

Six observations about state government digital information preservation capabilities drawn from the analysis of the data are presented below (see Table 1). The observations are offered to inform discussions related to the development of state government digital preservation partnerships. Based on these observations, several general suggestions for improving existing digital preservation capabilities in the states are offered and discussed.

Table 1. Observations about the digital information preservation capabilities of the states	
Observation 1	Capability for preserving state government digital information is low.
Observation 2	There is no consistent approach to addressing “at-risk” information.
Observation 3	Authority for setting standards and responsibility for providing digital preservation services is dispersed.
Observation 4	Executive, legislative, and judicial agencies operate parallel digital preservation efforts.
Observation 5	Digital preservation and Enterprise Architecture (EA) initiatives are not well-connected.
Observation 6	Efforts to develop strategic digital preservation programs are hampered by problem focused practices and funding and staffing models.

### Observation 1. Capability for preserving state government digital information is low.

Formal education and professional development within the LARM professions has traditionally focused on paper. As a consequence, many of the skills required for the preservation of state government information in digital form have not been developed, and in some cases even identified. To get at the extent of the skills gap, the advisory committee requested a significant segment of the survey be devoted to this question. To support the collection of this information the advisory committee identified 12 specific categories of digital preservation capability (see Table 2).

The majority of respondents indicated that their LARM units, or some combination of the three, are in need of basic or advanced training in all categories. In 11 of the 12 categories 25% or less of the respondents report that training has already been provided. Respondents reported a high of 34% for training in **Identifying key stakeholders** already provided and a low of 8% for **Manage the long-term storage of digital information in a repository**. The high-level of need for basic and advanced training may signal an overall low to medium level of capability for digital preservation across the states. Several respondents further stated that training alone is not sufficient to build digital preservation capabilities; funding, digital preservation related tools, and personnel was identified as more critical at this stage than training.

Barriers to building capability within the current professional community include developing appropriate material and identifying organizations to assume responsibility for continuing education programs including identifying qualified trainers. New curricula for undergraduate and graduate programs was also identified as necessary in addressing the capability gap.

Interestingly, while respondents indicate a high level of new training is necessary to build capability within LARM units, these same units are currently responsible for providing consulting and training services to executive agencies and to a lesser extent, judicial and legislative agencies in these same areas (See Tables 9, 10, and 11).

Table 2. Levels of training needed for digital preservation activities

Capability	Basic or advanced training needed	Training already provided
Identify the type and amount of digital information throughout the state	80% (49)	20% (12)
Select and appraise state government information in digital form	76% (47)	24% (15)
Identify key stakeholders related to specific digital information (other local/state agencies, other states, private sector, etc.)	66% (40)	34% (21)
Negotiate and make agreements with key stakeholders to preserve digital information	78% (47)	22% (13)
Acquire state government information in digital form for holdings	78% (47)	22% (13)
Manage state government information in digital form (metadata, reformatting, etc.)	83% (50)	17% (10)
Manage the ingest of digital information into a repository	79% (49)	21% (13)
Manage the long-term storage of digital information in a repository	92% (57)	8% (5)
Develop mechanisms to monitor the long-term usability of state government information in digital form	89% (54)	11% (7)
Make state government information in digital form accessible to users	77% (47)	23% (14)
Produce a disaster and recovery planning for state government information in digital form	82% (51)	18% (11)
Manage copyright, security, and other legal issues of relevance to state government digital information	84% (55)	16% (10)

## Observation 2. There is no consistent approach to addressing “at-risk” information.

The majority of states report being involved in at least one activity to preserve state government digital information identified as **at-risk** and **a priority for preservation**. The results indicate that there are still definitional issues to be resolved; for some respondents at-risk means “it’s actually being lost,” in other cases, it means the information is valuable. Definitional issues aside, the results provide some insight into the where states are, and maybe more importantly, are not, generally investing in strategies to preserve at-risk information. Table 3 combines results from the Library of Congress States Workshops(3) and results from this survey. Doing so shows that the top six categories of at-risk information, as identified during the workshops, are receiving inconsistent attention across the states. While a large group of states are involved in activities to preserve at least one of these categories of information, no state is consistently addressing each (or even a number) of the priority categories. Three of the six priority categories, for example, **databases/data sets**, **email**, and **audio and video**, are being addressed by only four states, six states, and three states respectively.

