NAS**CIO**
Representing Chief Information
Officers of the States

GrantThornton

CompTIA.

STATE CIO AS COMMUNICATOR

THE EVOLVING NATURE OF TECHNOLOGY LEADERSHIP

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ABOUT THE NATIONAL ASSOCIATION OF STATE CHIEF INFORMATION OFFICERS

Founded in 1969, the National Association of State Chief Information Officers (NASCIO) represents state chief informa-
tion officers (CIOs) and information technology (IT) executives and managers from the states, territories and District of
Columbia. NASCIO's mission is to foster government excellence through quality business practices, information manage-
ment and technology policy. NASCIO provides state CIOs and state members with products and services designed to
support the challenging role of the state CIO, stimulate the exchange of information and promote the adoption of IT best
practices and innovations. From national conferences to peer networking, research and publications, briefings and gov-
ernment affairs, NASCIO is the premier network and resource for state CIOs. For more information, visit www.NASCIO.org.

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events, professional certifications and public policy advocacy. Through its Public Sector Councils and its advocacy arm,
CompTIA champions member-driven business and IT priorities that impact all information technology companies – from
small managed solutions providers and software developers to large equipment manufacturers and communications
service providers. CompTIA gives eyes, ears and a voice to technology companies, informing them of market trends and
policy developments – and providing the means to do something about it. Visit www.comptia.org.

ABOUT THE SURVEY

Survey purpose

The National Association of State Chief Information Officers (NASCIO), Grant Thornton LLP and CompTIA have collaborated for a ninth consecutive year to survey state government information technology (IT) leaders on current issues, trends and perspectives. The survey sponsors seek to provide these state government IT leaders with an opportunity to voice their thoughts and opinions on matters of high importance. Governors, legislators and business leaders can benefit from these knowledgeable insights about essential state IT services.

Methodology

In spring 2018, the sponsors jointly developed a series of questions reflecting both the new issues of the day as well as follow-up on some of the questions they included in prior years' surveys. The questions were presented to state Chief Information Officers (CIOs) in an online tool, and between June and July 2018, they individually logged in and addressed the forty-six multiple-choice and open-ended questions.

All fifty NASCIO member states completed the survey. Primary respondents were the state chief information officers (CIOs), although deputy CIOs and other senior state IT leaders contributed. Throughout the survey, we refer to them all as state CIOs. Thirty-three of the respondents also participated in the 2017 survey. However, new perspectives were introduced by 34 percent of the respondents who are different due to the normal turnover that occurs in state CIO positions. We also conducted in-person interviews with twenty four state CIOs and incorporated their "advice from the trenches" along with the quantitative and qualitative responses to the online survey.

Anonymity

This report reflects the responses and opinions of the survey respondents to the maximum extent possible. However, to preserve anonymity we do not attribute responses to specific individuals.

To obtain a copy of the survey report, please see the inside back cover of this report for directions to the sponsor organizations' websites.

EXECUTIVE SUMMARY

In this ninth annual state CIO survey we were privileged to receive the perspective of all 50 state CIOs on the factors and trends driving the adoption of enterprise IT in the states. The timing of this year's survey is particularly interesting, coming as it does immediately prior to an election cycle that will likely see a significant turnover in the ranks of many states' most senior technology officials. Given this, we wanted to use this year's survey as a means for the current cadre of state CIOs to offer advice to a new generation of technology leaders that may soon be taking office. Some key themes that emerged from this year's survey were the continued evolution of the role of the state CIO, diversity of skills needed to succeed in that role, and the disruption that digital technologies are continuing to impose in the state technology landscape.

Critical Success Factors for the CIO

Gone are the days where state CIOs are primarily focused on IT infrastructure. When asked, CIOs consistently ranked communication, relationship-building and strategic thinking as the most critical leadership traits for a successful CIO. In contrast, technology expertise came in at number nine.

When we asked CIOs for lessons learned that could be shared with new incoming CIOs, a consistent picture emerged. Key advice that many CIOs shared was the need to build strong relationships with key stakeholders at the governor's office, agency and legislative level, and to develop a strong understanding of the budget process and relationships with the budget office. Once this is accomplished, nurturing enterprise thinking that is focused on generating value for the business will set the foundation for success. A focus on enterprise vision and strategy, security and risk management, and agency customer service and relationship management were seen as the most critical dimensions in order to make a difference.

Legacy Modernization Funding and Procurement

One area of evolution over the past several years has been the adoption of alternative software development approaches – in particular, a move away from extended, traditional waterfall lifecycle projects and towards the rapid delivery of software in an incremental fashion, often using Agile software development techniques. However, software development lifecycle models are only one part of the story in planning and executing legacy modernization initiatives in state government. The funding, procurement and contracting model used by the state can be an even greater influence on project approach.

With this in mind, we asked CIOs how they would characterize their state's use of innovative funding, procurement and contracting models. In particular, legacy modernization projects are increasingly structured around modular or incremental deployment of functionality, versus a large monolithic Design Development and Implementation (DD&I) phase. Almost two thirds of states are already using such approaches, with another quarter either planning or considering their use. A major driver of modular approaches across states is the federal government and their push for incremental funding of modernizations for feder-

ally funded programs such as Medicaid. We also asked CIOs to what extent their state was adopting modular procurement and contracting for legacy modernization projects. This would involve modules/releases for a solution being contracted individually, versus a more traditional single system integrator contract for the entire modernization project. Modular procurement and contracting is also quite widespread, although not yet as widely used as modular funding. However, in addition to the 48 percent currently employing the practice, 40 percent are either planning or considering it, so it could soon become as commonplace. Where states had used modular contracting, some consistent lessons learned were that education of stakeholders (including the legislature) was critical, and that the additional complexity of procurements and contracting can push a system integrator role on to the state even if the state is not prepared to take on such a role.

Digital Transformation and Emerging Technologies

The needs, benefits, and solutions of an effective digital transformation strategy are maturing and becoming clearer. Digital transformation has taken on a broader definition than simply moving state government to online services. State leaders aspire to have seamless citizen transactions, increase engagements, provide mobile services, establish common online identities, and enable crowdsourcing and digital assistants to help navigate services. An effective statewide digital strategy and roll-out requires a collaborative, multi-agency effort. That effort should include agency directors, deputy directors, and other program leaders.

However, the question for state governments remains who should drive those efforts. While the survey respondents were evenly split on the question of the state CIO being responsible for executing a digital strategy for the state, they were overwhelmingly in agreement that the state CIO should take a leadership role in digital efforts. Over 80 percent of respondents believe the state CIO should lead/participate in policy setting and over 70 percent believe the state CIO should set overall direction. This is a small but noticeable change from last year's survey and reflects the growing awareness and maturity around digital services. The state CIO is viewed as the person most able to provide an enterprise view of modernization needs, help set standards and facilitate an effective execution.

In the area of emerging IT, we saw big changes in this year's survey regarding what CIOs consider the most impactful emerging IT. When asked "what emerging IT area will be the most impactful in the next 3 to 5 years?," 57 percent of respondents chose artificial intelligence. This is up significantly from the prior year's survey, in which only 29 percent selected artificial intelligence. Meanwhile, interest around the Internet of Things (IoT) fell from 43 percent to 27 percent. When CIOs were asked if they were planning to deploy some form of automation software, a full 44 percent replied that these efforts were complete, in-progress or planned. Another 29 percent were considering deploying automation software, while a small number either had no plans or were unsure.

CRITICAL SUCCESS FACTORS FOR THE CIO

At NASCIO's 2018 Midyear Conference, attendees were able to see data visualization come to life. The room was cleared of tables and chairs which left a large, empty space for moving around. Attendees were asked a series of questions and had to move to the corner of the room that corresponded with their answer. One question that was asked was which leadership trait or attribute is the most important to the success of state CIOs. Overwhelmingly the audience moved to the corner labeled communicator with negotiator as the second choice. Where did the least amount of people go? The corner labeled technologist. We asked the same question in this 2018 survey (as we did in 2015) and communicator prevailed again (as it did in 2015) with relationship manager and strategist taking up the 2nd and 3rd positions. Technologist, while clearly necessary, was, again, towards the bottom of the pack.

Gone are the days where state CIOs are the boxes and wires, pocket protector uniform type. They are business leads, big picture thinkers who must know how to tackle any situation head on. Or, as one CIO put it, "the most significant tasks before a state CIO do not require technological skills. Successful execution is rooted in outstanding and visionary leadership." Another CIO said, "listening is your most important super power!"

