

2020 Deloitte-NASCIO Cybersecurity Study *Key Findings & Recommendations*



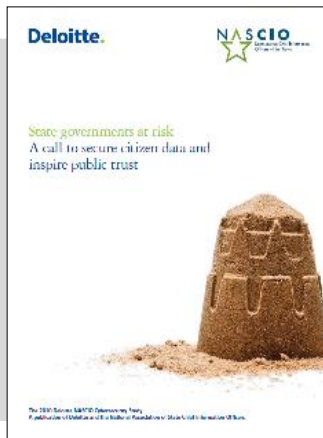
December 16, 2020

2020 Deloitte-NASCIO Cybersecurity Study – *Background and Overview*

States at risk: The cybersecurity imperative in uncertain times

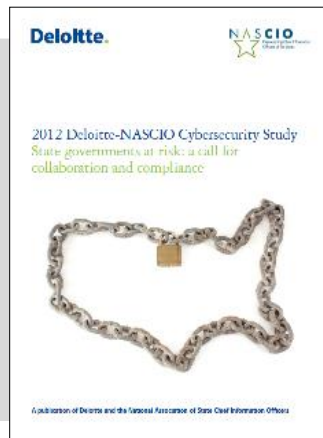
- 2020 survey report marks Deloitte and NASCIO's sixth joint, biennial state & local government cybersecurity report.
- A record 51 state & territory chief information security officers participated in the 2020 survey, including the NYS CISO.
- 3 key takeaways:
 1. COVID-19 has challenged continuity and amplified gaps
 2. Connecting the cyber dots across state, local, and higher education
 3. Strength, consistency, and enforcement in numbers
- Updated progress on the 2018 survey report's "Bold Plays:"
 1. Advocate for dedicated cyber program funding
 2. CISOs as an enabler of innovation, not a barrier
 3. Team with the private sector and higher education

2010



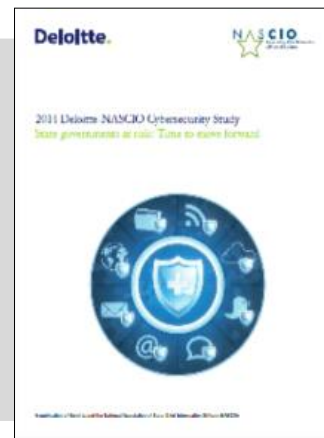
A call to secure citizen data and inspire trust

2012



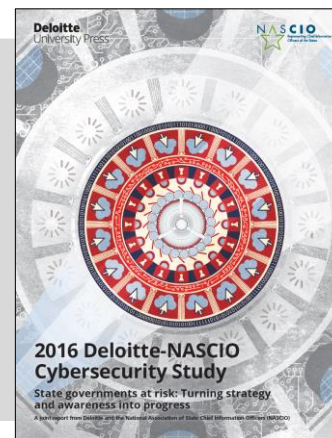
A call for collaboration and compliance

2014



Time to move forward

2016



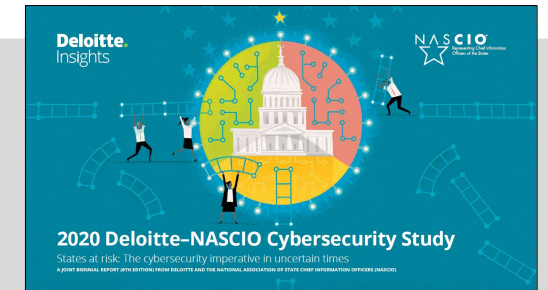
Turning strategy and awareness into progress

2018



Bold plays for change

2020



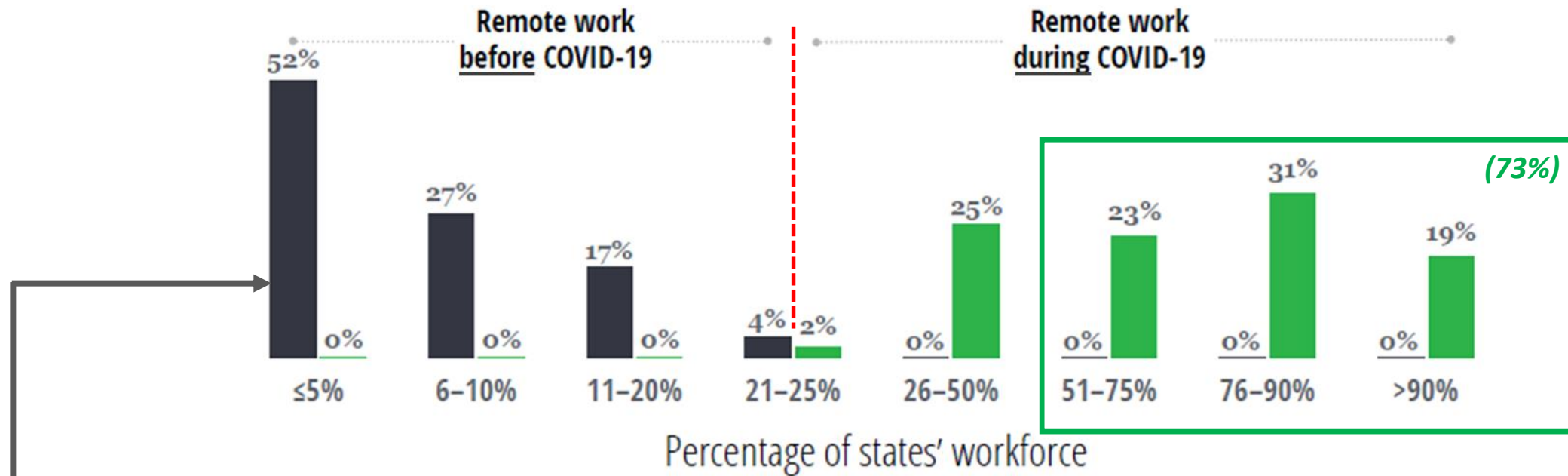
The cybersecurity imperative in uncertain times

