



**AFFIRM**

**The Federal Chief  
Information  
Officer**

**Thirteenth Annual  
Top Ten  
Challenges  
Survey**

**A Resource Paper  
Produced by the**

**Association for  
Federal Information  
Resources Management**

**December 2008**

AFFIRM, the Association for Federal Information Resources Management, is a non-profit, volunteer, educational organization founded in 1979 to improve the management of information, and related systems and resources within the Federal Government. AFFIRM's members include information management professionals from the federal, academic, and industry sectors. AFFIRM is an affiliated council of the American Council for Technology (ACT).

*For electronic copies of this document, visit the publications section of the AFFIRM web site at [www.affirm.org](http://www.affirm.org). Comments pertaining to this white paper may be sent to [emergingissues@affirm.org](mailto:emergingissues@affirm.org). Other AFFIRM comments may be sent to [info@affirm.org](mailto:info@affirm.org).*

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## Letter from the AFFIRM President

December 2008

Dear Colleague:

For thirteen years now, the Association for Federal Information Resources Management (AFFIRM) Emerging Issues Forum has conducted annual surveys of the senior federal Information Technology (IT) community to determine the most critical challenges facing the federal Chief Information Officer (CIO). We have also asked what technologies are considered most critical to implementing IT-based solutions. In addition, we have included a set of questions intended to help the CIOs and other government executives explore a few specific issues.

The participants in the survey process represent a broad spectrum of executive and management levels in the federal IT community. As such, the results do not solely represent the thinking of federal CIOs, but rather are a reflection of the broader federal IT community. AFFIRM hopes the survey results will prove useful to individual CIOs, the CIO Council, and industry in understanding the key challenges the CIO will face as we enter 2009 and a new Administration. We will continue to sponsor other similar studies to advance the state of knowledge and practice in managing federal information resources and solicit your ideas, involvement, and comments.

I want to personally thank the members of the Emerging Issues Forum team for their hard work and the survey respondents from the Federal Government for their participation.

Sincerely,

A handwritten signature in cursive script that reads "Jacquelyn Patillo".

Jacquelyn Patillo  
President  
AFFIRM

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## **AFFIRM Emerging Issues Forum Co-Chairs/Working Group**

Robert Golas	Vision-Genesis, Inc.
Michael Lisagor	Celerity Works
Stephanie 'Diane' Akers	Consultant
Art Chantker	Potomac Forum, Ltd.
Mark Day	McDonald Bradley, Inc.
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**Special thanks to L-3 Enterprise IT Solutions for their generous publication support.**

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## **I. Introduction**

The federal information technology community is faced with the enormous challenge of enabling a coordinated and proactive response to global terrorism, finding new ways to excel in supporting federal agency missions, and doing so within the context of limited resources. This thirteenth annual Association for Federal Information Resources Management (AFFIRM) survey explores how the top challenges facing federal CIOs today, as viewed by senior Federal Government information technology officials and staff, have changed from approximately one year ago. The survey also seeks to identify any changes in the priority among the top ten critical technologies/solutions.

## **II. Survey Methodology and Responses**

Several thousand email survey requests were distributed in August 2008 to senior information technology officials and managers at federal departments and agencies. From these requests, 86 were fully completed on the AFFIRM survey web site. Fifteen percent of the responses were from the Department of Defense or the Intelligence Agency category and 85% were from a civilian department/agency/bureau.

The responses to ten special questions contained in the survey are presented in Section III. The detailed results of the CIO challenges question are illustrated in Figure 1 in Section IV, and the results of the critical technologies/solutions question are presented in Figure 2 in Section V. Each of these two figures also shows a comparison between this year's responses and the prior six years. In a few cases, specific challenge statements and technologies have been added or altered to reflect current realities while still enabling year-to-year comparisons.

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### III. Special Questions: Results and Discussion

For the eighth year in a row, this survey has included additional questions to help the CIO and other government executives better understand the impact of some very pressing issues on federal IT.

**Question #1: Based upon your IT workforce, where are the skills/knowledge gaps (more skills needed)? Please select ALL that apply.**

**Responses:**

Skills/knowledge gaps:	Percentage of Respondents 2008	Percentage of Respondents 2007 (See Note)
Program management	43%	48%
Security	37%	60%
Collaborating across organizational boundaries	32%	--
Enterprise architecture	28%	45%
Strategic planning	18%	--
Earned value management	16%	46%
Contract administration	16%	40%
IT infrastructure	16%	27%
Configuration management	14%	--
Data management	12%	--
Risk management	11%	46%
Consolidation management	10%	--
Outsourcing management	9%	35%
Software development	7%	17%
Quality assurance	5%	--
Network engineering	5%	--
Test and evaluation	3%	22%
Other	11%	12%

**Note:** The percentages in the columns do not represent an aggregate of 100%. These percentages simply reflect a raw score produced by the number of respondents selecting a particular area. Also, new areas that were introduced this year show no data for 2007.

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**Discussion:**

Due to the addition of several new skills/knowledge categories for this year's survey, response rates for 2008 reflect lower percentages overall as compared with last year's results. Nonetheless, response rates to the question about the skills/knowledge expertise most needed in the IT workforce reflect a slightly different climate from last year, particularly in the topmost tier. The skills/knowledge requirement for "Program management" continues to reflect a fairly steady level of importance with a score of 43%, and is now the number one area identified for which expanded skills/knowledge areas are required. Perceived gaps in workforce "Security" (largest skills/knowledge gap identified in 2007 and 2006) has fallen to second place.

Proficiency in "Collaborating across organizational boundaries," one of several new categories introduced this year at the suggestion of the IT community, stands out in third place among identified gaps—just ahead of "Enterprise architecture." Another new entry for this year is "Strategic planning," which is ranked fifth as an area where more skills/knowledge proficiency is required. In contrast to last year, the perceived skills/knowledge gap in the area of "Risk management" is thought to be significantly less important than last year.

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**Question #2: In light of the previous special question (#1), is the skills gap being closed in your agency?**

**Responses:**

<b>Closing skill gaps?</b>	<b>Percentage of Respondents 2008</b>	<b>Percentage of Respondents 2007 (See Note)</b>
Yes – the gap is closed or almost closed	4%	0%
Yes – the gap has decreased	39%	34%
No – the gap has remained the same	39%	35%
No – the gap has increased	18%	28%

*Note:* For 2007, there was an additional category denoted “Other” that accounted for three percent of the responses.

