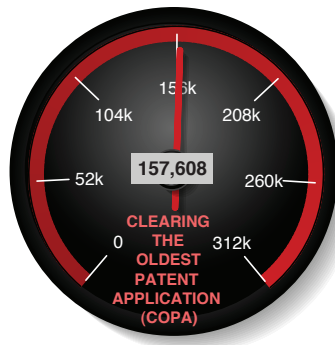
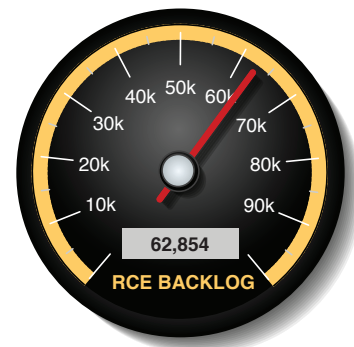


# Use of Dashboards in Government



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**Sukumar Ganapati**

Associate Professor

Public Administration Department

School of International and Public Affairs

Florida International University





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## Foreword

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Use of Dashboards in Government*, by Sukumar Ganapati, an associate professor at Florida International University.

When President Barack Obama took office, he said, “The question is not whether government is too big or too small but whether it works.” But how do you know what works and what doesn’t? Government leaders are deluged with thousands of streams of data about the performance of agencies and programs.

One approach that the Obama administration has pursued is the creation of dashboards to make sense of the deluge of data it receives. By using online dashboards presenting performance data, government organizations can track key performance metrics of both individual agencies and cross-departmental activities. The administration has touted the benefits of dashboards as a way of organizing and filtering performance data so that it makes sense to decision-makers. One goal of dashboards is that decision-makers will be able to both clearly understand their organization’s performance and act on that information.

One example has been the Federal Information Technology Dashboard, showing the status of dozens of technology investments across the federal government. The Obama administration claims that the dashboard, along with regular review meetings using the dashboard data, has led to decisions saving \$3 billion in technology spending and cutting in half the delivery time of technology projects.

Agencies across government are now exploring the development of dashboards to both monitor internal performance and make available performance information to the public. Agencies profiled in this report include the Food and Drug Administration and the United States Patent and Trademark Office.



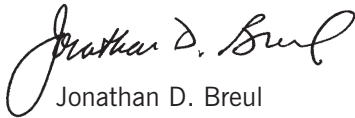
Jonathan D. Breul



Gregory J. Greben

Congress has recently expressed interest in expanding the use of different transparency tools, including dashboards, across all federal spending programs. As a result, their use may extend beyond the current administration and may become a standard tool in managing agency and program performance in the future.

We hope this report by Dr. Ganapati is a useful introduction for federal executives interested in understanding the value and uses of performance dashboards.



Jonathan D. Breul  
Executive Director  
IBM Center for The Business of Government  
[jonathan.d.breul@us.ibm.com](mailto:jonathan.d.breul@us.ibm.com)



Gregory J. Greben  
Vice President, Practice Leader  
Business Analytics & Optimization  
IBM Global Business Services  
[greg.greben@us.ibm.com](mailto:greg.greben@us.ibm.com)

# Executive Summary

The use of dashboards in federal government agencies increased dramatically following the Obama administration's Open Government Initiative issued in January 2009, which espoused the principles of transparency, participation, and collaboration. Federal agencies now use dashboards both for internal organizational management and to disseminate performance measures for transparency and accountability.

In February 2009, a month after President Obama's inauguration, his administration implemented [Recovery.gov](#), incorporating a dashboard for transparency and accountability in federal stimulus funding under the 2009 American Recovery and Reinvestment Act. Subsequently, the U.S. Chief Information Officer, Vivek Kundra, implemented the IT Dashboard in June 2009 for accountability and transparency in federal IT investments. The Open Government Directive, issued in December 2009, required the creation of an "Open Government Dashboard."

In August 2010, in advance of the 2010 GPRA Modernization Act (GPRAMA), the Office of Management and Budget (OMB) launched Performance.gov, a central website with dashboards to track key performance metrics of federal agencies. Performance.gov is currently open only to federal government employees. Several additional federal agencies (e.g., the Food and Drug Administration, the Centers for Medicare and Medicaid Services, the United States Patent and Trademark Office) have implemented dashboards to track performance metrics. As described by O'Reilly, "the dashboards are an incredibly ambitious undertaking" (O'Reilly, 2009).

Few defines a dashboard as a "visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance" (Few, 2006, p. 34). Dashboards summarize key performance metrics of organizations. They typically integrate data from different sources and display performance measures through informative graphics. The visualization allows readers to understand complex data in less time than it would take to read similar material located in the text of a full report. At the same time, the dashboards should be self-contained. Dashboards can be static (providing metrics at a particular time, e.g., PDF files) or dynamic (providing metrics in real time, e.g., interactive web dashboards).

In terms of their use, dashboards can be of three types:

- **Operational** (for monitoring in real time)
- **Tactical** (for analysis and benchmarking)
- **Strategic** (for tracking achievement of strategic objectives) (Eckerson, 2006)

There are two key elements in dashboard implementation and use:

- **Dashboard design:** The design is not meant only for aesthetics, but also for easy grasp of actionable data and information. Leading dashboard experts highlight three core principles of design: the dashboard should fit on a single page; the dashboard should be simple;

and it should use the best display medium (i.e., the graphic visual) for communicating data effectively.

- **Dashboard performance measures:** Federal agencies follow GPRAMA requirements in reporting their performance. An agency must carefully select performance metrics to reflect its strategic goals. The measures should be useful to agencies in improving performance (e.g., the face-to-face TechStat sessions used in conjunction with the IT Dashboard to discuss IT investments). The measures should also serve the broader goal of public accountability.

This report examines the emerging implementation and uses of dashboards in the federal government. The intent is to identify practical principles in using dashboards in federal agencies. Case studies of selected federal dashboards are included. The dashboards are both cross-agency and agency-specific. The case studies include:

- The [IT Dashboard](#) operated by OMB's Office of E-Government & Information Technology
- Two financial transparency dashboards ([USAspending.gov](#) and [Recovery.gov](#))
- Two agency-specific dashboards ([Food and Drug Administration's FDA-TRACK](#) and the [U.S. Patent and Trademark Organization's \(USPTO\) Data Visualization Center](#)).

The case studies offer insights into the uses of dashboards. Four lessons can be learned from them.

### **Lesson One: Data Quality is Key to the Credibility of Dashboard Performance Measures**

The dashboards in the case studies (especially the cross-agency ones) have faced data quality issues. This compromises dashboard performance measures and could eventually damage the dashboard's credibility. To overcome some of the data quality issues, standardized data definitions and training of key agency personnel are required. Adopting a standard schema, such as the Extensible Business Reporting Language (XBRL) used in business applications, for federal financial dashboards such as [Recovery.gov](#) or [USAspending.gov](#) would enhance data quality and reporting efficiency.

### **Lesson Two: Best Practices Resources Are Necessary in the Design and Use of Dashboards**

Agencies have different design approaches to dashboards. Whereas the [USPTO](#) dashboards are visually rich, the [FDA-TRACK](#) dashboards are essentially tables. The [Recovery.gov](#) and [USAspending.gov](#) dashboards feature maps. Although design may be idiosyncratic and vary based on technical capacity within the organization, a set of best practices or standards would enhance design quality. The [Usability.gov](#) website, developed a decade ago, enhanced government websites by providing standardized guidelines. A website for standardizing dashboards or giving best practices would be equally useful. Focus group feedback would assist in enhancing the usability of the dashboards as would the creation of communities of practice within government.

### **Lesson Three: Performance Measures Should Reflect Organization Goals**

Performance measures differ based on agency needs. Cross-agency dashboards have common measures. The essential approach should be to align performance measures to organizational goals. This increases the usability of dashboards. Responding to different audiences requires reporting different performance metrics. Indeed, performance measures in some dashboards (e.g., [Recovery.gov](#), [USPTO's Data Visualization Center](#), [FDA-TRACK](#)) evolved in response to different audiences' needs.



**Lesson Four: Dashboards are Only Tools; Effectiveness Depends on Use**

Dashboards are only tools to visualize performance data. Their effectiveness depends on how organizations use them to enhance internal performance and external accountability and transparency. Organizations should be cognizant of both the strengths and weaknesses of dashboards. Dashboards need to be useful to the organization's purposes. In internal organizational management, this implies that dashboards are used in the decision-making process (e.g., the face-to-face sessions based on the Federal IT dashboard and FDA-TRACK to identify weak projects). At the external accountability level, use of dashboards means that agencies are exposing their performance metrics to public scrutiny. In this context, both the dashboard performance measures and the underlying data need to be publicly accessible for credible organizational accountability.

# Introduction

As soon as he took office in January 2009, President Barack Obama signed the *Memorandum on Transparency and Open Government*, affirming his administration's commitment to "creating an unprecedented level of openness in Government" (White House, 2009). The *Memorandum* highlights three essential pillars of open government:

- Transparency
- Participation
- Collaboration

The *Memorandum* instructed the Office of Management and Budget (OMB) to develop an Open Government Directive that federal executive departments and agencies (including independent agencies) are required to comply with. On a separate track, the Obama administration implemented [Recovery.gov](http://Recovery.gov) in February 2009, incorporating a dashboard to track federal stimulus funding under the 2009 American Recovery and Reinvestment Act (Recovery Act).

The *Open Government Directive*, issued in December 2009, established deadlines for actions to be taken by federal agencies. Required actions included:

- Publishing government information online
- Improving information quality
- Creating and institutionalizing a culture of open government
- Creating an enabling policy framework for open government

The *Directive* further instructed federal agencies to have an Open Government Plan and to identify at least one specific, new transparency, participation, or collaboration initiative. Lastly, the directive required creation of an "Open Government Dashboard."

