agencies, to ensure that they use best-in-class technologies and share best practices.

The CTO will have a specific focus on transparency, by ensuring that each arm of the federal government makes its records open and accessible as the E-Government Act requires. The CTO will also focus on using new technologies to solicit and receive information back from citizens to improve the functioning of democratic government.

The CTO will also ensure technological interoperability of key government functions. For example, the Chief Technology Officer will oversee the development of a national, interoperable wireless network for local, state and federal first responders as the 9/11 commission recommended. This will ensure that fire officials, police officers and [emergency medical technicians] from different jurisdictions have the ability to communicate with each other during a crisis and we do not have a repeat of the failure to deliver critical public services that occurred in the aftermath of Hurricane Katrina.<sup>5</sup>

In November 2008, President-elect Obama reiterated his intentions for the CTO on Change.gov, the website of the Office of the President-elect:

Bring Government into the 21<sup>st</sup> Century: Use technology to reform government and improve the exchange of information between the federal government and citizens while ensuring the security of our networks. Appoint the nation's first Chief Technology Officer (CTO) to ensure the safety of our networks and lead an interagency effort, working with chief technology and chief information officers of each of the federal agencies, to ensure that they use best-in-class technologies and share best practices.<sup>6</sup>

Prior to Mr. Chopra's appointment, details related to the CTO position remained uncertain. There was little or no information on the specific duties and authorities of the CTO and how its functions will be coordinated and integrated within OSTP, with other White House offices, and with federal departments and agencies. During this period, some commentators speculated about the range of duties and authorities the CTO may be given (see discussion on pages 3-5 of this report). While many details remain uncertain about the CTO's role, some aspects have become more clear as Mr. Chopra has undertaken initiatives, testified before Congress, and given interviews (see "CTO Structure and Activities in the Obama Administration").

## **Potential Scope of Duties and Authorities**

A fundamental question for policymakers related to the CTO position is: What should be the scope of duties and authorities of this position? Two broad roles for the CTO appear to have emerged.

The first role, explicitly articulated on President Obama's campaign and transition websites, might be described as a supra-chief information officer with the mission of using information technology to improve the delivery of government services, increasing transparency of government policymaking, and opening channels for increased citizen participation in

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<sup>5</sup> Obama '08, *Barack Obama: Connecting and Empowering All Americans Through Technology and Innovation*, November 2007. Available at [http://www.barackobama.com/pdf/issues/technology/Fact\\_Sheet\\_Innovation\\_and\\_Technology.pdf](http://www.barackobama.com/pdf/issues/technology/Fact_Sheet_Innovation_and_Technology.pdf).

<sup>6</sup> Website of the Office of the President-elect. Available at [http://change.gov/agenda/technology\\_agenda/](http://change.gov/agenda/technology_agenda/).

government, as well as ensuring that the nation's information and communications infrastructure is robust and secure. In this capacity, the CTO would also ensure that "best practices" are identified, shared, and implemented across agencies.

The second role for the CTO might be described as an advocate for technological innovation in support of national interests such as economic growth, job creation, improvements to quality of life, national defense, and homeland security. President Obama's dual appointment of Mr. Chopra to serve as both CTO and OSTP associate director for technology, and his statement accompanying the selection, positioned Mr. Chopra to undertake such a role.

Prior to Mr. Chopra's appointment, several analysts proposed a variety of roles for an Obama administration CTO. Stanford University professor Lawrence Lessig asserted that the CTO could play an important role in bringing an understanding of how technology might be used to address national challenges:

The CTO could be a critically important position, from deciding how to make government more efficient and transparent through technology, to helping advance public policy questions like those surrounding global warming.<sup>7</sup>

The CTO could play an important role in national economic policy according to Andrew D. Lipman, a telecommunications attorney with Bingham McCutchen, LLP. Mr. Lipman asserted that

[President] Obama sees greater broadband penetration as an enormous economic engine, much like the railroads were a century ago. That is why the CTO will play such a critical role in any recovery plan.<sup>8</sup>

Ed Felten, a Princeton University professor of computer science and public affairs and director of Princeton's Center for Information Technology Policy, likewise suggested a broad role for the CTO in innovation policy:

The CTO could act as the cybersecurity czar, ensuring that reliability of the government infrastructure is protected. And much like the role of the presidential science advisor, the CTO could offer advice to the President on all areas of technology. The role could be a catalyst to push us closer to being a more entrepreneurial, high-tech country.<sup>9</sup>

The Center for American Progress (CAP) and New Democracy Project (NDP), public policy institutes, proposed that the CTO serve as a champion for information and communications technologies broadly. CAP/NDP proposed that the CTO be given three roles: advising the president on the use of ICT to create a more open and efficient government; working with OSTP to advise the president on all issues that have a critical ICT component, including economic, national security, health care, and education policies; and helping to ensure ICT platforms deployed across the United States are robust, broadly available, and affordable to all sectors. CAP/NDP anticipate this latter role would "straddle the public and private sectors" to maximize private innovation for the public good.<sup>10</sup>

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<sup>7</sup> Tom Lowry, "The Short List for U.S. Chief Technology Office," *BusinessWeek*, October 19, 2008.