**Table 3. Preserving at-risk state government digital information**

<b>Category of at-risk digital information in order of priority(4)</b>	<b>Specific type of at-risk digital information</b>	<b>States that reported involvement in related preservation activities</b>	<b>Number of states involved</b>
Records	Vital, land, and other historical records; legislative and court records	CA, GA, MA, MD, MI, MO, MN, MS, MT, NJ, OK, SD, TN, TX, UT, VT, WA, WY	18
Databases/data sets	Geographic Information System (GIS) data; geospatial data	CA, CT, KY, ME	4
Digital Publication	Web-based publications; born-digital state publications; state government document; state agency reports	AK, AR, AZ, CA, CO, CT, FL, IA, IL, KS, KY, LA, MN, MO, MT, NC, NE, NJ, NM, NY, OH, OR, SC, TN, TX, UT, VA, WI, WY	29
Web sites	State government agency Web sites; Governor's Web site; subset of Web site content regarded as having special importance such as press releases	AL, AZ, DE, KY, MI, MS, NC, PA, SC, SD, UT, VA, WI	13
e-mail	Agency e-mail; official e-mail records including attachments; electronic correspondence of elected officials	ME, NC, NJ, OH, PA, VA	6
Audio and Video	Digital photographs and digital recordings of government proceedings and public meetings	IL, MI, MS	3

One unknown at this point is the approach being used by each state to define “at-risk”, to determine what information is at-risk, and to prioritize from among those information types. There are many indications that states are establishing priorities based on available resources such as staff skills and grant dollars rather than based on a program strategy that might factor in issues such as the value proposition of specific information types.

### Observation 3. Authority for setting standards and responsibility for providing digital preservation services is dispersed.

Understanding institutional roles and responsibilities of state LARM units was identified by the Library of Congress States Workshop participants as necessary to the process of partnership development. The participants noted that this information would also inform the development of digital preservation programs.

As shown in Table 4, a number of other units in all three branches either share authority for setting standards and responsibility for providing services with LARM units or have sole responsibility. The IT unit, in particular, stands out across all three branches of government as holding a significant role in the standards setting process and in providing services related to digital preservation. The units identified as consistently playing a central role include the office of the state CIO or its equivalent and IT units in the legislative and judicial branches. In addition, respondents identified statewide committees and commissions (some of which are IT focused) and specific units within legislative and judicial agencies as also having responsibilities with regard to the preservation of state government digital information.

**Table 4. Units other than LARM with authority for setting standards for and providing services to executive, legislative, and judicial agencies**

Other unit category	Other unit named by respondents
State IT unit	Office of the State CIO
	Enterprise Technology Services
	Department of Administration or Administrative Services (IT Divisions)
	Bureau of Information and Technology
	Department of Information and Innovation
	Office of Information Technology
Committee or commission	The State Records Board
	Legislative Information Technology Committee
	Information Technology Advisory Council
	Information Technology Resource Management Council
	Architecture Oversight Committee, chaired by the CIO
Legislative unit	Legislature
	Legislative Auditor
	Legislative Budgetary Council
	The Law and Research Library
	Information Technology Division of the General Assembly
	Offices of the Senate and House
	Legislative Reference Bureau
	Legislative Printing, Information, and Technology Systems
Judicial unit	Judiciary
	Administrative Office of the Courts
	Director of Information Systems for the Judiciary
	Information Technology and Communications Division of the Judiciary
	Superior Courts Clerks Authority
	Judiciary CIO

**Observation 4. Executive, legislative, and judicial agencies operate parallel digital preservation efforts.**

State-level LARM units and related units within legislative and judicial agencies are investing in parallel standards

setting and service provision efforts in support of digital preservation. Survey findings consistently show that even within the areas generally considered to be within the realm of LARM units – retention and disposal; legislative and judicial agencies are operating to a great degree independent of state LARM units (see Table 5).

**Table 5. Setting standards for information retention and disposal (e.g., retention periods and methods of disposal) for various series/types of digital records and publications**

Agency Type	Authority not assigned	L, A, or RM has authority	L, A, or RM share authority with Other	Only Other has authority
Executive	5%	61%	26%	8%
Legislative	21%	34%	18%	24%
Judicial	13%	29%	18%	39%

The following two sections present a more detailed discussion of these findings both in terms of authority for setting standards and responsibility for providing services.