OMB inaugurated Version 1.0 of the Open Government Dashboard within 60 days. Furthermore, in conformity with the transparency initiative, OMB undertook additional tasks or strengthened existing ones. Most of these tasks required dashboards as the public interface for summarizing complex data from the different agencies. In essence, the Obama administration adopted dashboards as a key means of furthering open government at the federal level.

Several dashboards have evolved to provide information about the performance of various federal agencies. Significant examples include:

- IT Dashboard, detailing federal information technology investments
- [Recovery.gov](http://Recovery.gov), the official website for access to data related to Recovery Act spending, including reporting of potential fraud, waste, and abuse

- [USAspending.gov](http://USAspending.gov), a searchable website for obtaining information about federal financial awards under the 2006 Federal Funding Accountability and Transparency Act
- Performance.gov, a cross-agency site used internally by OMB and federal agencies to track agency performance
- Planned and implemented dashboards at several other federal agencies, including FDA and USPTO.

As described by O'Reilly, "the dashboards are an incredibly ambitious undertaking" (O'Reilly, 2009).

Dashboards are becoming an important means of tracking key performance indicators for private, nonprofit, and public organizations. Broadly, dashboards summarize "key performance metrics and underlying performance drivers" (Pauwels, et al., 2009, p. 177). Typically, dashboards display data integrated from multiple sources and exhibited in an easy-to-comprehend, informative graphic representation with explanatory text. This allows a reader to understand complex information in less time than it would take to read a full report. At the same time, dashboards are self-contained in explanation. For example, business dashboards track key indicators with real-time visibility of how the business is performing, with charts, tables, and graphs. Similarly, nonprofits use dashboards to ensure that their activities are mission-oriented.

Government organizations use dashboards not only to track their performance internally, but also to reach out to the public. While there is extensive literature on the use of performance-management dashboards in the private sector (Gasmelseid, 2007; Gitlow, 2005; Hanselman, 2009; Muras, Smith, and Meyers, 2008; Rasmussen, Bansal, Chen, 2009) and design (Ballou, Heitger, and Donnell, 2010; Malik, 2005), a smaller number of research papers on the use of dashboards in government has emerged in the past decade (Edwards and Thomas, 2005; Park and Jamieson, 2009).

This report examines the implementation and uses of dashboards in federal agencies. The case studies presented in the report include five federal dashboards created subsequent to the administration's Open Government Initiative. The intent of the report is to identify lessons learned in using dashboards in government.

# Evolution of Dashboards

## Dashboards in the Private Sector

The concept of dashboards is not new. The *Tableau de Bord* (literally, the dashboard) emerged in France at the turn of the 20th century to improve production processes in firms (Epstein and Manzoni, 1998). It was a reporting tool for top management to get a quick view of the firm's operations and its environment, and could also be used as a diagnostic tool and for hierarchical dialogue with lower management rungs (Bourguignon, Malleret, and Nørreklit, 2004).

In the United States, dashboards evolved in the private sector as a part of the Business Intelligence framework, which was used to analyze data for better decision-making and organizational performance. Few highlights the similarities between dashboards and executive information systems (EIS) which were developed during the 1980s (Few, 2006). The EIS provided a summary of financial measures that could be easily understood by busy executives with little time to spend on information gathering. However, EIS did not gather much momentum since the technology to gather the requisite data from disparate sources was not yet in place.

During the 1990s, the concept of the *balanced scorecard* (BSC) approach, described in Robert Kaplan and David Norton's popular book, emphasized key performance measures from four organizational perspectives: financial, customer, internal-business-process, and learning and growth. (Kaplan and Norton, 1996) The BSC framework included non-financial indicators that could impact organizational performance. Similar to the *Tableau de Bord*, the BSC could be cascaded down to the organization's sub-units for individual managers to align themselves to larger organizational goals. Of course, the *Tableau de Bord* is distinct from BSC in several other respects (e.g., the *Tableau de Bord* does not specifically relate to the four organizational aspects). (See Bourguignon, Malleret, and Nørreklit, 2004; Epstein and Manzoni, 1998).

The imperative for private-sector chief executives to track their organizations' performance increased with the Sarbanes-Oxley (SOX) Act of 2002, enacted following the collapse of a number of major corporate (e.g., Enron) and accounting (e.g., Long-Term Capital Management) firms (Frolick and Ariyachandra, 2006). A key aspect of the SOX Act requires the firm's "principal officers" to certify and approve the integrity of the firm's financial reports (Clarke, 2005; Lam, 2008). Dashboards offer convenient tools for the principal officers (typically, CEOs, CFOs, and CIOs) to track the key performance measures.

## Dashboards in Government

During the 1990s, performance management gained increased prominence in both the public and private sectors. The 1993 Government Performance and Results Act (GPRA) sought to shift the focus of government decision-making and accountability away from *activities* that are undertaken (e.g., amount of grants made) to the *results* of these activities (e.g., program quality). Consequently, the focus was on performance indicators to measure agency outputs, service levels, and outcomes of program activities.

## Technology and Dashboards

The creation of the dashboards became technologically facile with advances in *data warehousing* (a database that could be queried) and *online analytical processing* (OLAP) (selective analysis of the data based on purpose to provide status reports and decision support) (Inmon, Welch, and Glassey, 1997; Jarke, et. al., 2003; Thomsen, 1997). In a dashboard implementation, data are typically collected from different operational units of the organization and then moved into a data warehouse where the data are processed using OLAP to provide an integrated, multidimensional view of the organization's performance—from an overall organizational perspective at the macro level to a detailed perspective of sub-units at the micro-level, often referred to as drill-down. Web-based dashboards thus could potentially provide real-time performance measures culled from several different organizational sub-units on one webpage. Whereas these web-based dashboards are dynamic, providing performance information on the fly, static dashboards (e.g., PDF reports) provide such information at specific times. Many vendors of business intelligence software offer dashboard services.

### Bush Administration

The George W. Bush administration introduced the President's Management Agenda (PMA) Scorecard in 2002 to grade agencies on their management practices. Similar to dashboards, OMB gave federal agencies either a red, yellow, or green light indicating its assessment of how well an agency had completed a checklist of actions on five priority areas. Subsequently the Bush administration created the Program Assessment Rating Tool (PART), which translates GPRA's focus on goals and measurement at the agency level to the program level. OMB led the program reviews on four categories of questions (program purpose and design; strategic planning; program management; and program results/accountability). OMB gave scores on each question and provided an overall rating based on the scores. The PART reviews, scores, and ratings were made publicly available through a website ([Expectmore.gov](http://Expectmore.gov)). Although these were not dashboard reports, they laid the groundwork for the performance indicators to be used.

### Obama Administration

The use of dashboards increased in the federal government after the inauguration of President Obama. When President Obama took office in January 2009, he issued a *Memorandum on Transparency and Open Government*. As McDermott observes, the Obama initiative is built on a base of existing laws and regulations, including the Freedom of Information Act, Paperwork Reduction Act of 1980, and the E-Government Act (and their amendments) (McDermott, 2010). The *Memorandum* explicitly identifies the following as key components of open government:

- **Transparency** implies that government agencies should disclose information about their operations and decisions online in publicly accessible ways.
- **Participation** implies public engagement to enhance government effectiveness, tapping on collective expertise and information distributed across the society.
- **Collaboration** implies using innovative tools, methods, and systems to cooperate among government agencies and with nonprofit organizations, businesses, and individuals in the private sector (Lathrop and Ruma, 2010).

**Recovery.gov.** The American Recovery and Reinvestment Act, passed in February 2009, required the Recovery Act Accountability and Transparency Board to set up a website to “provide data on relevant economic, financial, grant, and contract information in user-friendly visual presentations to enhance public awareness of the use of covered funds” (Section 1526). Recovery.gov incorporated a drill-down dashboard to track the stimulus expenditure.

## Purposes of Dashboards

While a principal purpose of dashboards is for internal management, government organizations also use dashboards for transparency to inform the public about their performance. When deployed over the Internet, dashboards are potentially accessible to anyone. Citizens can therefore monitor an agency's performance, which is crucial for the agency's transparency and accountability. Using the dashboard for transparency in government organizations brings an additional layer of complexity. Dashboards must then not only make sense for internal management purposes, but should also be citizen-oriented and depict organizational performance.

The recent GPRA Modernization Act of 2010 (GPRAMA) includes both external accountability and internal management perspectives:

- **On the external side**, the law (Section 7) requires transparency of agency performance through web-based performance planning and reporting, whereby federal agencies will need to report their performance plans, strategic plans, and performance reports online.
- **On the internal management side**, the law (Section 9) requires federal agencies to designate a Performance Improvement Officer (PIO), who will assist the agency heads in agency performance and personnel performance.

GPRAMA (Section 1122) also requires OMB to set up a single government-wide performance website by 2012. Performance dashboards of federal agencies would thus not only be for internal purposes of management, but also be open to external review by citizens in general.

**Data.gov.** During the first several months of the administration, the administration engaged in internal discussions within the MAX Federal Community (an exchange forum used by OMB and federal agencies) and in a three-phase public consultation (brainstorming, discussion, and drafting, including online discussions using wiki tools) for enhancing open government. These discussions raised the need for publishing raw government data online in machine-readable formats. Consequently, the Council of Chief Information Officers launched Data.gov, a platform for providing access to federal government datasets, in May 2009.

**IT Dashboard.** In June 2009, the U.S. Chief Information Officer, Vivek Kundra, launched the IT Dashboard, a one-stop information clearinghouse allowing the public to track federal spending on information technology initiatives.

