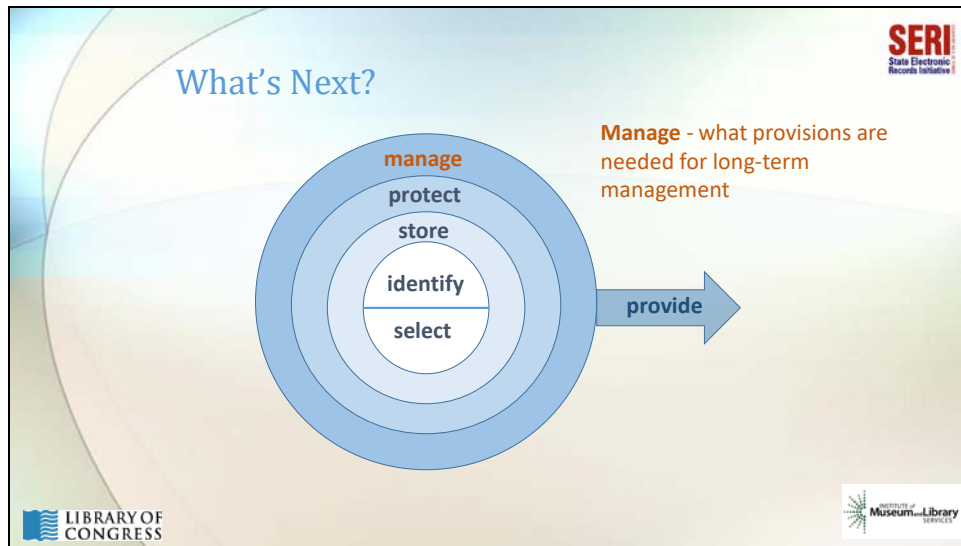




Welcome to Managing Digital Content Over Time. This training was produced by the State Electronic Records Initiative in coordination with the Council of State Archivists. It was developed under a grant from the Institute of Museum and Library Services and based primarily on training created by the Library of Congress. It is designed to help archivists and others who manage digital content understand the necessary steps of digital preservation. This is module 5, Manage.



This diagram should look pretty familiar to you now as we've used it to illustrate how each of the modules relate to each other, each building on the last.

Once these activities are in motion, we can work on *Storing* the selected content and *Protecting* what is stored.

Now, we're going to talk about managing your digital content over time, with the end goal of *Providing* long-term access to the preserved content.



The Manage module is all about “planning.” **What kinds of things are needed for longer term management of the digital content?**

It’s about finding balance between the many different aspects of digital preservation.

- For instance, planning to be able to tie digital preservation into your organizational goals and assessing the skills your organization would need to have a successful program.
- Planning to be able to assess the technological needs of your digital preservation program
- And finally, planning so that you have the resources (funding and staffing) to support a sustainable digital preservation program.

Why do we plan?



Because of the risks of not doing so....

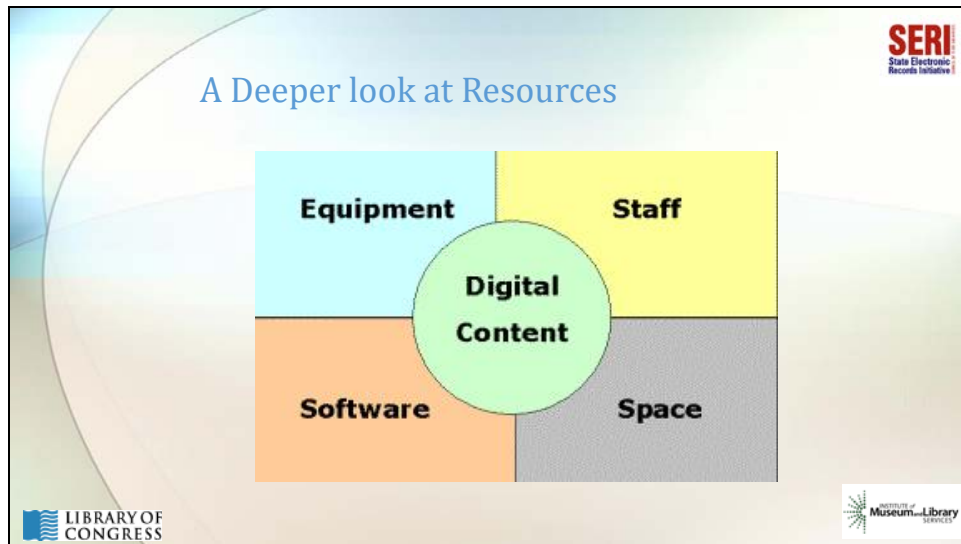
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Medical Students Horseplay
Image ID: WHI-6639

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But, there needs to be a balance between planning and doing if you're going to have any sort of sustainable digital preservation program.



