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BIG DATA AND THE PUBLIC SECTOR

*A Survey of IT Decision Makers in
Federal and State Public Sector Organizations*



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KEY FACTS AND HEADLINE-WORTHY FIGURES

1. Big Data is Here to Stay: 82% Say Real-Time Big Data is the Way of the Future

2. Real-Time Big Data Could Save Government 10% or More Annually

3. Real-Time Big Data Could Save Significant Number of Lives

4. Big Data is Helping Improve the Quality of Citizens' Lives

5. State IT Officials Agree Big Data Can Improve Social and Welfare Services

KEY FACTS AND HEADLINE-WORTHY FIGURES, CONT.

6. Big Data Advances in Medicine, Public Safety Seen as Most Important

7. Privacy and Policy Concerns Remain a Barrier to Utilizing Big Data

8. Public Sector IT Officials Frustrated With Multiple Data Formats, Leadership Changes

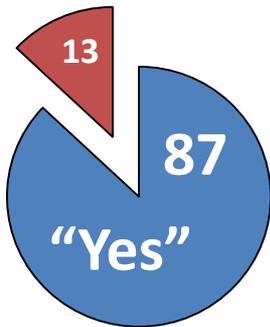
9. Many Public Sector IT Officials Say Database queries Take Too Much Time

10. Nearly All Government IT Officials Would Opt For Real Time Access to Data Over Backward Looking Queries

STATE AND FEDERAL IT DECISION MAKERS SAY “BIG DATA” IS HERE TO STAY

- 82% of public IT officials say the effective use of real-time Big Data is the way of the future.

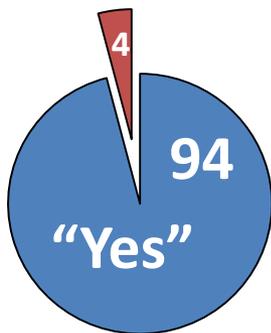
“Are you familiar with the term ‘Big Data?’”



“Big data usually includes data sets with sizes beyond the ability of commonly-used software tools to capture, manage, and process the data within a tolerable elapsed time.”

– Chief Information Officer in a Federal Agency

Federal



“What does the term ‘Big Data’ mean to you?”

“Big Data is a collection of data sets so large and complex that it becomes awkward to work with using on-hand database management tools.”

– Chief Technology Officer in a State Agency

State

REAL-TIME BIG DATA OFFERS HUGE MONEY-SAVING POTENTIAL

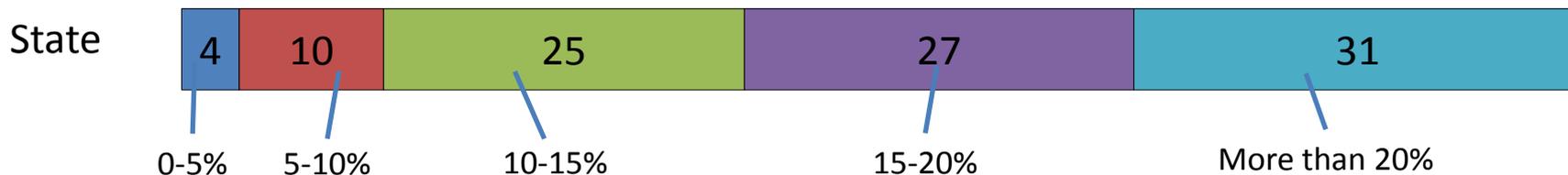
- 83% of Federal IT officials say Big Data can save 10% (\$380 billion) or more from the federal budget, or about \$1,200 per American



Annual departmental cost savings.



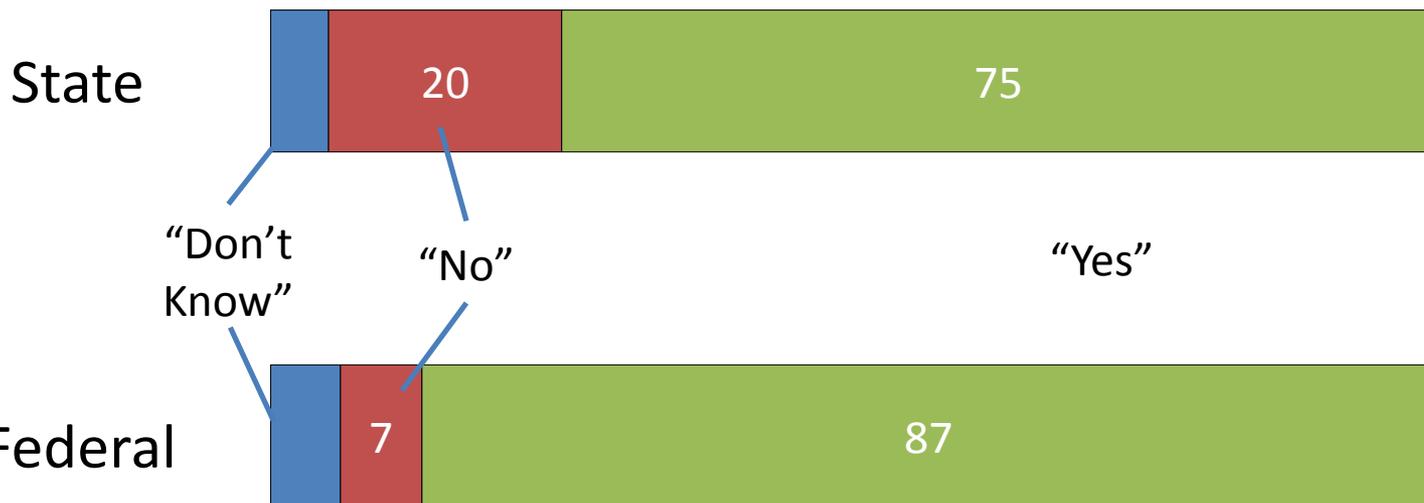
Annual savings to taxpayers, nationwide



OFFICIALS WHO DO NOT INVEST IN BIG DATA MAY BE MISSING LIFE-SAVING OPPORTUNITIES

- Federal IT officials more optimistic on Big Data's lifesaving potential than their state government counterparts