**Discussion:**

There is evidence that some degree of progress is being made in the effort to close the skills and knowledge gaps within federal agencies. Even so, much still remains to be done in this area. As contrasted with a zero rating in the “Yes—the gap is closed or almost closed” category for last year, 2008 survey respondents indicate a small but positive movement in the direction of actually closing or almost closing the gap. When coupled with the reported 10% decline (28% in 2007 to 18% in 2008) in responses indicating that the gap has increased, it would appear that there is movement in the right direction. Additionally, 39% of survey participants report that the gap has actually decreased, an improvement of five percentage points over last year.

However, these prospectively positive findings are somewhat offset by the fact that 39% of respondents said “No—the gap has remained the same,” a somewhat neutral indicator when compared with 35% reporting this to be the case in 2007 and 31% in 2006 (not shown in the above table).

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**Question #3: If your answer was “no” to Question #2, does this gap adversely affect your agency’s mission?**

**Responses:**

<b>Adverse impact?</b>	<b>Percentage of Respondents 2008</b>
Yes	83%
No	13%
Other	4%

**Discussion:**

Over the previous three years of this survey, increasingly more survey respondents report the skills and knowledge gap within their departments/agencies has remained the same (no improvement). However, when directly asked for the first time about the effect this circumstance has on department/agency mission, 83% of the federal IT community participants assert that this gap has an adverse impact.

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**Question #4: Based on your experience, has progress been made in your department/agency in implementing OMB’s Lines of Business (LoB) initiatives?**

**Responses:**

<b>Significant progress?</b>	<b>Percentage of Respondents 2008</b>	<b>Percentage of Respondents 2007</b>	<b>Percentage of Respondents 2006</b>
Yes	34%	18%	24%
Somewhat	50%	53%	47%
No	14%	25%	25%
Other	2%	4%	4%

**Discussion:**

This year, a more definitive “Yes” is reported in the area of significant progress in implementing OMB’s Lines of Business (LoB) initiatives by 34% of survey contributors, a solid increase of 16 percentage points (or almost double) over that reported for 2007. This positive movement is reinforced by the decline in “No” responses, which previously held at a fairly constant level to create a several-year trend.

Correspondingly, to the question of whether progress in this area has been made over the past three years, approximately half of federal IT professionals have reported “Somewhat.” When combined with the definitive “Yes” response cited above, a positive progress indicator of 84% for 2008 is the result—up from 71% in 2006 and 2007.

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**Question #5: What effects do you believe the hostilities in Iraq/Afghanistan and recovery from natural disasters will have on your IT budget?**

**Responses:**

<b>Effects on IT budget:</b>	<b>Percentage of Respondents 2008</b>	<b>Percentage of Respondents 2007</b>	<b>Percentage of Respondents 2006</b>
Decrease it	35%	47%	38%
No change	43%	31%	31%
Increase it	10%	14%	10%
Don't know—funds frozen	8%	8%	10%
Other	4%	--	11%

**Discussion:**

Forty-three percent (43%) of 2008 survey respondents anticipate virtually no change in IT budget levels, an increase from 31% in 2006 and 2007. Concern around IT resource allocations over the immediately preceding years has clearly led to streamlining efforts, especially within the federal civilian sector. Federal departments and agencies have experienced the complex dynamics of competing priorities on the domestic as well as international front. Increased operations efficiency and reduction in overhead costs, wherever feasible, tend to generate a steady state that promotes the capacity to “do more with less.”

This year, fewer respondents think the effects of the hostilities in Iraq/Afghanistan and the recovery from natural disasters could further decrease the IT budget (35% in 2008 versus 47% in 2007). The expectation of budgetary increases (10%) reflects a percentage slightly less than 2007 (14%). It may be inferred that Federal Government fiscal planning provides adequate flexibility to accommodate unexpected events in the areas of defense, intelligence, and disaster recovery. Eight percent of the federal IT participants indicate their funds are frozen and they do not know what effects, if any, overseas initiatives and homeland emergencies might have on their particular department/agency budget.

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**Question #6: Has the IT infrastructure that supports your department/agency’s mission become less vulnerable (more secure), remained unchanged, or become more vulnerable (less secure)?**

**Responses:**

<b>IT infrastructure has become:</b>	<b>Percentage of Respondents 2008</b>	<b>Percentage of Respondents 2007</b>	<b>Percentage of Respondents 2006</b>
Less vulnerable (more secure)?	47%	49%	54%
Unchanged?	17%	24%	25%
More vulnerable (less secure)?	33%	24%	20%
Other	3%	3%	1%

**Discussion:**

For the fifth consecutive year of this survey, the federal IT community continues to reflect a decline in confidence in the security of their IT infrastructure. Less than half (47%) of respondents report the perception their agency has become less vulnerable (more secure). Starting with a 74% confidence level reported in 2003 (reference prior year reports), confidence dropped to 72% in 2004, then to 68% in 2005. The above table reveals a pattern of decreasing levels of confidence over subsequent years, resulting in the current 47% confidence-level vote.

Supporting this trend is the response pattern of survey contributors who continue to reflect an increasing degree of perceived vulnerability (less secure) in their IT infrastructure. Looking at 2003 numbers (not shown in the above table) as a baseline, two percent of respondents thought their IT infrastructure was more vulnerable (less secure) than in previous years. This number rose to six percent in 2004, 11% in 2005, and has continued to climb steadily upward over the past three years to 33% for 2008, as depicted in the above graphic.

Last year (2007), the authors attempted to give a corresponding “glass is half full” (more favorable toward better security) perspective by stating, “While these above two results {Less vulnerable (more secure) and Unchanged} show an increasing concern about the ability to improve security, it has to be noted that it is also true that 73% believe the security is the same or better (49% better and 24% same) than the prior year.” From this perspective this year, only 64% (versus 73% in 2007) believe the security is the same or better (47% better and 17% same). Again, we are not going in the right direction. This trend needs to be reversed.

The bottom line is that neither trend reflects positively on the issue of IT infrastructure and its security. As suggested in last year’s report, the decrease in confidence in the security of IT infrastructure may be attributable to a heightened awareness of security issues across the federal community combined with concern about how to deal proactively with increasingly sophisticated attacks.