### Authority for setting standards for digital information created or maintained by executive, legislative, and judicial agencies

The findings indicate that authority for setting standards related to the creation and maintenance of digital information resides primarily outside of state LARM units. In executive agencies authority is shared between LARM units and other units; in legislative and judicial agencies it often exists fully outside of state LARM units.

As shown in Tables 6-8, units other than the state LARM units were consistently identified by the states as having the authority to set standards for digital information created and maintained by government agencies. For some states, this authority was shared among the LARM units or some combination of the three and these other units. However, a number of states responded that authority resided only within units other than the state LARM units. As described above, these other governmental units most often included state IT units when dealing with digital information created or maintained by executive agencies and a combination of state IT units and legislative and judicial units when dealing with information created or maintained by legislative and judicial agencies.

**Table 6. Authority for setting standards for digital information created or maintained by executive agencies**

Standard	Authority not assigned	L, A, or RM has authority	L, A, or RM share authority with Other	Only Other has authority
Setting data management standards and or guidelines for information creation (e.g., metadata, file formats)	11%(4)	18%(7)	34%(13)	<b>37%(14)</b>
Setting information technology standards and or guidelines for information creation (e.g., state approved software applications)	13%(5)	5%(2)	16%(6)	<b>66%(25)</b>
Setting standards for information retention and disposal (e.g., retention periods and methods of disposal) for various series/types of digital records and publications	5%(2)	<b>61%(23)</b>	26%(10)	8%(3)

**Table 7. Authority for setting standards for digital information created or maintained by legislative agencies**

Standard	Authority not assigned	L, A, or RM has authority	L, A, or RM share authority with Other	Only Other has authority
Setting data management standards and or guidelines for information creation (e.g., metadata, file formats)	29%(11)	13%(5)	13%(5)	<b>39%(15)</b>
Setting information technology standards and or guidelines for information creation (e.g., state approved software applications)	26%(10)	3%(1)	3%(1)	<b>63%(24)</b>
Setting standards for information retention and disposal (e.g., retention periods and methods of disposal) for various series/types of digital records and publications	21%(8)	<b>34%(13)</b>	18%(7)	24%(9)

**Table 8. Authority for setting standards for digital information created or maintained by judicial agencies**

<b>Standard</b>	<b>Authority not assigned</b>	<b>L, A, or RM has authority</b>	<b>L, A, or RM share authority with Other</b>	<b>Only Other has authority</b>
Setting data management standards and or guidelines for information creation (e.g., metadata, file formats)	16%(6)	11%(4)	11%(4)	<b>61%(23)</b>
Setting information technology standards and or guidelines for information creation (e.g., state approved software applications)	13%(5)	0%(0)	5%(2)	<b>82%(31)</b>
Setting standards for information retention and disposal (e.g., retention periods and methods of disposal) for various series/types of digital records and publications	13%(5)	29%(11)	18%(7)	<b>39%(15)</b>

### Digital preservation services provided to executive, legislative, and judicial agencies

As shown in Tables 9-11, LARM units or some combination of the three appear to provide most of the digital preservation services to executive agencies. The numbers of states where the LARM units or some combination of the three provide digital preservation services to executive agencies increases when the services are also provided by other governmental units. The government units other than the LARM units that provide these services are the same state IT units that have authority for setting standards for information created and maintained by executive agencies.

Similar to authority for setting standards for information created and maintained by legislative and judicial agencies, the units that provide digital preservation services to both of these branches of government appear to be combinations of LARM units along with other units within the legislative and judicial branches and to a lesser extent state IT units. In the case of services provided to legislative agencies and even more so for services provided to judicial agencies, a large number of the states indicated that these same legislative, judicial, and to a lesser extent state IT units provided these services rather than the LARM units.