Is success simply a lack of failure or is there a method to the madness? We wanted to know how CIOs advance their agenda and drive results and what critical success factors and dimensions are needed to do so. The top five responses are ranked in this manner:

1. Enterprise vision and strategy
2. Security and risk management
3. Agency customer service and relationship management
4. Enterprise IT governance
5. Align IT for value creation

While CIOs are always focused on security and risk reduction, it is clear that they understand that vision, strategy, customer service and relationships are the keys to success. As one CIO said, "build relationships, listen, act ethically, tell the truth." Still, another said, "relationships matter. Communicate often and bad news doesn't age well."

All CIOs have perspectives regarding how their performance should be assessed. We asked CIOs to select the top three criteria they believe **should** be used to measure a CIO's success. The top two selections were reduction of risk to the state (68 percent) and successful execution against strategy and plans (66 percent).

What are the three most important leadership traits or attributes critical to the success of a state CIO?

| Communicator | Relationship Manager | Strategist | Motivator | Diplomat |
| Change Manager | Negotiator | Facilitator | Technologist | Educator |

HIGHEST RANK ▬▬▬▬▬▬ LOWEST RANK

Improvement in project service delivery (48 percent) and improved internal and external satisfaction (44 percent) followed. To compare aspirations with reality, we asked how a CIO's success is *actually* measured. A clear contrast was evident between what CIOs desire and what actually happens with number one being deliver cost reductions to state (72 percent) and number two, improvement in project and service delivery (54 percent). Given the continued fiscal pressures on the states, this emphasis is not surprising. Governors and budget directors want to tout reductions in state spending and efficiencies to taxpayers, especially when it concerns internal business operations. Improved internal and external satisfaction (48 percent) and reduction of risk to the state (40 percent) were also ranked highly in a CIO's actual measures of success. It is important to note that CIOs ranked delivering cost reductions to the state as the sixth most important thing (out of 9) that *should* be used to measure a CIO's success.

Finally, in this section we asked CIOs about their priorities and challenges. Many of these are closely related and intersect, proving difficult to rank individually. Nonetheless, CIOs were asked to choose their top five priorities and goals and it is no surprise that ensure IT systems comply with security and regulatory requirements ranked number one. As we mentioned before, CIOs are always thinking about
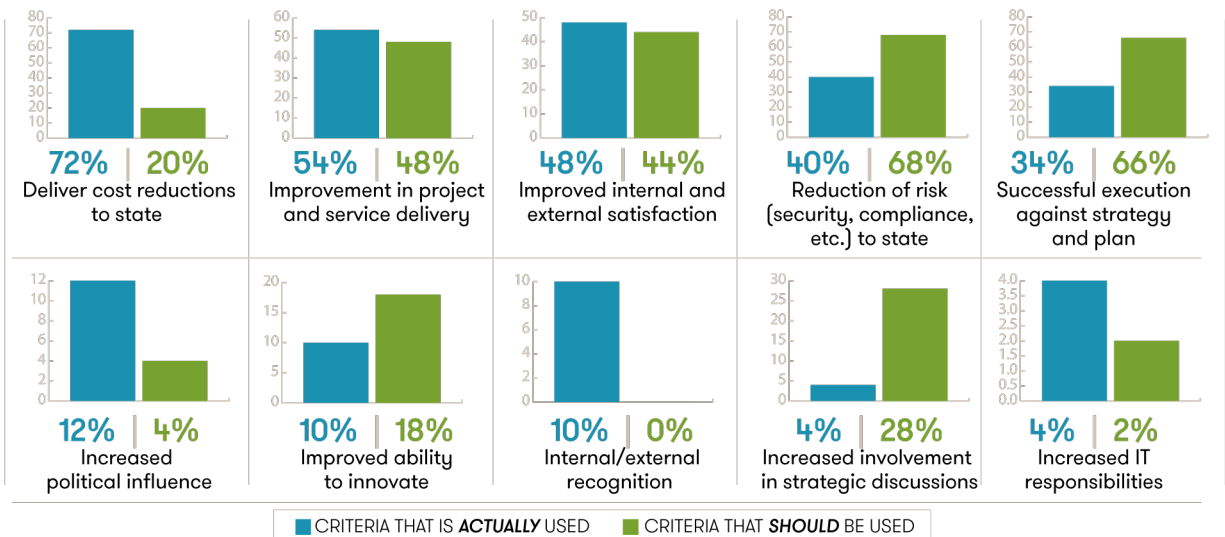
security. It is interesting that one CIO also commented that they wanted to enable true cybersecurity, not just meeting regulations. But, what else ranked highly?

- Improve IT relationships with the business (2)
- Create and drive IT strategy that aligns to overall state objectives (3)
- Improve IT governance (4)
- Improve portfolio management and project delivery metrics (5)

Again, we see relationships and strategy on the minds of state CIOs. When we asked this same question in 2015, CIOs were focused on security, vision, strategy and value creation.

When goals and priorities are considered, so must challenges and obstacles. Thus, we asked CIOs to rank their top challenges as CIO. Agency resistance to change ranked highest, but that doesn't seem to be deterring CIOs. "Drive out the fear of change," was good advice given by one CIO. Another said, "Don't stop for the naysayers. Everyone will complain no matter what you do - AIM FOR MARS!" CIOs also reported that recruiting and retaining IT talent was a major roadblock for them, and this is consistent with what CIOs have been telling us for the past few years of surveys. However, as one CIO advised, "try to make a difference every day. Keep pushing, don't give up."

Criteria used to measure a CIO's success: reality vs. aspiration

72%	20%	54%	48%	48%	44%	40%	68%	34%	66%
Deliver cost reductions to state		Improvement in project and service delivery		Improved internal and external satisfaction		Reduction of risk (security, compliance, etc.) to state		Successful execution against strategy and plan	

12%	4%	10%	18%	10%	0%	4%	28%	4%	2%
Increased political influence		Improved ability to innovate		Internal/external recognition		Increased involvement in strategic discussions		Increased IT responsibilities	

■ CRITERIA THAT IS *ACTUALLY* USED   ■ CRITERIA THAT *SHOULD* BE USED

CIO BUSINESS MODELS

The role of a CIO and which business models support that role vary widely across state governments. Since first asking about these topics in 2010, responses have shown a consistent trend of moving towards CIOs operating as a business manager or broker of services as opposed to an owner and operator of assets. More and more states are using shared services models for their IT operations.

When asked how CIO organizations plan to deliver or obtain IT services over the next three years, responses support the idea that CIOs are continuing to shift the business model by expanding more shared services, as-a-service models, IT shared services model, and managed services model. States are continuing to examine how a CIO should operate, and the general consensus is that more than half of the states are downsizing state owned and operated data centers. The trends show that the dominant business model across state government is one of a CIO organization operating as a shared services broker that leverages as-a-service models to deliver on their service portfolio.

"CIO as a broker is the future, that's where the private sector has gone and now the public sector will follow."

Given the constant trend towards CIOs acting as brokers for IT services, we introduced a question that sought to understand the obstacles that organizations encounter when making this move. Concerns over effective operational governance to include high participation from business and effective management of services from multiple sources trouble over 40 percent of CIOs. Funding and recovery models and a CIO's ability to deliver highly specialized needs are currently catching up to the idea that CIOs are operating as brokers in a managed services model. Some states struggle with procurement or management of IT services to include traversing current procurement statutes and regulations.

How does your state CIO organization plan to deliver or obtain IT services over the next three years (e.g., server and platform administration, backup, storage, software and hardware maintenance, network management and service desk management)?