Key takeaway 1: COVID-19 has challenged continuity and amplified gaps

The pandemic widened cyber challenges: budget, talent, threats, and the need for partnerships

States' remote workforce before and during COVID-19

What percentage of your workforce worked remotely before COVID-19? *And during?*



Before the pandemic, 52% of respondents said *less than 5% of staff worked remotely*. 

Key takeaway 1: COVID-19 has challenged continuity and amplified gaps (cont'd)

The pandemic widened cyber challenges: budget, talent, threats, and the need for partnerships

Top safeguards reinforced or established by CISOs as part of the COVID-19 response

- 01 Safeguard teleconferencing and video solutions and update policies and procedures
- 02 Establish secure work connections with multifactor authentication
- 03 Provide guidance on phishing and disinformation campaigns
- 04 Ensure continuity of operations plans/business continuity plans are up-to-date
- 05 Provide continuous guidance on COVID-19-related scams and precautions

Top barriers to overcome cybersecurity challenges

- 1  Lack of sufficient cybersecurity budget
- 2  Inadequate cybersecurity staffing
- 3  Legacy infrastructure and solutions to support emerging threats
- 4  Lack of dedicated cybersecurity budget
- 5  Inadequate availability of cybersecurity professionals

← 2018 report
"Bold Play"

Key takeaway 2: Connecting the cyber dots across state, local, and higher education

Collaboration with local governments and public higher education is critical to managing increasingly complex cyber risk within state borders

56% of CISOs are not very confident and 35% of CISOs are only somewhat confident in the cybersecurity practices of their local governments.

- A “**whole-of-state-approach**”—one that engages local, city and county governments, legislative and judicial branches of government, and public higher education—could potentially strengthen cybersecurity at all levels of government.
- States should consider increasing their leadership and influencing role in how federal grant funding, provided through the annual Homeland Security Grant Program (HSGP) and proposed *State and Local Cybersecurity Improvement Act* (H.R.5823), etc., is most effectively and efficiently invested to enhance local government cybersecurity.

Only 28% of states reported that they had collaborated extensively with local governments as part of their state's security program during the past year, with 65% reporting limited collaboration.



Key takeaway 3: Strength, consistency, and enforcement in numbers

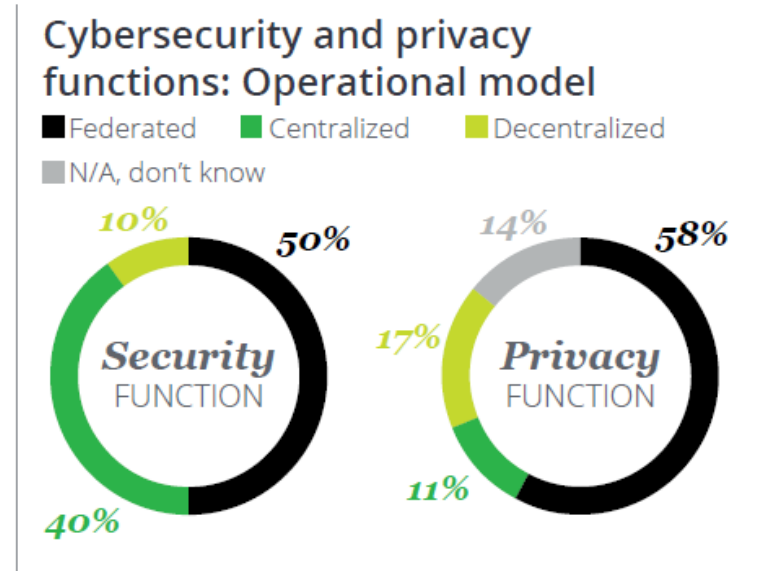
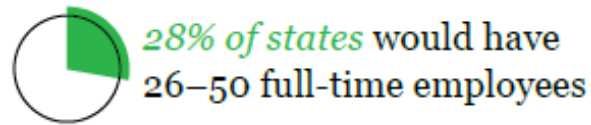
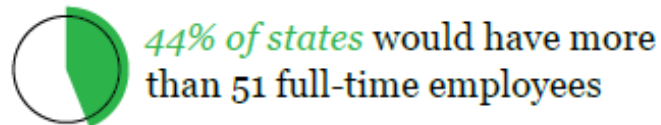
A centralized model may help CISOs position cyber to improve agility, effectiveness, and efficiencies

3 models of cybersecurity governance:

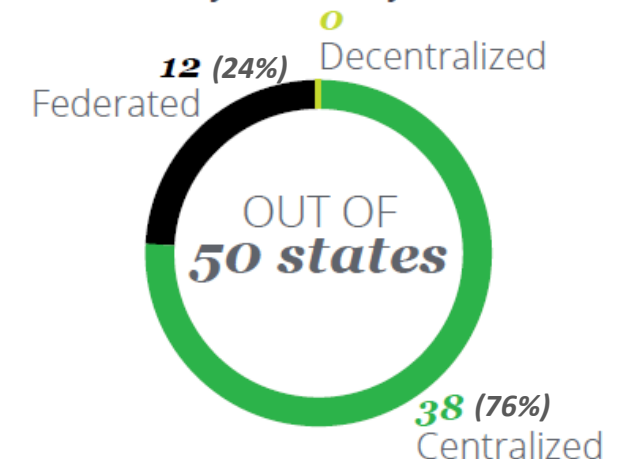
- **Decentralized** model – Individual state agencies are on their own for cyber services and execution with only policy guidance from the State CIO and/or CISO
- **Federated** model – State CISOs are responsible for centralized policy with a mix of centralized shared services and agency-led services specific to each agency
- **Centralized** model – Centralized governance structure where State CISO is responsible for cybersecurity for all state agencies

Potential advantages of a centralized model include:

- With the state CISO at forefront, higher agency adoption of enterprise security services
- A centralized cybersecurity budget elevates overall importance of cyber, helping to improve a state's overall cybersecurity posture
- Increased agility and efficiency in deploying scarce cyber resources to the agencies and programs with the highest need
- Improved scale in cross-training and upskilling may lead to more career growth opportunities for cyber staff
- Opportunity to leverage federal funding (e.g. state-level grants) for implementing and delivering cybersecurity services in a shared model to benefit all agencies
- If all states were to follow a *centralized model*:



Most states indicate that a centralized operating model can best reduce cybersecurity risk



Bold Play 1: Advocate for dedicated cyber program funding

There has been limited progress since 2018 on dedicated state cybersecurity budget line items

(36%)
Only 18 states have a cybersecurity budget line item.

Average cybersecurity spend in 2020 (percentage of IT budget)

1–3% Most state governments






16.3% Federal agencies*

10.9% Financial institutions

*Federal civilian agencies under the CFO Act of 1990.

Federal agencies spend a greater percentage of their IT budgets on cybersecurity than many states

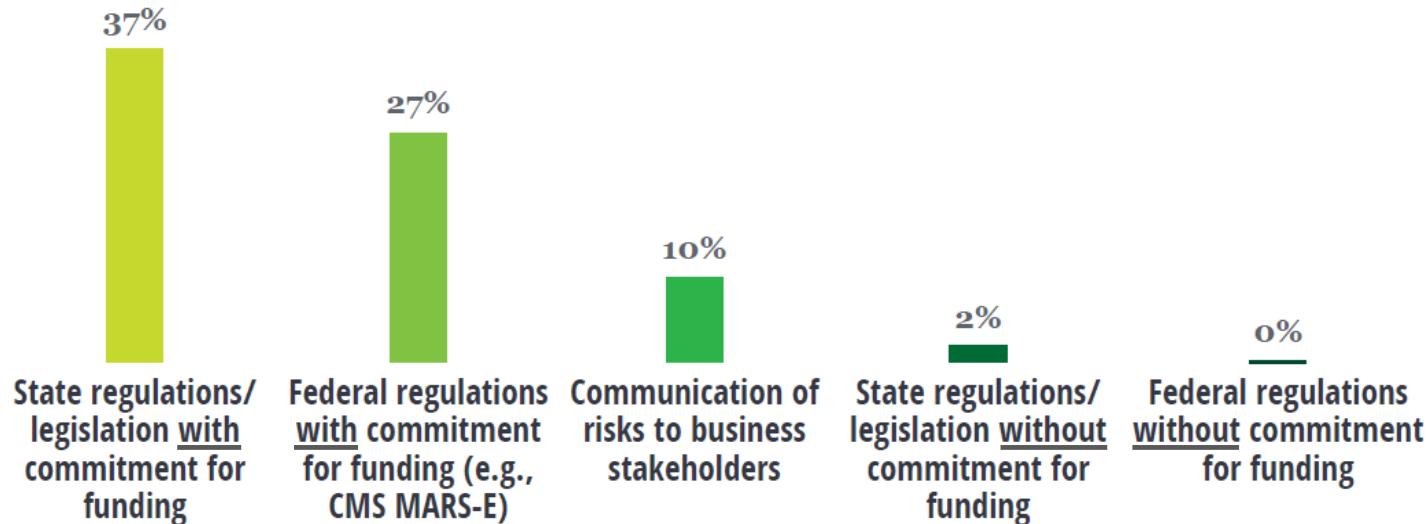
Federal agencies' cybersecurity budgets as a percentage of total IT budget and year-over-year growth

			2019	2020	2021
	Department of Transportation	Percentage of IT budget	5.63%	7.09%	7.33%
		Year-over-year increase	10.54%	21.12%	-4.92%
	Health and Human Services	Percentage of IT budget	6.44%	8.43%	8.12%
		Year-over-year increase	18.50%	-7.18%	9.19%
	Social Security Administration	Percentage of IT budget	11.40%	10.54%	10.79%
		Year-over-year increase	4.21%	1.76%	-1.25%
	Treasury	Percentage of IT budget	10.82%	11.77%	14.06%
		Year-over-year increase	-7.23%	15.19%	17.06%
	Justice	Percentage of IT budget	25.07%	30.07%	28.16%
		Year-over-year increase	-0.67%	7.56%	3.19%