At the heart of digital preservation is the digital content. Special resources must be considered for identifying, capturing, and managing digital content and associated metadata.

EQUIPMENT:

What do you need to capture and manage your digital content?

- hardware
- networking devices
- storage / backups
- scanners
- Devices to recover data from old media

SOFTWARE:

Are you purchasing some sort of repository, is there software you need to help with the processing

- Office software – for inventory, documentation

SPACE:

The physical space needed for

- staff workspaces
- equipment
- technology

STAFF:

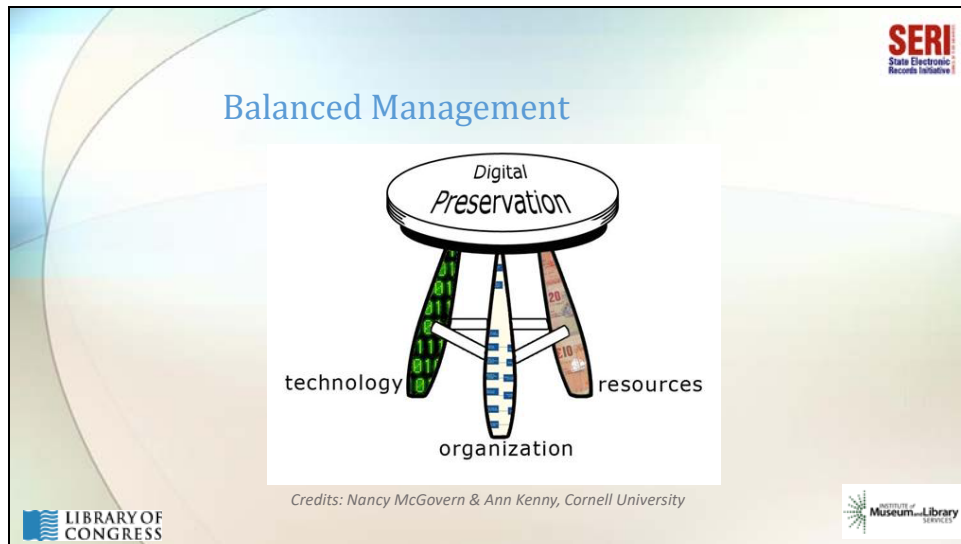
Skilled staff to work with the content

Legal staff

IT support

Website – for access of materials

So how do we go about building this into the structure of our organization...



Let's talk for a moment about the concept of balanced management.

It is easy to jump into action without wanting to devote time to planning or policy development.

Sometimes the reasons are beyond our control – staffing, lots of work and limited resources, lack of management understanding of what we need to do.

We need to do this piece NOW but will catch up with the rest of this stuff later.

Nothing will happen (fingers crossed)

We can think of digital preservation as a three legged stool, comprised of technology, the organization, and resources.

This graphic comes out of work at Cornell University around 2003. They developed and included in their digital project management workshops a model called the three-legged stool for digital preservation. Looking at this model can help you visualize and develop a well-formed and sustainable digital preservation program.

An effective approach will address:

- Organizational requirements and objectives
- Technological opportunities and change
- Resources – funding, staff, equipment, etc.

Often organizations focus on the technology piece of digital preservation (do we have the software and hardware, scanners, etc), but if you want a sustainable program, you need to look at the other “legs” of the stool.

Assembling a team and developing their skills may be the most important component of any successful preservation program; but without the technology to support this leg, the stool can’t balance, and without the organization buying in and developing a policy and plan, the stool will fall right over this way.

Organization -

This leg provides the organizational rationale and mandate for preserving your digital content as well as detailing policies, procedures and long-term plans.

- Successful long-term management will be dependent on a top-down awareness and acceptance that this will be an ongoing part of the work.
- Organizational awareness – trickle-down theory
- Long-term funding (via Budgets) will be handled at this level

Technology

This is the actual technological infrastructure you have which sustains the digital content and will be determined by the other two legs

- hardware
- Software
- Scanners
- Periodic upgrades and replacements

Resources – supports the processes necessary to meet program goals.

- And we will take another look at that in a minute



Before we look further at each leg of the stool, some of the overarching skills that might be needed to support the program in one fashion or another include the items listed on the graph.