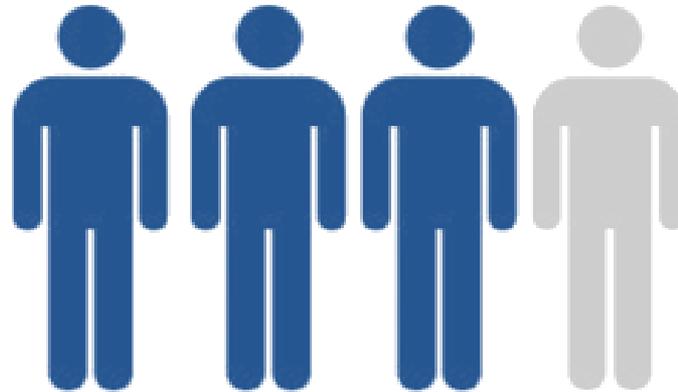
"Do you think that the nationwide use of real-time Big Data has the potential to save a significant number of lives each year?"



3 IN 4 IT OFFICIALS SAY BIG DATA IS HELPING IMPROVE THE QUALITY OF CITIZENS' LIVES

- 26% of Federal IT officials thought Big Data was mostly for bureaucratic use

75%



25%

Real-time Big Data is helping government improve the quality of citizens' lives

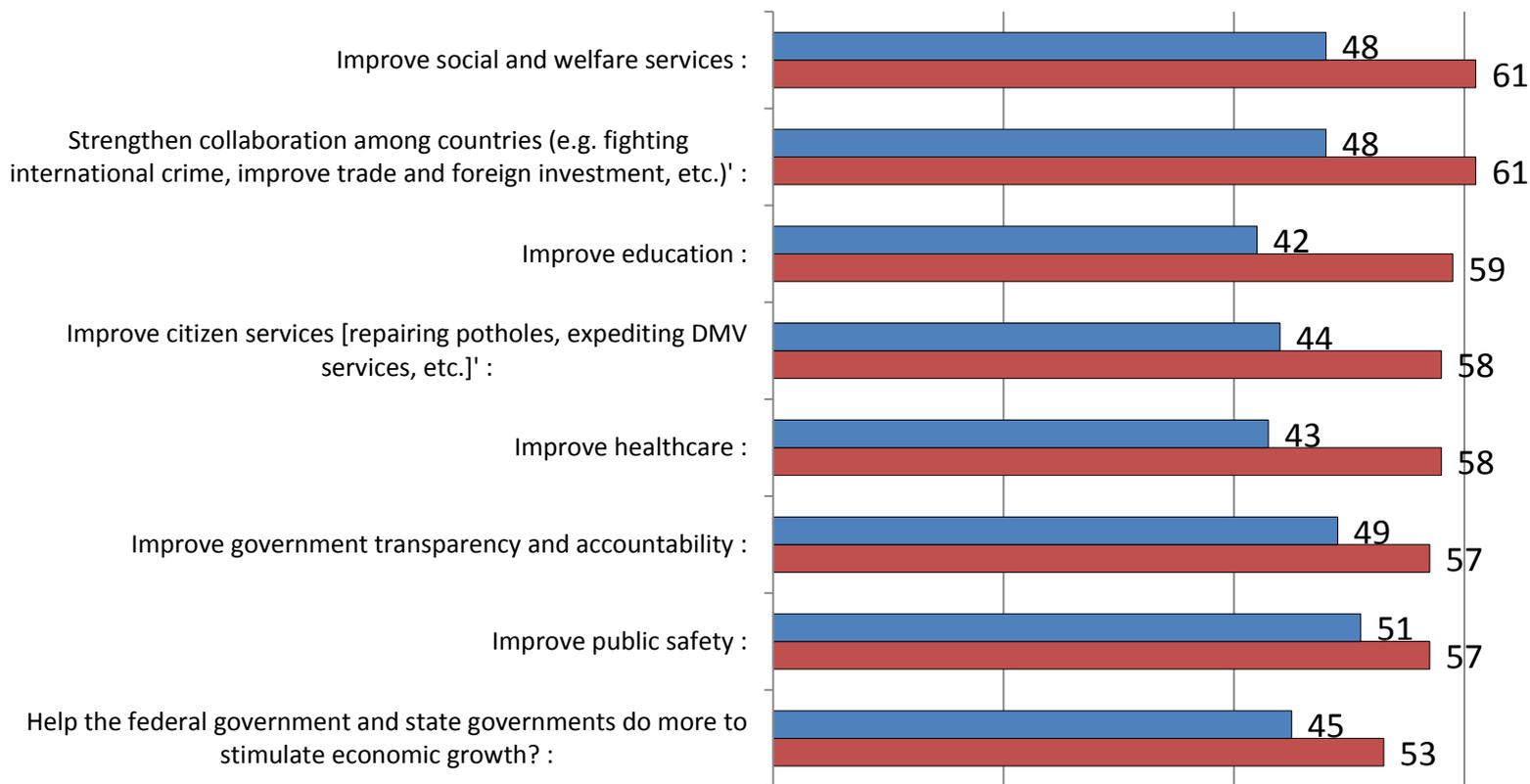
Real-time Big Data is mostly for bureaucratic use

"[Our database] application combines information across agencies to help provide better services to needy citizens."
– State Network Supervisor

61% OF STATE IT OFFICIALS STRONGLY AGREE THAT BIG DATA CAN IMPROVE SOCIAL AND WELFARE SERVICES

- State IT officials were generally more optimistic about the possibilities for Big Data to improve the services they offer citizens.

"Real-time Big Data has the potential to ..." (% Strongly Agree)



■ Federal ■ State

PRACTICAL BENEFITS TRUMP COST SAVINGS: IT OFFICIALS SAY BIG DATA ADVANCES IN MEDICINE, PUBLIC SAFETY MOST IMPORTANT

- When messaging Big Data, more personally relevant and emotive topics like fighting cancer and reducing crime are more effective
- It's important to emphasize both outcomes and process
- Nearly all subjects tested have broad appeal

Tested Scenario

Medical researchers now have the capability to aggregate **information from cancer patients** into large, anonymous datasets from which patterns may emerge, potentially opening the door to new cancer treatments. Real-time Big Data tools can be used to increase treatment efficacy and provide more individualized care for a patient's specific case.