Bold Play 1: Advocate for dedicated cyber program funding (cont'd)

Added challenges of unfunded and non-harmonized cyber regulatory mandates

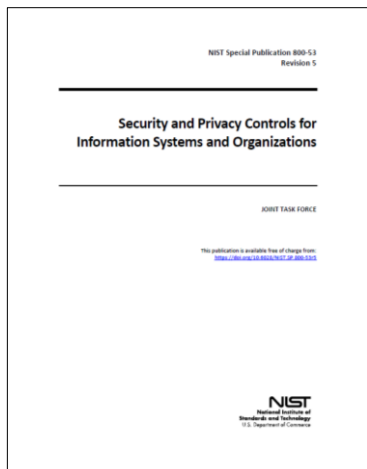
Which regulations are most effective at improving cybersecurity posture and reducing risk?



There are several federal regulations that require States receiving federal information to implement specific security controls and comply with associated compliance audits. These regulations often include conflicting security requirements and inconsistent levels of financial assistance to help offset compliance costs.

Examples of such regulatory compliance standards include:

- IRS Publication 1075
- FBI Criminal Justice Information Services Security Policy (FBI-CJIS)
- CMS Minimum Acceptable Risk Standards for Exchanges (MARS-E)
- Agencies Exchanging Electronic Information with the Social Security Administration



From NASCIO President testimony to the House Oversight Committee, Intergovernmental Affairs Subcommittee (7/18):

Federal Regulation:	IRS Publication 1075	FBI-Criminal Justice Information Services	SSA Electronic Information Exchange Security Requirements and Procedures
Unsuccessful logins	Information system <u>must enforce a limit of 3 consecutive invalid login attempts by a user during a 120 min period, and automatically lock account for at least 15 mins.</u>	Where technically feasible, system <u>shall enforce limit of no more than 5 consecutive invalid attempts, otherwise locking system for 10 mins.</u>	SSA requires that state agencies have a logical control feature that designates a maximum number of unsuccessful login attempts for agency workstations and devices that store or process SSA-provided information...SSA <u>recommends no fewer than three (3) and no greater than five (5).</u>

From U.S. GAO Report (5/20): "Among the four federal agencies (IRS, FBI, CMS & SSA) [with requirements to secure data that states receive], the **percentage of total requirements with conflicting parameters ranged from 49 percent to 79 percent.**"

Coordinating with state and federal agencies when assessing state agencies' cybersecurity may help to minimize states' cost and time impacts and reduce associated federal costs."

Bold Play 2: CISOs as an enabler of innovation, not a barrier

The 2018 study challenged state CISOs to elevate role of cybersecurity by taking a leadership role in digital modernization and embracing Artificial Intelligence, IOT, and Smart Government

- Emerging technologies are still not yet a high priority among state CISOs when compared to operational cybersecurity initiatives.
- As resources allow, state CISOs could look to Financial Services and other industry sectors in prioritizing cybersecurity-focused investments in cloud, data analytics, & robotic process automation (RPA).
- CISO role in tech modernization will likely increase as states accelerate adoption of cloud, RPA, mobile technologies, etc., particularly considering rapid shift to remote work due to pandemic.

Bold Play 3: Team with the private sector & higher education

State CISOs should consider leveraging public-private sector partnerships and collaborations with local colleges and universities to provide a pipeline of new talent, as well as outsourcing to private sector firms

- Increases in outsourcing of cyber functions are helping States grapple with continued cyber talent shortages
- CISOs should consider partnering with local colleges & universities to develop a pipeline of new cyber talent through internships, co-ops, and apprentice programs, while working together to develop common strategies to improve statewide services