These are the results from a National Digital Stewardship Alliance (or NDSA) Staffing survey question about what skills are required for a successful digital preservation program. This graph shows what survey respondents thought were the most important skills to have. As you can see these range from simply having the passion for digital preservation to having digital preservation experience and technical skills, to a wide range of other soft skills.

--

<http://z.umn.edu/jol>

<http://digitalpreservation.gov/ndsa/documents/NDSA-Staffing-Survey-Report-Final122013.pdf>

Results of the NDSA Staffing Survey also asked about skills required...

<http://digitalpreservation.gov/ndsa/documents/NDSA-Staffing-Survey-Report-Final122013.pdf>

Organizational Element: People

Knowledge and skills include:

- Policy development
- Project management
- Repository/software management, programming
- Metadata management
- Legal expertise
- Marketing expertise

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There are different kinds of skills that contribute to digital preservation – most can be found either directly or through available networks. Some skills are needed all the time (for example, project management and metadata management) and some periodically (for example, legal and marketing expertise)

Keep in mind that you may already have these skills in-house. For others you might have to seek help elsewhere from another organization or service.

-Policy development: I'll talk more specifically about developing policy in a moment and why that is important.

- Having someone at your organization who could serve as a project manager, or someone who can assign roles, and guide staff to manage projects from start to finish.

-You most likely will need repository/software management, or programming skills depending on how you decide to store your content

-Legal and marketing expertise will likely only be needed periodically.

Questions To Ask

What skills do you think might be useful for managing digital content?

What skills do you have?

What skills are you lacking?

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How do you get started on all this? Think about what you have and then what you need...



The slide features a light blue and green background with abstract curved lines. The title 'Institutional Support' is in blue. The bulleted list is in black. The quote is in orange. Logos for SERI, Library of Congress, and the Institute of Museum and Library Services are present.

Institutional Support

- Acknowledgement of the importance of digital preservation
- Support of digital preservation activities
 - Resources (staff, technology) and finances

** Institutional acknowledgement, support, and commitment begins with planning and policy development.*

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Institutional support is a critical piece of the organizational leg of the stool.

First steps – are often just getting the conversation started and making them aware of the importance of what it is you are doing.

It is not unusual for others outside the immediate circle of this work to not understand what it is you do and why it is important.

After that – you can work on getting the resources to support the other legs of the stool

I will speak in more detail about advocating for digital preservation programs, but one of the key things you can do to help your case is with planning and Policy development. Writing these often necessitates that they are adopted at the institutional level if they are going to be advertised as institutional policies. We all have them - Collection policies, Deed of gift policies, transfers based on records schedules, etc.

It is often through the writing and adoption of these documents at the institutional level that that first step can happen.



Creating a Preservation Policy

Benefits of a preservation policy:

- Specifies institutional commitment
- Raises awareness
- Helps define roles and responsibilities
- Developing policy builds digital preservation team
- Demonstrates compliance – meet requirements
- Manages expectations – message to stakeholders
- Identifies issues and challenges

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Why create a preservation policy?

1) Institutional commitment—

One benefit to developing a policy related to your digital preservation program is that a policy specifies institutional commitment—a promise that you will care for this digital content indefinitely.

It may be helpful to find somebody fairly high up and convince them to make it a priority, maybe be the sponsor of the organizational effort, and then they come to the meetings and then we put in our policy that the purpose is to formalize our organization's commitment to long-term preservation of its digital assets.

2) Raises awareness—it's going to be the same thing here—the act of writing this document is going to be a big awareness raiser, as people sit around and share information that they haven't discussed before about what risks you are facing. And then once this document is written and circulates, many more people will have the beginnings of a consciousness about digital preservation.

3) This document also defines roles and responsibilities of who will be doing what – It may provide you with the ability to make some recommendations for a digital preservation team

Working through some of the guideline documents for how to put together a digital preservation policy, and then hashing it out, will be a great team education exercise.

What are you going to do?

What are other people in your office responsible for?

What are your IT resources and their responsibilities?

What about your managers?

4) Developing a policy helps you to build your digital preservation team. As you write your policy you will likely discover that you have people with some skills that can start your digital preservation team. You may know something about technology in general and also have a close relationship with your IT department, Plus staff that work with some sort of existing digital asset management system, and a director, who is interested in becoming part of this effort, and your acquisitions staff, who know some of the potential donors and who may be hearing about electronic collections we might or might not be receiving.

The Preservation Policy is also where you state your commitment to meeting standards which, when complete, sends a message to our stakeholders that we are serious about digital preservation.