	Introduce	Maintain	Expand	Downsize
State-owned-and-operated data center(s)	0%	35%	14%	52%
Outsourcing service model	15%	26%	57%	2%
Managed services model	10%	23%	65%	2%
IT shared services model	0%	22%	75%	2%
"As-a-service" models (e.g. SaaS, PaaS, IaaS, etc.)	14%	12%	75%	0%
State IT staff	0%	69%	10%	22%

What are the top three obstacles for your state CIO organization to acting as a broker for IT services?
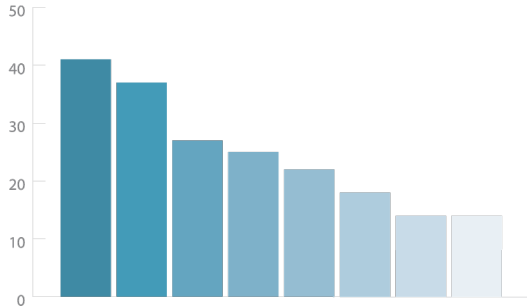
41% | Effective operational governance

37% | Current funding or recovery model

27% | Concerns over ability to deliver highly specialized needs of various state agencies or departments

25% | Fragmented procurement or management of IT services

22% | Current procurement statutes and regulations

18% | Obtaining staff that are experienced in managing services and vendors

14% | Current management culture

14% | Lack of legislative understanding and support

The motivation behind driving to a brokered services model is dominated by cost effectiveness (53 percent of responses), modern capabilities (45 percent) and the quality of services (43 percent) or access to business outcomes (43 percent). These motivations are not surprising, as brokering services reduces or relieves the infrastructure and operational costs on the CIO organizations as well as allowing them access to vendor-supported services and resources that may not exist in government.

As one of the biggest elements of state IT strategy is cost effectiveness, CIOs were asked a question surrounding adoption of the Technology Business Management (TBM) model and decision-making framework (page 8). Nearly one quarter (22 percent) of CIOs surveyed indicated full investment in or current implementation of TBM with 26 percent contemplating moving to TBM in the next year or are in the planning stages. However, 51 percent expressed no plans to implement this model. This could indicate that TBM is yet to achieve widespread adoption or contemplation. However, during the in-person interviews nearly all CIOs discussed the need to utilize a TBM model. A number that said they are not planning to roll out a TBM model also suggested that the next governor's administration will very likely want and need to do this.

What are the three strategic or operational issues that are driving the increase in the use of brokered services?
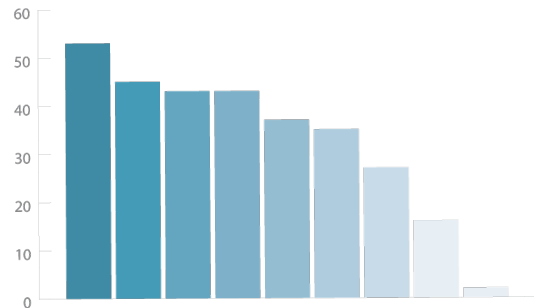
53% | Cost effectiveness

45% | Modern capabilities

43% | Quality of services

43% | Business outcomes

37% | Access to qualified resources and services

35% | Flexibility

27% | Transition to digital government

16% | Current funding or recovery model inhibits investment

2% | Other

Does your organization intend to use the Technology Business Management model and decision-making framework?

12%	Yes, we are fully invested in this model
10%	Yes, we are currently implementing this model
14%	Yes, we are contemplating moving in this direction (planning stages)
12%	Yes, we are contemplating moving to this model in the next year
51%	No, we have no plans to implement this model

The ever increasing reliance on information technology has elevated the role of IT to a major element of the state organization, thus, CIOs were asked to describe the current role of IT in their organization. Nearly 80 percent indicated having a voice in state agency strategy and strategic initiatives. Additionally, over 70 percent of CIOs responded that driving innovation or modernization of programs, driving stabilization of operations, and proactively identifying and removing obstacles that improve the delivery of projects and services were also major roles. However, 20 percent identified linking, monitoring, and reporting IT spends versus value delivered as IT's current role.

Given the rapid growth and expansion of IT within state organizations, CIOs were asked about the number of IT C-Suite roles/positions on the leadership team. Seventy-seven percent of CIOs indicated that additional C-Suite roles (e.g. chief privacy officer, chief transformation officer) are staffed or approved on the leadership team. The most common roles staffed or approved were found to be the Chief Technology Officer (CTO) with 67 percent and the Chief Operating Officer (COO) with 63 percent. The least staffed or approved role is Chief Customer Officer (CCO) at 30 percent, however, 54 percent indicated the role as not being required with no plans to staff.

How would you describe the current role of your IT organization?

 78% Have a voice in state agency strategy and strategic initiatives

 71% Drive innovation or modernization programs

 71% Drive stabilization of operations

 71% Proactively identify and remove obstacles that improve the delivery of projects and services

 41% Improve program/project delivery metrics

 20% Link, monitor and report IT spend versus value delivered

**What roles (or equivalent) do you currently have (or plan to have) in your leadership team?**

	Role approved and/or staffed	Role planned: pending approval	Role desired but not approved	Role not required/no plans to staff
Chief Data Officer	42%	2%	33%	23%
Chief Operating Officer for IT	63%	4%	10%	23%
Chief Technology Officer	67%	6%	13%	15%
Chief Customer Officer	30%	0%	15%	54%
Chief IT Procurement Officer	48%	2%	17%	33%
Other C-Suite role	77%	3%	0%	19%

LEGACY MODERNIZATION FUNDING AND PROCUREMENT

State IT projects continue to receive significant exposure and attention, both from state legislators and from the media. There continues to be a general perception that states are struggling to implement technology solutions. This perception – whether warranted or not – ramps up the pressure on state CIOs to improve the management of technology projects and to demonstrate the value that their organizations are providing to business customers. One initiative states have undertaken over the last several years has been to explore alternative software development approaches – in particular a move away from extended, traditional waterfall lifecycle projects and towards the rapid delivery of software in an incremental fashion, often using Agile software development techniques. However, software development lifecycle models are only one part of the story in planning and executing legacy modernization initiatives in state government. The funding, procurement and contracting model used by the state can be an even greater influence on project approach.

With this in mind, we asked CIOs how they would characterize their state's use of innovative funding models to generate the capital for modernization initiatives, or to invest more generally in innovation.

What innovative ways is your state exploring to generate the capital funding necessary to modernize legacy systems, or to invest in innovation?
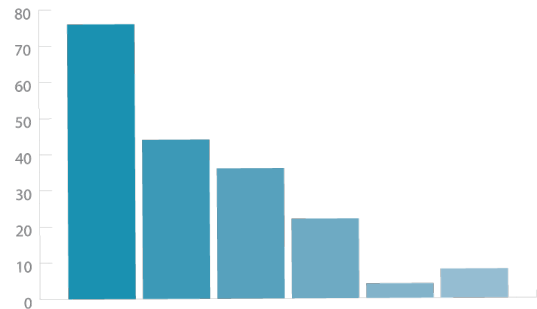
76% | Outsourcing /as-a-service models where no capital required and costs treated as operating expenses

44% | Establishing a modernization/ innovation fund to which projects apply to access funding

36% | Public/private partnerships where commercial entities provide the initial capital and are paid through additional savings/revenues/use fees

22% | Bonds or Certificates of Participation

4% | Seed capital for private sector start-ups focused on state technology innovation

8% | None/NA

As shown in the table above, outsourcing/as-a-service models are by far the most common approach, where costs associated with the modernization initiatives are treated as operating expenses rather than a capital investment. CIOs observe that moving costs from CapEx to OpEx increased the odds of initiatives being funded. Almost half of states have also established a dedicated modernization fund to which projects apply to access funding. One lesson shared by CIOs is to be careful not to use such a fund for operational activities, since

then the fund will lose focus. About a third of states are using public/private partnership (P3) structures where commercial entities provide the initial capital and are paid through additional savings, revenues and/or use fees. As one CIO noted, "we have also learned that many vendor partners are willing to 'foot the bill' for financing at zero percent interest. Provided the business case is sound, this provides for the ability to modernize today based on the cost savings of tomorrow." Bonds and Certificates of Participation are also used by a number of states, but some CIOs cautioned that, in their view, the trade off for bonds is steep – being beholden to a vendor/technology for longer than would be otherwise desirable.

In general, some lessons learned that CIOs shared were that the more innovative or unusual the funding strategy, the stronger the return on investment needs to be to get all stake holders to come along. CIOs also stated that it is crucial to get the budget office to the table and make the business case for IT investment from a business perspective, including how the initiative will reduce costs, improve efficiencies and also, importantly, reduce risk.

In addition to exploring innovative sources of funding, we also asked CIOs how they are exploring new ways to apply this funding to specific projects. In particular, legacy modernization projects are increasingly structured around modular or incremental deployment of functionality, versus a large monolithic Design Development and Implementation (DD&I) phase. We asked CIOs to what extent their state was also adopting incremental/modular funding for legacy modernization projects, where projects are funded incrementally by release or phase.