**Open Government Initiative.** Following the public discussion on the Open Government Initiative, OMB issued the Open Government Directive in December 2009 (Orszag, 2009). The directive establishes deadlines for action by different agencies. The directive lays out specific actions:

- Publish government information online
- Improve the quality of government information
- Create and institutionalize a culture of open government
- Create an enabling policy framework for open government

The directive also requires agencies to have specific open government plans, incorporating the three aspects of open government in the Presidential Memorandum. The directive specifically requires the creation of an "Open Government Dashboard" (Orszag, 2009, p. 2):

Within 60 days, the Federal Chief Information Officer and the Federal Chief Technology Officer shall create an Open Government Dashboard on [www.whitehouse.gov/open](http://www.whitehouse.gov/open).

The Open Government Dashboard will make available each agency's Open Government Plan, together with aggregate statistics and visualizations designed to provide an assessment of the state of open government in the Executive Branch and progress over time toward meeting the deadlines for action outlined in this Directive.

OMB inaugurated Version 1.0 of the open government dashboard as required by the directive within 60 days. The main purpose of the dashboard is to track agency progress on the deliverables required by the directive, including each agency's open government plan. By early April, 2010, all federal departments published an open government plan, specifying roadmaps for making operations and data more transparent, and expanding opportunities for citizen participation, collaboration, and oversight. The open government dashboard provides an evaluation of the agencies based on 30 specific criteria drawn from the Open Government Directive, grouped into five broad areas (high value data, data integrity, open webpage, public consultation, and open government plan).

**Performance.gov.** In advance of the GPRAMA, OMB inaugurated Performance.gov in August 2010 for use by federal employees to support communications within and between agencies. Although selected elements of the website are expected to be made publicly accessible, it is currently accessible to federal employees only. The website will likely be the platform for performance planning and reporting required under GPRAMA. Agencies can sort their activities by theme on Performance.gov to find other agencies with similar priority goals and coordinate with them (OMB, 2011a).

**Human Resources Dashboard.** The Obama administration plans to implement a Human Resources Dashboard, focusing on employee and manager satisfaction with the hiring process and other key metrics of personnel management. Similar to the IT Dashboard, the HR Dashboard would provide senior leaders and managers with better information on the current status of hiring (OMB, 2011a).

**The OMB 25-Point Plan.** OMB's 25-point plan to reform federal IT management, issued by the Federal CIO in December 2010, includes a key role for dashboards in IT governance in federal agencies (Kundra, 2010). The plan broadly focuses on enhancing internal management of IT implementation in federal agencies in a six-to-18-month time frame. It encompasses two areas in this respect: achieving operational efficiency and managing large-scale IT programs effectively. The 25 points include ambitious goals, for example: turn around or terminate at least one-third of underperforming projects in the IT portfolio; shift to a "Cloud First" policy; and reduce the number of federal data centers by at least 800 by 2015. A major aim of the plan is to streamline governance and improve accountability of IT investments in federal agencies, using data from the IT dashboard. Based on such data, OMB has held TechStat Accountability Sessions, which are face-to-face, evidence-based reviews of agency IT programs with the agency leaders. The sessions analyze federal IT investments with a focus on problem-solving and concrete actions to improve performance. The U.S. CIO's reform plan is to roll out similar TechStat sessions at the bureau level to enhance effective management of large IT programs.

# Key Features of Dashboards

Organizational dashboards are often likened to dashboards in plane cockpits and cars, which allow the pilot or the driver to see instant information about various metrics (e.g., speed, mileage, fuel level) and make travel adjustments or spot vehicular issues on the fly. Organizational dashboards can provide executives with an instant view of the organization's performance metrics on selected dimensions. Broadly, dashboards summarize "key performance metrics and underlying performance drivers" (Pauwels, et al., 2009, p. 177). Like vehicular dashboards, organizational dashboards display performance metrics in a visually engaging way, so that key information is easily understood by executives in a short time.

The vehicular metaphor, however, should be viewed with some caution, since the purposes of vehicular dashboards and organizational dashboards are distinct from one another. Organizational dashboards require more human, political judgment on performance metrics than vehicular dashboards do. Car dashboards do not give historical data; they provide a snapshot of information at a particular time. The warnings on car dashboards, though useful, could arrive too late for appropriate action to be taken (Love and Resnick, 2006). Tufte noted in a response to a blog comment on his website, "It is interesting how lame the dashboard metaphor becomes when taken seriously" (Tufte, 2003a).

Few defines the dashboard as a "visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance" (Few, 2006, p. 34). In other words, a dashboard is a visual display or presentation mechanism; it does not refer to a particular technology. Although there are many dashboard software vendors, dashboards are not solely software products. Before selecting dashboard software to serve as the platform for the organization's performance information, agencies must carefully select the performance metrics to be displayed in visually meaningful ways. Typically, dashboards integrate data from different sources and exhibit them through informative graphics with explanatory captions.

Data visualization allows readers to understand complex data in less time than it takes to read a full report. Unlike PowerPoint, which assists someone in making a presentation, the dashboard itself is the presentation. According to Alexander and Walkenbach, one attribute of the dashboard is that it "contains predefined conclusions relevant to the goal of the dashboard and relieves the reader from performing his own analysis." (Alexander and Walkenbach, 2010, p. 12) In its IT glossary, Gartner describes a dashboard as a "subset of reporting [that] includes the ability to publish formal, Web-based reports with intuitive interactive displays of information, including dials, gauges, sliders, check boxes, and traffic lights. These displays indicate the status of an item or the state of a performance metric compared with a goal or target value." ([www.gartner.com/technology/research/it-glossary/](http://www.gartner.com/technology/research/it-glossary/)) However, the suite of data visualization tools is quite rich, as outlined by Tufte (1997; 2001; 2006) and Few (2004, 2006; 2009a).



In terms of their display, dashboards can be either static or dynamic:

- **Static dashboards**, such as printed reports, are not interactive and cannot be updated on the fly; they provide performance metrics for a specific time (or period of time).
- **Dynamic dashboards**, such as web-based dashboards (or other forms) draw on live information from data warehouses, making them interactive and capable of manipulation by the user. Dynamic dashboards have the power to provide information in real time, based on how often the underlying data are updated.

Government agencies use both forms of dashboards. Often, static dashboards are deployed over the Internet as PDF files that can be downloaded by users. Deploying dynamic dashboards over the Internet, however, requires more advanced technical capacity (e.g., data warehousing, OLAP). Dynamic dashboards, although more technically challenging, may be preferred over static dashboards since they are more interactive and provide real-time information.

Based on the end purpose of a dashboard's use, Eckerson identifies three types of dashboards:

- **Operational dashboards** are used mainly for monitoring purposes. Front-line workers use operational dashboards to monitor operational processes, events, and activities on a real-time basis.
- **Tactical dashboards** are used mainly for analytical purposes. Executives use tactical dashboards to review and benchmark performance of departmental activities and processes. Departmental managers use the dashboards for monitoring their unit's progress.
- **Strategic dashboards** are used by executives to track progress toward achieving strategic objectives. These dashboards are often implemented using the balanced scorecard framework (Eckerson, 2006).

Hybrid dashboards cross over the three types in their use and function. Eckerson's typology is mainly oriented toward internal management of an organization. However, as noted earlier, dashboards in government are not only intended for internal management, but also to reach out to citizens for accountability and transparency. In this context, operational dashboards could be used for internal monitoring; they could be less useful for accountability. Tactical and strategic dashboards could be used for both internal management and external outreach purposes.

There are two key elements in the implementation of the different types of an organizational dashboard:

- The design of the dashboard (since it is a data visualization technique)
- Performance metrics (i.e., the content) used in the dashboard

These two elements are crucial to the implementation and use of dashboards.

## Dashboard Design

Since dashboards are essentially data visualization techniques, the dashboard design is important in deploying them. The design is meant not only for aesthetics, but also for easy grasp of the underlying data and information for users to act upon. Poorly designed dashboards could lead to erroneous conclusions or time-consuming interpretation. Well-designed dashboards with informative graphics could capture the user's imagination. A compelling story of a good graphic is told by *New York Times* columnist Nicholas Kristof, who wrote a series of articles on Third World diseases in January 1997. In a subsequent interview, Bill and Melinda Gates told Kristof they were impressed with the series, which had gotten them thinking about public health in the Third World. Gates said that it was not the text itself, but a graphic in the article

that had captured his imagination and stayed with him. The graphic was a simple two-column insert, listing Third World health problems and the number of lives claimed. Kristof concluded, “No graphic in human history has saved so many lives in Africa and Asia.”<sup>1</sup> This demonstrates the significant role that graphics can play in contributing to the understanding of an issue.

Tufte provides a useful analysis of the uses and misuses of data visualization techniques (Tufte, 1997; 2001; 2006). Few provides specific guidance on the design of dashboards (Few, 2006). Several other authors have also focused on the design of dashboards (Richardson, 2009). Fundamental aspects of dashboard design include:

- **Dashboards should fit on a single page (or screen).** Few argues that all the key information of interest in a dashboard should fit on a single page (or screen) for easy visualization. Scrolling through screens or viewing multiple screens fragments the data and the user may not be able to make connections between the various performance indicators of interest (Few, 2006).
- **Dashboards should be simple.** Dashboards should provide the needed information in a sparse way. Tufte refers to this as maximizing the data-ink (i.e., the ratio of data-ink to total-ink). Visual components that are purely decorative in nature (that contribute to “chart junk”) should be minimized (Tufte, 2001).
- **Dashboards should use the best display medium for communicating data effectively.** There are several ways of summarizing data: tables, graphs, icons, text (Few, 2006). Appropriate selection of the medium is important for an effective dashboard. For example, tables allow identification of individual values more efficiently than a graph does. Graphs can condense complex data to give visual trends or comparison between data points. Icons can be used to highlight alerts (similar to stoplights in roads), up or down movement, or on/off state. Text can supplement graphics for self-contained explanation of dashboard.