The preservation policy identifies issues and challenges in a couple of ways: just thinking about starting to write it, and realizing who you are going to need to consult with and thinking about how to get their attention will bring up one set of challenges. This may be things like realizing that certain stakeholders don't even work well together. Then of course there will be the issues and challenges you identify in the policy itself.

Other benefits include:

- After you finish the framework document, you could make recommendations for a digital preservation team at your institution.

- Another benefit to having a policy is that you could demonstrate compliance or meet requirements if you had to undergo an audit.

- Stating in your policy that "We will do this" or "we will not do this" manages expectations to stakeholders. You cannot preserve everything, so having a policy means you can point back to it to say, this is out of scope.

- Having policy can help you identify issues and challenges you may run into when trying to implement a digital preservation program like Education (training for all staff), sustainability, etc.

Tips on Developing a Plan

http://www.mnhs.org/preserve/records/legislativerecords/carol/docs_pdfs/PreservationPlan.pdf

Preserving State Government Digital Information
Minnesota Historical Society

Developing a Preservation Plan

A preservation plan should address an institution's overall preservation goals and provide a framework that defines the methods used to reach those goals. At a minimum the plan should define the collections covered by the plan, list the structural requirements of the records, list best practices and standards that are being followed, include documentation of policies and procedures related to preservation activities, and determine staff responsibility for each preservation action. It is important to remember that preservation activities are not static and the preservation plan will need to be reviewed and readdressed on a regular basis to remain viable and useful.

The costs of preservation will be a major factor in the development of your plan. To some degree costs will help determine the level of your preservation efforts. Often there is not enough money available to preserve all electronic records for the long-term. Understanding financial resources allows you to make informed decisions on what to preserve. Without this understanding even the best laid preservation plans will fail.

The Electronic Resource Preservation and Access Network (ERPANet) divides costs into four major categories: technical infrastructure, financial plan, staffing infrastructure, and outsourcing costs.¹ Technical infrastructure costs include equipment purchase, maintenance, and upgrades necessary to keep networks online and adjust to software and hardware obsolescence. A solid financial plan must be backed up with a commitment to long-term funding. Staffing costs include the costs of hiring and training employees. Any services that are outsourced will have a direct effect on your preservation costs. Costs also depend on the record format, level of security required, and the length of time the materials need to be preserved.

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Carol Kussman from the MN Historical Society developed a 4 page document that provides an introduction to developing a preservation plan. It points out some resources and identifies common elements of successful preservation plans.

A preservation plan should address an institution's overall preservation goals and provide a framework that defines the methods used to reach those goals.

What are some of the common elements of successful preservation plans? Let's take a look:



A preservation policy represents a commitment—a promise that you will care for this digital content as long as legally required OR institutionally mandated.

It needs to address many issues and the basic components of a policy might include:

Purpose Statement:

Why are you writing the preservation plan? Why is digital preservation important to your institution?

Relation Statement:

How does the document relate to others across the institution? Does it for instance compliment current records management policies?

OBJECTIVE STATEMENT:

What are the goals of preserving your digital content? Are the goals based on a specific project or do they reach the institution level? What are the overarching goals of your preservation program? You may want to include both short- and long-term goals.

To maintain and preserve digital content for future generations
To meet legal requirements as mandated by territorial laws

PERIODIC REVIEW:

How often will the preservation plan be reviewed? Is it based on a schedule or on an event that triggers review? Record what changes are made, who made them and when. This will help ensure your preservation plan is sustainable over time.

If you change it – record what changes are being made

DESCRIPTIVE STATEMENT:

Of what will and what will not be preserved.

Formats that you will support

How long you will preserve things (according to schedule or forever)

How will access be provided

Who has access to the records

Where are files stored

IMPLEMENTATION PLAN: Formalizes and documents everything in more detail

Staff responsibilities (positions, not specific names)

Access and Use Restrictions

Risk Management policies and procedures can be referenced

Identifying stakeholders – who is going to use this

Storage Requirements – how are you going to store files, back them up, how often

Quality Control/Security measures - How often will integrity checks be made? Define who has access to digital content

While it would be ideal to create an institutional level policy and that would be a faster path to global institutional awareness, it doesn't HAVE to take this path. You may need to start small. Write a policy for a department that works most with digital materials, test how things work, roll it out to a larger group, and work towards an organizational-level policy if that is appropriate.

-A purpose statement helps to formalize commitment to long-term preservation of digital assets

-A relation statement explains how the policy relates to others across the institution.