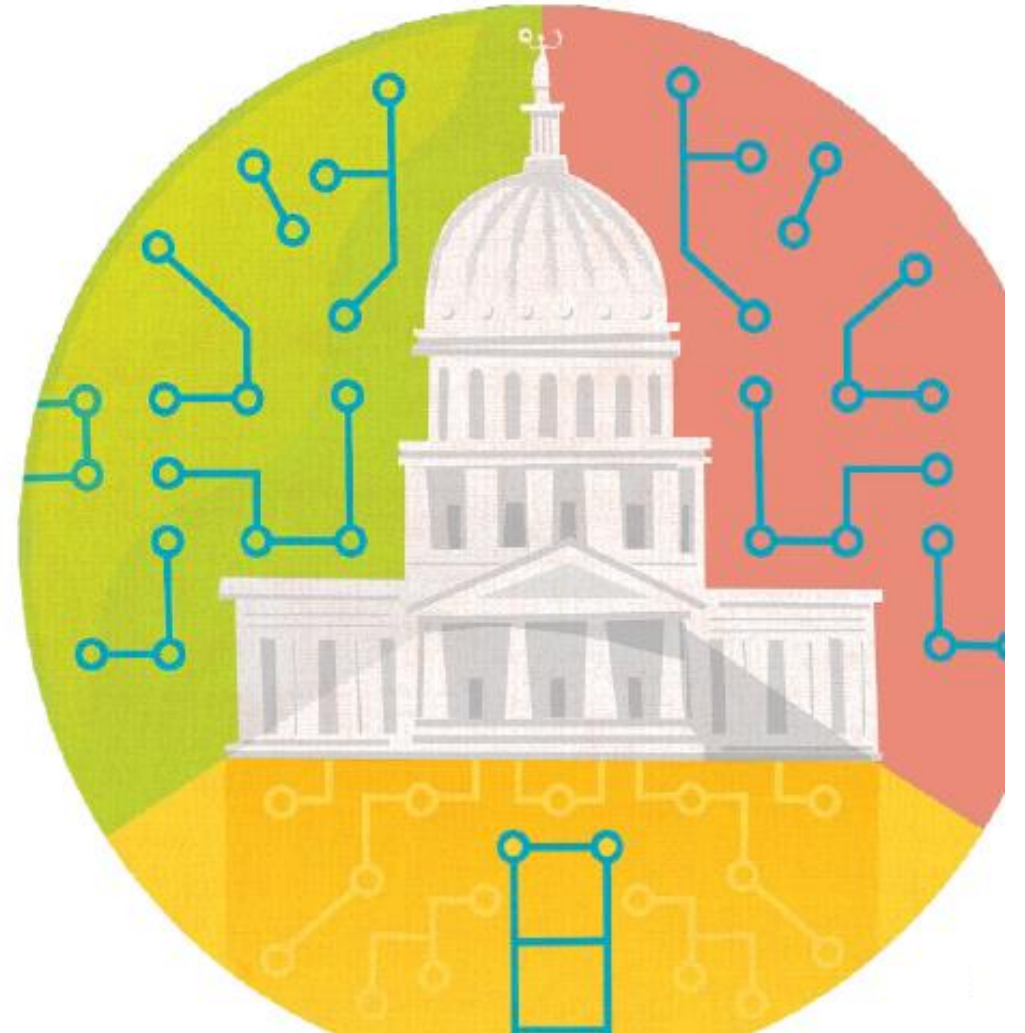


Only eight states are very confident on cybersecurity practices of third parties.
Twenty-six states were somewhat confident, down from 31 states in 2018.

It is concerning that *confidence in third parties has decreased*. Standardizing governance and adherence to leading practices and policies can help increase confidence in these third-party partnerships.

Survey data analysis deep dives

In the following section, we take a detailed look at the survey findings.



Survey data analysis deep dive: Strategy and governance

Only 10 states:

- Have appropriately aligned on cybersecurity initiatives with the goals and initiatives of business/program stakeholders.
- Have legislation in place that provides funding to support the role and authority of the enterprise CISO or equivalent.

CISOs receive input on cyber strategy from:

- 01 State technology decision-makers | 47 states
- 02 State business decision-makers | 39 states
- 03 Private sector | 23 states
- 04 Higher education | 16 states

Declining trend on periodic executive cybersecurity report

2018-2020

To governor: 24 to 22 states

To legislature: 27 to 16 states

(-41%)

Enterprise security services adopted by state agencies

- 57% Security awareness
- 57% Security operations center
- 47% Incident response
- 35% Risk and vulnerability assessments
- 14% Identity and access management

Top cyber services provided to the state, local, and public higher education entities

- 01 Incident management
- 02 Awareness and training
- 03 Investigation and forensics
- 04 Security operations center
- 05 Vulnerability management

CISO's role in procurement of hardware, software, and service providers

- 01 Establish security policies and guidelines (90%)
- 02 Evaluate a security questionnaire that vendors need to complete for procurement opportunity (67%)
- 03 Prohibit procurement of specific manufacturers/vendors/products (38%)

Risk and privacy leadership in states

16 States with chief privacy officer | 13 States with chief risk officer

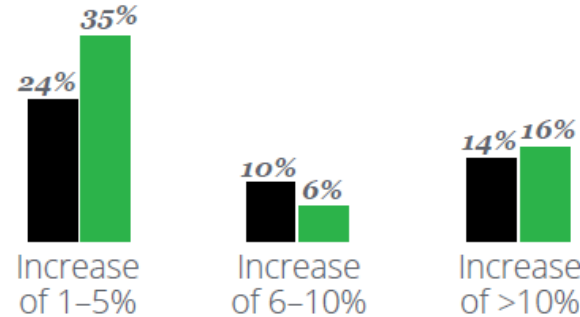
Survey data analysis deep dive: More on cyber budget

Budget continues to be the top barrier

- 01** Lack of sufficient cybersecurity budget (**46%**)
- 02** Inadequate cybersecurity staffing (**42%**)
- 03** Legacy infrastructure and solutions to support emerging threats (**34%**)

Only a few states reported a budget increase since 2018

2018 vs. 2020



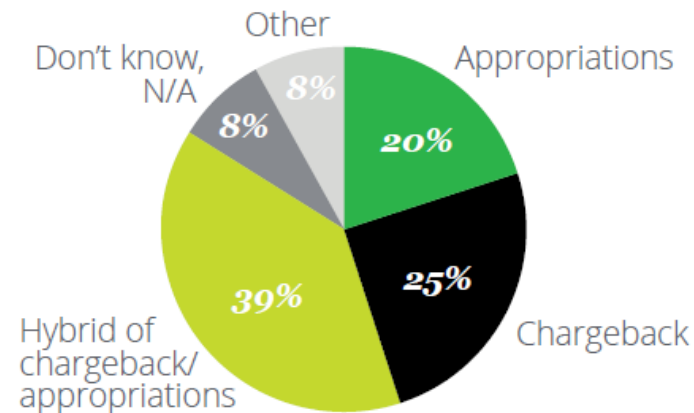
Top five areas covered in the cybersecurity budget