**Note:** In the CIO Challenges section later in this report, the issue of “Balancing information sharing and security/privacy requirements” has jumped to the number two position for 2008, up from number eight on the list of top ten CIO Challenges in 2007. Clearly, the area of IT infrastructure security qualifies as a top priority.

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**Question #7: What effects do you believe the change of the Administration will have on your IT budget?**

**Responses:**

Effects on IT budget:	Percentage of Respondents 2008
Increase it	20%
No change	48%
Decrease it	24%
Other	8%

**Discussion:**

This year, 48% of the CIO survey participants indicate that no immediate or very near-term changes (within two years) are anticipated in IT funding. A number of elements have probably contributed to this response, such as: established budget cycles; fiscal planning policy; operations and systems well in place; programs and projects already in progress; principles of checks and balances; and, the critical importance of maintaining continuity of operations.

Twenty percent (20%) of federal respondents project that the change in the Administration will probably lead to budget increases and a slightly larger number (24%) believe there could likely be decreases in fiscal allocations. The remaining eight percent of survey participants are undecided on this issue. Overall, the responses essentially indicate a wait-and-see outlook on the projected impact a change in Administrations will have on federal department/agency budgets.

It is important to keep in mind that the determination of IT spending priorities will be a function of the next President within the context of setting overall program priorities. The next Administration's program priorities will dictate the scope and content of the budget deemed necessary to support an effective IT strategy, as IT will provide a means to accomplish program goals and objectives.

Additional edited survey comments provided include:

- ◆ Agencies will have to wait and see what changes the next Administration will implement.
- ◆ It will make everything far more uncertain than before. It will depend on how well the senior managers brought into the government (appointees—replacements) understand information technology. The more they understand, the better our potential budget.

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**Question #8: With regard to federal IT and the next Administration, what do you think should change?**

This open-ended question is intended to keep the survey vital and to broaden the scope of the study by capturing additional areas of interest and relevance to the federal IT community. For the most part, respondents have used this portion of the survey as a venue to expand on responses to questions that are structured around issues previously identified as having high importance. The most efficient and effective way to report the wide ranging set of findings is to provide a summarization of the highlights. For the purposes of this report, comments have been organized according to general subject areas that encompass policy, business, and technical considerations.

Within this framework, the area of security figures prominently with the recommendation that additional IT resources be applied to operational information security and IT infrastructure. It is also recommended that efforts be made for continuous or on-demand security and configuration assessments, with policy proactively set and enforced. There is a push for more emphasis on government network security to include encryption and increased protection for the federal network infrastructure. The federal IT community asserts that to ensure American leadership within the sphere of technology, it would do well to make privacy and security more transparent and to encourage IPv6.

There is also focus on attaining optimal return on investment (ROI) by promoting increased efficiency to reduce costs rather than simply imposing new requirements with the potential to increase costs. The proposition is made that there is a need for leadership to prioritize IT projects (and programs), and that bold steps need to be taken to “kill” those with the lowest priority and to adequately fund and staff the critical ones. Information assurance, closely connected to the discipline of IT security, receives a nod for more funding to pursue risk management through the DoD Information Assurance Workforce Improvement Program. Essentially, the message is that we need to define a new approach to working together and leveraging investments in IT to maximize ROI.

Promotion of increased levels of information and services sharing through cross-agency collaboration are complementary areas that factor heavily in the responses. There is a call to create a new effort that combines respect for the particular missions of agencies with rewards for cost-savings achieved through collaboration. Not only is it advised that there needs to be more emphasis on multi-agency solutions in the Lines of Business (LoB) area, but it is recommended that cross-agency activities be elevated to include Congressional involvement in developing a model that addresses funding considerations. The CIO Council is cited as an appropriate forum for shaping best practices through leveraging investments in IT and collaborating on solutions to meet the next set of challenges.

It is interesting that a considerable number of respondents took this opportunity to step outside the box to express their point of view on the evolving role of the federal CIO. As stated in a recent AFFIRM white paper, “What Could Be the Suggested IT Strategy for the Next Administration” (June 2008), “...the (federal) CIO needs to be more of a visionary who can assist with developing a strategic roadmap—mission is always the driver...technology is the vehicle that makes appropriate information available when needed.” In this 2008 CIO survey, the federal IT community persists in the assertion that the CIO occupies a strategic position and as such

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should report directly to the CEO, have authority in the security area as a prominent part of job responsibility, and be afforded the latitude to flex the budget—that is, to prioritize projects and control program spending based on business needs.

Survey respondents express the consensus that, ideally, the federal CIO should be a career employee (i.e., not an appointee) with a proven IT management background. One survey respondent summarizes the comments offered by a number of colleagues: “We need to foster an environment where CIOs have some longevity in their positions and consequently the ability to carry programs through to fruition.” This particular paradigm would improve and promote stability (through longevity), consistency, and intra-governmental teamwork.

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**Question #9: With regard to federal IT and the next Administration, what do you think should remain the same?**

The purpose of this open-ended question is to explore and identify what the federal IT community regards to be of particular value, is working well, and is therefore well worth sustaining. Similar to the narrative format used for the previous question, a summarization of highlights appears to be the most logical way to synthesize and present the comments. The areas span policy, business, and technical considerations; and, as might be anticipated, the responses reinforce and are complementary to other findings reported in this study.

Recognizing the importance of IT as an enabling vehicle to increase productivity and cut costs, it is crucial to maintain adherence to the provisions detailed in the Information Technology Management Reform Act (ITMRA) of 1996 (also known as the Clinger-Cohen Act), which stipulates that federal IT operations should be conducted in the same manner as any efficient and profitable business. The ITMRA places an emphasis on treating IT as a capital investment and focuses on the establishment of an integrated technology program designed to effectively support the business of federal departments and agencies.

With a keen focus on the process of “Capital Planning and Investment Control” (CPIC) as mandated by ITMRA, respondents support the move toward standards implementation, open systems interoperability, integrated governance, and *having requirements drive IT solutions*. Support is also expressed for consolidation with ongoing review of government-wide systems to further reduce duplication in cross-cutting systems. There is an emphasis on the ongoing critical need to enhance IT security, pursue increased funding to ensure adequate data security, and further promote effective information assurance (risk management). As might be expected, the continued improvement of measures designed to protect and safeguard personal identity information is strongly endorsed.