Police departments are now using real-time Big Data tools to develop predictive models about when and where crimes are likely to occur, **dramatically reducing the overall crime rate** in some areas. Real-time Big Data enables law enforcement to find patterns in crime data that might have otherwise gone unnoticed. Officials can then station officers or position other resources in order to prevent and pre-empt crime, instead of simply solving it.

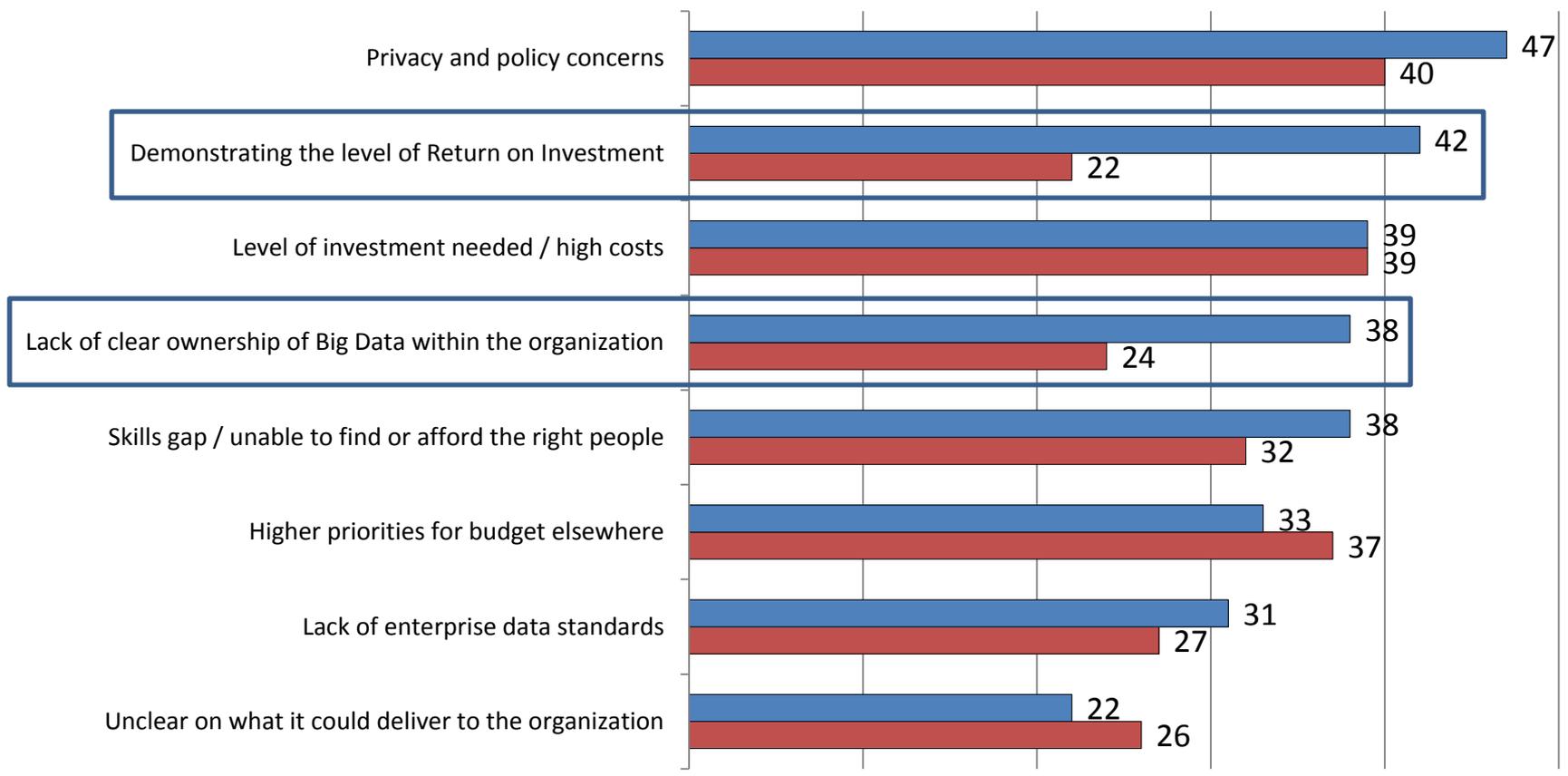
63% of federal IT officials say this is **“Very Important”**

76% of state IT officials say this would be **“Extremely Beneficial”**

47% OF FEDERAL IT OFFICIALS SAY PRIVACY IS A BARRIER: CHALLENGE IS EXPLAINING BIG DATA IS NOT “BIG BROTHER”

- 42% of federal IT officials say demonstrating ROI is a barrier, compared to just 22% of state officials.
- 38% of federal officials cite a lack of clear ownership as a barrier to using Big Data, compare to 24% of state IT officials.

“What do you consider to be the biggest barriers to using or taking advantage of Big Data?”