Area	2020 vs. 2018
86% Audit logging and security information and event monitoring	+16%
84% Security operations center	+18%
76% Cybersecurity strategy and road map	+4%
76% Threat intelligence and analytics	+6%
76% Compliance and risk management	+10%

Additional cyber funding sources

Source	2020 vs. 2018
46% US Department of Homeland Security	+13%
40% Interagency collaboration	+2%
23% Other state funding from legislature	+15%
19% Business or program stakeholders	-16%

Cyber funding charge back versus appropriations



Survey data analysis deep dive: Cybersecurity workforce

Top benefits to attract/retain cybersecurity talent

- 01 Opportunity to serve and contribute
- 02 Job stability
- 03 Workplace flexibility and predictable work hours

Top talent management practices to attract and retain cyber workforce

- 01 Promote nonsalary benefits
- 02 Highlight greater stability
- 03 Internship programs

Barriers impacting the development and support of cyber workforce

- 01 State salary rates and pay grades
- 02 Lack of qualified candidates
- 03 Workforce leaving for private sector

States' plan to close the cybersecurity competency gap

	2020 vs. 2018
94% Provide training to staff who are developing the required competencies	+31%
69% Use specialist augmentation (e.g., consultants and contractors)	+66%
51% Contracting with a managed security services provider	+44%
40% Outsource certain functional areas	+27%

Dedicated cybersecurity professionals at the enterprise security office

Full-time equivalents	2010	2018	2020
1 to 5	47%	18%	16%
6 to 15	39%	49%	30%
(54%) 16 to 25	4%	14%	18%
26 to 50	4%	14%	20%
>51	2%	4%	16%
Other	4%	0%	0%

No state has fully adopted and established the National Initiative for Cybersecurity Education (NICE) workforce framework and **only eight states** are implementing portions of the NICE framework.

<https://niccs.cisa.gov/workforce-development/cyber-security-workforce-framework>

<https://csrc.nist.gov/publications/detail/sp/800-181/rev-1/final>







Survey data analysis deep dive: Identity and Access Management (IAM)

IAM moves up in enterprise priority

	Ranking	
	2018	2020
Risk assessments	1	1
Enterprise identity and access management	11	2
Cybersecurity strategy	4	3
Operationalizing cybersecurity	13	3
Metrics to measure and report effectiveness	1	3

Only 15 states have an enterprisewide IAM solution that covers all agencies under the governor’s jurisdiction.

IAM is critical to tech modernization and digital transformation

	2020 vs. 2018
92% Security	
77% Modernization and digital transformation	
73% Standardization: IAM framework, application development, and user interface	
71% Compliance	
69% Improved end-user experience: single credential for citizen access	
63% Operational efficiency/cost savings	

Top IAM initiatives

- 01** Multifactor authentication (**90%**)
- 02** Privileged identity management (**52%**)
- 03** Cloud-based IAM (**48%**)

Top barriers to adopt enterprise IAM

- 01** Complexity of integrating with legacy systems (**65%**)
- 02** Competing or higher-priority initiatives (**46%**)
- 02** Decentralized environment of the state (**46%**)

Survey data analysis deep dive: Cyber operations

Financial fraud ranked higher as an external threat

01 Malicious code | **26 states**

01 Web applications | **26 states**

03 Financial fraud involving information systems | **22 states (only 5 states in 2018)**

Only 22 states use DMARC* for their state's enterprise email systems.

**Domain-based Message Authentication, Reporting, and Conformance*

States improving on performing regular cyber assessments

67% Security events monitoring/security operations center

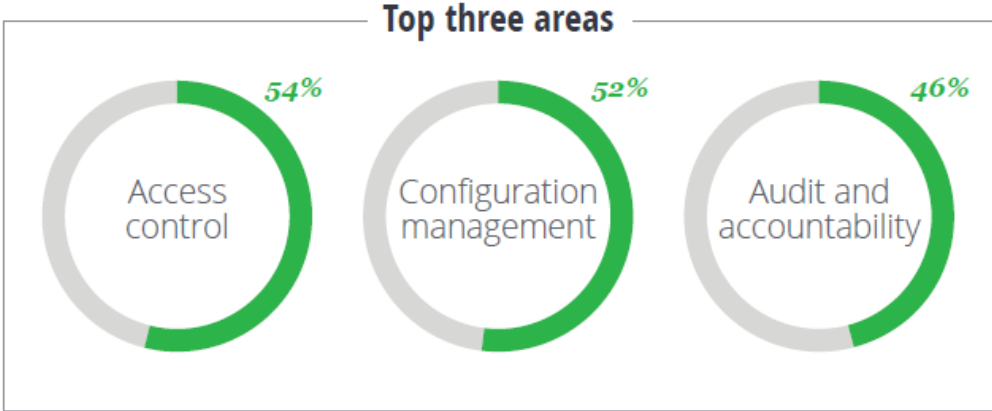
63% Annual disaster recovery exercises and tests

60% Application security testing and code review

2020 vs. 2018



Areas where external audit findings have identified gaps in the past year



44% Identification and authentication

42% Risk assessment

40% System and services acquisition

40% Contingency planning

38% System and communications protections

31% Security assessment and authorizations

29% Incident response

27% System and information integrity

25% Planning

23% Physical and environmental protection

23% Media protection

21% Personnel security

21% Maintenance

19% Awareness and training

17% N/A, don't know

15% Privacy


4% No internal/external audit findings

Survey data analysis deep dive: Cyberthreats

54% of the states are not confident in their ability to address threats from emerging technology.