<sup>8</sup> *Ibid.*

<sup>9</sup> *Ibid.*

<sup>10</sup> *Change for America: A Progressive Blueprint for the 44<sup>th</sup> President*, Center for American Progress and New (continued...)

In contrast, the Association of American Universities (AAU), an association of research universities, recommended to President Obama that a CTO be given a more narrow role:

If a new Chief Technology Officer position is created, this individual's responsibilities primarily should be to oversee the use of technology within the White House and to coordinate the use of technology within the Executive Branch.<sup>11</sup>

In addition, the AAU urged that OSTP remain the sole presidential advisor for science and technology:

[The president should] retain a single presidential advisor for science and technology with a strong associate director for technology and innovation.... The responsibility for coordinating and helping to shape science and technology policy across government agencies should remain that of the OSTP Director, as has historically been the case.<sup>12</sup>

Three factors are likely to play key roles in defining the full scope of duties and authorities of the CTO: first, the role that President Obama wants the CTO to play (including authorities derived from formal means, such as an executive order, and non-formal means, such as presidential expressions of support for, and confidence in, the CTO); second, congressional oversight of any actions by the Obama Administration; and, third, statutory duties and authorities, if any, that Congress may elect to confer upon the position and/or office.

Further, the personal attributes of the CTO may, in part, define the role of CTO. In this regard, Mr. Chopra served as Virginia's Secretary of Technology where he led "the Commonwealth's strategy to effectively leverage technology in government reform, to promote Virginia's innovation agenda, and to foster technology-related economic development."<sup>13</sup> Previously, Chopra served as managing director of the Advisory Board Company, a public company that provides best practices research and analysis to the health care industry. He led the firm's Financial Leadership Council and the Working Council for Health Plan Executives.<sup>14</sup>

## Organizational Precedents

In defining or refining the duties and authorities of the CTO, Congress and the Obama Administration may opt to draw from the duties and authorities of existing and previous organizational structures and positions. These could include agency-level chief information officers (CIOs) and CTOs; the Bush Administration's use of the Office of Management and Budget (OMB) to handle CIO, CTO, and e-government responsibilities; the Clinton

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(...continued)

Democracy Project, November 12, 2008.

<sup>11</sup> *Policy Recommendations for President-elect Obama*, Association of American Universities, December 2008, available at [http://www.aau.edu/policy/policy\\_recommendations\\_new\\_admin.aspx?id=7710](http://www.aau.edu/policy/policy_recommendations_new_admin.aspx?id=7710).

<sup>12</sup> Ibid.

<sup>13</sup> The White House, "President Obama Discusses Efforts to Reform Spending, Government Waste; Names Chief Performance Officer and Chief Technology Officer," press release, April 18, 2009, [http://www.whitehouse.gov/the\\_press\\_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/](http://www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/).

<sup>14</sup> Ibid; also Security and Exchange Commission annual filing, Form 10-K, Advisory Board Company, May 30, 2008, available at <http://cchn.10kwizard.com/xml/download.php?repo=tenk&ipage=5705904&format=PDF>.

Administration's "reinventing government" initiative; the Commerce Department's recently-eliminated Technology Administration and its agency predecessors; and the White House Office of Science and Technology Policy (OSTP). An overview of each is provided below.

## **Agency CIOs, CTOs, and the Chief Information Officers Council (CIO Council)**

As information technology began to play an increasingly important (and more costly) role in federal agency operations and services, agencies began to appoint CIOs to manage information technology systems and acquisitions. According to the CIO Council (discussed below) the mandate of federal CIOs is

to ensure the rapid and effective implementation of information management and information technology (IM/IT) solutions within each agency and to create a more results-oriented, efficient, and citizen-centered Federal government.<sup>15</sup>

In 1996, Congress enacted the Clinger-Cohen Act<sup>16</sup> which, among other things, requires the establishment of a CIO in each federal agency. The duties assigned CIOs under the act include providing information management advice and policy to the agency head; developing, maintaining, and facilitating information systems; and evaluating, assessing, and reporting to the agency head on the progress made developing agency information technology systems.<sup>17</sup>

Following passage of the Clinger-Cohen Act, President Bill Clinton issued Executive Order 13011<sup>18</sup> which directs agencies to establish the position of chief information officer to provide clear accountability for information resources management activities; identifies the broad responsibilities of federal agency CIOs; and establishes a federal Chief Information Officer Council (CIO Council) chaired by the OMB deputy director for management. The CIO Council was later codified by the E-Government Act of 2002 (P.L. 107-347), which designated it

the principal interagency forum for improving agency practices related to the design, acquisition, development, modernization, use, operation, sharing, and performance of Federal Government information resources.<sup>19</sup>