To what extent is your state also adopting incremental/modular funding for legacy modernization projects, where projects are funded incrementally by release/phase?

|	
60%	Yes, already occurring
8%	Yes, planned
16%	Yes, considering
8%	No, not considering
2%	No, prohibited by statute or policy
6%	Unsure

As shown by the previous figure, almost two-thirds of states are already using incremental/modular funding approaches, with another quarter either planning or considering their use. A major driver of modular approaches across states is the federal government and their push for incremental funding of modernizations for federally funded programs such as Medicaid.

As a follow up to the funding question, we also asked CIOs to what extent their state was adopting modular procurement and contracting for legacy modernization projects. This would involve modules/releases for a solution being contracted individually, versus a more traditional single system integrator contract for the entire modernization project.

To what extent is your state adopting modular procurement and contracting to legacy modernization projects, where modules/releases are contracted individually, versus a more traditional single system integrator contract for the entire modernization project?
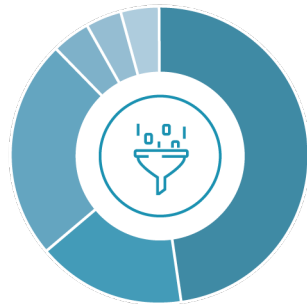
48%	Yes, already occurring
16%	Yes, planned
24%	Yes, considering
4%	No, not considering
4%	No, prohibited by statute or policy
4%	Unsure

Modular procurement and contracting is also quite widespread, although not yet as widely used as modular funding. However, in addition to the 48 percent currently employing the practice, 40 percent are either planning or considering it, so it could soon become as commonplace. Where states had used modular contracting, the most consistent lessons learned were:

- You must educate the legislature on why it isn't necessary to bundle all of the solution elements in a single procurement with a single master integrator with a corresponding big contract.

- Procurements are more complex, especially if they end up de-coupled and you have multiple suppliers delivering services as part of the same project. Taking a modular approach allows for better targeting of best of breed for every element of the overall solution. However, it also pushes a system integration role up to the state, or necessitates bringing in a supplier to play the system integrator role.

- Success requires a strategy to initiate cultural change in all areas of the organization, including legal, procurement, and operations.

- Multiple-award qualified vendor lists are very valuable.

CYBERSECURITY

Security and risk management is the number one priority of state CIOs according to the State CIO Top Ten Policy and Technology Priorities for 2018 published by NASCIO. As we have done since 2013, we asked CIOs about the current status of their cybersecurity program. When compared to the responses from 2017, 2015 and 2013, it is clear that states are maturing and progress continues to be made. In particular, development of security awareness training for workers and contractors is significantly more widespread than it was five years ago. This is a positive development toward risk reduction. In addition, CIOs report greater success in establishing trusted partnerships for information sharing and response. While the percentage of respondents whose states have obtained cyber insurance remains at only 42 percent, this is an increase of 22 percent from just three years ago.

Characterize the current status of the cybersecurity program and environment in state government.
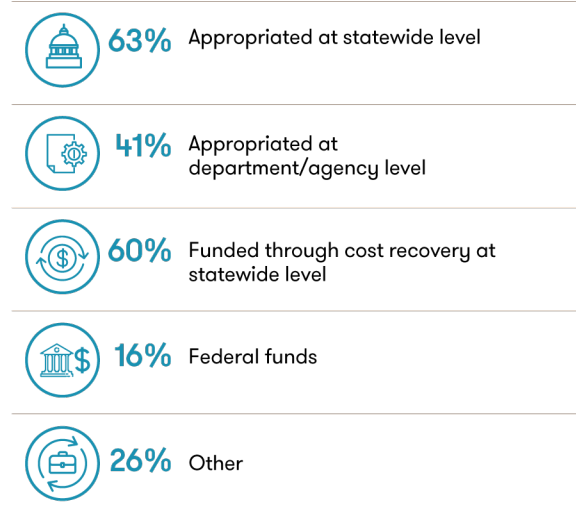
	2013	*2015*	*2017*	*2018*
Developed security awareness training for workers and contractors	78%	87%	88%	98%
Adopted a cybersecurity framework based on national standards and guidelines	78%	80%	95%	94%
Established trusted partnerships for information sharing and response	75%	80%	83%	92%
Adopted a cybersecurity strategic plan	61%	74%	83%	85%
Acquired and implemented continuous vulnerability monitoring capabilities	78%	80%	79%	81%
Created a culture of information security in your state government	73%	74%	83%	79%
Developed a cybersecurity disruption response plan	45%	52%	69%	69%
Documented the effectiveness of your cybersecurity program with metrics and testing	47%	52%	57%	63%
Using analytical tools, AI, machine learning, etc. to manage cybersecurity programs	n/a	n/a	n/a	44%
Obtained cyber insurance	n/a	20%	38%	42%

When examining patterns of success across all states, cybersecurity governance and clear leadership are critical factors. We asked CIOs what role they currently have in administering their state's cybersecurity program. The majority of CIOs report their role as leading or participating in policy setting. In addition, 88 percent are also responsible for setting overall direction and over 86 percent for oversight. Seventy-six percent are directly responsible for execution of the program. With recent legislation and executive orders expanding and strengthening the CIO role in cybersecurity, we expect to see this number increase in future surveys.

Funding (or rather lack of funding) is frequently reported by CIOs as a significant barrier to achieving cybersecurity goals. As one CIO stated, "IT is the bottom feeder of the agency budget and security is the bottom feeder of the IT budget." We asked CIOs how their states funded cybersecurity efforts. A wide variety of mechanisms are used, with 63 percent of CIOs reporting funds appropriated at a statewide level to the CIO's office and 60 percent reported funds through cost recovery at a statewide level. Federal funds, however, remain the least cited funding source. Throughout the in-person discussions, the CIOs stressed the importance of having a plan and transparency into what it will take to continue mitigating the risks associated with cybersecurity. Analyzing and determining the requirements as well as the "want to haves" and the associated costs, then working collaboratively with the state's financial leadership is the best and most direct path to success.

How is cybersecurity currently funded for your state?

63% Appropriated at statewide level

41% Appropriated at department/agency level

60% Funded through cost recovery at statewide level

16% Federal funds

26% Other

What is the current role of your CIO organization in administering the statewide cybersecurity program?

88% Leading or participating in policy setting

88% Responsible for setting overall direction

76% Responsible for execution

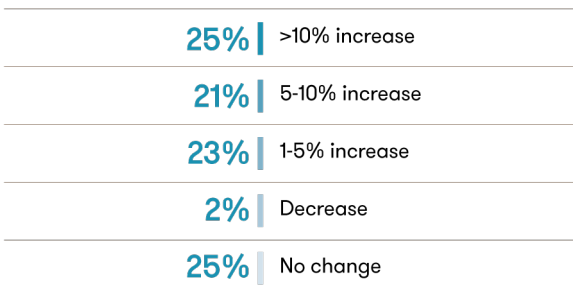**86%** Responsible for oversight

4% Not CIO responsibility

"Cyber is the only area where the legislature has been almost universally supportive of modestly increasing investments."

Almost all CIOs reported a need to focus on cybersecurity. Nearly 70 percent reported an increase in cybersecurity spending over the last 24 months with 25 percent citing more than a 10 percent increase for their state organizations. A very small number of CIOs indicated an actual decrease in cybersecurity spending (2 percent). With federal initiatives propelling cybersecurity into a position of heightened importance, we expect to see cybersecurity spending increase moving forward.

CIOs reported the existence of barriers facing their state's ability to address cybersecurity. The most common challenge reported by 82 percent of CIOs is the increasing sophistication of threats with a close second being the inability to attract and retain top-tier security and privacy talent at 71 percent. The least likely barriers are cited as lack of executive support at 8 percent and inadequate competence of security professionals at 12 percent.

Have you seen an increase or decrease in cybersecurity spending over the last 24 months?

25%	>10% increase
21%	5-10% increase
23%	1-5% increase
2%	Decrease
25%	No change

What major barriers does your state face in addressing cybersecurity?

|			
82%	Increasing sophistication of threats	**29%**	Lack of visibility and influence within the enterprise
71%	Inability to attract and retain top-tier security and privacy talent	**22%**	Lack of legislative support
47%	Lack of adequate funding	**18%**	Lack of governance and authority
43%	Inadequate availability of security professionals	**12%**	Inadequate competence of security professionals
31%	Emerging technologies	**8%**	Lack of executive support
31%	Lack of support from business stakeholders		

As CIOs acknowledged a great need for cooperation with legislators, CIOs were asked about their frequency of communication with state legislators on the level of business risk and the state's abilities to protect against external cyber-attacks. Seventeen percent of CIOs reported communicating regularly or more than four times per year with legislators. Nearly half (48 percent) reported communicating with legislators either less than twice per year or between two and four times per year. However, 35 percent of CIOs indicated contact with legislators only as required or on an ad-hoc basis. Having a healthy rapport with legislators is an integral part of garnering political support and increased funding. During the in-person interviews, the CIOs that had regular and open communications with legislators or the legislative leadership reported that they felt they had a partnership built on trust and mutual respect. Their relationship provided them the ability to gain funding and other needed support to drive cybersecurity programs.