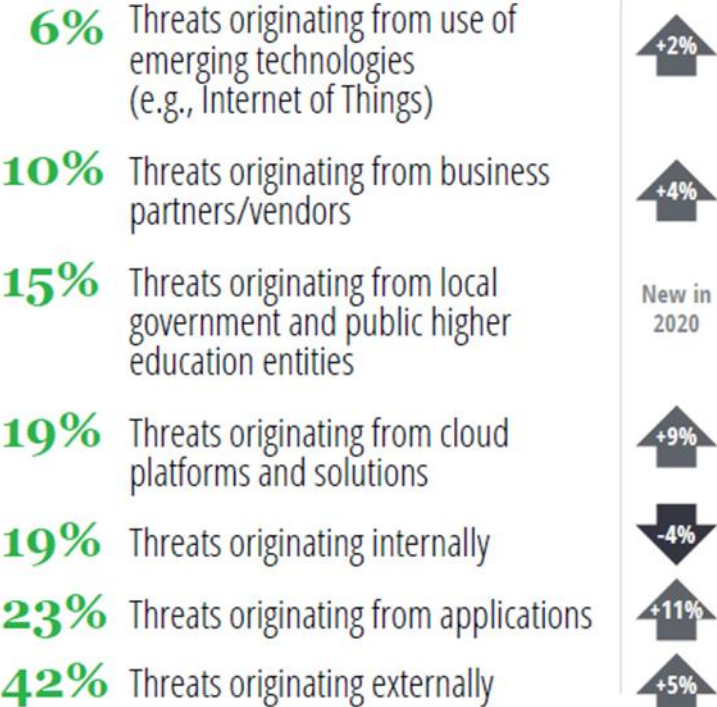
30 states said financial fraud was a leading cause of breaches in the past year compared to **10 states in 2018**.

Leading causes of breaches continue to be from external sources: **malicious code** (68%), **web applications from external sources** (81%), and **“hactivism”** (86%), which is on the rise.

Twenty-two states perform a periodic election security assessment. 

In 29 states, the enterprise CISO and agency CISO are the officials responsible for coordinating and responding to cyber incidents.

CISO confidence in tackling types of threats ("very confident" and "extremely confident" combined answers)



CISOs' top concerns for potential breaches have seen increases since 2018. Other notable changes:

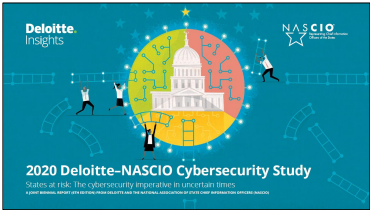
- 74 to 85%** Phishing/farming
- 59 to 70%** Ransomware/malware
- 47 to 54%** Exploits of unsecured code

Leading cybersecurity standards that states use:

- 01** National Institute of Standards and Technology (NIST) Special Publications (**88%**)
- 02** Center for Internet Security (**73%**)
- 03** NIST Cybersecurity Framework (**63%**)

2020 Deloitte-NASCIO Survey Report & 2019 Nationwide Cybersecurity Review (NCSR)

Parallels in top cybersecurity challenges and concerns



NCSR Info.: <https://www.cisecurity.org/ms-isac/services/ncsr/>

Top barriers to overcome cybersecurity challenges

- 1 Lack of sufficient cybersecurity budget
- 2 Inadequate cybersecurity staffing
- 3 Legacy infrastructure and solutions to support emerging threats
- 4 Lack of dedicated cybersecurity budget
- 5 Inadequate availability of cybersecurity professionals

2019 NCSR* Top Reported Security Concerns

- 1 Lack of sufficient funding
- 2 Increasing sophistication of threats
- 3 Lack of documented processes
- 4 Emerging technologies
- 5 Inadequate availability of cybersecurity professionals
- 6 Lack of a cybersecurity strategy (i.e., shifting priorities)

*Top Reported Security Concerns from 2019 NCSR are based on responses from same 51 State & Territorial CISO respondents to 2020 Deloitte-NASCIO Cybersecurity Study, plus many more respondents across local & Territorial govts.

Managing Cyber Threats through Effective Governance: A Call to Action for Governors and State Legislatures

- A collaborative effort between many leading government- and security-focused organizations:
 - Center for Internet Security (CIS)
 - Center for Technology in Government at the University at Albany (CTG UAlbany)
 - National Governors Association (NGA)
 - National Conference of State Legislatures (NCSL)

- A **Centralized** Approach to Cybersecurity Governance

- “Many organizations, including NASCIO, strongly recommend a **centralized** approach to cybersecurity governance.
- While full centralization may be out of reach for many states given their current culture and structures, evolving away from fully decentralized toward **centralization** is highly recommended.”