No parallel council exists in the federal government for CTOs, nor has Congress statutorily defined the duties, responsibilities, and qualifications of CTOs in a manner comparable to that for CIOs under the Clinger-Cohen Act. The position of chief technology officer first emerged in the private sector in the 1980s. Since then, some federal agencies have established CTO positions. In general, a CTO is responsible for monitoring, assessing, and selecting new technologies for applications to improve an organization's performance. Such applications of technology can be focused on developing new products and services or on improving internal processes. Given the ubiquitous role technology plays in most organizations today, CTOs often work with a wide

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<sup>15</sup> Chief Information Officers Council website, <http://www.cio.gov>.

<sup>16</sup> Incorporated as sections D and E of the National Defense Authorization Act for Fiscal Year 1996 (P.L. 104-106)

<sup>17</sup> For additional information, see CRS Report RL34492, *Reauthorization of the E-Government Act: A Brief Overview*, by Jeffrey W. Seifert. This report also provides perspectives on the anticipated benefits and drawbacks of establishing a chief federal CIO position.

<sup>18</sup> Executive Order 13011, "Federal Information Technology," 61 *Federal Register* 37657, July 19, 1996.

<sup>19</sup> P.L. 107-347.



variety of stakeholders, including chief executives, scientists, engineers, research managers, and marketing professionals.<sup>20</sup> Generally, federal agency CTOs are responsible for developing and/or implementing technologies that enable the agency to better perform its missions. The role of a CTO in a federal agency can be similar to, and the title sometimes used interchangeably with, the CIO.<sup>21</sup> In many cases, agency CTOs report to the CIO and have a focus on information technology. However, some CTOs have responsibility for a wider scope of technologies and technical issues. For example, the CTO for the Department of Homeland Security's Transportation Security Administration is responsible for "implementation and development of security technologies across several modes of transportation."<sup>22</sup>

## **CIO, CTO, and e-Government Positions at OMB**

Under President George W. Bush, the deputy director of management for OMB served as the federal CIO, providing oversight of agency-level CIOs and coordinating e-government initiatives. In 2001, OMB established the position of associate director for information technology and e-government at OMB to serve as "the leading federal e-government executive," and was given responsibility for the e-government fund, directing the activities of the CIO Council, and advising on the appointments of agency CIOs.<sup>23</sup> The associate director for information technology reported to the OMB deputy director for management. In 2002, Norman Lorentz became the first chief technology officer at OMB, reporting to the associate director for information technology and e-government. In this capacity, Mr. Lorentz was tasked to lead and coordinate multiple efforts to identify and develop the technological architecture needed to support federal e-government and other information technology initiatives.<sup>24</sup>

On April 18, 2009, President Obama announced his appointment of Jeffrey D. Zients to serve as federal chief performance officer (CPO) and OMB deputy director for management.<sup>25</sup> The president previously announced his appointment of Vivek Kundra to serve as federal chief information officer and OMB administrator for e-government and information technology.<sup>26</sup> In announcing the selection of Mr. Chopra, President Obama stated that the CTO would work closely with the federal CPO and CIO "to give all Americans a voice in their government and

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<sup>20</sup> Roger D. Smith, "The Chief Technology Officer: Strategic Responsibilities and Relationships," *Research Technology Management*, July/August 2003.

<sup>21</sup> The close linkage between the duties of a CTO and CIO is illustrated by dual assignments held in some agencies. For example, the Department of Education, National Aeronautics and Space Administration (NASA), and the U.S. Fish and Wildlife Service have CTOs who concurrently hold the title of Deputy CIO. To further illustrate the linkage, at NASA's Goddard Space Flight Center, the CTO is located in the Office of the Chief Information Officer.

<sup>22</sup> Transportation Security Administration, U.S. Department of Transportation, "TSA Names Mike Golden Chief Technology Officer," press release, December 11, 2006, [http://www.tsa.gov/press/releases/2006/press\\_release\\_12112006.shtm](http://www.tsa.gov/press/releases/2006/press_release_12112006.shtm).

<sup>23</sup> Office of Management and Budget, "Mark Forman Named Associate Director for Information Technology and E-Government," press release, 14 June 2001, <http://www.whitehouse.gov/omb/pubpress/2001-13.html>.

<sup>24</sup> For additional information, see CRS Report RL30914, *Federal Chief Information Officer (CIO): Opportunities and Challenges*, by Jeffrey W. Seifert.

<sup>25</sup> Personal communication with the Office of Management and Budget communications office, April 21, 2009.