When asked about the governance model for cybersecurity, almost all CIOs (98 percent) reported cybersecurity strategy and policies/regulations rest with the state. In effect, this describes a centralized approach. Sixty-seven percent of CIOs are responsible for budget and/or funding with a different department or agency responsible for the remainder. Based on state CIOs reporting, state organizations are overwhelmingly responsible for the cybersecurity governance model and major aspects of cybersecurity with no involvement by the federal government and minimal involvement by other departments/agencies.

How often do you communicate with legislators on level of business risk and your state's abilities to protect against external cyber attacks?
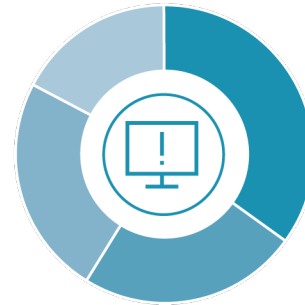
35% Ad-hoc / as required

24% Regularly, less than 2 times per year

24% Regularly, between 2 and 4 times per year

17% Regularly, more than 4 times per year

What is the governance model for cybersecurity in your state? Who has responsibility for the following aspects of cybersecurity?
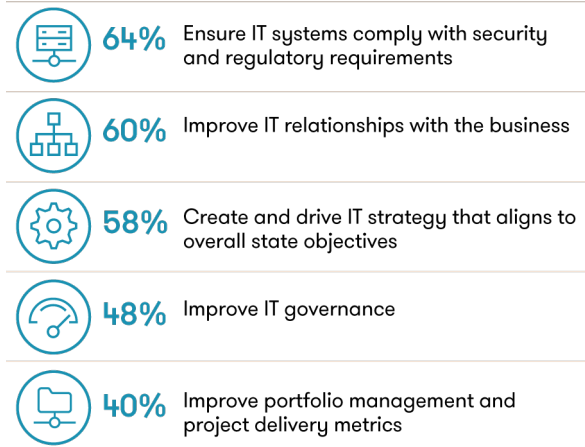
	State	Dept./ Agency	DK/DNA
Cybersecurity strategy	98%	2%	0%
Budget and/or funding	67%	33%	0%
Policies/regulations	98%	2%	0%
Execution/enforcement of policies/regulations	84%	14%	2%
Reporting to legislators	94%	2%	4%

PORTFOLIO MANAGEMENT

Effective portfolio management is seen by CIOs as a top issue and a critical success factor for the long-term to build, maintain and manage the states information technology needs and requirements. A common view is arising that describes the need to use more transparent planning to organize technology goals and initiatives into a defined plan or strategy through the use of portfolio management. Having a clear line of sight into the IT plans, and why they exist, improves communication and understanding between the business and executive stakeholders of an administration as well as state leadership and legislative members.

The top five responses to the question asking what CIOs consider their top priority all reflect, directly and indirectly, aspects of portfolio management:

What would you consider your top priorities/ goals as a CIO?

	64%	Ensure IT systems comply with security and regulatory requirements
	60%	Improve IT relationships with the business
	58%	Create and drive IT strategy that aligns to overall state objectives
	48%	Improve IT governance
	40%	Improve portfolio management and project delivery metrics

A common theme throughout the in-person CIO interviews is an emerging and growing holistic view of managing IT as a portfolio in coordination and partnership with the state business leaders, in particular, the state chief financial officer (CFO) and/or budget director. Much of what is being reported by CIOs is the need to grow the understanding of state IT needs through strategic planning and transparency. Portfolio management is evolving into a platform to drive this common understanding and vision, and in turn, drive appropriate funding.

While CIOs are quick to recognize the need and desire for effective portfolio management, there is a gap in its current use:

- 46% of the states report limited use of portfolio management
- 38% report the widespread use of portfolio management
- 12% have no formal portfolio management practices, but are planning to implement
- 2% have no use and no planned use for portfolio management

How would you characterize the use of portfolio management processes and tools within your state CIO organization?
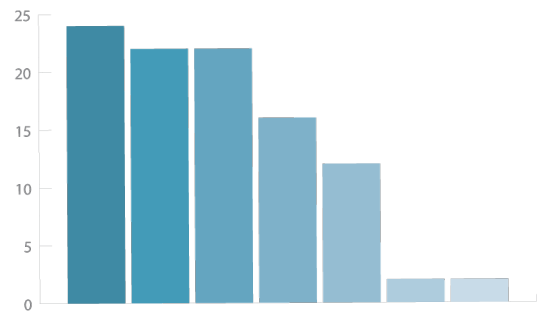
24% | Limited use, no dedicated portfolio management tool suite

22% | Limited use, but with dedicated portfolio management tool suite

22% | Widespread use, with dedicated portfolio management tool suite

16% | Widespread use, but no dedicated portfolio management tool suite

12% | No use currently, but planning to implement

2% | No use, none planned

2% | Do not know/does not apply

The reasons for these differences vary and include common obstacles such as funding and organizational behavior. One state reported that they are not using any type of tool, but rather have created a portfolio management team to manage the state's portfolio. Other CIOs report that they are maturing portfolio management in their state, but want to move the process into their Technology Business Management framework. Numerous CIOs also indicated that they are helping to lay the groundwork for their successor to move

forward with a formal portfolio management system and practices. Given the number of gubernatorial elections in 2018, it is anticipated by many CIOs that they may be replaced and that there is not enough time to successfully implement an effective portfolio management process prior to what could be a new administration. Several CIOs commented that the "next person" can dedicate the appropriate time and effort to this undertaking and implement a system that is in line with the policies of the new administration.

As noted, the CIO community is looking strategically and long term at the use of portfolio management. Some are incorporating or merging it with other efforts such as TBM while others view it as a tool to facilitate collaboration with the business and legislative leaders. The current use follows the classic definition and typical use of portfolio management practices and tools.

How does your organization use application portfolio management?

57% Track budget and spending

52% Reducing risk exposure

50% Support system lifecycle stage-gate decisions

38% Allocate resources based on supply of services and business demand

33% Monitor application performance, availability and service level agreement

9% Other

Other CIOs reported that the use of application portfolio management is left up to individual state agencies and not done at the enterprise level. Additionally, one state reported that beginning this year they will use the portfolio tool for manpower billing back to agencies.
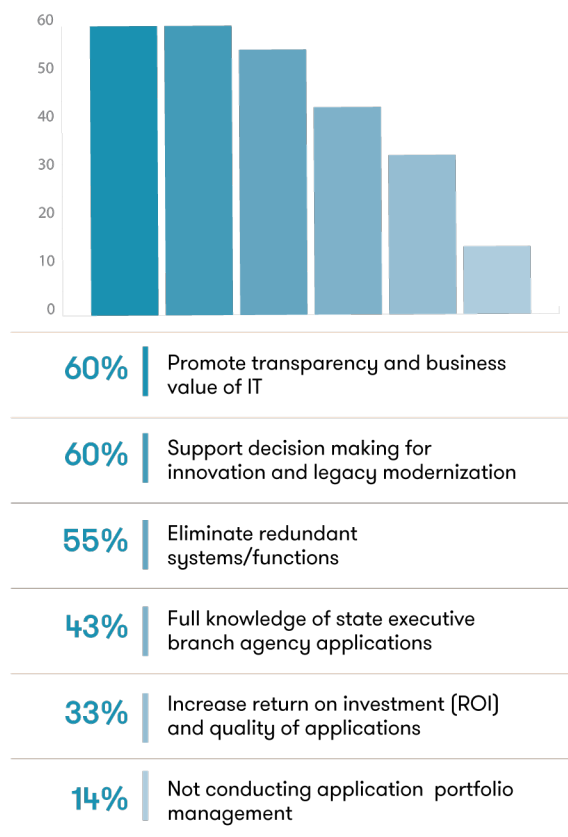
The use of portfolio management tools and processes is by far the rule and not the exception. While the current manner of use varies, nearly all CIOs expressed the feeling that the ongoing use of portfolio management is of strategic importance to the growing role of technology as the enabler of the business of government.