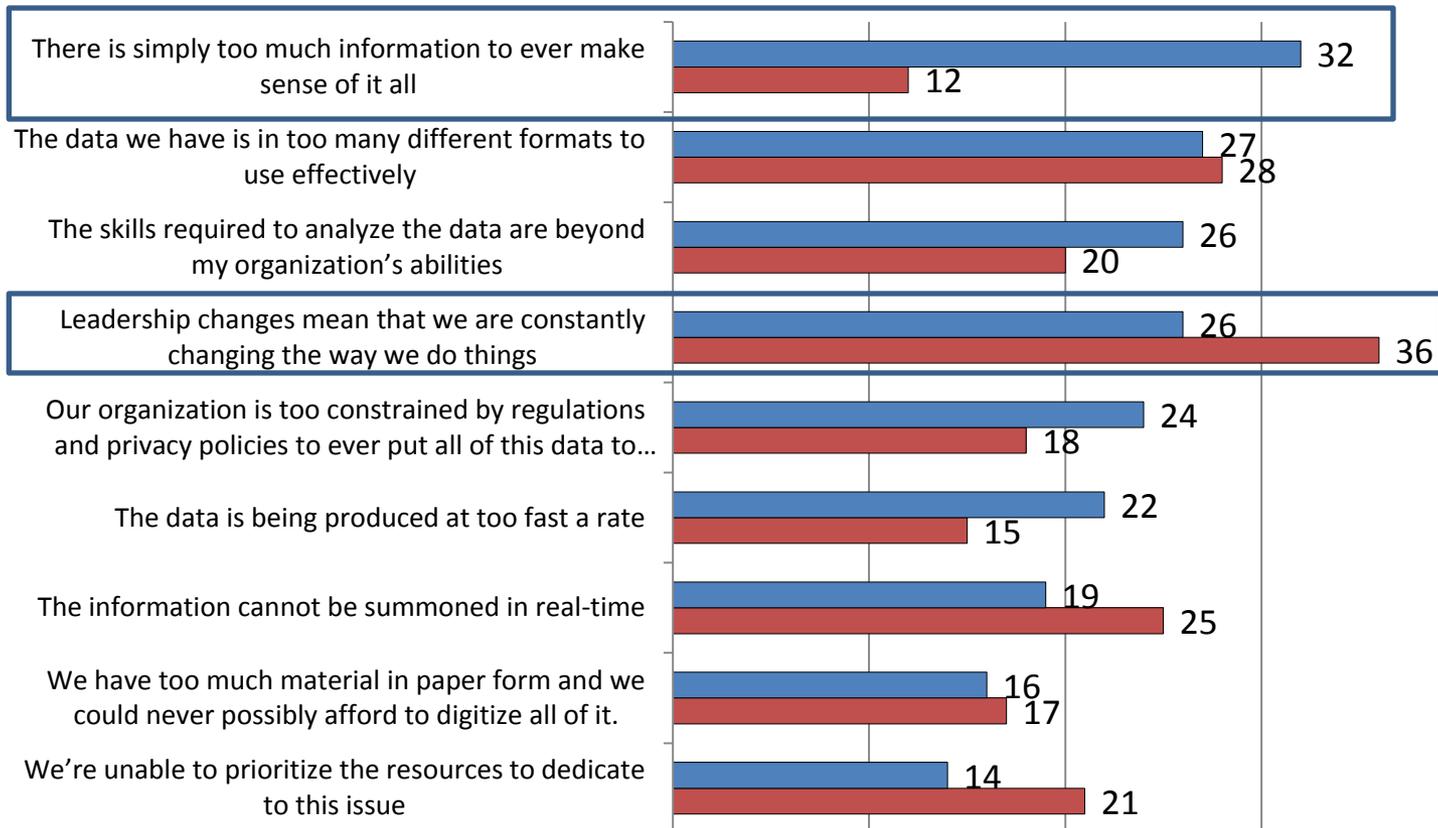


■ Federal ■ State

PUBLIC SECTOR IT OFFICIALS FRUSTRATED WITH MULTIPLE DATA FORMATS, LEADERSHIP CHANGES

- 32% of Federal IT officials (compared to just 12% of state officials) expressed frustration with overwhelming volumes of data
- 1 in 3 State IT officials said they were frustrated with frequent leadership changes

“What are your biggest frustrations with the way your organization manages Big Data?”