<sup>26</sup> The White House, "President Obama Names Vivek Kundra Chief Information Officer," press release, March 5, 2009, [http://www.whitehouse.gov/the\\_press\\_office/President-Obama-Names-Vivek-Kundra-Chief-Information-Officer/](http://www.whitehouse.gov/the_press_office/President-Obama-Names-Vivek-Kundra-Chief-Information-Officer/); personal communication with the Office of Management and Budget communications office, April 21, 2009.

ensure that they know exactly how we're spending their money – and can hold us accountable for the results.”<sup>27</sup>

## **National Performance Review/National Partnership for Reinventing Government**

The Clinton Administration's National Performance Review (NPR)/National Partnership for Reinventing Government (also known as the reinventing government initiative or ReGo) had certain functions similar to ones outlined for a CTO in President Obama's campaign document. In March 1993, President Bill Clinton announced the establishment of the NPR under Vice President Al Gore “to make the entire Federal Government both less expensive and more efficient ... [and to search for] ways to improve services to our citizens and to make our Government work better ... [in part through] better uses of technology.”<sup>28</sup> Information technology was one of the tools used to achieve these ends. In 1998, the NPR was renamed the “National Partnership for Reinventing Government” reflecting the administration's intent to shift from “review” to “reinvention,” with an emphasis on the use of information technology to transform government operations.<sup>29</sup> In January 2001, the E-Gov website reported

The National Partnership for Reinventing [Government] urged agencies to use information technology and the Internet to transform how citizens interact with government. Reinvention evolved into e-gov and the goal was to provide better access to government services. Today e-gov is putting people “online, not in line.” By the end of 2000, nearly 40 million Americans were doing business with the government electronically. On a regular basis, people are accessing information to solve problems themselves through the Internet, via telephones, and through neighborhood kiosks.<sup>30</sup>

Organizationally, the director of the National Partnership for Reinventing Government served as senior policy advisor to Vice President Gore.<sup>31</sup>

Among ReGo's technology-focused efforts were Access America, which sought the “integration of services across different federal agencies so citizens [could] ‘custom-tailor’ government to their specific needs,” and G-Gov, the use of geographic information and information technology to improve government services.<sup>32</sup>

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<sup>27</sup> The White House, “President Obama Discusses Efforts to Reform Spending, Government Waste; Names Chief Performance Officer and Chief Technology Officer,” press release, April 18, 2009, [http://www.whitehouse.gov/the\\_press\\_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/](http://www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending-Government-Waste-Names-Chief-Performance-Officer-and-Chief-Technology-Officer/).

<sup>28</sup> *Weekly Compilation of Presidential Documents*, Government Printing Office, vol. 29, Mar. 8, 1993, p. 350. Available at <http://frwebgate4.access.gpo.gov/cgi-bin/TEXTgate.cgi?WAISdocID=854991445865+0+1+0&WAIAction=retrieve>.

<sup>29</sup> Remarks of Morley Winograd, director, National Partnership for Reinventing Government, at the Virtual Government '99 Conference, February 23, 1999, available at <http://govinfo.library.unt.edu/npr/library/speeches/022399.html>

<sup>30</sup> The National Partnership for Reinventing Government website, January 2001, as archived at <http://govinfo.library.unt.edu/npr/initiati/index.html>.

<sup>31</sup> For additional information on the NPR/ National Partnership for Reinventing Government, see CRS Report RL30596, *The National Performance Review and Other Government Reform Initiatives: An Overview, 1993-2001*, by Harold C. Relyea, Maricele J. Cornejo Riemann, and Henry B. Hogue.

<sup>32</sup> *Ibid.*

## Department of Commerce Technology Administration

The role of chief government advocate for U.S. civilian technological innovation was previously performed largely by the Commerce Department's Technology Administration (TA) and its predecessors, the Office of Productivity, Technology and Innovation (OPTI)<sup>33</sup> and the Office of Industrial Technology (OIT).<sup>34</sup> During its existence, the Technology Administration was headed by an Under Secretary for Technology and included an analytical arm, the Office of Technology Policy (OTP).<sup>35</sup> In 2007, the Technology Administration, including the positions of Under Secretary for Technology and Assistant Secretary for Technology Policy, were eliminated under the provisions of the America COMPETES Act (P.L. 110-69). The act eliminated the duties of the Technology Administration and did not reassign any of them to other agencies. Among TA's duties:

- to conduct technology policy analyses to improve United States industrial productivity, technology, and innovation;
- to determine the relationships of technological developments and international technology transfers to the output, employment, productivity, and world trade performance;
- to determine the influence of economic, labor and other conditions, industrial structure and management, and government policies on technological developments in particular industrial sectors worldwide;
- to identify technological needs, problems, and opportunities within and across industrial sectors that, if addressed, could make a significant contribution to the economy of the United States;
- to assess whether the capital, technical and other resources being allocated to domestic industrial sectors which are likely to generate new technologies are adequate;
- to propose and support studies and policy experiments to determine the effectiveness of measures with the potential of advancing United States technological innovation;
- to encourage and assist the creation of centers and other joint initiatives by State or local governments, regional organizations, private businesses, institutions of higher education, nonprofit organizations, or Federal laboratories to encourage technology transfer, to stimulate innovation, and to promote an appropriate climate for investment in technology-related industries;
- to propose and encourage cooperative research to promote the common use of resources, to improve training programs and curricula, to stimulate interest in high technology careers, and to encourage the effective dissemination of technology skills within the wider community;

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<sup>33</sup> OPTI was established by the Federal Technology Transfer Act of 1986 (P.L. 99-502).

<sup>34</sup> OIT was established by the Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480).

<sup>35</sup> TA and OTP were established by the National Institute of Standards and Technology Authorization Act for Fiscal Year 1989 (P.L. 100-519).

- to serve as a focal point for discussions among United States companies on topics of interest to industry and labor, including discussions regarding manufacturing and discussions regarding emerging technologies; and
- to consider government measures with the potential of advancing United States technological innovation and exploiting innovations of foreign origin.<sup>36</sup>

Some or all of these duties might be assigned to a CTO in the context of serving as chief advocate for technological innovation.

## **White House Office of Science and Technology Policy**

The Office of Science and Technology Policy is the White House office with primary responsibility for science and technology issues.<sup>37</sup> The OSTP traces its organizational roots to the Office of Scientific Research and Development that was established within the Executive Office of the President in 1941 by President Franklin Roosevelt under Executive Order 8807.<sup>38</sup> In 1976, Congress directed the establishment of OSTP in the National Science and Technology Policy, Organization, and Priorities Act (P.L. 94-282), charging the office with serving “as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal Government.” The act authorizes OSTP to:

- advise the President and others within the Executive Office of the President on the impacts of science and technology on domestic and international affairs;
- lead an interagency effort to develop and implement sound science and technology policies and budgets;
- work with the private sector to ensure Federal investments in science and technology contribute to economic prosperity, environmental quality, and national security;
- build strong partnerships among Federal, State, and local governments, other countries, and the scientific community; and
- evaluate the scale, quality, and effectiveness of the Federal effort in science and technology.

To many observers, President Obama has imbued, in effect, the CTO position with the many of the duties of OSTP by selecting a single individual, Mr. Chopra, to serve as both CTO and associate director of OSTP for technology.

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<sup>36</sup> These and other duties were assigned to the Technology Administration and its predecessor organizations by the Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480), the Federal Technology Transfer Act of 1986 (P.L. 99-502), and the National Institute of Standards and Technology Authorization Act for Fiscal Year 1989 (P.L. 100-519).

<sup>37</sup> Other White House offices—such as the Council on Environmental Quality, the National Economic Council (NEC), Office of Management and Budget (OMB)—also play important roles in the development, coordination, and implementation of science and technology policies. For additional information about OSTP, see CRS Report RL34736, *The President’s Office of Science and Technology Policy (OSTP): Issues for Congress*, by Deborah D. Stine.

<sup>38</sup> Available at <http://www.presidency.ucsb.edu/ws/index.php?pid=16137>.

## Potential Challenges

Among the early challenges the CTO may face are: defining and communicating the roles of the position; identifying and recruiting talent, from both inside and outside of government; and negotiating domains of responsibilities, formal and informal, within the White House and with executive branch agencies that have overlapping missions. Beyond these initial challenges, the CTO will need to establish goals and milestones, set priorities, secure resources, and develop and execute a strategy. If the position or office of the CTO is not established by Congress and provided with statutory authorities and a dedicated budget, it may be difficult for the CTO to affect change in individual federal agencies or systemically throughout the federal government. In such a case, the efficacy of the CTO may depend largely on the mandate provided by President Obama to the CTO (and agencies' perception of the mandate), the imprimatur of the White House, and the personal attributes of the CTO (e.g., relationship with the President, past accomplishments, knowledge, professional reputation, persuasiveness).

Perhaps one of the most difficult and enduring challenges the CTO may face could be “turf wars” associated with overlapping responsibilities with other executive agencies and their principals. These “turf wars” could involve issues such as technology and innovation policy, computer and network security, and intellectual property enforcement. For example, there are several organizations within the Executive Office of the President (EOP) that have potentially overlapping authorities, including:

- The Office of Management and Budget (as discussed on pages 6-7 of this report);
- The National Economic Council (NEC), on issues related to technological innovation. For example, the NEC might evaluate federal policies intended to promote technological innovation as an option for achieving the President's economic policy objectives;
- The President's Council on Innovation and Competitiveness, which is charged under the America COMPETES Act with providing advice to the President with respect to global trends in competitiveness and innovation and allocation of Federal resources in education, job training, and technology research and development in the context of global trends in competitiveness and innovation, as well as making recommendations to the heads of executive agencies to improve innovation;<sup>39</sup> and
- The Intellectual Property Enforcement Coordinator, on technology-centered intellectual property rights (e.g., digital copyright).<sup>40</sup>