**Table 9. Services provided to executive agencies**

<b>Service</b>	<b>Service not provided</b>	<b>L, A, or RM provide service</b>	<b>L, A, or RM provide service with Other</b>	<b>Only Other provides service</b>
Storage for digital information	11%(4)	26%(10)	<b>34%(13)</b>	29%(11)
Consultation and training services on digital information creation	21%(8)	<b>32%(12)</b>	<b>32%(12)</b>	16%(6)
Consultation and training services on digital information management	13%(5)	<b>50%(19)</b>	32%(12)	5%(2)
Consultation and training services on digital information preservation	18%(7)	<b>66%(25)</b>	11%(4)	3%(1)
Consultation and training services on digital information access	26%(10)	<b>42%(16)</b>	18%(7)	16%(6)
Preservation (e.g., migration, reformatting)	18%(7)	<b>45%(17)</b>	26%(10)	11%(4)
Access (e.g., search engine)	13%(5)	<b>39%(15)</b>	26%(10)	21%(8)
Certification (e.g., trustworthiness of system, backups sufficient)	34%(13)	11%(4)	16%(6)	<b>37%(14)</b>



Table 10. Services provided to legislative agencies				
Service	Service not provided	L, A, or RM provide service	L, A, or RM provide service with Other	Only Other provides service
Storage for digital information	13%(5)	21%(8)	32%(12)	<b>34%(13)</b>
Consultation and training services on digital information creation	26%(10)	26%(10)	18%(7)	<b>29%(11)</b>
Consultation and training services on digital information management	24%(9)	<b>29%(11)</b>	21%(8)	26%(10)
Consultation and training services on digital information preservation	26%(10)	<b>45%(17)</b>	11%(4)	16%(6)
Consultation and training services on digital information access	<b>32%(12)</b>	26%(10)	13%(5)	29%(11)
Preservation (e.g., migration, reformatting)	18%(7)	<b>34%(13)</b>	18%(7)	29%(11)
Access (e.g., search engine)	18%(7)	26%(10)	18%(7)	<b>37%(14)</b>
Certification (e.g., trustworthiness of system, backups sufficient)	37%(14)	5%(2)	5%(2)	<b>50%(19)</b>

Table 11. Services provided to judicial agencies				
Service	Service not provided	L, A, or RM provide service	L, A, or RM provide service with Other	Only Other provides service
Storage for digital information	13%(5)	18%(7)	24%(9)	<b>45%(17)</b>
Consultation and training services on digital information creation	18%(7)	24%(9)	16%(6)	<b>42%(16)</b>
Consultation and training services on digital information management	16%(6)	29%(11)	16%(6)	<b>39%(15)</b>
Consultation and training services on digital information preservation	26%(10)	<b>29%(11)</b>	16%(6)	<b>29%(11)</b>
Consultation and training services on digital information access	21%(8)	18%(7)	21%(8)	<b>39%(15)</b>
Preservation (e.g., migration, reformatting)	<b>39%(15)</b>	18%(7)	16%(6)	26%(10)
Access (e.g., search engine)	29%(11)	18%(7)	18%(7)	<b>34%(13)</b>
Certification (e.g., trustworthiness of system, backups sufficient)	37%(14)	3%(1)	5%(2)	<b>53%(20)</b>

## Observation 5. Digital preservation and Enterprise Architecture (EA) initiatives are not well-connected.

State governments are creating Enterprise Architectures (EA) to guide enterprisewide information and information technology related decision making and planning. A 2005 NASCIO report indicates that states are embracing EA as a framework for reshaping government processes and organization.<sup>(5)</sup> Enterprise architecture efforts are generally managed by state CIO and IT units; the same units that hold authority for creating standards and responsibility for providing services related to digital preservation. EA initiatives were identified by Library of Congress States Workshop participants as having the potential to positively influence digital preservation initiatives by integrating the issues of digital preservation into the ongoing creation of enterprise governance bodies, reference models, business processes, and accountability strategies under development and in use in many states.

The National Association of State Chief Information Officers (NASCIO) defines EA as a management engineering discipline that presents a comprehensive view of the enterprise including:

- Strategic planning,
- Organization development,
- Relationship management,
- Business process improvement,
- Information and knowledge management, and

- Operations.

It is an ongoing iterative process of analysis, collaboration, and leadership to make better decisions. See **IT Procurement & Enterprise Architecture: Recognizing the Mutual Benefits** NASCIO Research Brief, October 2005 at [http://www.nascio.org/nascioCommittees/procurement/EA\\_IT\\_Procurement\\_Brief100305.pdf](http://www.nascio.org/nascioCommittees/procurement/EA_IT_Procurement_Brief100305.pdf).