When asked about the top three benefits of portfolio management for the CIO organization there was a great deal of commonality with the answers:

- Promote transparency and the business value of IT
- Support decision making for innovation and legacy modernization
- Eliminate redundant systems and functions

Full knowledge of state executive branch agency applications was most commonly ranked fourth in the list of benefits. This answer is consistent with responses found throughout the survey results and interviews. The CIO community desires to have visibility across the enterprise and ability to put in place standards and common practices and policies to better enable the chances of success and overall improved management of technology throughout the state.
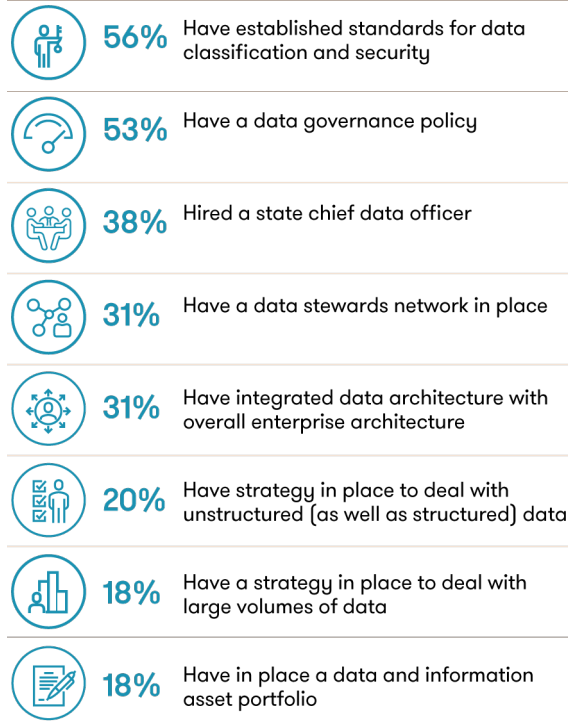
What are the top benefits of portfolio management for your CIO organization?

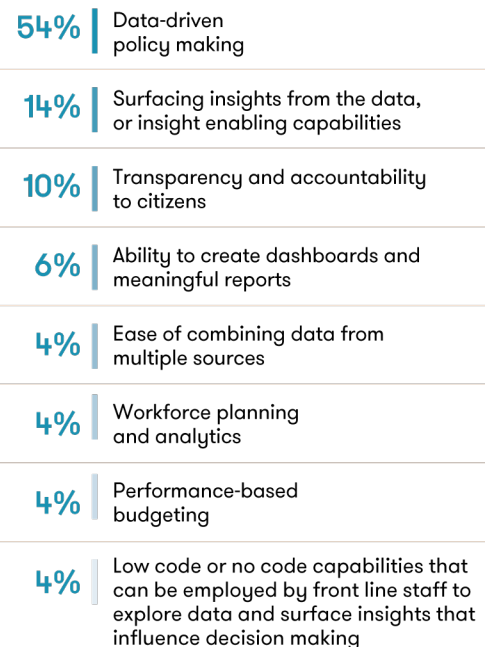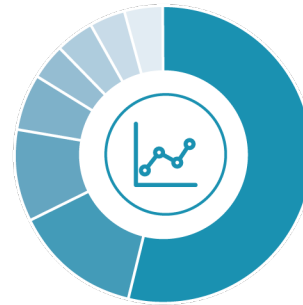|	
60%	Promote transparency and business value of IT
60%	Support decision making for innovation and legacy modernization
55%	Eliminate redundant systems/functions
43%	Full knowledge of state executive branch agency applications
33%	Increase return on investment (ROI) and quality of applications
14%	Not conducting application portfolio management

DATA MANAGEMENT AND ANALYTICS

Whereas our 2017 survey examined high-level practices to identify trends and understand how CIOs are supporting their state's ability to analyze information, our 2018 survey probed at the state of data management and analytics. The results cover areas of highest importance, status, and established efforts. Across these areas a theme emerges indicating data governance/standards and security have received the most attention from CIOs in terms of efforts to-date and the areas believed to be most critical.

Please describe the current status of enterprise data management in your state.

56% Have established standards for data classification and security

53% Have a data governance policy

38% Hired a state chief data officer

31% Have a data stewards network in place

31% Have integrated data architecture with overall enterprise architecture

20% Have strategy in place to deal with unstructured (as well as structured) data

18% Have a strategy in place to deal with large volumes of data

18% Have in place a data and information asset portfolio

When asked about the largest opportunity for using analytics, CIOs overwhelmingly chose data-driven policy making. Separately, fully one-third of CIOs believe analytics and visualization are critical for overall data management and analytics programs in order to draw insights from data, though less important than security, governance, and architecture.

What do you think is the biggest opportunity for using analytics?

54% Data-driven policy making

14% Surfacing insights from the data, or insight enabling capabilities

10% Transparency and accountability to citizens

6% Ability to create dashboards and meaningful reports

4% Ease of combining data from multiple sources

4% Workforce planning and analytics

4% Performance-based budgeting

4% Low code or no code capabilities that can be employed by front line staff to explore data and surface insights that influence decision making
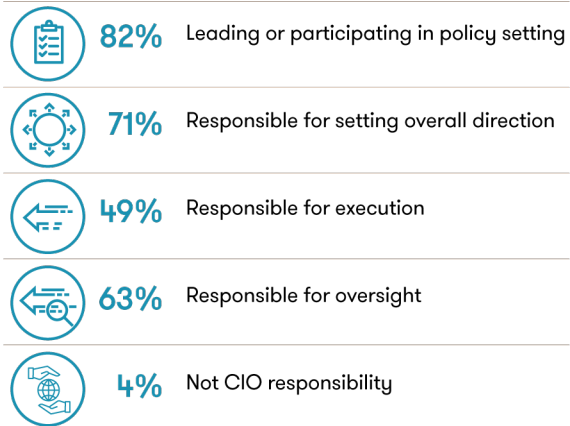
Taken on the whole, the collective results suggest CIOs are taking a staged view to data management and analytics. While they see the value of analytics to yield insights and believe the opportunity, they are focused on the pre-requisite activities of organizing, governing, and securing the data so that it will be reliable, of quality, and standardized for future efforts when it can be leveraged for evidence-based decision and policy making.

DIGITAL GOVERNMENT

The needs, benefits, and solutions of an effective digital transformation strategy are maturing and becoming clearer. It has taken on a broader definition than simply moving state government to online services. State leaders aspire to have seamless citizen transactions, increase engagements, provide mobile services, establish common online identities, and enable crowdsourcing and digital assistants to help navigate services. An effective statewide digital strategy and roll-out requires a collaborative, multi-agency effort. That effort should include agency directors, deputy directors, and other program leaders. Given the diversity and complexity of state government missions, this is a challenging endeavor.

However, the question for state government remains who should drive those efforts. While the survey respondents were evenly split on the question of the state CIO being responsible for executing a digital strategy for the state, they were overwhelmingly in agreement that the state CIO should take a leadership role in digital efforts.

What is the current role of your CIO organization in administering statewide digital government services?

📋	**82%**	Leading or participating in policy setting
✳	**71%**	Responsible for setting overall direction
←	**49%**	Responsible for execution
←	**63%**	Responsible for oversight
🌐	**4%**	Not CIO responsibility

Over 80 percent of respondents report the state CIO is leading/participating in policy setting and 71 percent of state CIOs are setting overall direction. This is a small but noticeable change from last year's survey and reflects the growing awareness and maturity around digital services. The state CIO is viewed as the person most able to provide an enterprise view of modernization needs, help set standards and facilitate an effective execution.

> **"Digital government's biggest challenge is culture."**

One respondent summed this up as, "our CIO organization operates a centralized digital government services portal and a set of services that are available for all agencies to utilize. However, agencies have the freedom to execute digital government services on their own. Our organization sets policy and overall direction."

This view that the state CIO should be setting policy and direction for state government is reflected in the responses to their approach for taking state government digital. Over two-thirds have, or plan to, establish a multi-agency governance council. Meanwhile, a little less than half desire a single statewide digital services organization. Most striking is that only 38 percent are leaving it up to individual agencies.