Federal survey participants urge maintaining the commitment to inter-agency collaboration through the OMB-led development of a Federal Enterprise Architecture (FEA). The FEA establishes a business-based framework for government-wide improvement in a number of key areas including E-Government, cross-agency collaboration, information sharing, performance measurement, budget allocation, and budget/performance integration. Essentially, the OMB-designated Lines of Business (LoB) provide a good structure for collaboration and information sharing. An active role for the CIO Council and the General Services Administration (GSA) in fostering communication and cooperation among departments and agencies is advocated.

It is important to pursue better IT management at all levels, including the formulation of policy that maintains experienced federal IT professionals in key management positions and Senior Executive Service (SES) leaders as heads of federal agencies. Accountability programs such as the President’s Management Agenda (PMA) need to remain in place to ensure sustained concentration on quality assurance and performance optimization. The E-Government initiative is making it increasingly feasible and possible for the public to successfully transact business with the government or find the information they are seeking. The federal IT community holds to the principle that citizens, federal departments and agencies, state and local governments, and other countries are valued customers.

**Question #10: In which of the following areas would investments in technology have the greatest impact on improving the performance of government? Please select the top THREE.**

**Responses:**

Technology investments	Percentage of Respondents 2008 (See Note)
Cross-agency information sharing and collaboration	61%
Information security and privacy	47%
Critical infrastructure sustainability and continuity	40%
Government management	31%
Transparent, citizen-centric government	30%
Acquisition process	23%
Financial institution regulatory reform	13%
Disaster protection	12%
Healthcare	12%
Entitlement programs	8%
Immigration and border protection	6%
War on terror	3%
Other	13%

*Note:* The percentages in the column do not represent an aggregate of 100%. These percentages simply reflect a raw score produced by the number of respondents selecting a particular area. This is a newly introduced question with no data from previous years.

**Discussion:**

Based on the recommendation and request of the AFFIRM advisors, government performance relative to IT investment is an area explored for the first time in this survey. The real bottom line is driven by setting IT priorities to yield the greatest return on investment (ROI). Return on investment is measured by improved effectiveness and efficiency of government departments and agencies which would in turn directly impact performance and hard dollar savings.

“Cross-agency information sharing and collaboration” is ranked the number one area where investments in technology would likely have the greatest impact on government performance. This is an area where measures to promote sharing of data (as appropriate), IT solutions, and resources could drive a substantially positive return. “Information security and privacy” is voted into second place, continuing to hold a high position on the list of top priorities, and would definitely factor heavily in collaborative partnerships. Ranked third, “Critical infrastructure sustainability and continuity” ties into investments required to support broadband technology and is vital to ensuring the long-range security of the nation.

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The next three categories identified in terms of voting priorities represent the areas of government management, the need for transparent, citizen-centric government, and the acquisition process underlying the making of investments—in that order. Domestic concerns around financial institution regulatory reform, disaster protection, and healthcare are next, scoring within a percentage point of each other. Entitlement programs, immigration and border protection, and the war on terror—while important—receive lower ranking relative to other areas where ROI is concerned.

Additional edited survey comments provided include:

- ◆ Cross-agency authentication
- ◆ Identity management
- ◆ Financial systems

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## IV. CIO Challenges: Results and Discussion

### Summary

The survey recipients were asked to select five items from a list of 25 challenges that they consider the most important to the federal CIO in performing the CIO function.

The “top ten” (there are 11 actual challenges in the top ten due to a tie at #10) out of 25 survey challenges in descending order of importance are:

2008 Votes	2008 Rank	CIO Challenges	2007 Rank
34	1	Hiring and retaining skilled professionals	1
31	2	Balancing information sharing and security/privacy requirements	8
28	3	Obtaining adequate funding for IT programs and projects	3
27	4	Simplifying business processes to maximize the benefit of technology	15
26	5	Aligning IT and organizational mission goals	2
24	6	Managing or replacing legacy systems	6
23	7	Developing agency-wide IT accountability	12
20	8	Consolidating common IT business/mission functions	10
20	8	Creating data interoperability across agencies	17
18	10	Building effective relationships in support of IT initiatives with agency senior executives (agency head, CFO, etc.)	5
18	10	Formulating or implementing an enterprise architecture (EA)	7

While some semblance of stability is demonstrated in the survey from year to year, changes — some dramatic—do occur every year, as well. This is the nature of the environment and a reflection of changing priorities. Details about all the CIO challenges, including prior year comparisons, are shown in **Figure 1**. Detailed discussion follows that.

**Figure 1: CIO Challenges—2008 Survey Responses and Prior Year Comparisons**

2008 Votes	2008 Rank	CIO Challenges	2007 Rank	2006 Rank	2005 Rank	2004 Rank	2003 Rank	2002 Rank
34	1	Hiring and retaining skilled professionals	1	3	4	5	2	3
31	2	Balancing information sharing and security/privacy requirements	8	13	14	17	10	15
28	3	Obtaining adequate funding for IT programs and projects	3	4	2	3	1	5
27	4	Simplifying business processes to maximize the benefit of technology	15	15	14	10	9	8
26	5	Aligning IT and organizational mission goals	2	1	1	1	6	3
24	6	Managing or replacing legacy systems	6	9	9	5	11	14
23	7	Developing agency-wide IT accountability	12	8	10	7	15	11
20	8	Consolidating common IT business/mission functions	10	2	17	11	8	--
20	8	Creating data interoperability across agencies	17	--	--	--	--	--
18	10	Building effective relationships in support of IT initiatives with agency senior executives (agency head, CFO, etc.)	5	9	2	11	11	10
18	10	Formulating or implementing an enterprise architecture (EA)	7	5	5	4	3	1
17	12	Assessing and developing agency IT competence (training and education)	17	19	20	23	17	13
17	12	Using IT to improve service to customers/stakeholders/citizens	3	13	7	2	13	9
17	12	Understanding true cost of infrastructure and business systems	11	--	--	--	--	--
16	15	Implementing and controlling IT capital planning and investment management across the agency	8	7	11	9	4	5
15	16	Consolidating/Virtualizing the IT infrastructure	15	6	7	--	--	--
15	16	Providing effective IT infrastructure and related services	17	21	18	11	17	16
14	18	Preventing internal and external IT security violations	14	16	11	18	15	19
13	19	Ensuring continuity of operations	--	--	--	--	--	--
10	20	Implementing authentication and certification requirements	22	17	19	19	17	--
7	21	Implementing E-Government and Lines of Business solutions	21	18	16	15	20	17
6	22	Implementing Trusted Internet Connection (TIC) to enhance cyber security	--	--	--	--	--	--
5	23	Achieving teleworking objectives	23	--	--	--	--	--
5	23	Implementing COTS solutions (ERP, CRM, etc.)	25	21	23	24	24	20
5	23	Implementing "green computing" for environmental /cost benefits	26	--	--	--	--	--