Tufte is critical of standard presentations using PowerPoint (Tufte, 2006). He argues that PowerPoint’s cognitive style affected the nature of engineering analysis and debates among NASA engineers and bureaucrats about the damage to the Columbia orbiter in 2003. Other criticisms of PowerPoint and similar slideware presentations have emerged. Critics argue that the hierarchical bullet points in the presentations tend to ignore the richness of the larger context, and that PowerPoint “stifles discussion, critical thinking and thoughtful decision-making” (Bumiller, 2010). Similar criticisms of dashboards could emerge if the quality of design and meaningful data visualization are not taken into account (Hymovitz, 2005; Matthews, 2011).

## Dashboard Performance Measures

The dashboard’s content in terms of performance measures greatly influences its use. The choice of performance measures can differ based on the type of dashboard. Operational dashboards used by front-line personnel dealing with day-to-day activities of the organization require detailed metrics related to their daily operations. Tactical dashboards used by executives require comparative metrics to review and benchmark data of the departments. Strategic dashboards used by organizational leaders require performance indicators with respect to their organizational goals. Strategic dashboards often use the balanced scorecard framework, where the leading and lagging performance indicators with respect to the four perspectives are identified. Because government organizations include a large service component, they need to include meaningful service indicators which would differ from the financial bottom-line indicators in the private sector.

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1. Based on “Talk to the Newsroom: Graphics Director Steve Duenes,” *New York Times*, February 25, 2008 (<http://www.nytimes.com/2008/02/25/business/media/25asktheeditors.html?pagewanted=3>).

Parmenter identifies four types of performance measures in the private sector:

- **Key Results Indicators (KRIs)** explain how an organization has performed on a specific perspective or a critical success factor.
- **Results Indicators** explain what an organization has done.
- **Performance Indicators** describe what an organization does.
- **Key Performance Indicators (KPIs)** represent measures focusing on those aspects of organizational performance that are most critical for the current and future success of the organization (Parmenter, 2010, p. 1) .

In Parmenter's approach, results are financially oriented. KPIs are, however, distinctive: they are non-financial measures; are measured frequently; are acted on by the CEO and the senior management team; clearly indicate what action is required by the staff; tie responsibility to a team; have a significant impact; and encourage appropriate action. Organizational leaders need to buy into the KPIs used, and the KPIs need to be aligned with the organization's vision and mission.

In the context of government organizations, the 1993 GPRA and its recent update, GPRAMA, require federal agencies to establish performance goals and identify a set of performance indicators to be used in measuring progress toward each goal. These indicators include customer service measures (service delivery assessments such as quality, timeliness, and satisfaction); efficiency measures (ratio of inputs, e.g., employee costs or hours, to outputs, e.g., amount of products or services delivered); and outcome measures (assessment of the results of a program activity compared to its intended purpose). Given the legal imperative of the GPRA, these measures form a significant part of the suite of KPIs for federal agencies. However, these measures need to be customized to the agency's strategic mission and goals.

Metzenbaum argues that despite the GPRA and PART, there have been systematic problems since meaningful performance information, such as performance levels, performance trends, and targets, is not readily available. Agencies have often been unable to show how their GPRA goals harmonized with the PART targets. According to Metzenbaum, the key performance management challenge is "to *use*—not just *produce*—performance goals and measures" (Metzenbaum, 2009, p. 7). She proposes four guiding principles relevant to implementing performance measures in federal agencies:

- Measures should communicate direction of performance trends and targets (i.e., improvement or decline), rather than target attainment and ratings (which are limited performance indicators)
- Agencies should be encouraged to improve performance through diagnostic analysis, data-driven discussion, practical experiments, and knowledge sharing with others who could analyze the patterns and inform decision-making
- Performance information should be presented in ways that meet the needs of specific stakeholder audiences
- Accountability mechanisms need to be structured in a way to encourage and inspire agencies, not embarrass, reprimand, or punish them

OMB's focus on target attainment, PART ratings, and President's Management Agenda Scorecard, for example, implicitly "punishes programs when targets are not met even when a program applies smart strategies based on available evidence, collects relevant data, and exerts strong effort" (Metzenbaum, 2009, p. 22).

# Case Studies: Federal Dashboards

## Introduction to Case Studies

It is instructive to examine federal dashboards to gain insights into their deployment and use. The use of dashboards is an evolving experience. Technological options for deploying dashboards are also evolving quickly. The cloud solution for dashboards, for example, is a recent phenomenon. This report focuses on a broad array of publicly accessible federal dashboards. The dashboards selected for the case studies include federal government-wide dashboards and those developed for specific agency purposes. The first case study is the IT Dashboard, which was among the first to be implemented and has been used extensively by OMB to streamline IT investments in federal agencies. The next is the set of dashboards used in the context of federal financial transparency ([USAspending.gov](http://USAspending.gov) and [Recovery.gov](http://Recovery.gov)). These dashboards are government-wide. The next two dashboards, from the U.S. Patent and Trademark Office (USPTO) and the Food and Drug Administration (FDA), are agency-specific.

## The IT Dashboard

Information technology investments in the federal government have been estimated at \$79 billion in 2011. To ensure greater transparency, OMB (under the Federal Chief Information Officer's leadership) launched the IT Dashboard on June 30, 2009, as a public website to

### Other Examples of Dashboards

There are additional cross-agency (e.g., OMB's [Performance.gov](http://Performance.gov)) and agency-specific dashboards (e.g., the Center for Medicare and Medicaid Services' (CMS) dashboards) that are emerging. Additional dashboards are in the pipeline throughout the federal government. Dashboards not covered in this report include:

- **Performance.gov**, launched by OMB as a cross-agency, internal management tool for federal agency performance measures, coordination among federal employees, and communications support for OMB and the agencies. The site is not yet publicly accessible. OMB plans to open portions of the site to the Congress and the general public during the summer of 2011. The site is significant since it will likely become the mechanism for reporting performance achievements required under the 2010 GPRAMA. OMB bases its quarterly Priority Goal Constructive Performance Reviews on the site. Using the site, agencies provide quarterly updates of their priority goals, action plans, strategies, and status on measures and milestones.
- **The CMS dashboards**, including the Medicare Inpatient Hospital Dashboard and Medicare Prescription Drug Benefit Dashboard BETA. The former provides statistical views of the Inpatient Prospective Payment System data relating to claims payment and volume; the latter is a beta dashboard that offers statistical views of the Prescription Drug Event data relating to drug costs and utilization. Insights gained from experiences of the already functioning dashboards could be useful to the design and utilization of emerging and planned dashboards in the future.

## The IT Dashboard

An Official Website Of The United States Government Thursday, June 16, 2011 Login

# IT DASHBOARD

HOME PORTFOLIO TOOLS DATA FEEDS FAQ

## DATA IN MOTION

Use the trends analysis tool to see how IT spending changes over time and between agencies. Use animation and color on interactive column graphs and scatterplots to make comparisons.

View More Data

1 2 3

### 04. Mission Area Spending

2007

Army (Dept of) Agriculture (Dept of) National Science Foundation

### Welcome to the IT Dashboard

The IT Dashboard is a website enabling federal agencies, industry, the general public and other stakeholders to view details of federal information technology investments.

The purpose of the Dashboard is to provide information on the effectiveness of government IT programs and to support decisions regarding the investment and management of resources. The Dashboard is now being used by the Administration and Congress to make budget and policy decisions.

### Open Source

In response to high demand from federal agencies and the software development community, we have now made the [source code](#) of the IT Dashboard available to the public. This first open source release represents a starting point, enabling communities of interest to adapt and mature their own versions of the Dashboard to their own unique needs. We invite [suggestions and contributions](#) from the user community, the software development community and the general public.

### Mobile Access

Now you can get updates from the IT Dashboard anywhere you use your mobile device. Access Mobile version at <http://www.itdashboard.gov/mobile>

#### WELCOME TO THE IT DASHBOARD

Overview

#### COMPARE

types of spending over time

Compare

#### EXPLORE

spending throughout the portfolio

Explore

#### FIND IT INVESTMENTS

search and filter techniques

Search & Filter

Spread The Message: Facebook Twitter

USA.GOV USASPENDING.GOV WHITEHOUSE.GOV

Source: <http://it.USAspending.gov/>

provide information about IT investments. Data for the dashboard are drawn from the Exhibit 53, required to be submitted annually by federal agencies in response to OMB Memorandum M-02-01 (Guidance for Preparing and Submitting Security Plans of Action and Milestones). Exhibit 53, which reports IT investments, also requires agencies to identify major investments called “Capital Asset Plans” (Exhibit 300). The dashboard includes general information on over 7,000 investments (from Exhibit 53), and detailed data for over 800 major investments (from Exhibit 300) reported by 27 agencies. In essence, the dashboard displays basic investment information (e.g., investment name, description), CIO’s information (e.g., name, contact e-mail, photo, bio), awarded contracts (e.g., obligation amount, vendor name, type, contract start and end dates), performance information (e.g., measurement indicator, baseline, actual

results, target, rating), and cost/schedule ratings (milestone description, percent completed, planned completion date, planned cost, actual cost, cost variance).

From a design perspective, the dashboard includes five tabs. The tabs are:

- **Home** presents a quick overview of federal IT investment data.
- **Portfolio** includes overall rating of the federal government and the individual agencies/investments.
- **Tools** gives the trends and current-year dashboard ratings.
- **Data Feeds** provides customization of the dashboard ratings data.
- **FAQ** lists frequently asked questions.

At the end of March 2011, CIO Kundra's office made the dashboard software open source, to enable tapping into the "collective talents and ingenuity of the American people, to enhance functionality, improve the code and address existing challenges," and to enable other interested CIOs in local and state organizations to implement similar dashboards (Kundra, 2011).