However, few LARM units are actively involved in these efforts. Results show that while the majority of respondents are aware of their state's EA efforts, only half of those who indicated awareness are involved in current efforts.

For those respondents reporting involvement in their state's EA efforts, many characterized their effort as "in the early stages" of working on EA with state IT and other units. As shown in Table 12, these EA efforts are primarily focused on strategic planning and policy related issues and their involvement tends to be issue related rather than ongoing.

Table 12. Involvement in State Enterprise Architecture (EA) efforts	
Involvement in State EA efforts	Specific example
Committees or working groups related to EA efforts	State CIO's Enterprise Architecture and Standards Committee
	Electronic Records Working Group
	State CIO's project team and Electronic Records Preservation project team
	IT planning Board
	Enterprise Architecture Committee
	Information Technology Strategic Planning group
	E-government committees
	Information Domain teams
	Enterprise Applications Subcommittee of the state's Architecture Oversight Committee and Assistive Technology Advisory Committee
	Fiscal and HR part of the state's EA efforts
Involvement in EA efforts	Worked with the state's Division of Information Systems and Communication on storage agreements
	Submit Return on Investment Technology Plan each biennium
	Auditing requirements including records management schedules
	Leading a subcommittee on drafting the Information Management section of the Statewide Technical Architecture
	Heading a team of representatives from other state agencies in developing a new 'Records Management' series of Information Technology Bulletins providing policies and procedures for managing the state electronic records
	Jointly developing a comprehensive strategy for the management of all records created by state agencies
	Working with the Office of Enterprise Technology to maintain the data and records chapter of the architecture
	Managing the search engine for the state Web site and assisting with training on use of content management system
	Working with the lead agency for the personnel system to determine how best to preserve important long-term records
	Partnership with the state judiciary to provide access to all verified land record instruments in the state

Helping develop an enterprise Web portal for the state and metadata standards and subject thesauri
Joint development of a Web-based depository for all state electronic publications with the Information Technology Enterprise section of the Department of Administrative Services
Participation in the data and electronic records domain of the state's Department of Information Resources' enterprise architecture project
Providing back-channel communications as appropriate
Participation in state EA survey

### Observation 6. Efforts to develop strategic digital preservation programs are hampered by problem focused practices and funding and staffing models.

The preservation of state government information is the core responsibility of most LARM units. Overtime, more and more of this information is created and maintained in digital form. In the early days of the digital era, LARM units created ad-hoc response strategies informed by long-standing approaches for preserving paper-based information. As the scales have tipped to the point where information is almost exclusively created and maintained in digital form, these ad-hoc preservation approaches are no longer sufficient, however, states face many challenges as they work to evolve to more strategic digital preservation programs. In particular, funding and staffing investments appear to be driven by episodic problem solving priorities rather than an overall program development strategy. Survey respondents stated that recent or ongoing digital information preservation activities are supported with limited or project specific state funding or relatively short duration grants where funding ends when the project is complete. Additional evidence of this can be found in the approaches taken to respond to at-risk information. Survey responses illustrate a consistent focus on a small number of specific types of at-risk digital information rather than broader or multiple categories of at-risk digital information. This approach appears to be influencing investments in staff development programs as well. Training is primarily focused on gaining the skills necessary to solve a specific problem rather than to develop overall capability in terms of digital preservation. The low to medium level capabilities reported by the majority of states appears to be both a consequence of and a contributor to ad hoc project (versus program) level initiatives.

### Moving forward

The task of using this baseline data to move the efforts to build digital preservation partnerships forward lies in the hands of LARM and IT professionals, agency executives, elected officials, and many others at all levels of government. The following recommendations are offered to assist them in that task.

#### Identify and build on existing knowledge and expertise

The findings presented in this report highlight the many challenges facing state governments in their digital preservation efforts. However, the activities described in the state-level profiles present many success stories as well. Many states have been successful in at least one if not several areas of digital preservation including building successful funding models, training programs and collaborative partnerships, establishing clearly defined roles and responsibilities for digital preservation, and building effective technical tools and infrastructure. The baseline data presents the challenge; the profile data provides the inspiration that challenges can, in some cases, be overcome. The assignment for public managers with digital preservation responsibility is to seek out colleagues with complementary or leveraging capabilities and to employ partnerships as a strategy for building capability.