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## Detailed discussion

- ◆ Voted as the single, most important federal CIO challenge in 2008 is “Hiring and retaining skilled professionals.” This same CIO challenge was also voted as the number one challenge in 2007. It first entered the AFFIRM survey in 1998 when it was voted as the 13<sup>th</sup> most important challenge (not shown in Figure 1). Indicative of its overall importance to the federal community, this CIO challenge has since been voted as one of the top five challenges for the last ten years. Of those ten years, this challenge has been voted number one four times—twice within the last two years. No other challenge remaining in the current survey can claim the same distinction. This certainly is indicative of its importance, and the continued overall importance of recruiting and retention in the Federal Government.
- ◆ Entering the top five for the first time as the second most important challenge, since its initial survey entry in 1998 (slightly renamed since then), is “Balancing information sharing and security/privacy requirements.” Since its entry in 1998 in the number eight position (not shown in Figure 1), this challenge generally lost ground to other more important challenges, as considered by those surveyed. While wallowing in the challenge “teens” for several years, the challenge of “Balancing information sharing and security/privacy requirements” broke back into the top ten in 2007 and now is ranked as the second most important challenge facing the federal IT community.
- ◆ In the third most important challenge position is “Obtaining adequate funding for IT programs and projects.” Since its 1999 initial entry into the AFFIRM survey (not shown in Figure 1), this challenge has always been voted as one of the top five challenges. As was stated in last year’s survey, “No other challenge has that same distinction.”
- ◆ Making a huge jump (the largest positive move year-over-year) from 15<sup>th</sup> place in 2007 to fourth place in 2008 is the challenge of “Simplifying business processes to maximize the benefits of technology” (renamed from “Championing BPR as a precursor to IT decisions” in 2001). In its current form, this challenge has had limited success with some top ten showings. For the previous three years, its rankings have been as follows: 2005 – 14<sup>th</sup>; 2006 – 15<sup>th</sup>; and 2007 – 15<sup>th</sup>. For 2008, those surveyed rank it in the fourth position, its highest ranking ever, which could be reflective of the increased budget pressures being experienced by civilian agency management and the need to do more with less.
- ◆ At number five is “Aligning IT and organizational mission goals,” falling from its second place position last year. This challenge has been part of the Federal CIO survey since its inception in 1996. During this 13-year period, this contender has placed in the top ten challenges a total of ten times, and in the top five eight times—three times as the number one challenge (2004, 2005, 2006), indicative of its overall importance.
- ◆ A review of last year’s (2007) top five challenges shows that “Hiring and retaining skilled professionals” remains the top challenge for 2008; “Aligning IT and organizational mission goals” at number two in 2007 has dropped to number six in 2008; “Obtaining adequate funding for IT programs and projects” continues in its number three position year-over-year while “Using IT to improve service to customers/stakeholders/citizens,” also tied for third in 2007, has dropped out of the top ten challenges to tie for 12<sup>th</sup> in 2008; and, the challenge of “Building effective relationships in support of IT initiatives with agency senior executives” while ranked in the fifth challenge position in 2007 has fallen to a tenth place tie in 2008.

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## Rounding out the 2008 top ten CIO Challenges:

- ◆ At number six is the challenge of “Managing or replacing legacy systems.” For the previous four survey years (and including this year), this “Managing or replacing legacy systems” challenge has been in the top ten (number five in 2004). Last year it ranked number six. Considering the massive number of legacy systems and the lack of budget to modernize them, the need to keep them operational—or to find innovative ways to replace them—can be expected to become even more pronounced.
- ◆ The challenge of “Developing agency-wide accountability” is number seven. This is another challenge which has been in the survey since its inception. Over the 13 years of this survey, this challenge has mostly languished in the middle, being in the top ten only four times with its highest ranking being seventh in 2004. An increased scrutiny, and measurements by OMB of IT program success, has perhaps heightened the sensitivity to the need for accountability.
- ◆ Tied at eighth are the two challenges of: 1) “Consolidating common IT business/mission functions;” and, 2) “Creating data interoperability across agencies.”
  - The challenge of “Consolidating common IT business/mission functions” first entered the survey in 2003 with a ranking of eighth. Over the next two years, its importance waned until it hit its lowest ranking of 17<sup>th</sup> in 2005. As reported in the 2006 AFFIRM CIO survey when this challenge jumped from 17<sup>th</sup> position in 2005 to second position in 2006, “...this appears to be the single, largest positive year-over-year jump made by any CIO challenge.” This continues to be true. For the last two years of this survey, this challenge placed tenth in 2007 and has placed ninth in 2008—its overall average for this survey is 9.5. This challenge seems to have found its point of equilibrium, at least for now.
  - Also tied for eighth is the challenge of “Creating data interoperability across agencies.” This challenge was first added to the survey in 2007 and was ranked 17<sup>th</sup> in importance by survey participants. This year, it ranks among the top ten and is tied for eighth place. With each passing year, data interoperability and supporting standards are becoming more important as is evidenced by the critical need to share information among the intelligence community and the desire to integrate patient records among the various civilian and defense health agencies.
- ◆ Tied for tenth are the two challenges of: 1) “Building effective relationships in support of IT initiatives with agency senior executives (agency head, CFO, etc.);” and, 2) “Formulating or implementing an enterprise architecture.”
  - The challenge of “Building effective relationships in support of IT initiatives” has been in the survey from the very beginning (1996). Of those 13 years, this initiative has been voted into the top ten nine times. This year it has tied for tenth; last year, this challenge was in the top five at number five.
  - The second challenge tied at number ten is “Formulating or implementing an enterprise architecture (EA).” This is another challenge which has been in the AFFIRM federal CIO survey since its inception (1996). During this 13-year period, this challenge has always been in the top ten. In fact, over the 13-year period of this survey, this is the only challenge that has been in the top ten all 13 years. Of those 13 years, eight of them have

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been in the top five. Quite a distinction. Nonetheless, the last two years have shown some of its lowest rankings, with this year being the lowest it has ever achieved (but still in the top ten). Perhaps the overall importance of the EA challenge has been somewhat minimized since, according to recent news, 25 out of 27 federal agencies reviewed have received a score of green for EA. If nothing else, “congratulations” may be in order.