From a performance measure perspective, the IT investments' ratings in the dashboard are based on three components: the agency CIO's evaluation, costs, and schedule. IT investments are evaluated using a set of pre-established criteria (risk management, requirements management, contractor oversight, historical performance, human capital, and other factors deemed by the CIO). The CIO then provides the evaluation rating on a five-point scale (1=high risk, 5=low risk) which is then color-coded as red (1, 2), yellow (3), or green (4, 5). The CIO can update the rating at any time throughout the life of the investment. Cost rating (and cost milestone rating) is based on cost variance of the project (less than 10 percent is color-coded green; 10 percent to less than 30 percent is coded yellow; and above 30 percent is coded red). Similar to the cost rating, the schedule rating is based on schedule variance. To compute overall rating the three values of evaluation, cost, and schedule ratings are weighted equally. However, if a CIO evaluation is lower than or equal to both the cost and schedule ratings, the CIO evaluation becomes the overall rating.

The data displayed in the dashboards are public data culled from Exhibits 53 and 300. Sensitive procurement data are not displayed in the dashboard; only the public procurement data obtained from [USAspending.gov](http://USAspending.gov) (which pulls data from the publicly accessible Federal Procurement Data System) are displayed. The data updates can be made only by agency officials with valid MAX credentials, using XML API (System-to-System Integration or Manual XML Load). The two lists of Exhibit 53 and Exhibit 300 data elements with descriptions, source, and XML schema fields populated in the dashboard are available at <http://it.USAspending.gov/faq-agencies/exhibit-X-fields> (where X=53 or 300, as appropriate). The agency CIO's information is drawn from <http://www.cio.gov>. The agency CIO's information gives credence to the CIO evaluation from the viewpoint of public accountability and transparency.

Under the U.S. CIO's leadership, the IT Dashboard made remarkable progress within the first few months of its launch. Agency CIOs had evaluated all IT projects within two months of the IT Dashboard's launch. The evaluations lead to early suspensions or terminations of projects (e.g., the Department of Veterans Affairs suspended 45 projects, of which 12 were eventually terminated).

In January 2010, the U.S. CIO began to use the information from the IT Dashboard to engage agency CIOs and staff in face-to-face TechStat sessions to review the IT investments. The TechStat face-to-face sessions were essentially modeled after the New York's Compstat and Baltimore's CitiStat programs. A TechStat session is an intensive review of an IT investment,

based on the data from IT Dashboard. The session is triggered when an agency determines that a project is underperforming, based on the IT Dashboard and other sources. In the session, OMB officials, the agency CIO, and other agency IT project managers meet for an hour-long review, focusing on the management of the investment, performance data, and opportunities for corrective action. The TechStat sessions conclude with clear plans for corrective actions to turn around a troubled or failing program, potentially even resulting in program suspension or termination. OMB conducted 58 TechStat sessions by December 2010 (GAO, 2011, p. 10).

According to Kundra, the TechStat reviews of high priority and financial systems alone have led to “over \$3 billion in life-cycle cost reductions, and have reduced time to delivery from over two years to eight months” (OMB, 2011b, p. 3). In his 25-point plan, the U.S. CIO aims to expand the TechStat reviews to agency levels, and keep OMB’s direct involvement at a limited number of highest-priority cases. Toward that end, over 130 agency representatives were trained and eight agencies had conducted their own TechStat sessions (OMB, 2011b, p. 9). Drawing on the success of the TechStat sessions, the Office of Federal Procurement Policy implemented AcqStat sessions to bring together acquisition professionals for discussions which would lead to more efficient procurement processes.

While the IT Dashboard has indeed been useful in enhancing transparency and accountability in IT investments, there have been two principal sets of criticisms. The first set of criticisms relate to the design. Few gives a detailed critique of the IT Dashboard’s design in his blog. His criticisms are:

- Morphing of the indicators in the “Home” tab every few seconds (which prevents a user from taking some time to review the indicators)
- Ineffective use of graphics (e.g., pie charts) resulting in “chart junk” in the performance information
- Lack of appropriate labeling
- Ineffective design of the treemap
- Ineffectiveness of animation in conveying performance information over time (Few, 2009b)

Similar criticisms were made by Grimes (Grimes, 2009). While the finer design aspects could be subjective, Few’s observations are relevant to improved citizen feedback and more effective use of the IT Dashboard.

Another set of criticisms concerns inaccuracies in the performance measures of cost and schedule. The Government Accountability Office (GAO) conducted two reviews of the IT Dashboard since it was launched. The first GAO review concluded, “OMB has taken significant steps to enhance the oversight, transparency, and accountability of federal IT investments by creating its IT Dashboard” (GAO, 2010a, p. 19). The GAO report also highlighted that the cost and schedule ratings were not consistently accurate for selected agencies, and recommended that OMB develop and issue clear guidance on standardizing milestone reporting on the Dashboard. OMB accepted the recommendation and created a working group to develop such guidance. The GAO report also found that a majority of the agencies in the study did not use the IT Dashboard for management purposes. Other agencies indicated that they use the Dashboard to supplement their existing management processes.

The second review noted that OMB had made several efforts to increase the Dashboard’s value as an oversight tool, using the data to improve federal IT management. At the same time, GAO found that performance data inaccuracies remained: “The ratings of selected IT investments on the Dashboard did not always accurately reflect current performance, which is counter to the Web site’s purpose of reporting near real-time performance ... These inaccuracies can be

attributed to weaknesses in how agencies report data to the Dashboard, such as providing erroneous data submissions, as well as limitations in how OMB calculates the ratings” (GAO, 2011, p. 1). The GAO report recommended improvements in the dashboard’s rating accuracy and increased reliability of data based on addressing the inconsistency between IT Dashboard and program baselines, reporting of erroneous data, and unreliable source data.

## Federal Financial Transparency Dashboards

There are two principal sites for federal financial transparency: [USAspending.gov](http://USAspending.gov) and [Recovery.gov](http://Recovery.gov). These sites are mainly oriented toward disseminating federal financial data. The sites incorporate dashboards with financial indicators. [USAspending.gov](http://USAspending.gov) was launched in December 2007 in response to the Federal Funding Accountability and Transparency Act, which required OMB to maintain a single, searchable website that contains information on all federal spending awards (FFATA, P.L.109-282, as amended by section 6202(a) of P.L. 110-252). [Recovery.gov](http://Recovery.gov), launched in February 2009, was mandated by the American Recovery and Reinvestment Act of 2009 to “foster greater accountability and transparency in the use of funds made available in this Act.”

### [USAspending.gov](http://USAspending.gov)

The [USAspending.gov](http://USAspending.gov) site provides data about contracts, grants, loans, and other types of spending in the federal government. The spending data required are:

- Name of the entity receiving the award
- Award amount
- Award information (transaction type, funding agency, etc.)
- Entity location
- Unique identifier of the entity receiving the award

From a design viewpoint, the site is organized into eight tabs. Of these, two tabs are dashboards, providing financial indicators:

- **Summaries** give prime award spending data by agency, prime awardee, and location. The financial information provided includes grants, direct payments, insurance, loans, and other assistance. In December 2010, the site began to provide sub-award data on contracts and grants by prime awardee, sub-awardee, and location.
- **Trends** give an interactive interface for showing different types of federal spending for the last 12 years. Users can select a trend by:
  - Place (e.g., state, congressional district)
  - Contract views (e.g., extent competed, contract, funding agency, products or services purchased)
  - Assistance views (by assistance, recipient, and Catalog of Federal Domestic Assistance)
  - Charge cards (by agency, type of spending)

Spending can be customized by contracts, grants, loans and guarantees, direct payments, insurance, and others. The data can be filtered by agency, state, district, charge card, fiscal year, and more. The resulting data can be displayed as a list view, or as a graph view (which could also be animated for indicating the trends over time).



## USAspending.gov

The screenshot shows the USAspending.gov website. At the top, it is identified as an official web site of the United States Government, dated Thursday, June 16, 2011. The navigation menu includes Home, News, Summaries, Trends, Data Feeds, Opportunities, Sub-award Documents, and FAQs. A search bar is located below the menu, with a 'Search' button. Below the search bar are links for 'Prime Award Advanced Search' and 'Sub-award Advanced Search'. The main content area is divided into three sections: 'Popular Requests' with a list of categories like Gulf Oil Spill Contracts, Construction Contracts, Housing Assistance, Student Assistance, Research and Development Contracts, and Higher Education Grants; 'Spending Trends' featuring a scatter plot of Grant Spending vs. Contract Spending over time; and 'What's new' with a sign-up form for updates and a note about tracking sub-award data. The footer includes logos for IT Dashboard, Data.gov, Recovery.gov, Whitehouse.gov, and USA.gov.

Source: <http://USAspending.gov>

The remaining six tabs are related to dissemination of financial data:

- **Home** gives searchable interface for the spending data.
- **News** provides updates on the current activities undertaken in the site.
- **Data Feeds** provides customized downloadable data.
- **Opportunities** provides links to grants, jobs and other federal financial opportunities.
- **Sub-award Documents** gives links to FFATA sub-award policies.
- **FAQs** lists frequently asked questions.

From a measures perspective, the performance data on USAspending.gov are mainly the dollar amounts by different categories of spending (contracts, grants, loans, direct payments, insurance, and other). The data for the spending are drawn from:

- Federal Procurement Data System—Next Generation (FPDS-NG, for contract procurement)
- Federal Assistance Award Data System PLUS (FAADS PLUS, for grants, loans, direct payments and other assistance transactions)
- SmartPay (charge card data provided by the national banks with whom master contracts are negotiated)
- FAADS (for assistance award actions provided by the grant systems)

The data are validated through:

- Dun & Bradstreet (D&B, for verifying DUNS numbers, which are unique identifiers for recipients)

- Catalog of Federal Domestic Assistance (CFDA, for CFDA numbers and program titles)
- FFATA Sub-award Reporting System (FSRS, for sub-award and executive compensation data; prime contractors)
- Central Contractor Registration (CCR, for verifying registration of entities with the federal government)

In September 2008, OMB launched the Data Submission and Validation Tool (DSVT) to upload data directly to [USAspending.gov](http://USAspending.gov). The DSVT began to streamline the submission of data files on the Internet, including real-time feedback on file validation, and to track historical data submissions.