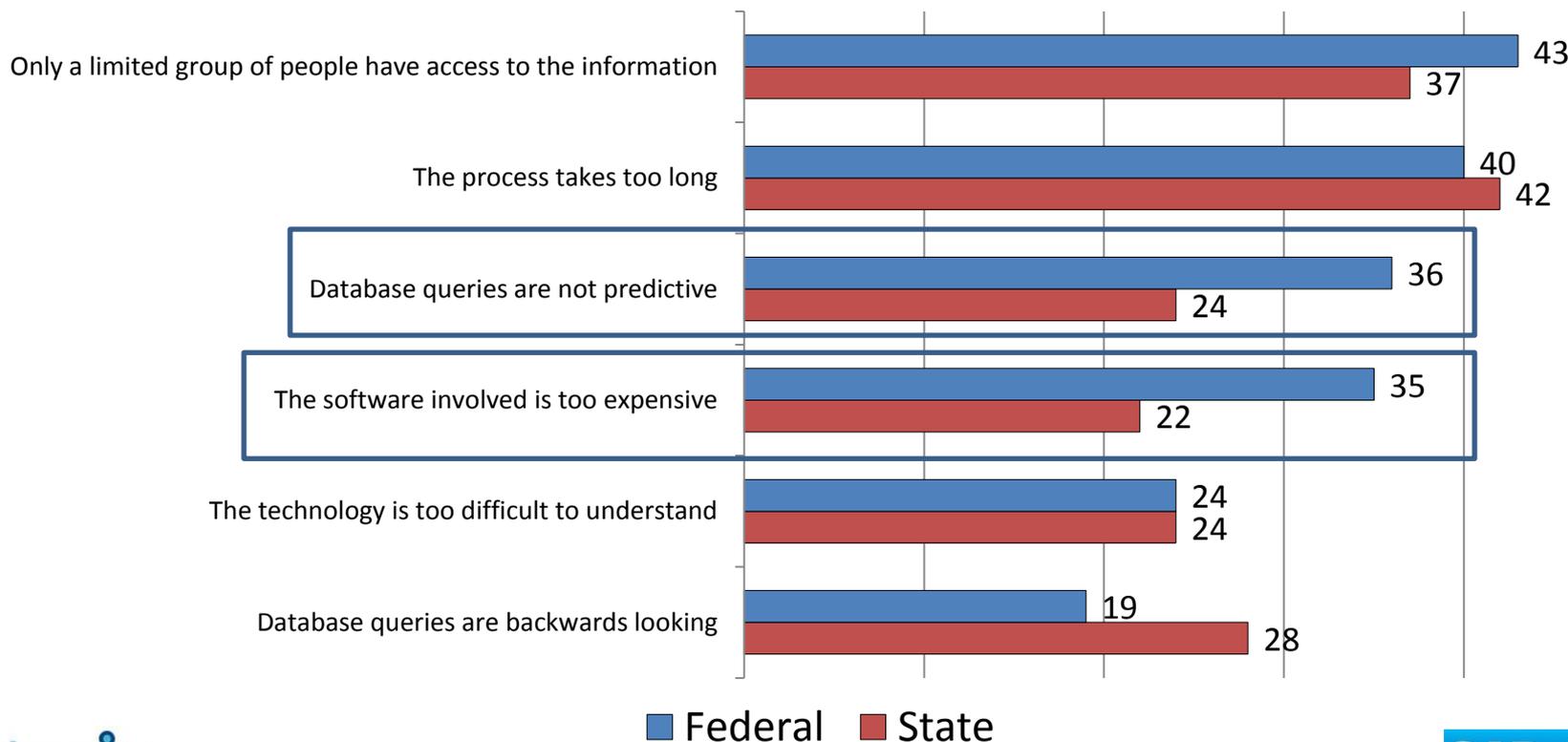


■ Federal ■ State

41% OF PUBLIC SECTOR IT OFFICIALS SAY DATABASE QUERIES TAKE TOO MUCH TIME

- Across both State and Federal IT officials, time is the most widely experienced frustration
- 4 in 10 complain that too few people have access to the information they need
- Federal ITDMs more concerned about expense (35% to 22%) and lack of predictive abilities (36% to 24%) than state ITDMs

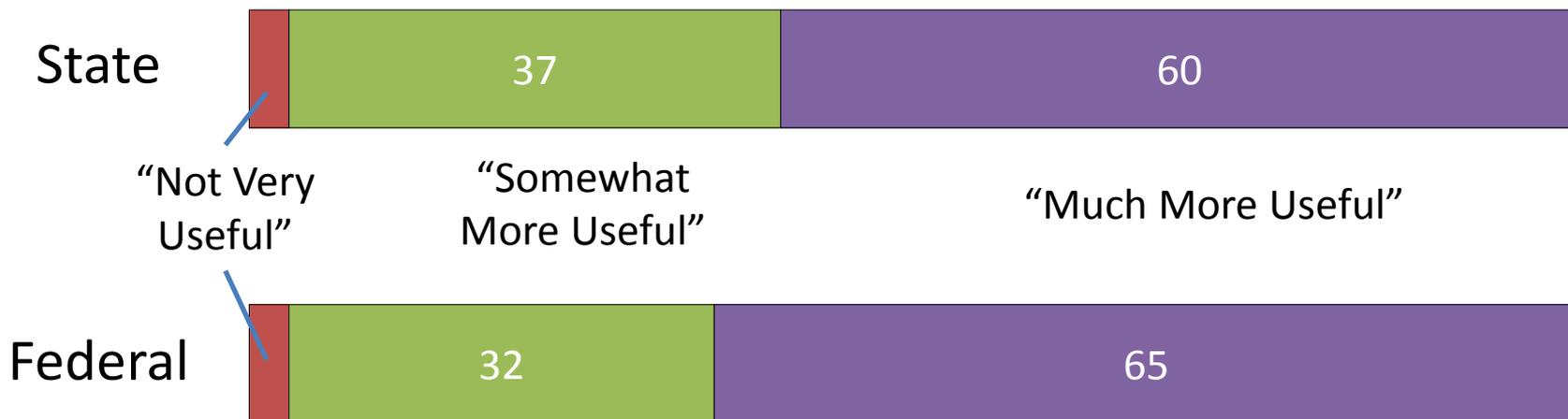
“Which of the following frustrations do you have with the way database queries are currently conducted in your organization?”



NEARLY ALL GOVERNMENT IT OFFICIALS WOULD OPT FOR REAL TIME ACCESS TO DATA

- 65% of Federal IT officials say real-time database queries would be “much more useful” than the way they are currently conducted.

“How much more useful would it be for your organization if you were able to access information from your database in real-time, without having to conduct lengthy, backwards looking queries?”



APPENDIX A: METHODOLGY

METHODOLOGY

Timing:

Prepared: October 12, 2012

Quantitative Online Survey: August 13 – September 24, 2012

Objectives:

Explore territory of “Big Data,” assessing leadership criteria in Public Sector technology. Study impact of Big Data in government on Americans.

Audiences:



98 IT Decision Makers (ITDMs) in **Federal** Public Sector Organizations
 100 IT Decision Makers (ITDMs) in **State** Public Sector Organizations

IT Decision Makers: Employed full-time, age 25 or older, work for a state government or the federal government, has primary or shared responsibility for strategic IT/IS investment decisions for multiple departments or organization as a whole with \$1 million or more in annual IT spending.

Geography and Methodology:

Penn, Schoen, Berland Associates conducted a quantitative online survey with 198 respondents across the United States.

Audience	N-size	MoE*
Federal ITDMs	98	+/- 8.28%
State ITDMs	100	+/- 8.20%
All ITDMs	198	+/- 5.83%

All of the results, except where indicated, are shown in percentages.

**Margin of error is shown at the 90% confidence level*

APPENDIX B: BIG DATA USE CASES & POTENTIAL IMPACT

PRACTICAL BENEFITS TRUMP COST SAVINGS: IT OFFICIALS SAY BIG DATA ADVANCES IN MEDICINE, PUBLIC SAFETY MOST IMPORTANT

- Emotive topics like fighting cancer and crime seen as more compelling use of Big Data
- 63% of Federal IT officials say using Big Data to treat cancer is “Very Important”