- ◆ Each year, relative stability is observed within the survey CIO challenges by having seven or eight top ten challenges from the previous year return to the top ten for the current year. The same is true for this year. Consistency. As discussed, the biggest positive movement from year to year is illustrated by the challenge of “Simplifying business processes to maximize the benefit of technology” which moved from 17<sup>th</sup> place in 2007 to fourth place this year. The biggest challenge drop is for “Using IT to improve service to customers/stakeholders/citizens” which has fallen from a rank of tied for third place in 2007 to tie for 12<sup>th</sup> in 2008.
- ◆ This year, two new challenges have been introduced: 1) “Ensuring continuity of operations” which comes in at 19<sup>th</sup> in the list of challenges; and, 2) “Implementing Trusted Internet Connection (TIC) to enhance cyber security” which ranks 22<sup>nd</sup>. While these are somewhat lackluster showings, they will be safe from elimination for at least another survey year—partially because they are new entrants.
- ◆ Tied for last, with only five votes, are the three challenges of “Achieving teleworking objectives,” “Implementing COTS solutions (ERP, CRM, etc.),” and “Implementing ‘green computing’ for environmental/cost benefits.”
  - While only in its second year in the survey, the authors expected the challenge of “Achieving teleworking objectives” to score much higher than it did in its first year (2007) 23<sup>rd</sup> place showing. Though this challenge did tie for 23<sup>rd</sup>, this year the 23<sup>rd</sup> position is the last position. It did not do better.
  - The challenge of “Implementing COTS solutions (ERP, CRM, etc.)” has languished in the survey since its initial entry in 1999 (not shown in Figure 1). That same year it achieved its highest ranking of 15<sup>th</sup> place. Since then, this challenge has continued to score poorly (placement in the 20s). Each year the authors threaten to “yank” this challenge from the survey—but that action would leave the CIO Challenges portion of this survey almost void of software choices. Something has to be done. The authors believe there is more importance to software than what is being voted/displayed in this survey. Stay tuned for next year’s AFFIRM survey. There will be a change.
  - The final CIO challenge, also tied for last, is “Implementing ‘green computing’ for environmental/cost benefits.” Green computing pertains to maximizing the use of our precious natural resources for IT purposes while reducing the use and disposal of hazardous materials—and with minimum impact to the environment. This challenge first entered this survey in 2007 and was voted last in position of importance; it is tied for last in 2008. Under normal circumstances, this challenge would be a candidate for elimination in AFFIRM’s 2009 federal CIO “Top Ten Challenges Survey.” However, other factors, near-recent events, and articles continue to indicate that “green computing” will play a far more important role in the not too distant future. As such, this “green computing” challenge will stay in the survey—at least another year—hopefully proving the authors correct.

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## V. Critical Technologies and Solutions: Results and Discussion

### Summary

The survey recipients were asked to select five items from a list of 30 critical technologies and solutions that they considered the most important to performing the federal CIO function.

The “top ten” selected critical technologies and solutions in descending order of importance were:

2008 Votes	2008 Rank	Critical Technologies/Solutions	2007 Rank
38	1	Web 2.0/Collaborative technologies	--
30	2	Information sharing	--
26	3	Knowledge management	8
22	4	Service-oriented architecture (SOA)	4
20	5	Wireless technology	2
20	5	Identity management/HSPD12 (smart cards, biometrics, etc.)	3
19	7	Security applications	18
19	7	Workflow	18
18	9	Security infrastructure	1
18	9	Executive information and decision support systems	11

This year’s critical technologies/solutions survey results present some interesting surprises. “Web 2.0/Collaborative technologies” and “Information sharing,” appearing for the first time in the survey, have entered at number one and number two, respectively. This has never happened before. Clearly, the emphasis on collaborative and information sharing solutions affirms the importance of these technologies and the impact they bring to bear on government performance, an issue explored in Question #10 (reference the discussion on page 18).

“Knowledge management” also places in the forefront, jumping from number eight to number three in this year’s survey. However, both “Internet/Intranet/Web infrastructure” (moving from number ten in 2007 to #19 in 2008) and “Internet/Intranet/Web applications” (moving from number five in 2007 to #21 in 2008) have fallen significantly. The decline in rankings may be indicative of the relative maturity of these technologies/solutions as compared with other areas.

The 2008 survey detailed results of CIO critical technologies and a comparison to prior year results are illustrated in **Figure 2**. A detailed discussion of the results follows that figure.

**Figure 2: Critical Technologies/Solutions—2008 Survey Responses and Prior Year Comparisons**

2008 Votes	2008 Rank	Critical Technologies/Solutions	2007 Rank	2006 Rank	2005 Rank	2004 Rank	2003 Rank	2002 Rank
38	1	Web 2.0/Collaborative technologies	--	--	--	--	--	--
30	2	Information sharing	--	--	--	--	--	--
26	3	Knowledge management	8	7	13	5	5	3
22	4	Service Oriented Architecture(SOA)	4	2	5	--	--	--
20	5	Wireless technology	2	5	3	3	10	6
20	5	Identity management/HSPD-12 (smart cards, biometrics, etc.)	3	3	4	14	--	--
19	7	Security applications	18	11	9	14	4	13
19	7	Workflow	18	21	14	16	16	12
18	9	Security infrastructure	1	1	2	1	2	1
18	9	Executive information and decision support systems	11	10	20	19	12	6
17	11	Data stds./metadata/ knowledge representative/semantics	8	--	--	--	--	--
17	11	Content management	14	16	16	13	13	11
16	13	Business intelligence	--	--	--	--	--	--
15	14	Records management/electronic document management systems	6	4	11	7	7	6
15	14	Portal technologies	14	12	14	10	15	10
15	14	Data, voice and video convergence including VOIP	21	18	16	19	17	13
14	17	Remote and mobile computing including personal digital assistants	7	14	7	18	11	17
13	18	E-Mail	14	9	11	5	9	13
10	19	Internet /Intranet /Web infrastructure	10	14	6	8	8	6
10	19	Cloud computing	--	--	--	--	--	--
9	21	Internet/ Intranet/Web applications	5	8	1	2	1	2
8	22	Data warehousing/data mining	12	6	10	4	3	4
8	22	Standard systems interfaces	22	--	--	--	--	--
7	24	IPv6 communication protocol	18	12	14	--	--	--
6	25	XML and/or web services (including UDDI, SOAP, WSDL)	12	19	8	14	6	5
6	25	Storage and storage networks (SAN)	17	19	23	9	27	13
6	25	Video solutions (distance learning, virtual office, desktop)	22	22	26	22	21	24
5	28	Netcentric computing	26	22	26	27	26	--
4	29	Modeling and forecasting	--	--	--	--	--	--
0	30	Expert systems	--	--	--	--	--	--