#### Build digital preservation partnerships within and among states

The results show that intra- and interstate partnerships present great opportunities to those involved in and responsible for state government digital information preservation. Building partnerships with those who share

authority over the standards setting processes and responsibility for providing digital preservation services appears well-advised. The findings show that authority for and responsibility for digital preservation related standards setting and digital preservation services are divided among a number of agencies/units within each state. In many cases it is clear that LARM units have little authority over the standards setting processes for digital preservation related standards, yet significant responsibility for providing digital preservation services. This division of labor is one of the more challenging conditions in the environment. Its impact may be mitigated by building partnerships among state-level LARM units and those units located within legislative and judicial agencies.

Other new intra-state partners should include the state IT department. Of note, ten states – GA, IA, KS, ME, MI, MN, MT, PA, SD, and UT – indicated that the equivalent of their state IT department or a committee or commission formed by their state IT department is a partner in the digital preservation activity described in their response. These efforts and others can serve as models for other states in building new relationships between and among state LARM units and state and agency level IT units.

### Clarify roles and responsibilities between and among LARM, IT, and other interested and responsible parties

Decisions about how information is created, managed, and used are being made across all branches of government as well. This distribution of authority must be well understood in the development of digital preservation programs. Each state has taken a somewhat unique approach to assigning authority for standards that govern creation and management of information. How these differences come about is in some cases due to different institutional structures, unique policies, and idiosyncratic practices. In other cases their source is unclear. In some cases no formal authority for these activities have been assigned. Understanding the nature and source of these differences is an important element in identifying and working with potential partners.

### Use State EA efforts to establish the centrality of digital preservation to enterprisewide information management responsibilities

In general, the nature of EA activities provides an ideal opportunity for integrating the full range of management, policy, and technology issues related to the preservation of state government digital information into enterprisewide information and information technology related decision making and planning. EA efforts provide a forum for the discussion of roles and responsibilities, as well as an examination of enterprise business processes and requirements. The centrality of digital preservation as a enterprise business responsibility can be illustrated and ideally, operationalized, through these discussions. EA efforts also provide a forum for discussions about the development of program capabilities rather than one-off problem solving efforts. The EA planning and policy development process may be the most effective venue for discussions about authority over standards setting processes that govern the full life-cycle of digital information. While the level of awareness reported above is encouraging, the level of involvement is less so. Fully, two-thirds of the respondents, generally top management in state LARM units, are not involved in the EA efforts of their state.

### Continue to invest in knowledge sharing initiatives across the digital preservation community

Participants in the Library of Congress States Workshops, as well as respondents to the survey, expressed an interest in and a need for additional and ongoing forums focused on the preservation of state government digital information. Workshop participants expressed a need for a continuing forum sharing knowledge and expertise among members of the “digital preservation community.”

Many respondents to the survey also shared ideas and preferences on future baseline efforts. Two examples of information of interest are:

- Identify those digital preservation initiatives funded/created by specific legislation – identify the state and the legislation so others can track it down as a reference.
- Determine if and how units act on their standards setting authority.

The baseline data and the state profiles provide a wealth of data to support a range of uses by the digital preservation community. The data will have most value to the community, however, if used and improved upon in the development of partnerships, in making a case to agency leaders or elected officials for investments in digital preservation, and for creating new synergies and new knowledge within and across states about digital

preservation challenges and opportunities.

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(3) The complete list of the at-risk digital information that the states identified during the workshops is included in the **Report of the Library of Congress Convening Workshops with States**, which is available at [http://www.digitalpreservation.gov/partners/states\\_wkshps.pdf](http://www.digitalpreservation.gov/partners/states_wkshps.pdf).

(4) As identified by participants at the spring 2005 Library of Congress workshops with the states.

(5) Thirty-seven states and the District of Columbia responded to the NASCIO survey. Download a copy of the NASCIO report **The States and Enterprise Architecture: How far have we come? Findings from the NASCIO 2005 EA Assessment**, NASCIO, October 2005 at <http://www.nascio.org/publications/index.cfm>.