Although [USAspending.gov](http://USAspending.gov) represents an advance in financial transparency, the site has been criticized for its data inaccuracies. In its evaluation, the GAO concluded, “Until OMB and agencies better ensure that complete and accurate information is included on [USAspending.gov](http://USAspending.gov), the Web site will be limited in providing the public with a view into the details of federal spending” (GAO, 2010b, p. 3). Nonprofit groups engaged in federal accountability and transparency have also been critical of data accuracy. The Sunlight Foundation found that the site had misreported \$1.2 trillion dollars in spending in 2009 (late, incomplete, or inconsistent with other information sources that track federal spending); the identifiers were also criticized as poorly designed, unreliable, and barriers to use of the data (Miller, 2011). In her Congressional testimony, Miller argued that agencies need to take their reporting responsibilities more seriously and ensure that accurate data are uploaded.

### [Recovery.gov](http://Recovery.gov)

The Recovery Act was passed in February 2009 in response to the economic crisis. The act had three goals: to create new jobs and save existing ones; spur economic activity and invest in long-term growth; and foster greater accountability and transparency in government spending. A total of \$787 billion (the stimulus money) was allocated to be spent by 28 federal agencies: \$288 billion in tax cuts and benefits; \$224 billion for education, health care, and entitlement programs; and \$275 billion in federal contracts, grants, and loans.

To enhance accountability and transparency, the Recovery Act established the Accountability and Transparency Board as an independent agency to track funding and to maintain a public website for disseminating funding information. The Board launched [Recovery.gov](http://Recovery.gov), an online mechanism for tracking the stimulus funding. The [Recovery.gov](http://Recovery.gov) site was launched on February 17, 2009, the day the President signed the Recovery Act. The site was expected to give user-friendly tracking tools in the form of charts, graphs, and maps that provide national overviews or display specific zip codes. The site is also meant to be a mechanism for the public to report suspected fraud, waste, or abuse related to the stimulus funding. The site also reports the number of complaints of wrongdoing and the number of triggered investigations.

In July 2009, the Recovery Board and the General Services Administration awarded an \$18 million contract for website redesign, website hosting and operations, content management, and labor support. The contract was criticized in the popular press as being too expensive. A newly designed site was launched in September 2009 (with updates in the subsequent month), based partly on the focus groups that were conducted to obtain feedback on the content, functionality, and usability of the site. The site was moved to a cloud computing environment in May 2010, using [Amazon.com](http://Amazon.com)'s EC2 commercial cloud service offering.

The data for [Recovery.gov](http://Recovery.gov) are uploaded through [FederalReporting.gov](http://FederalReporting.gov) (also maintained by the Board), which is the central nationwide data collection system for federal agencies and recipients of federal awards under section 1512 of the Recovery Act. Award recipients have used

## Recovery.gov



Source: <http://www.recovery.gov/Pages/default.aspx>

the site to fulfill their quarterly reporting obligations since October 2009. Federal agencies can submit reports, view and comment on reports, and update or correct reports. Data submitted to [FederalReporting.gov](http://www.federalreporting.gov) are reviewed by the funding or awarding agency before being made public (generally in two weeks) on [Recovery.gov](http://www.recovery.gov).

In terms of design, [Recovery.gov](http://www.recovery.gov) consists of nine tabs. Of these, the Home tab provides a quick summary dashboard. The tab features an overview of the three main areas of recovery funding, funds awarded under contracts, grants, and loans, jobs created, and an interactive map of the funding distribution. Besides this tab, one other tab—Where is the Money Going?—presents the performance dashboard of the Recovery Act. In terms of performance metrics, the tab provides exhibits of recipient-reported and agency-reported information on Recovery Act awards. The measures are available for the macro national level, the state level (each state maintains its own website too), and at the micro zip-code level. The Where is the Money Going? tab is organized into seven sections:

- **Overview of Funding** gives the total funding distributed within the three main Recovery Act categories: Tax Benefits; Contracts, Grants and Loans; and Entitlements. It includes the breakdown of funding for the specific programs within each category and by agency.
- **Recipient Reported Data** come from the recipients of federal contract, grant, and loan awards (entitlements and tax benefits are not included). It includes additional features, such as an awards map of recipients geocoded by place, quarterly summary, state/territory

## Recovery.gov

Text -A A +A Google Translate RSS Feeds

RECOVERY.GOV TRACK THE MONEY

Recovery.gov is the U.S. government's official website that provides easy access to data related to Recovery Act spending and allows for the reporting of potential fraud, waste, and abuse.

REPORT FRAUD, WASTE & ABUSE

Connect With Us [Facebook] [Twitter] [LinkedIn] [YouTube] [Blog]

All of Recovery.gov Search Go

Looking For ? HOME ABOUT ACCOUNTABILITY WHERE IS THE MONEY GOING? OPPORTUNITIES NEWS FAQs & RESOURCES CONTACT US SITE INDEX

Home > Where is The Money Going?

» Overview of Funding  
» Recipient Reported Data  
» Recovery Explorer  
» Maps  
» Agency Reported Data  
» Images of Recovery

**See Where the Money Is Going**

» Go to the Recipient Reported Data Map

**WHERE IS THE MONEY GOING?**

Maps, charts, and graphs display recipient-reported and agency-reported information on Recovery Act awards. All the recipient-reported award numbers throughout the section are cumulative (February 17, 2009 to March 31, 2011); however, the job numbers reported are for Quarter 1, 2011 only.

**Overview of Funding**  
A breakdown of Recovery funding by Tax Benefits, Contract, Grant, and Loan awards, and Entitlements, including all the programs and Inspectors General reports for each category.

**Recipient Reported Data**  
Maps, charts, and graphs of cumulative and quarterly award information reported by Recovery recipients.

**Recovery Explorer**  
Create your own customized charts and graphs using the recipient reported data

**Maps**  
Interactive maps showing all Recovery contracts, grants, and loans; states with the highest number of non-reporting recipients; and the Lights-On map designed by Edward Tufte. And maps that compare Recovery funding to other data using a side-by-side mapping tool.

**Agency Reported Data**  
Weekly Financial and Activity Reports filed by each federal agency distributing Recovery funds, as well as the agencies' overall Recovery plans, national totals by states, and non-competitive/non-fixed price contract information.

**Images of Recovery**  
A slideshow of Recovery projects on the Recovery.gov Flickr account.

Required Plug-ins

SHARE/PRINT

Accessibility Contact Information Copyright Information FOIA No FEAR Act Posting Guidelines Privacy Policy Site Index

Source: <http://www.recovery.gov/Transparency/Pages/WhereistheMoneyGoing.aspx>

summaries, jobs summary, state/territory totals by award type, state/territory totals by agency, late reporters, and more.

- **Recovery Explorer** gives users the ability to create and customize charts and graphs (e.g., bar charts, tree graphs, trends) with the prime recipient reported data.
- **Maps** gives links to a set of interactive maps powered by ArcGIS. The maps include a featured map (Completed Recovery Awards Map), which gives the completed contract, grant, and loan awards. There are more than dozen other map links (e.g., Jobs Training Awards vs. Unemployment; Recipient Reported Jobs by State; Recovery Awards vs. Unemployment; etc.). One map, called Lights-On, was designed and created by Edward Tufte. It shows the distribution of Recovery awards (each dot represents an award in the map).
  - Comparison maps include a set of two maps displayed side by side, each based on themes selected from a drop-down menu. The left-hand menu includes funding categories (e.g., total recovery funding, bridge funding, broadband funding). The right-hand menu features recovery activities (e.g., unemployment rate, bridges needing rehabilitation, broadband connectivity).
- **Agency Reported Data** include agency reports, agency funds by state, non-competitive and non-fixed price contracts, and maps of agency funding for the country and by states. The

sources for this data include [FederalReporting.gov](http://FederalReporting.gov), Federal Procurement Data System, and [USAspending.gov](http://USAspending.gov).

- **Images of Recovery** shows pictures of projects using the recovery funding (featured in the Recovery.gov group on Flickr).

Award recipients began their quarterly reporting in October 2009. However, the first round of reporting contained errors. Congressional districts and zip codes didn't match to the recipients' location, creating an illusion of phantom areas. One report, for example, identified that \$6.4 billion was spent in 440 phantom congressional districts ([watchdog.org](http://watchdog.org), 2009). The data errors received much attention in the popular media, including a late-night television comedy show (The Colbert Report). Indeed, an early GAO report observed, "While recipients GAO contacted appear to have made good faith efforts to ensure complete and accurate reporting, GAO's fieldwork and initial review and analysis of recipient data from [www.recovery.gov](http://www.recovery.gov), indicate that there are a range of significant reporting and quality issues that need to be addressed" (GAO, 2009, p. 15). Some of the data issues were fixed subsequently.

With experience, award recipients found greater ease in meeting the reporting requirements, although a few continued to face difficulties in the performance metric of jobs created under the Act (GAO, 2010c). Due to highly publicized oversight over Recovery funding recipients who do not report their data, the number of such non-reporters fell drastically from 4,359 in the first reporting period to 366 in the latest period (March 2011). The site also overcame early criticism and has received praise and awards for its transparency and accountability, including the 2010 Webby, 2010 Gold Addy, and the 2010 Web Marketing Association Award—Outstanding Website. It was ranked in the top five government websites by [Congress.org](http://Congress.org).