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## Detailed discussion

- ◆ Voted as the number one and number two top technologies, respectively, are “Web 2.0/Collaborative technologies” and “Information sharing” which enter the survey for the first time this year. This has never happened before (the exception being the first year of the survey—which is understandable) and is consistent with the need for government agencies to improve their ability to obtain and assess critical multi-agency information in a timely manner. It also suggests the awareness on the part of IT managers that Web 2.0 solutions can greatly enhance the citizen online government experience.
- ◆ Voted as the third most important technology/solution is “Knowledge management,” which has moved up from tied for number eight in 2007. This is a clear indication of the increased importance of collaborative and information sharing solutions. If correctly implemented, knowledge management systems can result in significant IT project risk mitigation, improved performance, competitive advantage, innovation, and transfer of valuable lessons learned. Since its initial survey entrance in 1998 (not shown in Figure 2) at that time also in the number three position, “Knowledge management” has been in the top ten critical technologies/solutions every year with the exception of 2006 when it was #13. It has been in the top five technologies/solutions for eight years out of ten in the survey, including 2008. This is a very consistent track record of importance.
- ◆ In the fourth critical technologies/solutions position, and in the same position as last year, is “Service-Oriented Architecture (SOA).” Since first entering the survey in 2005 at the fifth position of importance, SOA has continued to remain in the top five technologies/solutions. This is an indication of its continuing importance in helping organizations create new application solutions from portions of previously developed solutions, circumventing the need to write the entire application.
- ◆ Tied for the fifth position are “Wireless technology” and “Identity management,” (number two and number three, respectively, in AFFIRM’s 2007 survey).
  - “Wireless technology” was first added to this survey in 2001 and was voted the tenth most important critical technology/solution. Since then, “Wireless technology” has always been voted into the top ten, and for the last five years has been voted into the top five every year—including this year. This year’s ranking affirms the significance of the trend toward remote computing as contrasted with traditional data centers. The slight downward shift in priority order this year may be reflective of the increasing maturation of wireless technologies that enable users at remote locations.
  - “Identity management/HSPD-12 (smart cards, biometrics, etc.)” entered the survey in 2004 tied for 14<sup>th</sup> (originally labeled “Biometrics,” this technology area was renamed in 2005 to its current description). Homeland Security Presidential Directive/HSPD-12 was issued in August 2004, requiring federal agencies to converge physical and logical access control onto a single credential: an interoperable identification card. From 2005 forward, the federal IT community has scored this technology within in the top five critical technologies. The increasing emphasis on the importance of trusted users and trusted networks is further evidenced by a higher anticipated spending growth rate as projected over five years (2008-2013).

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## Rounding out the 2008 top ten Critical Technologies/Solutions:

- ◆ Tied at number seven are “Security applications” and “Workflow.” In previous surveys, we discussed consistency. In AFFIRM’s 2007 survey, both technologies/solutions were tied for 18<sup>th</sup>. This year, they are both tied for seventh. Both technologies have made the single, largest year-over-year positive jump for this survey year.
  - Normally in this survey, “Security applications” always lags behind its cohort, “Security infrastructure.” Not so for this year.
  - “Workflow,” another collaborative/information sharing solution, enables cross organizational coordination and enhances business processes while reducing costs, and so it is no surprise that it would be in the top ten.
- ◆ Tied at number nine are “Security infrastructure” and “Executive information and decision support systems.”
  - “Security infrastructure” has received fewer votes this year than normally expected, tying it for ninth. What a surprise! This critical technology/solution has been part of AFFIRM’s survey from the very beginning. Each previous year, with 1999 (not shown in Figure 2) being the exception, “Security infrastructure” has always been voted as the first or second most critical technology/solution. Perhaps this change is an indication that agencies have a more mature infrastructure and have shifted their concern to “Security applications” (tied for number seven in this survey year). It is also possible that survey respondents are taking a more integrated approach to security management. In other words, “Security infrastructure” may now be viewed more like all the systems applications, including security, that work together to mitigate risk of malicious activity from both internal and external sources.
  - “Executive information and decision support systems” has also been part of this survey from the beginning (1996—not shown in Figure 2) when it was voted the seventh most important critical technology/solution. This year, it enters the top ten but only by moving one position up from #11 in last year’s survey. While having placed in the top ten critical technologies/solutions seven times during the 13 years of this survey, never once did it break the barrier into the top five—its highest was number six in 1999 (not shown in Figure 2).
- ◆ Outside the top ten technologies/solutions, “Business intelligence” enters the survey for its first year at a respectable #13. Perhaps if this technology had been called “Management intelligence” it might have been perceived as being even more important. Still, quite a few respondents indicate they are paying more attention to optimizing the migration of this critical commercial technology into the government sphere.
- ◆ “Cloud computing,” another addition this year, enters the survey at #19, which is a somewhat “OK” ranking considering it is a rather new technology. The other two new technologies/solutions in this year’s survey, “Modeling and forecasting” and “Expert systems,” have received the lowest rankings. These two are perhaps too narrowly focused for a government-wide technology survey. Nonetheless, they are new entrants and will be given another year to prove themselves.