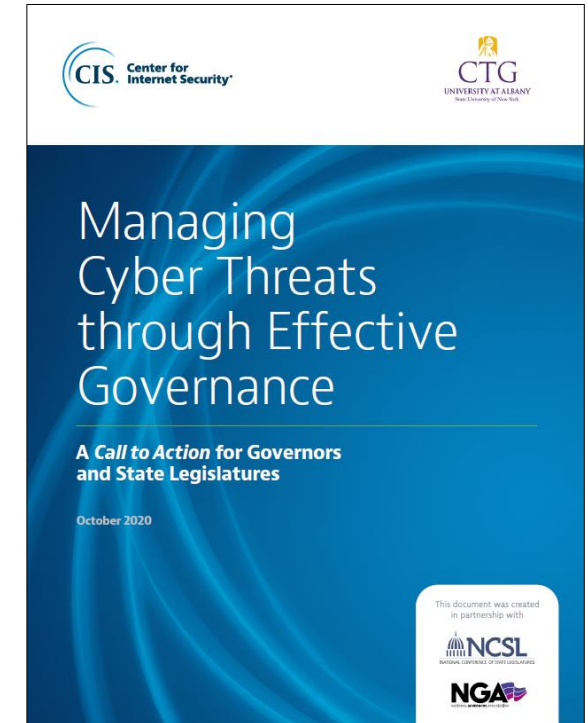
- Building a **Whole of State** Risk Management Program

- “Increasingly, success will correlate with the extent to which states are able to expand the scope of their cybersecurity governance across all of a state’s public and private critical infrastructures.
- This implies incremental expansion from executive level agency assets to a **“whole of state”** perspective that engages stakeholders across all branches, jurisdictions, and sectors in a collaborative process of risk management.”

Recommendations consistent with Deloitte-NASCIO Study report

- 4 Actions Steps for Governors and State Legislatures:

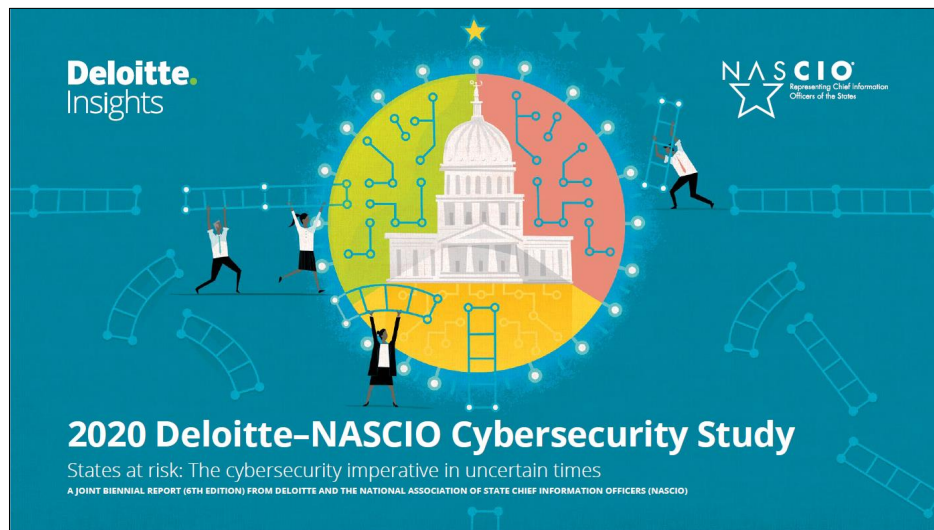
- 1. Establish Authorities through Executive Order & Legislation** – “Executive orders and legislation are being used by governors to formally establish the entities and authorities required to govern cybersecurity. Such authorities are being designed to overcome existing fragmentation in cyber governance and, where possible, are leveraging strong existing governance structures.”
- 2. Formalize Key Processes** – “An effective governance framework formalizes key processes, including financial, procurement, technical standards, and risk assessment, necessary to effectively identify and manage cyber risks.”
- 3. Assign Roles and Responsibilities** – “An effective governance framework includes an assignment of roles and responsibilities for designing and implementing the state’s cybersecurity program as directed by the governor and/or legislature.”
- 4. Monitor Indicators for Decision-Making and Adaptation** – “An effective governance framework requires the use of relevant indicators, beyond incident reporting, in decision-making processes to guide cybersecurity governance strategies and execution.”



<https://www.cisecurity.org/white-papers/managing-cyber-threats-through-effective-governance/>

2020 Deloitte-NASCIO Cybersecurity Study: *Related and Supporting Activities*

- The Deloitte-NASCIO Study report is available to state CISOs, CIOs and other cyber and IT leaders in state and local government, as well as their partners in the federal government, private industry and academia, as a resource providing State CISO-survey-based information on challenges and opportunities in S&L government cybersecurity.
- The Senate Homeland Security and Governmental Affairs Committee’s Federal Spending Oversight and Emergency Management Subcommittee held a hearing on 12/2/20, which included findings from the Deloitte-NASCIO survey report:
 - Hearing: “State and Local Cybersecurity: Defending Our Communities from Cyber Threats amid COVID-19”
 - Denis Goulet, New Hampshire CIO and current NASCIO President, continually noted in his testimony the report’s “whole-of-state” approach and advocated for much-needed State & Local government grant funding.
 - Senator Margaret Wood Hassan, D-NH, Ranking Member, also accentuated need for federal grant dollars for S&L Cybersecurity.
- Deloitte continues to collaborate with organizations such as NASCIO and the National Governors Association (NGA) in their efforts to help advance the importance and need for federal support of state and local government cybersecurity.



To learn more or to take steps to rethink your cyber strategy, please contact us:

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https://www2.deloitte.com/content/dam/insights/us/articles/6899_nascio/DI_NASCIO_interactive.pdf



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