Potential conflict between the CTO and these offices might be magnified with the co-location of the CTO within OSTP. While assigning Mr. Chopra the dual roles of assistant to the president and CTO and associate director of OSTP may contribute to better coordination and integration of CTO and OSTP functions, it may also create reporting and issue jurisdiction issues, both within

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<sup>39</sup> The America COMPETES Act (P.L. 110-69) directs the President to establish a President's Council on Innovation and Competitiveness.

<sup>40</sup> The Prioritizing Resources and Organization for Intellectual Property Act of 2008 (P.L. 110-403) directs the President to appoint an Intellectual Property Enforcement Coordinator to serve within the Executive Office of the President.

OSTP and with other EOP offices. For example, in his capacity as OSTP associate director for technology, Mr. Chopra reports to the director of OSTP, just as the position has in previous administrations. However, in his capacity as assistant to the president and as CTO, both he and the director of OSTP carry the equivalent title of “assistant to the president.” In addition, placing the CTO in OSTP may also create jurisdiction issues with the OMB’s CPO and CIO functions. The CTO’s responsibilities might also overlap with other executive branch agencies, such as the Federal Communications Commission (FCC) and/or the Department of Commerce’s National Telecommunications and Information Administration (NTIA) on issues such as information and communication technology, and with agency CIOs and CTOs.

Finally, the manner in which the CTO has been established may affect the position/office’s ability to transcend presidential administrations. If the authorities of the CTO continue to rely solely upon the President’s executive authority (through an executive order, for example), then its continued existence would be at the sole discretion of the current or future Presidents. In contrast, if the CTO were to be established by statute (as OSTP was, for example), then the position/office would continue to exist through changes of presidential administrations unless eliminated by statute.

## **CTO Structure and Activities in the Obama Administration**

There is no official position description for the CTO,<sup>41</sup> nor has President Obama sought legislation to create a statutory foundation for the CTO position. Accordingly, to date, the structure and official duties of the CTO remain largely undefined.

Structurally, Mr. Chopra has a small staff to assist him in his role as CTO, including three deputy CTOs and an assistant deputy CTO.<sup>42</sup> Appointment to the CTO position is at the sole discretion of the president and does not require Senate confirmation. However, Mr. Chopra’s appointment as associate director of OSTP position required Senate confirmation; he was confirmed on May 21, 2009.<sup>43</sup> According to OSTP, the CTO is organizationally a part of OSTP. Further, OSTP states that the CTO and associate director of OSTP for technology are separate and distinct positions though they are currently held by the same individual.<sup>44</sup>

In the absence of a formal position description, some insights into the duties of the CTO in the Obama Administration may be gleaned from what Mr. Chopra has said and done since assuming his dual responsibilities. However, in the course of his public communications, Mr. Chopra does not generally associate his various activities with the unique responsibilities of the two positions he holds. This makes it difficult to identify which of his efforts and comments are specifically linked to his duties as CTO as distinct from those that are linked to his duties as associate director of OSTP.

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<sup>41</sup> Telephone conversation with Rick Weiss, assistant director for strategic communications, OSTP, The White House, January 6, 2009.

<sup>42</sup> Mr. Chopra has additional staff support for his role as assistant director of OSTP for Technology. See [http://www.ostp.gov/cs/about\\_ostp/leadership\\_staff](http://www.ostp.gov/cs/about_ostp/leadership_staff).

<sup>43</sup> See [http://www.senate.gov/pagelayout/legislative/one\\_item\\_and\\_teasers/nom\\_conf.htm](http://www.senate.gov/pagelayout/legislative/one_item_and_teasers/nom_conf.htm).

<sup>44</sup> Ibid.

In a December 2009 interview with a trade publication, Mr. Chopra described his role as CTO as an umbrella over his two-part service as assistant to the president and OSTP associate director for technology:

The Chief Technology Officer role has two components: the first is my service as Assistant to the President; the second is in my capacity as Associate Director for Technology in the White House Office of Science and Technology Policy. In my role as Assistant to the President, I serve as one of 25 key advisors who meet every morning in the West Wing to coordinate and collaborate on all the major issues in front of the President. My responsibility is largely to ensure that the voice of technology and innovation is heard across a wide range of policy priorities—healthcare, energy, or education. At OSTP, a role for which the United States Senate confirmed me back in May, I coordinate agency technology R&D and policy and interface with the private sector in advancing our policy priorities.<sup>45</sup>

Mr. Chopra's role as assistant to the president, as articulated above, seems consistent with then-candidate Obama's assertion at a campaign event in Silicon Valley that one of the reasons behind his plan to appoint a CTO is to "make certain we incorporate technology into every decision we make."<sup>46</sup> It is unclear, however, how his self-described role as assistant to the president to "ensure that the voice of technology and innovation is heard across a wide range of policy priorities" aligns with the role of OSTP director John Holdren who also serves as assistant to the president for science and technology. In previous presidential administrations, the role Mr. Chopra asserts for himself has been one generally reserved to the President's science advisor.