## Agency-Specific Dashboards

A few federal agencies have implemented dashboards to track their agency-specific performance metrics. Two such dashboards are included here: the [FDA-TRACK](#) and [USPTO's Data Visualization Center](#). The two dashboards have different approaches in terms of their design and use, as discussed below.


### FDA-TRACK


The Food and Drug Administration (FDA) is an agency within the Department of Health and Human Services (DHHS). It has a public health mission, to ensure the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, food supply, cosmetics, and products that emit radiation; and to regulate the manufacture, marketing, and distribution of tobacco products. The FDA implemented FDA-TRACK in April 2009 as an agency-wide performance management program in direct response to President Obama's Open Government Initiative.

FDA-TRACK was a flagship initiative for the DHHS Open Government Plan. TRACK is an acronym for the program's five major objectives:

- **Transparency** (to allow third parties to look into how FDA performs its work)
- **Results** (to highlight performance measures and results aligned with FDA's mission)
- **Accountability** (to require senior managers to develop, track, and report performance and to hold the program offices accountable for their priorities, plans and results)
- **Credibility** (to encourage sharing of information about FDA performance and to obtain suggestions for improvements)

## FDA-TRACK Dashboards


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### Dashboards

Sign up to receive FDA-TRACK email updates

Each FDA-TRACK program office collects, analyzes, and reports its performance measures and results via FDA-TRACK dashboards. These FDA-TRACK dashboards may include one or several program offices which contribute to similar public health objectives or program areas.

FDA anticipates that as the agency gains experience with measures, some may be changed to better capture important data or goals. Updated performance measures and results are posted to each dashboard approximately 30 days after each quarterly briefing. Please email us at [FDATRACK@fda.hhs.gov](mailto:FDATRACK@fda.hhs.gov) if you need help accessing this information.

For more information on how program offices are organized and how performance measures and results are reported, please visit the FDA-TRACK Program Areas section of this site.

**Resources for You**

- [FDA-TRACK Glossary](#)
- [FDA Acronyms](#)

**FDA-TRACK Cross-Agency Dashboards**

- [FDA-TRACK Advisory Committees Dashboard](#)
- [FDA-TRACK Egg-TRACK Dashboard](#)
- [FDA-TRACK Freedom of Information Act \(FOIA\) Dashboard](#)
- [FDA-TRACK Health Care Reform Dashboard](#)

**FDA-TRACK Center for Biologics Evaluation and Research (CBER) Dashboards**

- [FDA-TRACK CBER Cross Management Support Offices Dashboard](#)
- [FDA-TRACK CBER Cross Program Support Offices Dashboard](#)
- [FDA-TRACK CBER Research and Review Offices Dashboard](#)

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- [FDA-TRACK CDER Office of New Drug Quality Assessment Dashboard](#)
- [FDA-TRACK CDER Office of Surveillance and Epidemiology Dashboard](#)
- [FDA-TRACK CDER Office of Testing and Research Dashboard](#)
- [FDA-TRACK CDER Office of Translational Sciences Dashboard](#)

**FDA-TRACK Center for Devices and Radiological Health (CDRH) Dashboards**

- [FDA-TRACK CDRH Management Dashboard](#)
- [FDA-TRACK CDRH Office of Communication, Education, and Radiation Programs \(OCER\) Dashboard](#)
- [FDA-TRACK CDRH Office of Compliance \(OC\) Dashboard](#)
- [FDA-TRACK CDRH Office of Science and Engineering Laboratories \(OSEL\) Dashboard](#)
- [FDA-TRACK CDRH Office of Surveillance and Biometrics \(OSB\) Dashboard](#)
- [FDA-TRACK CDRH Premarket Dashboard](#)

**FDA-TRACK Center for Food Safety and Applied Nutrition (CFSAN) Dashboards**

- [FDA-TRACK CFSAN Administration and Management Dashboard](#)
- [FDA-TRACK CFSAN Food and Cosmetic Safety Dashboard](#)
- [FDA-TRACK CFSAN Food Regulation, Policy and Labeling Dashboard](#)
- [FDA-TRACK CFSAN Science and Research Dashboard](#)

**FDA-TRACK Center for Tobacco Products (CTP) Dashboards**

- [FDA-TRACK CTP Dashboard](#)

**FDA-TRACK Dashboards (continued)**

<p><b>FDA-TRACK Center for Veterinary Medicine (CVM) Dashboards</b></p> <ul style="list-style-type: none"> <li>• FDA-TRACK CVM Administrative Dashboard</li> <li>• FDA-TRACK CVM Office of Research (OR) Dashboard</li> <li>• FDA-TRACK CVM Office of Surveillance and Compliance (OSC) Dashboard</li> <li>• FDA-TRACK CVM Premarket Dashboard</li> </ul>
<p><b>FDA-TRACK National Center for Toxicological Research (NCTR) Dashboards</b></p> <ul style="list-style-type: none"> <li>• FDA-TRACK NCTR Administrative and Coordination Offices Dashboard</li> <li>• FDA-TRACK NCTR Research Divisions Dashboard</li> </ul>
<p><b>FDA-TRACK Office of Regulatory Affairs (ORA) Dashboards</b></p> <ul style="list-style-type: none"> <li>• FDA-TRACK ORA Laboratories Dashboard</li> <li>• FDA-TRACK ORA Office of Criminal Investigations Dashboard</li> <li>• FDA-TRACK ORA Office of Enforcement Dashboard</li> <li>• FDA-TRACK ORA Regional Offices Dashboard</li> <li>• FDA-TRACK ORA Resource Management Dashboard</li> </ul>
<p><b>FDA-TRACK Office of the Commissioner (OC) Dashboards</b></p> <ul style="list-style-type: none"> <li>• FDA-TRACK OC External Affairs Dashboard</li> <li>• FDA-TRACK OC Office of International Programs Dashboard</li> <li>• FDA-TRACK OC Office of Special Medical Programs Dashboard</li> <li>• FDA-TRACK OC Office of the Chief Scientist Dashboard</li> <li>• FDA-TRACK OC Offices of Administration Dashboard</li> <li>• FDA-TRACK OC Other Offices Dashboard</li> </ul>
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<p>Page Last Updated: 06/08/2011  Note: If you need help accessing information in different file formats, see <a href="#">Instructions for Downloading Viewers and Players.</a></p> <p><a href="#">Home</a>   <a href="#">About FDA</a>   <a href="#">Contact Us</a>   <a href="#">A to Z Subject Index</a>   <a href="#">Site Map</a>   <a href="#">Web Site Policies</a>   <a href="#">Transparency</a>   <a href="#">FOIA</a>   <a href="#">Accessibility</a>   <a href="#">No FEAR Act</a></p> <p><a href="#">Combination Products</a>   <a href="#">Advisory Committees</a>   <a href="#">Science &amp; Research</a>   <a href="#">Regulatory Information</a>   <a href="#">Safety</a>   <a href="#">Emergency Preparedness</a>   <a href="#">International Programs</a>  <a href="#">News &amp; Events</a>   <a href="#">Training and Continuing Education</a>   <a href="#">Inspections/Compliance</a>   <a href="#">State &amp; Local Officials</a>   <a href="#">Consumers</a>   <a href="#">Industry</a>   <a href="#">Health Professionals</a></p>

Source: <http://www.fda.gov/AboutFDA/Transparency/track/ucm195011.htm>, accessed online on May 15, 2011

- **Knowledge-Sharing** (to identify common issues among program offices to improve FDA's operational effectiveness through better collaboration)

FDA-TRACK is used both as an internal performance management tool and as an external tool to track the agency's measures and progress toward work in critical public health programs. The FDA-TRACK also supports operational initiatives such as improvement in the amount of time it takes to hire new employees and in FDA's response time to emergency calls in its call centers.

In terms of performance measures, FDA-TRACK focuses on agency-wide and center-specific measures, including measures of key projects. The agency has nine divisions (six product centers, one research center, and two offices), with program offices in each, and employs over 11,500 employees. FDA-TRACK was implemented in a phased manner. It was piloted initially

in 16 program offices. Since then, the FDA-TRACK analyzes and reports over 600 monthly performance measures in around 100 key projects, spanning 114 program offices and eight key initiatives. The performance measures are classified in four categories:

- **Common Measures:** FDA-wide measures common to all program offices, focusing the agency's priorities
- **Key Center Director Measures:** Center-specific measures relevant to the Center's priorities and strategic goals
- **Program Measures:** Program office-specific measures focusing on operational issues
- **Key Projects:** Program office-specific project; performance is measured in terms of the achievement of established milestones achieved in the project plan

Organizationally, the FDA's Office of Planning organizes and coordinates FDA-TRACK. The Office of Planning examines the performance data and analyzes the trends using statistical models. The program offices are responsible for collecting and providing monthly data. The FDA-TRACK dashboards currently include 650 performance measures and 100 key projects. The metrics are specific to the program offices for operational purposes. The internal use of FDA-TRACK dashboards is for periodic quarterly briefings for project management, akin to the Stat sessions. The performance data are tracked and analyzed for discussions in quarterly briefing discussions. Over 20 such briefings are held, in which FDA senior management (e.g., the commissioner/principal deputy commissioner, assistant commissioner for planning, center directors, office directors) and other stakeholders participate. Office directors present their data to FDA senior management in the face-to-face briefings. Decisions are made based on FDA-TRACK dashboard performance measures and issues raised in the quarterly briefings. The discussion results are also posted on FDA-TRACK about a month after the briefings so that other stakeholders can monitor the agency's performance.