Scenario (ranked by federal % very important)	% Very Important		% Extremely Beneficial	
	Federal	State	Federal	State
Medical researchers now have the capability to aggregate information from cancer patients into large, anonymous datasets from which patterns may emerge, potentially opening the door to new cancer treatments. Real-time Big Data tools can be used to increase treatment efficacy and provide more individualized care for a patient’s specific case.	63	62	65	71
Police department are now using real-time Big Data tools to develop predictive models about when and where crimes are likely to occur, dramatically reducing the overall crime rate in some areas. Real-time Big Data enables law enforcement to find patterns in crime data that might have otherwise gone unnoticed. Officials can then station officers or position other resources in order to prevent and pre-empt crime, instead of simply solving it.	62	67	64	76
Real-time Big Data tools allow energy officials to tap into a network of sensors, alerting them to potential safety hazards before they become dangerous. This means that natural gas pipes and electrical lines can be re-routed preemptively and technicians can be dispatched to investigate a problem before an accident occurs. Big Data gives officials the ability to see potential grid failure patterns before they would be otherwise visible.	62	65	62	69
Real-time Big Data tools are capable of measuring power consumption from individual houses as often as every five minutes. This wealth of data gives energy officials a better understanding of periods of peak demand, as well as an early warning of when the grid might be subject to overload, preventing blackouts. Real-time Big Data gives energy officials an important tool for one of the most difficult parts of their jobs: predicting and moderating energy demand.	62	61	58	64
Real-time Big Data tools allow energy officials to optimally distribute excess energy coming back into a power grid from residential solar energy production.	60	49	57	65
Regulators can use real-time Big Data tools to better track the safety and effectiveness of pharmaceuticals and medical devices. Now rather than looking at the few devices in use in a certain area, regulators can evaluate data on all units of a certain device and see issues or problems that might not otherwise be visible.	59	55	57	69
Weather officials can use real-time Big Data tools to apply weather models to residential population databases to quickly alert affected people of pending danger from weather-related emergencies. Officials will have access to multiple feeds of streaming data including weather information, but also mobile phone and social media activity to report on tornado and other extreme weather sightings.	58	59	58	72

PRACTICAL BENEFITS TRUMP COST SAVINGS: IT OFFICIALS SAY BIG DATA ADVANCES IN MEDICINE, PUBLIC SAFETY MOST IMPORTANT

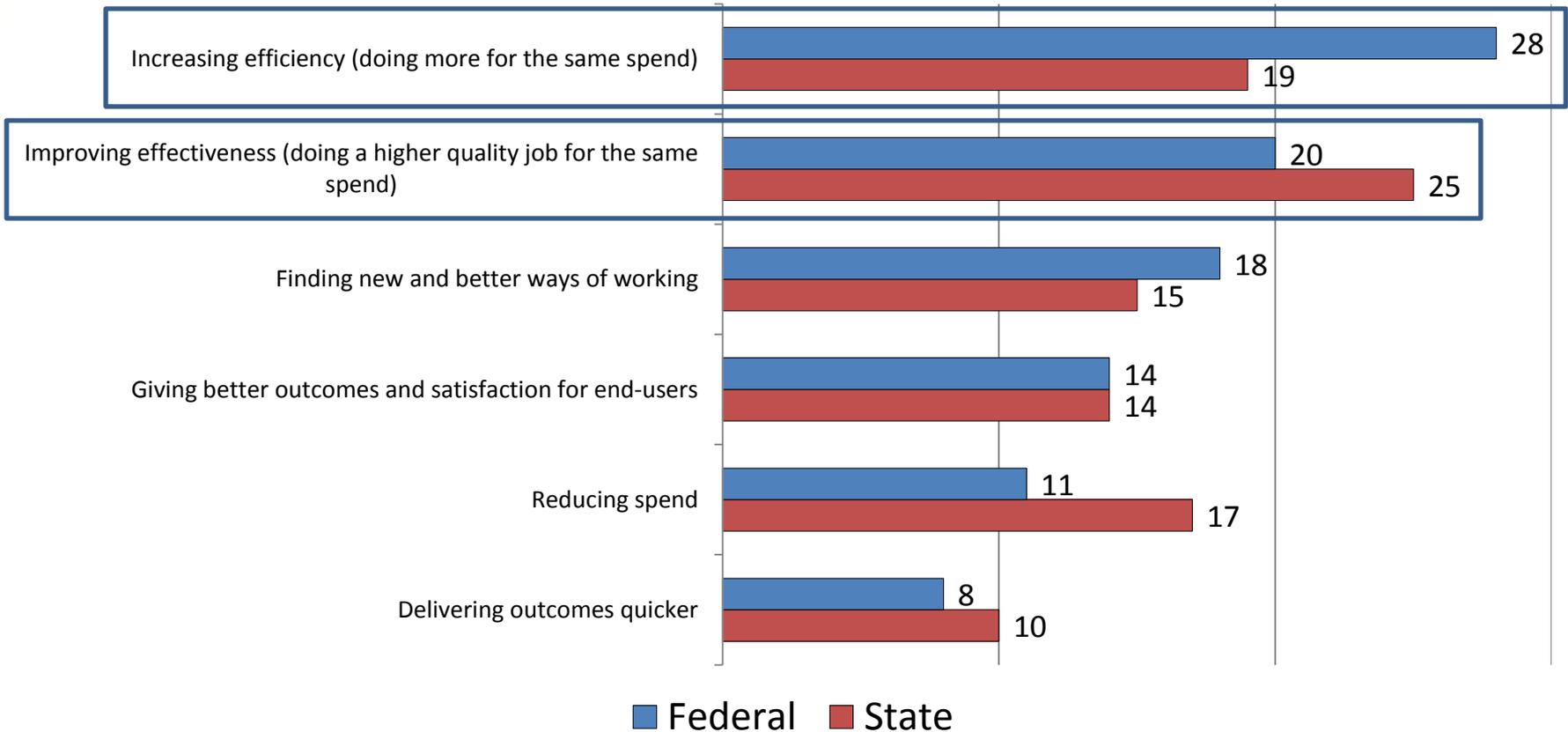
- While still scoring well, Big Data benefits in areas such as Smart Buildings and traffic prevention ranked lower compared to other applications