According to OSTP,<sup>47</sup> one of Mr. Chopra's responsibilities is to assist in implementation of the President's Strategy for American Innovation, articulated in an Executive Office of the President report published in September 2009.<sup>48</sup> The strategy includes four thrusts:

- "Invest in the Building Blocks of American Innovation," including fundamental research, 21<sup>st</sup> century workforce skill development, physical infrastructure, and widespread access to information technology tools.
- "Promote Competitive Markets that Spur Productive Entrepreneurship," including promoting American exports, supporting open capital markets, encouraging high-growth and innovation-based entrepreneurship, and improving innovation.
- "Drive Innovations in Health Care Technology," including expanding use of health care information technology, increasing investment in medical research, and slowing the rising costs of health care costs.
- "Catalyze Breakthroughs for National Priorities," including investments in new energy technologies, advanced vehicle technologies, and health care technology,

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<sup>45</sup> J.D. Kathuria, "14 Questions for the Federal CTO Aneesh Chopra," *ExecutiveBiz*, December 24, 2009, pp. <http://blog.executivebiz.com/exclusive-14-questions-for-federal-cto-aneesh-chopra/6579/comment-page-1>.

<sup>46</sup> "Barack Obama expected to be the first US 'Tech President,'" *Agence France-Presse*, November 5, 2008.

<sup>47</sup> Telephone conversation with Rick Weiss, assistant director for strategic communications, OSTP, The White House, January 6, 2009.

<sup>48</sup> Office of Science and Technology Policy/National Economic Council, The White House, *A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs*, Washington, DC, September 21, 2009, [http://www.whitehouse.gov/assets/documents/SEPT\\_20\\_\\_Innovation\\_Whitepaper\\_FINAL.pdf](http://www.whitehouse.gov/assets/documents/SEPT_20__Innovation_Whitepaper_FINAL.pdf).

as well as addressing “grand challenges” through science, technology and innovation.<sup>49</sup>

In testimony before the Senate Budget Committee Task Force on Government Performance, Mr. Chopra stated that his focus was on “harnessing the power and potential of technology and innovation to execute on the President’s vision for a 21<sup>st</sup> Century economy” to create jobs, improve U.S. competitiveness, improve the affordability of communications, expand adoption of broadband technologies, help keep families more connected, and increase the safety and security of Americans.<sup>50</sup>

Further, in his testimony, Mr. Chopra discussed three areas of his work:

- Technology for open government. Mr. Chopra cited his efforts in support of the Open Government Directive,<sup>51</sup> issued by the White House Office of Management and Budget, that instructs agencies to provide information to the public in open, accessible, machine-readable formats; requires agencies to formulate an Open Government Plan and website; and calls for a review of government-wide information policies. Mr. Chopra described his office’s role in the development of this directive as undertaking a month-long pilot initiative using emerging technologies like wikis, blogs, and posts to solicit ideas from the public on the topic, then culling more than 1,000 responses to incorporate their ideas into the crafting of the directive.
- Technology for government performance. Mr. Chopra discussed several examples of efforts to improve government performance in moving research into development and deployment, supporting open standards, and using prizes and competitions to align innovation with national priorities. It was not clear from his remarks the role the CTO played in these activities.
- The President’s Strategy for American Innovation (see earlier discussion).

Mr. Chopra has also advocated for the application of technology and innovation to improve education. In testimony before the House Committee on Education and Labor,<sup>52</sup> Mr. Chopra asserted the need for a greater proportion of Americans to earn college degrees; an increase in the number of students excelling in science, technology, engineering, and mathematics; breakthrough strategies to identify hidden talent in the United States; and the potential role for technology and innovation to help meet these needs.

It would appear from the initiatives Mr. Chopra has undertaken and the testimony and interviews he has given that his scope of duties is wide and generally aligned with the vision articulated by President Obama during the campaign and transition. Among the tools Mr. Chopra has used to

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<sup>49</sup> Ibid.

<sup>50</sup> “Data-Driven Performance: Using Technology to Deliver Results,” testimony of Aneesh Chopra, Chief Technology Officer and Associate Director for Technology, OSTP, The White House, before the Committee on the Budget, Task Force on Government Performance, U.S. Senate, December 10, 2009.