In terms of design, the dashboards are simple HTML files (i.e., static web pages) with the performance measures reported in long tables. There are no bells and whistles (e.g., charts/diagrams) to explain the performance measures. They are not dashboards, in the strict sense of dashboard designs incorporating data visualization. Since the dashboards are used for operational purposes, the tabular display of performance measures for discussion in internal briefings is quite basic, and perhaps serves the internal management purposes. However, the dashboards are not visually sophisticated and are not user-friendly; hence, they may not have much appeal to the public and thus create limited interest among stakeholders.

### USPTO's Data Visualization Center

The United States Patent and Trademark Office (USPTO) is an agency within the U.S. Department of Commerce. Its main task is to grant U.S. patents and to register trademarks. It advises the Secretary of Commerce and federal agencies on intellectual property (IP) policy, protection, and enforcement. It also provides training, education, and capacity building programs on IP issues and IP enforcement. In 2009, the USPTO launched several initiatives in response to the Obama administration's Open Government Directive. One initiative is the USPTO Data Visualization Center, a performance dashboard, launched on September 7, 2010. The site has been evolving, with new sets of performance measures added since its inception. The USPTO dashboards are not just for internal management, but also show the agency's performance to stakeholders and the general public.

The USPTO has two major organizations: Patents and Trademarks. The Patent organization examines patent applications to determine whether a claimed invention is "new, useful, and non-obvious." The organization reviews newly filed patent applications, publishes pending applications, issues patents to successful ones, and disseminates information on issued patents.



## USPTO's Patents Dashboard



Source: <http://www.uspto.gov/dashboards/patents/main.dashboard>

The Trademark organization registers marks (trademarks, service marks, certification marks, and collective membership marks). In all, the USPTO has over 9,500 employees. It has been fully supported by user fees to fund its operations since 1991 (USPTO, 2011).

In terms of performance measures, the site features three sets of dashboards. The measures are oriented toward achieving USPTO's strategic goals.

- **Patents Dashboard** was the first to be introduced in September 2010. It gives key performance measures relating to patents in conformity with the organization's strategic goal of optimizing patent quality and timeliness. Such measures include pendency (time taken to decide on an application), backlog (number of applications pending), and other tracking measures.
- **Trademark Dashboard** was launched in May 2011. It gives key performance measures relating to trademarks in conformity with the organization's strategic goal of optimizing trademark quality and timeliness. These measures include quality, pendency, application filings, and other metrics.
- **Policy and External Affairs Dashboard** was launched in April, 2011. The Office of Policy and External Affairs assists the USPTO and other federal agencies on domestic and

international intellectual property policies. It promotes the development of intellectual property systems internationally, and advocates improvements in training.

In terms of design, the dashboards are visually rich, providing a summary overview of the measures at the top as animated gauges. The summary is followed by more detailed measures along each dimension, along with an explanation of the measure. Pierce, however, has been critical of the USPTO dashboard (Pierce, 2010). His main points of contention include the length of the dashboard (seven screens; ideally dashboards are single-screen); gauges as inefficient mechanisms for displaying performance measures; and use of descriptive text. Pierce suggests that the site could be redesigned into one screen using bullet graphs and spark lines for more effective communication. During 2010 and early 2011, USPTO revised the agency's dashboards.

# Lessons on Uses of Dashboards

The common features in the case studies offer lessons on the uses of dashboards. First, dashboards (especially the cross-agency ones) face data quality issues. Such problems compromise dashboard performance measures, and eventually could adversely affect the credibility of the dashboard. Second, the dashboards have different design approaches. Although the designs can be idiosyncratic and vary based on technical capacity within the organization, evolving a few best practices or standards would enhance the design quality (and increase the use). Third, the performance measures differ based on agencies. Cross-agency dashboards have common measures. The essential approach should be to align the performance measures to the organizational goals. Last, but not least, the dashboards are only tools to visualize performance data. Their effectiveness depends on how organizations use them to enhance internal organizational performance and external accountability and transparency.

## Lesson One: Data Quality is Key to the Credibility of Dashboard Performance Measures

The underlying data quality is key to the accuracy and therefore the credible use of the dashboard performance measures in organizational management. Significant errors or lack of common data standards compromise data quality. In real-time dashboards, delay in data uploads and differences in time periods studied based on comparable data contribute to the data quality problems. The data quality problems are especially important to address in cross-agency dashboards, where the agencies may interpret common measures differently. Data quality problems are evident in [USAspending.gov](http://USAspending.gov), [Data.gov](http://Data.gov), and [Recovery.gov](http://Recovery.gov). Popular press as well as nonprofit watchdogs of government have assailed the data quality issues. Standardizing data definitions and providing training to key personnel in the agencies to uphold data quality are required to overcome some of the data quality issues. On GAO's recommendations, OMB has issued several guidance memos to agencies on the data quality of the cross-agency dashboards. Adopting a standard schema, such as the Extensible Business Reporting Language (XBRL) used in business applications, to federal financial dashboards such as [Recovery.gov](http://Recovery.gov) or [USAspending.gov](http://USAspending.gov) could enhance the data quality and efficiency of reporting (UBMatrix, 2009; OMBWatch, 2009).

## Lesson Two: Best Practices Resources are Necessary in the Design and Use of Dashboards

Agencies have different design approaches to dashboards. Whereas the [USPTO](http://USPTO) dashboards are visually rich, the [FDA-TRACK](http://FDA-TRACK) dashboards are essentially tables. The [Recovery.gov](http://Recovery.gov) and [USAspending.gov](http://USAspending.gov) dashboards feature maps. The designs of some of these dashboards have come under criticism by experts, such as Stephen Few, Edward Tufte, and others.

Evolving a set of best practices or standards would enhance design quality for many agencies. For example, [Usability.gov](http://Usability.gov), a site hosted by the DHHS, began in the early 2000s to provide guidance and tools on how to make government websites more usable and useful. A similar effort on standardizing dashboards would be beneficial, especially since federal agencies are beginning to adopt these mechanisms to report performance measures. Feedback provided by focus groups could also be useful in designing enhancements that increase the usability of the dashboards.

### Lesson Three: Performance Measures Should Reflect Organizational Goals

The performance measures chosen for reporting in the dashboards are fundamental to the use of the dashboards. These measures need to fulfill the purpose of the dashboards. In general, dashboards are oriented toward enhancing the organization's strategic goals. The usability of the dashboards would be greater if the performance measures also reflected such indicators. The performance measures could differ according to the audience. As federal agencies have to report their performance under GPRAMA, the measures have to broadly follow GPRAMA's requirements. However, the Congress, OMB, and watchdog groups may have different objectives. Responding to these different audiences requires reporting of different performance measures. Indeed, the performance measures in some of the dashboards in the study (e.g., [Recovery.gov](http://Recovery.gov), [USPTO's Data Visualization Center](http://USPTO's Data Visualization Center), [FDA-TRACK](http://FDA-TRACK)) have evolved in response to the different audiences' needs.

### Lesson Four: Dashboards are Only Tools; Effectiveness Depends on Use

Dashboards, in essence, are data visualization tools. They enable the audience to obtain a quick overview of organizational performance. Dashboards in government are used for both internal management purposes and external accountability purposes. Increasing the effectiveness on both sides requires careful use of the dashboards. Organizations should be cognizant of both the strengths and weaknesses of dashboards. With the increasing popularity of dashboards as data visualization mechanisms, organizations need not get caught up and adopt them as a fad that makes for a good visual on the organization's website.

Dashboards should not become like PowerPoint presentations, which have come under criticism (Tufte, 2003b). Rather, the dashboards need to be useful. In internal organization management, this implies that the dashboards are used in the decision-making process. The [Federal IT dashboard](http://Federal IT dashboard) and [FDA-TRACK](http://FDA-TRACK) are good examples in this context. The dashboards are used as the basis for face-to-face (e.g., TechStat) sessions to identify weak projects so that such projects can be turned around. OMB's effort in the 25-point plan to expand the TechStat sessions in other federal agencies through training programs is commendable in this context. At the external accountability level, use of dashboards means that the agencies are exposing their performance metrics to public scrutiny. In this context, both the dashboard performance measures and the underlying data need to be publicly accessible for credible organizational accountability.

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## About the Author

**Sukumar Ganapati** is an Associate Professor at Florida International University (FIU), joining the Public Administration faculty in August 2004. Prior to FIU, he taught at California State University, Northridge; California Polytechnic State University, Pomona; the University of Southern California; and the Manipal Institute of Technology (India).

Dr. Ganapati's research deals with the role of institutions in the urban context, particularly with respect to housing, community development, and information technology. He has published in the Journal of the American Planning Association, the Journal of Planning Education and Research (JPER), Housing Studies, the Urban Affairs Review, Public Administration and Development, the Journal of Environmental Planning and Management, the International Journal of Urban and Regional Research, Cityscape, Habitat International, and the International Journal of Electronic Government Research.

He obtained his Ph.D. in Planning from the University of Southern California in 2003.



# Key Contact Information

## To contact the author:

### **Sukumar Ganapati**

Associate Professor  
Public Administration Department, PCA 363B  
School of International and Public Affairs  
College of Arts and Sciences  
Florida International University  
Miami, FL 33199  
(305) 348-6275

e-mail: [ganapati@fiu.edu](mailto:ganapati@fiu.edu)

website: [www.fiu.edu/~ganapati](http://www.fiu.edu/~ganapati)



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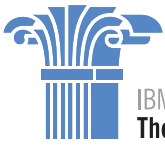
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### For more information:

**Jonathan D. Breul**

Executive Director

IBM Center for The Business of Government

600 14th Street NW

Second Floor

Washington, DC 20005

202-551-9342

website: [www.businessofgovernment.org](http://www.businessofgovernment.org)

e-mail: [businessofgovernment@us.ibm.com](mailto:businessofgovernment@us.ibm.com)

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