## What is your approach to delivering digital government services?
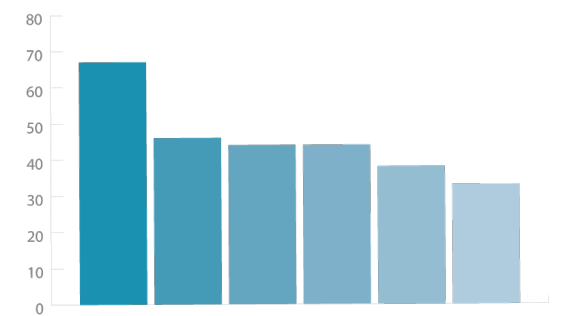
67%	Establishing a multi-agency governance council
46%	Creating data sharing
44%	Agile development processes that incorporate user feedback
44%	Creating a single digital services organization to drive state wide efforts
38%	Responsibility of individual agencies/departments
33%	Focus on creating a unique citizen ID

When asked about CIO's top two challenges, no single issue stood out. Rather, a handful of issues received similar responses as issues concerning the roll-out of statewide digital transformation services. Agency readiness topped the list of challenges getting 43 percent of the votes. This may be correlated to the responses in an earlier question on approach and focus on multi-agency governance councils. Overcoming complex legacy systems and manual processes was the next biggest concern at 35 percent. Next on the list of top of mind concerns were existing business practices (29 percent), a common understanding of a digital strategy (27 percent), and security/identity management/privacy (25 percent).

"We should move from how government views itself to how citizens view government, with a customer service focus. Start viewing yourself as citizens and businesses see you."

What are the top two challenges in delivering digital government services?
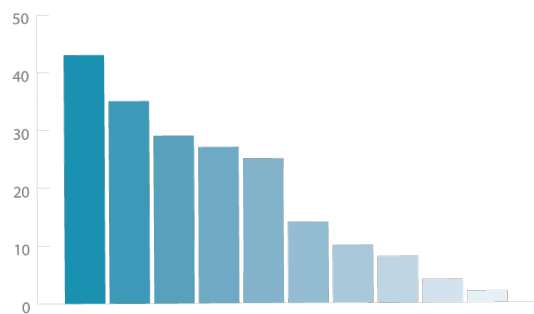
43%	Agency Readiness
35%	Complex legacy systems or manual processes
29%	Existing rules, procedures, business practices, roles
27%	Common understanding of an enterprise digital strategy
25%	Security/identity management/privacy
14%	Budget
10%	Common platform for content management
8%	Proliferation of apps
4%	Citizen expectations
2%	Other

AGILE AND INCREMENTAL SOFTWARE DELIVERY

Use of Agile and incremental software delivery approaches continue to progress in state governments. When we asked CIOs in 2015 about their use of these approaches, most CIOs reported limited use, or pilots occurring on certain projects. Two years later, almost half of CIOs reported widespread use of Agile, with only 17 percent reporting no or limited uses. In the past year, it appears that the overall percentage of states using Agile on a widespread basis has stayed consistent, but a greater number of those states are centralizing oversight and guidance. This may reflect a general maturing of the use of Agile as states become more comfortable and experienced in its use.

Over the past four years, states have gained experience in determining how successful Agile approaches can be in a state context, and on what types of projects Agile is a best fit. Since we first asked CIOs for their assessment of Agile success in 2015, many more CIOs feel comfortable expressing an opinion on the use of Agile approaches, and over 40 percent believe them to be generally superior to traditional waterfall development. This conclusion comes with a caveat however, since CIOs commented that the skills of the project team and dedication of business stakeholders were greater predictors of project success than just the methodology employed.

How would you characterize the use of Agile or incremental software development approaches within your state?

	2015	2017	2018
Widespread use, subject to centralized oversight or guidelines	9%	10%	18%
Widespread use, but not subject to centralized oversight or guidelines	21%	37%	28%
Pilot/trial adoption on certain projects	32%	34%	26%
Limited use, uncoordinated	34%	17%	22%
No use/Do not know	4%	2%	6%

To the extent that Agile or incremental software development approaches have been followed on projects in your state, how would you characterize their success?

	2015	2018
Too early to tell – not enough information to-date	62%	34%
These approaches were superior in success to waterfall software development	22%	42%
These approaches were comparable in success to waterfall software development	14%	16%
These approaches did not work for our state	2%	2%
Do not know/Does not apply	0%	6%

CLOUD

As with past surveys, topics related to the cloud are of great interest for CIOs. This year we asked the status of categories migrating to a cloud environment. Most of the transitions are completed or ongoing with the majority of these currently in process.

While the majority of CIOs have in place or are adopting a formal cloud strategy, some have no plans for a cloud migration strategy. The CIOs with no formal strategy currently in place report they are moving to cloud as needed or incrementally. Others reported that their state is in the very early stage only having executed small projects and they want to have a conservative approach and learn from others before moving forward at the enterprise level.

Does your organization have a strategy to migrate legacy applications to the cloud?

41% | Yes, cloud migration strategy in place

37% | No, but cloud migration strategy in development

22% | No cloud migration strategy planned
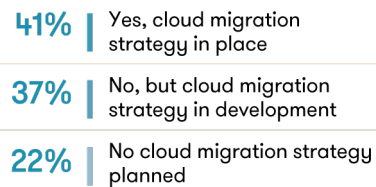
What categories of services have you migrated or do you plan to migrate to the cloud?

	Done	Ongoing	Planned	DNA/DNK
Business Intelligence	11%	41%	18%	30%
Citizen relationship management	18%	31%	29%	22%
Digital archives	9%	29%	29%	33%
Project and portfolio management	29%	29%	15%	27%
E-mail and collaboration	58%	29%	10%	2%
Open data	23%	23%	15%	38%

The main drivers to migrate legacy applications to the cloud fall into three main responses:

- Cost and economics
- Security and maintenance
- Flexibility and portability

Responses show each of these areas are essentially equally important and essential business drivers behind the migration activities.

There have been challenges consistently expressed consistently in survey responses as well as interviews related to migrating to a cloud environment. While the discussion of moving to the cloud has been taking place over the past number of years, the actual movement is a more recent undertaking. With this comes a lag in maturity of the market overall and understanding of the details of this type of initiative. One CIO simply stated "this sounds great, and it is, but one thing it is not is easy! There is so much more work involved than we anticipated."

Many of the challenges reported are people and process related, "technology is easy, people and processes are hard." Other challenges reported by CIOs include:

- Clarity into the security of cloud providers and alignment with state standards, rules and law
- Long-term vendor relationship vulnerabilities, contract compliance and measurements over time
- Exit strategy
- Clear understanding of the cost model associated with the cloud provider
- Jurisdictional issues

Along with the cloud migration strategy, the majority of states that still utilize mainframe computing are planning to move to an off-premise Mainframe-as-a-Service solution over the next three years.

Are you planning to move to an off-premise Mainframe-as-a-Service solution in the next 2-3 years?

18%	Yes, already complete
20%	Yes, planned
27%	Yes, considering
29%	No
6%	Unsure

It is typical to share contract vehicles and some services and applications with local government. When asked about sharing cloud solutions and strategies with other governments within the state, the majority of states do not make their infrastructure available outside of state government.

To what extent has your cloud strategy and/or solutions been integrated with other jurisdictions?

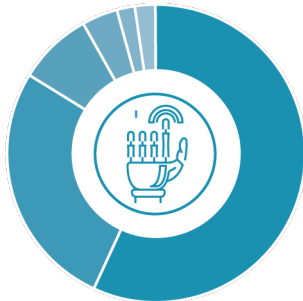|	Local (not shared)	Shared w/ other justisdictions within the state	Shared with government agencies	DNA/DNK
Cloud strategy	21%	10%	48%	21%
Budget and funding	26%	11%	30%	34%
Cloud procurement	10%	31%	38%	21%
Cloud securtity services/monitoring	19%	23%	29%	29%
IAAS	21%	17%	36%	26%
SAAS	21%	15%	40%	25%
PAAS	21%	19%	33%	27%
Project and portfolio management	26%	13%	32%	30%

EMERGING TECHNOLOGY

We saw big changes in this year's survey regarding what CIOs consider the most impactful emerging IT.

When asked what emerging IT area will be the most impactful in the next 3 to 5 years, 57 percent of respondent chose artificial intelligence/robotic process automation. This is up significantly from the prior year's survey, in which only 29 percent selected artificial intelligence. Meanwhile, ranking for the Internet of Things (IoT) fell from 43 percent to 27 percent.