<sup>51</sup> Open Government Directive, M10-06, Office of Management and Budget, December 8, 2009, <http://www.whitehouse.gov/open/documents/open-government-directive>. For more information on the Open Government Initiative, see <http://www.whitehouse.gov/Open>.

<sup>52</sup> “The Future of Learning: How Technology is Transforming Public Schools,” testimony of Aneesh Chopra, Chief Technology Officer and Associate Director for Technology, OSTP, The White House, before the Committee on Education and Labor, U.S. House of Representatives, June 16, 2009.



fulfill his CTO responsibilities are the development and promotion of ideas, policy development, public communication, and fostering agency collaboration and coordination.

## Issues for Consideration by Congress

With the appointment of Mr. Chopra as CTO, Congress has the opportunity to consider and oversee the Administration's plans for and use of this position. Although the president has provided a broad overview of the role of the CTO, the White House has not provided detailed information on the roles and responsibilities of the CTO, its organizational structure, staffing plans, or relationship to White House offices and federal agencies.<sup>53</sup> Nor has the president sought to create a statutory foundation for the CTO that might be used to define the office's duties and authorities.

On April 2, 2009, Representative Gerald E. Connolly introduced the Chief Technology Officer Act of 2009 (H.R. 1910). Representative Connolly stated that the purpose of the bill, in part, is to make the position of CTO permanent to "ensure that a presidentially-appointed Chief Technology Officer would be part of future administrations."<sup>54</sup> In an interview with the *National Journal's* *nextgov*, Representative Connolly further explained,

What I'm trying to do here is essentially provide a statutory framework for what President Obama has done by executive order.... It is a logical extension of what he has done. It guarantees that the CTO is the spokesman for technology in the federal government and the White House itself—and the advocate for it.<sup>55</sup>

The act would provide a statutory foundation for the Office of the Chief Technology Officer, establishing it as an Executive Office of the President headed by a federal chief technology officer. The act assigns thirteen duties to the office, focused primarily on the Federal government's use of information technology and its role in securing the national information infrastructure. Under the act, the CTO would also:

serve as a source of analysis and advice for the President and heads of Federal departments and agencies with respect to major policies, plans, and programs of the Federal Government associated with information technology.<sup>56</sup>

Bruce McConnell, a former head of information technology policy at OMB, asserts that the bill does not give the CTO a broad enough portfolio, placing too great a focus on information technology which instead should be the domain of the federal chief information officer (CIO). Alan Paller of the SANS Institute, a computer security research and education organization, has expressed concerns that the wide range of duties and responsibilities assigned the CTO in the bill

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<sup>53</sup> According to the White House Office of Presidential Personnel, the only publicly available information about the CTO (including the roles, responsibilities, structure, organizational placement, and relationship to other offices) is what is available on the White House website. Personal communication between CRS and the White House Office of Presidential Personnel, April 20, 2009.

<sup>54</sup> Rep. Gerald E. Connolly, Extension of Remarks, *Congressional Record*, April 21, 2009, p. E911, [http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2009\\_record&page=E911&position=all](http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2009_record&page=E911&position=all).

<sup>55</sup> Aliya Sternstein, "Congressman pushes to expand chief technology officer's influence," *National Journal's nextgov*, April 22, 2009.

<sup>56</sup> H.R. 1910.

might pull the CTO in too many directions and make the CTO ineffectual. Trey Hodgkins, vice president for national security and procurement policy at TechAmerica, an association that represents high-tech companies, stated that it was important for the CTO and CIO to have the authorities to facilitate participatory democracy and, if a statute was necessary to provide these authorities, the legislation may be beneficial.<sup>57</sup>

The act was referred to the House Committee on Oversight and Government Reform on May 4, 2009. No action has been taken.

If Congress chooses to establish the CTO position through statute, there are several issues it may wish to consider. For example:

- What mission, duties, and authorities should be given the CTO? Should one person serve as both the CTO and OSTP associate director for technology?
- What level of funding should be authorized and/or appropriated for the CTO?
- Should the CTO be placed in the Executive Office of the President or elsewhere in the executive branch? If in the EOP, should the CTO directly report to the president, or instead be a part of another EOP agency? Who should the CTO report to? Should the appointment of the CTO be subject to Senate confirmation?
- Should the CTO be a stand-alone position or an office or agency with its own staff? If the CTO is established together with a supporting office or agency, how many full-time equivalent positions should be authorized? What should be the composition of the staff with respect to occupation (e.g., scientists, engineers, IT professionals, lawyers, managers, administrators); political appointees and career civil servants; and permanent employees and employees on detail from other agencies?
- How should the work of the CTO differ, overlap, and/or complement the duties and authorities of offices in the Executive Office of the President, and other executive branch agencies?
- What should be the relationship between the president's CTO and the existing CTOs and CIOs of individual departments and agencies?

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<sup>57</sup> Ibid.