Scenario (ranked by federal % very important)	% Very Important		% Extremely Beneficial	
	Federal	State	Federal	State
Paramedics and first responders can use real-time Big Data to predict where they should be before an emergency happens. Big Data will allow emergency personnel to identify where they need to be, rather than how they need to get there.	54	57	63	69
Real-time Big Data tools will ultimately be able to connect a patient's complete medical history with prescription drug and treatment options to provide a more accurate diagnosis and better, more cost-effective care.	54	56	63	69
Real-time Big Data tools are now able to identify students at the highest risk for dropout, long before they actually stop attending classes. By utilizing these tools, school administrators can get at-risk students the attention they need before it is too late.	53	53	56	69
Real-time Big Data analysis can give education officials the tools they need to continuously improve the educational experience of their students. Administrators can quickly determine which techniques work and which do not. This can be as specific as scheduling math class at the time of day when students are proven to learn math best, or finding the optimal class size based on data analysis.	52	59	53	63
Real-time Big Data tools give planning officials the insight they need to design and manage the most efficient transportation patterns by analyzing weather, event, traffic and other variables, to enable them to change stop lights to adjust the flow of traffic.	52	58	63	72
Real-time Big Data tools give transportation officials the ability to track anonymous cell phone user data to quickly identify accidents and other traffic challenges. So instead of monitoring a few specific locations with traffic cameras, officials can now monitor the entire traffic network in real time.	52	52	56	67
Real-time Big Data has made possible the concept of Smart Buildings, structures that can not only sense the presence of occupants, but also learn their habits and lighting/temperature preferences to optimize energy savings.	48	48	54	61

28% OF FEDERAL IT DECISION MAKERS SAY BIG DATA COULD HAVE BIGGEST IMPACT ON IMPROVING EFFICIENCY

- Federal officials were most likely to think Big Data could increase efficiency, while state officials thought it could improve the effectiveness of their work.
- State officials were most optimistic about Big Data’s ability to reduce spending.

“What is the challenge in your sector or industry that Big Data could have the biggest impact on?”



■ Federal ■ State

GOVERNMENT IT OFFICIALS IMAGINE USING BIG DATA TO IMPROVE PROCESSES FROM LAW ENFORCEMENT TO PUBLIC HEALTH

“Threat assessment and hazard mitigation with tracking of information, trends, issues in areas of severe weather, disease all the way to nefarious intentional actors such as criminals and terrorists.” - State

“If you could use real-time Big Data to tackle a specific challenge in your organization, what would it be?”

“Analyzing clean/renewable energy statistics more effectively at the Department of Energy.” – Federal IT Director

“Statistical analysis of all patients compared to current patients.” – State CIO

“Analysis of criminal DB across all states.” – State IS Administrator

“Tracking of effectiveness of road building and the contracting processes. The level of expenditures and lack of warrantied products is out of whack. More attention to cost, quality, and timeliness are needed and we do have data that is properly analyzed will lead us on that path.” – State Senior Project Manager

“Tracking communicable disease trends globally.” – Federal IT Director

DEFENSE AND INTELLIGENCE COMMUNITIES HIGHLY REGARDED FOR USE OF BIG DATA

“Which federal, state or local agency would you consider to be the gold standard for using Big Data [and why]?”

“Department of Homeland Security, Ability to share information with other agencies quickly and effectively.” – Federal CIO

“Defense Department, The use of tactical data from multiple theaters in real time combined with multiple information collection platforms, aerial, ground, sea and with geospatial data and event data combined.”

– Federal IS Program Specialist

“Department of Defense, The use of competition in the private sector with the defense contractors, the big ones with tremendous resources to create databases for tactical, strategic, and theater planning, tracking, and real-time battlefield awareness and also for forensics.”

– State Information Assurance Officer

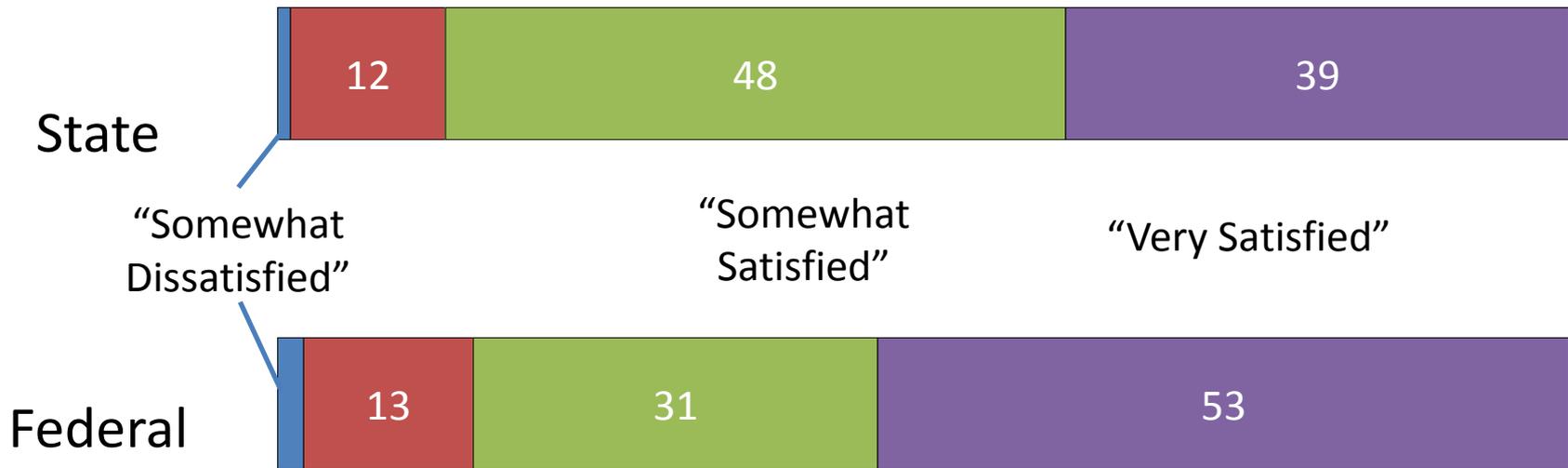
“CIA, they take info. from around the world and compile threat assessments.” – Federal CIO

APPENDIX C: SATISFACTION LEVELS & EXPECTATIONS OF BIG DATA

PUBLIC IT DECISION MAKERS SAY STAKEHOLDERS MOSTLY SATISFIED WITH DATABASE QUERY TIMELINESS

- 85% of public sector IT officials say that their stakeholders are either somewhat or very satisfied with the time involved in returning database queries