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- ◆ It is important to keep in mind that while some technologies have to be added, others must be deleted from year to year keep current. If there is a candidate for elimination in favor of a new technology entrant for next year, the first choice for elimination may be “Netcentric computing.” Since first entering the survey in 2004 and continuing through 2008, this technology/solution’s importance has scored a very low rating. Perhaps this could be due to “netcentric” being more DOD-related.
  - ◆ Besides “Security infrastructure” previously mentioned in this report, other big technology drops from 2007 to 2008 include:
    - Both “Internet/Intranet/Web infrastructure” (from number ten in 2007 to tied for #19 in 2008) and “Internet/Intranet/Web applications” (from number five in 2007 to #21 in 2008) fall significantly in this year’s survey. Perhaps this is an indication of the relative maturity of these technologies/solutions in relation to other needs. Also, “Web 2.0/Collaborative technologies” as the number one survey response gives a nod to the next generation of Internet/Intranet solutions.
    - Other significant decreases of importance for the survey year are: “Remote and mobile computing” (from number seven in 2007 to #17 in 2008), “Data warehousing/data mining” (from #12 in 2007 to #22 in 2008), and “XML and/or web services...” (from #12 in 2007 to #25 in 2008).

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## VI. Conclusions

This year's survey has three survey parts: 1) Special Questions; 2) CIO Challenges; and, 3) Critical Technologies/Solutions.

### ◆ Special Questions

1. **IT Work Force Skills/Knowledge Gap:** After a short two-year hiatus, "Program management" returns this year as representing the area with the biggest reported work force skills/knowledge gap, replacing "Security" by a significant percentage.
2. **Skills Gap Closing:** Unlike last year, this year more respondents think the skills gap is being closed/decreased.
3. **Skills Gap Affecting the Mission:** For those who responded to Question #2 that the skills gap is not being closed, 83% responded this skills gap is adversely affecting their agency's mission.
4. **Progress on Lines of Business (LoB) initiatives:** As a stark contrast to last year, almost double the percentage of respondents this year say that significant progress ("Yes") is now being made on OMB's Lines of Business (LoB) initiatives.
5. **Hostilities/Natural Disaster Recovery Impact on IT Budgets:** Unlike last year's survey, which saw 47% of the respondents stating budgets could be decreased, this year only 35% think budgets could be decreased due to hostilities/disaster recovery. The largest percentage (43%) of respondents state that there would be "No change."
6. **IT Infrastructure Vulnerability:** As stated in last year's survey, and it continues to be true for this survey year, "Overall confidence in the security of the IT infrastructure continues its downward trend."
7. **Change in Administration Impact on IT Budgets:** Most see no change/impact on the IT budget. Those who foresee change are almost evenly split between anticipating an increase versus forecasting a decrease.
8. **IT—What Should Change in the Next Administration:**

Additional resources must be applied to operational information security and IT infrastructure with more emphasis on government network security and increased focus on improving the transparency of security.

Leadership within the federal IT community needs more authority to: 1) prioritize projects and programs; 2) optimize return on investment (ROI) through increased efficiency and reduced costs; and 3) define a new approach to working together and leveraging investments in IT.

Levels of sharing information and services through cross-agency collaboration must be increased, and all such efforts need to combine respect for the particular missions of agencies with rewards for cost-savings achieved through collaboration.

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The federal CIO must be seen officially as occupying a strategic, ever-evolving role. As such, there needs to be policy stipulating that a career employee (not an appointee) with a proven IT management background should hold this position (to the extent feasible). This particular paradigm would improve and promote stability through longevity, consistency, and intra-governmental teamwork.

9. IT—What Should Remain the Same in the Next Administration:

The keen focus on managing IT as a capital investment needs to be maintained with continuing support for standards implementation, open systems interoperability, integrated governance, and *having requirements drive IT solutions*.

The OMB-designated Lines of Business (LoB) provide a good structure for collaboration and information sharing, and the commitment to inter-agency collaboration through the OMB-led development of a Federal Enterprise Architecture (FEA) should be re-affirmed.

It is important to continue improving IT management at all levels, which includes policy development to maintain experienced federal IT professionals in key management positions and Senior Executive Service (SES) leaders as heads of federal organizations.

Accountability programs such as the President’s Management Agenda (PMA) need to remain in place to ensure sustained concentration on quality assurance and performance optimization.

10. IT Investment—Greatest Impact on Improving Government Performance: By what is considered a significant margin, survey respondents state that investments in technology would have the greatest impact on “Cross-agency information sharing and collaboration.”

◆ **CIO Challenges**

Each year we report there is a near status quo in the number of challenges (eight) from the previous year being returned to the top ten for the current year. This year, again, eight challenges from last year return to the top ten. (Author’s note: Due to a tie for the tenth top challenge position, there are 11 challenges in the top ten. Otherwise, only seven challenges from last year would have been in the top ten. Nonetheless, this is still very consistent from year to year.) Two years ago we showered praise on the challenge of “Consolidating common IT business/mission functions” for making the largest, positive challenge jump ever from 17<sup>th</sup> place in 2005 to second place in 2006, only to see it fall back to tenth place in 2007. It attains a reasonable standing this year, being selected as the eighth most important challenge. The biggest positive challenge move for this year is “Simplifying business processes to maximize the benefit of technology,” which jumps from tied for 15<sup>th</sup> place in 2007 to fourth place in 2008. The biggest decline is for the challenge “Using IT to improve service to customers/stakeholders/citizens,” which drops from a tie for third place in 2007 to a tie for 12<sup>th</sup> place in 2008.

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### ◆ Critical Technologies/Solutions

For critical technologies/solutions, “Web 2.0/Collaborative technologies” and “Information sharing,” enter the survey for the first time this year and are ranked in first and second place, respectively. As stated in the Critical Technologies/Solutions section, an instance where two first-time survey technologies enter the list at the top of the rankings has never before occurred. Tied for the biggest positive technology moves, from 18<sup>th</sup> (2007) to seventh (2008), are the technologies of “Security applications” and “Workflow.” The biggest technology decline for the survey year of 2008 is for “Internet/Intranet/Web applications.” While this technology has consistently been in the top five since the inception of the survey (except for 2006 when it was number eight), this year it falls 16 positions from number five to #21. We obviously will look at this closely next year.

The AFFIRM Emerging Issues Forum hopes you find this survey of value in your day-to-day endeavors. We enjoyed preparing it.