In this year's CIO survey, we placed the focus on automation efforts in the states to better understand the state of the efforts and their roadblocks. When CIOs were asked if they were planning to deploy some form of automation software, a full 44 percent replied that these efforts were complete or planned. Another 29 percent were considering deploying automation software, while a small number either had no plans (12 percent) or were unsure (14 percent).

Are you planning to deploy automation software, either for robotic process automation (RPA), machine learning, or artificial intelligence (AI), in the next 2-3 years?
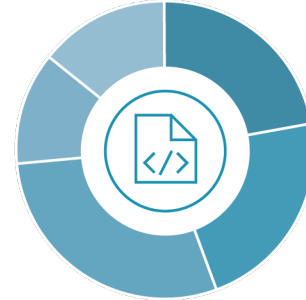
22%	Yes, already complete
22%	Yes, planned
29%	Yes, considering
12%	No
14%	Unsure

What emerging IT area will be most impactful in the next 3-5 years?

|	
57%	Artificial Intelligence/robotic process automation
27%	Internet of Things (IoT)
8%	Connected/Autonomous Vehicles
4%	Blockchain
2%	Unmanned Aerial Systems (UAS)
2%	Other

There was no single obstacle to deploying automation software that stood out. This was reflected in one respondent's comment that was echoed by another, that "actually EVERY one of the choices applies here. Not just one 'top' obstacle."

In fact, the two largest vote getters were opposite in their implications. Having staff that was experienced in managing automation software received the largest share of responses (25 percent). Meanwhile, concerns over the ability of automation software to deliver and solve government challenges (19 percent) was second. The conclusion that can be drawn is the largest block of concerns centers on how to manage a deployment while a very close second is if a deployment will return the promised results.

Challenges over the political environment (10 percent), current management culture (10 percent), and a fragmented management of services (8 percent), could be considered a similar response as a challenging business environment. Surprisingly, only 8 percent were concerned over the loss of jobs. This suggests that automation is seen as more of a helper in accomplishing tasks than taking away from the workforce. Interestingly, three respondents (6 percent) saw no obstacles.

Respondents were asked to choose the top two reasons why they are interested in automation software. They chose the more business-related outcome reasons as opposed to workforce and process-oriented motives. Better citizen services, improved quality of work, and lowering the total cost of business led the responses by a wide margin. This suggests that business operations and efficiencies are still a strong priority in any new or emerging technology, including automation software.

What are the strategic or operational issues that are driving the interest in the use of automation software?
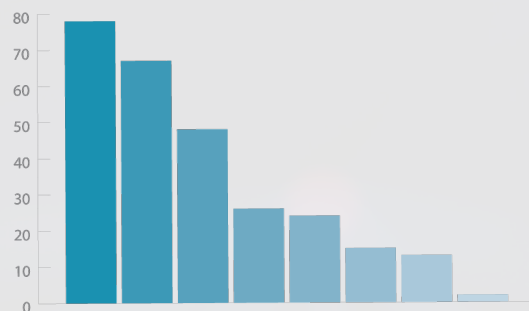
78%	Improved citizen services with faster and more accurate response time
67%	Remove defects, reduce time, and improve the quality of services for internal state agency processes
48%	Lower overall total costs of business
26%	Improve staff morale by eliminating low-value, repetitive tasks, and allowing staff to focus on strategic project
24%	Eliminate need for staffing for routine work
15%	Institute and enforce business processes for an agency or department-wide
13%	Increased volumes of data and documents read and processed
2%	Other

CONCLUSION

Collectively, the 2018 cohort of state CIOs represent over 150 years of experience in serving as their state's most senior technology leader. This experience reflects how the role of the CIO has evolved from primarily infrastructure focused to today's strategist and broker roles. It is likely that next year's class of CIOs will include a substantial percentage of new entrants. These new CIOs will benefit both from the foundation created by the predecessors as well as the advice and wisdom that more experienced state CIOs can provide.

As this year's survey has shown, the state technology landscape continues to evolve. From the technologies used to deliver services to the expectations of what it means to be a state CIO, changes will continue to challenge CIOs whether they are new to the role or have many years of experience. One constant will be the dedication of state CIOs to serving their customers and to delivering the maximum value from states' technology investments. We hope that this year's survey information will be useful both to existing state CIOs and their private sector partners, to new CIOs taking on the role for the first time, and to officials in new administrations that are thinking about the role of the state CIO and the best ways to govern investment in technology.

LIST OF STATES PARTICIPATING IN THE SURVEY

STATE OF ALABAMA
Jim Purcell
Acting Secretary of Information Technology

STATE OF ALASKA
Bill Vajda
Chief Information Officer

STATE OF ARIZONA
Morgan Reed
State Chief Information Officer

STATE OF ARKANSAS
Yessica Jones
Chief Technology Officer and Director

STATE OF CALIFORNIA
Amy Tong
Chief Information Officer

STATE OF COLORADO
Suma Nallapati
Secretary of Technology and Chief Information Officer

STATE OF CONNECTICUT
Mark Raymond
Chief Information Officer

STATE OF DELAWARE
James Collins
Chief Information Officer

STATE OF FLORIDA
Eric Larson
Chief Information Officer and Executive Director

STATE OF GEORGIA
Calvin Rhodes
State Chief Information Officer and Executive Director

STATE OF HAWAI'I
Todd Nacapuy
Chief Information Officer

STATE OF IDAHO
Greg Zickau
Chief Information Officer

STATE OF ILLINOIS
Kirk Lonbom
Acting Secretary and Chief Information Officer

STATE OF INDIANA
Dewand Neely
Chief Information Officer

STATE OF IOWA
Robert von Wolffradt
Chief Information Officer and Director

STATE OF KANSAS
Donna Shelite
Acting Chief Information Officer

COMMONWEALTH OF KENTUCKY
Chuck Grindle
Chief Information Officer

STATE OF LOUISIANA
Richard Howze
State Chief Information Officer

STATE OF MAINE
James Smith
Chief Information Officer

STATE OF MARYLAND
Michael Leahy
Secretary of Information Technology

COMMONWEALTH OF MASSACHUSETTS
Dennis McDermitt
Chief Information Officer

STATE OF MICHIGAN
Dave Devries
Chief Information Officer and Department Director

STATE OF MINNESOTA
Johanna Clyborne
Commissioner and Chief Information Officer

STATE OF MISSISSIPPI
Craig Orgeron, PhD
Chief Information Officer and Executive Director

STATE OF MISSOURI
Rich Kliethermes
Acting Chief Information Officer

STATE OF MONTANA
Tim Bottenfield
Chief Information Officer

STATE OF NEBRASKA
Ed Toner
Chief Information Officer

STATE OF NEVADA
Michael Dietrich
Chief Information Officer

STATE OF NEW HAMPSHIRE
Denis Goulet
Commissioner

STATE OF NEW JERSEY
Christopher Rein
Chief Technology Officer

STATE OF NEW MEXICO
Darryl Ackley
Secretary and State Chief Information Officer

STATE OF NEW YORK
Robert Samson
State Chief Information Officer

STATE OF NORTH CAROLINA
Eric Boyette
Secretary and State Chief Information Officer

STATE OF NORTH DAKOTA
Shawn Riley
Chief Information Officer

STATE OF OHIO
Stu Davis
Chief Information Officer and Assistant Director

STATE OF OKLAHOMA
Bo Reese
Chief Information Officer

STATE OF OREGON
Terrence Woods
Acting Chief Information Officer

COMMONWEALTH OF PENNSYLVANIA
John MacMillan
Deputy Secretary for Information Technology & Chief Information Officer

STATE OF RHODE ISLAND
Bijay Kumar
Chief Digital Officer/Chief Information Officer

STATE OF SOUTH CAROLINA
Keith Osman
Chief Information Officer

STATE OF SOUTH DAKOTA
Pat Snow
Acting Commissioner

STATE OF TENNESSEE
Mark Bengel
Chief Information Officer

STATE OF TEXAS
Todd Kimbriel
Chief Information Officer

STATE OF UTAH
Mike Hussey
Chief Information Officer

STATE OF VERMONT
John Quinn
Secretary of Digital Services and Chief Information Officer

COMMONWEALTH OF VIRGINIA
Nelson Moe
Chief Information Officer

STATE OF WASHINGTON
Vicki Smith
Acting Chief Information Officer

STATE OF WEST VIRGINIA
John Dunlap
Chief Technology Officer

STATE OF WISCONSIN
David Cagigal
Chief Information Officer

STATE OF WYOMING
Tony Young
State Chief Information Officer

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