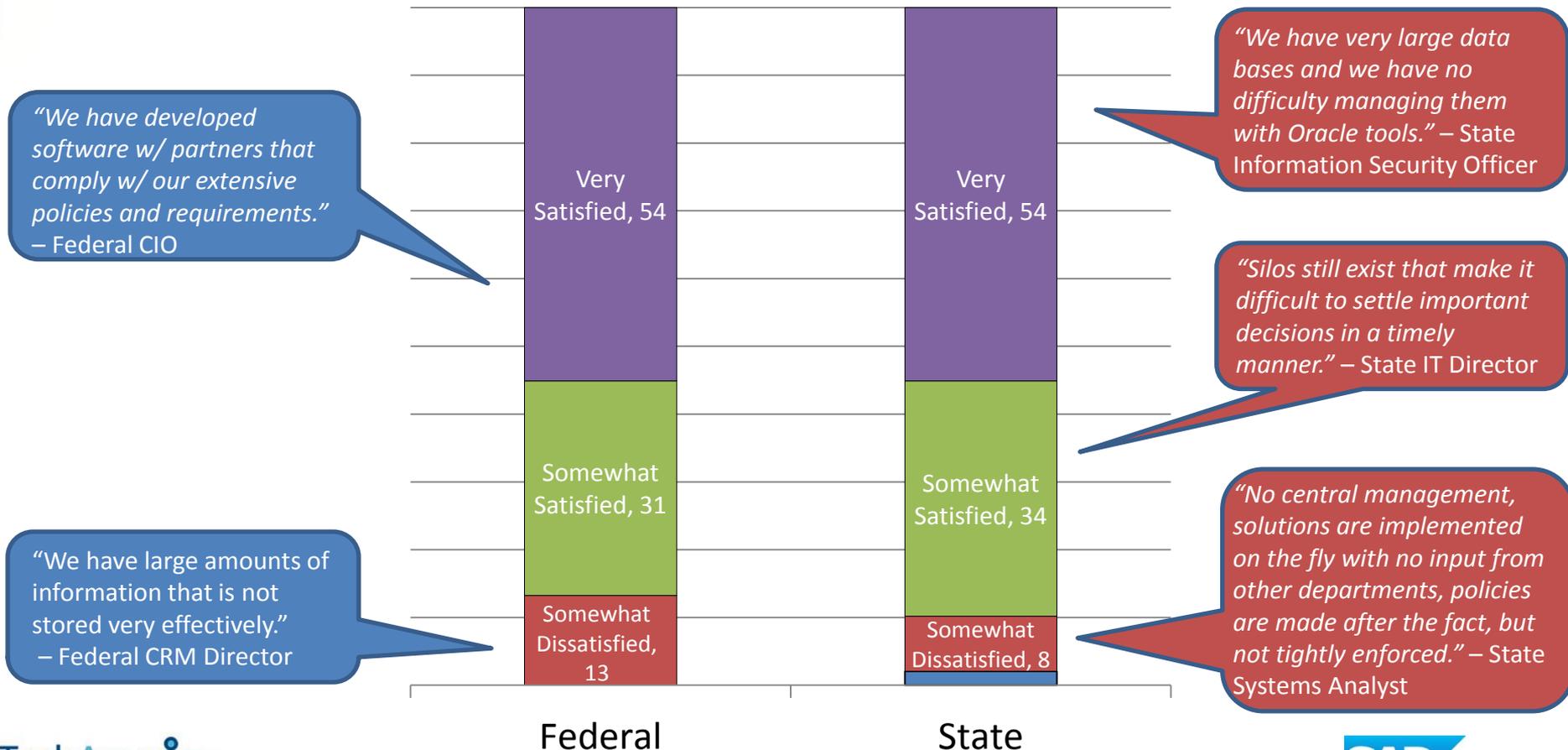
“How satisfied are stakeholders in your organization with the timeliness of processes that involve database queries?”



9 IN 10 PUBLIC SECTOR OFFICIALS ARE SATISFIED WITH HOW THEIR ORGANIZATION HANDLES BIG DATA, BUT CONCERNS REMAIN

- While most IT officials indicated satisfaction with the way their organization handles Big Data, many indicated ongoing concerns and areas for improvements

"How satisfied are you with the way your organization manages Big Data?"



SPEED AND SECURITY TOP REQUIREMENTS FOR DATABASE MANAGEMENT INDUSTRY LEADERSHIP

“What are the characteristics required to be a leader in the database management systems category?”

“Proven success in multiple industries and continued high performance.” – Federal Department Head, Infrastructure and Operations

“There has to be good data warehousing, clean coding to see where/how the data is being pulled, security in the data, backed up data, good amount of space available in the DB, etc.”
– State IT Director

“Speed and capability to deal with dirty data.”
– Federal CIO

“Must be able to comply to existing corporate policies concerning data management and security.” – Federal CIO

“Must have the ability to not only be efficient and robust, but must optimize the principles of information assurance including the integrity of data/protection from loss, damage, unauthorized manipulation, security and privacy.”
– State Information Assurance Security Officer

“Wide range of products and good service to stand behind them and help use with any technical issues that we run into.” – Federal IT Director

PUBLIC IT OFFICIALS MOST EXCITED ABOUT DATA INTEGRATION AND REDUCED PROCESSING TIMES

“What advances in Big Data technology are you most excited about?”

“Reporting tools that allow the linkage of multiple data sets as if you were reporting from one data source. Additionally, the dashboard capabilities have come a long way.” – Federal CIO

“The possibilities of integration with all the different data sources out there in a way that protects networks, customers and more while augmenting analytic power.” – State Information Assurance Officer

“Processing the huge amounts of data in a small amount of time.” – State IT Specialist

PUBLIC SECTOR IT OFFICIALS STRESS NEED FOR INCREASED SPEED AND INTEGRATION IN DATABASE MANAGEMENT

“In what way(s) do you think your organization could deliver a better service to citizens and stakeholders if it collected and managed data better in real-time?”

“Have more cloud computer services so people can manage their data better.” – Federal IT Manager

“Speed up our processes and eliminate down times.” – Federal CTO

“We could detect fraud better and pay claims more accurately.” – Federal CIO

“Obviously real-time data would better inform decisions and processes in order to improve outcomes.” – State IT Manager

“We could tie data together that affects citizens who require services from so many different agencies, such as Human Services, Health Dept, Work Force Services, etc.” – State Networking Manager

“I think if we can deliver quicker data, efficient results, and guarantee certain items, it would work out the best.” – State IT Director

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