-The Objective statement describes the goals of digital preservation, and to what level – a project, program, institution...

-To keep the policy up to date, it should include a review statement that indicates how often the policy will be reviewed and updated and if there are any events that specifically trigger a review.

-The descriptive statement describes what will and will not be preserved, what formats are supported, who has access... all the details

-The implementation plans will probably be external documents that explain HOW the things discussed in the descriptive statement are actually done and may include staff responsibilities, access and use restrictions, risk management, quality control, best practices and standards, preservation strategies, storage requirements, and financial responsibilities.

-A glossary will be useful if people are unfamiliar with digital preservation terms.



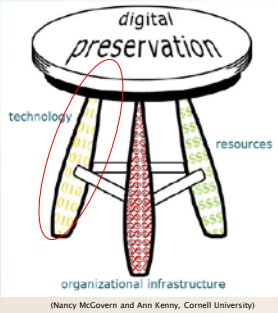
I would like to transition now and talk about another leg of the 3 legged stool: technology.

Technology issues are usually the first area of digital preservation management that most people think of. And, it is one of the legs of the stool of balanced management, that is obviously necessary for digital preservation management. Technology will include both hardware and software. You need to make sure that you make the right decisions about the technologies that you are going to invest in within your organization.

Technology

► Addresses:

- Functions and workflows
- Hardware and software
- Formats and storage
- Network and security
- System organization
- Procedures, protocols and documentation



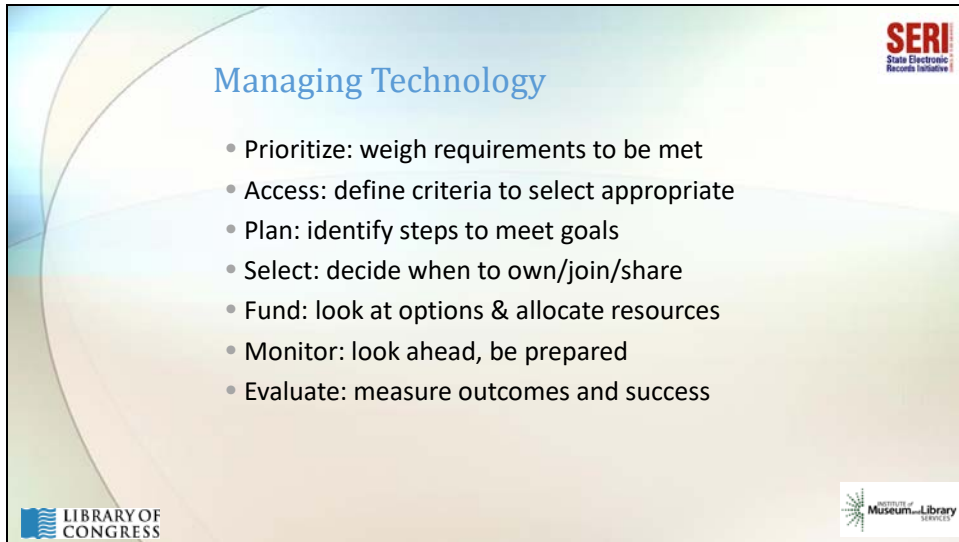
(Nancy McGovern and Ann Kenny, Cornell University)

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The technology leg covers many things... hardware, software, formats and storage, network and security, functions, workflows, procedures, protocols and documentation...

A presentation slide titled "Managing Technology" with a light blue and green background. The title is in blue text. Below the title is a bulleted list of seven steps: Prioritize, Access, Plan, Select, Fund, Monitor, and Evaluate. The slide includes logos for the Library of Congress, SERI (State Electronic Records Initiative), and the Institute of Museum and Library Services.

Managing Technology

- Prioritize: weigh requirements to be met
- Access: define criteria to select appropriate
- Plan: identify steps to meet goals
- Select: decide when to own/join/share
- Fund: look at options & allocate resources
- Monitor: look ahead, be prepared
- Evaluate: measure outcomes and success

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So, keeping in mind that there are different “levels” of digital preservation, here are some of the processes that you can use to help make the right technology decisions at your organization.

Prioritize: The most important is to know what your requirements are and what you want to accomplish the most; rank these to prioritize needs.

Access: Think about what your access criteria are – do you need to provide access to the public, an internal audience, or are you working with materials destined for a dark (no access) archive? Define your criteria so you select appropriate technologies.

Plan: Identify the steps you need to follow to meet your goals.


Select: You need to decide if you are going to run it yourself, or join a consortium, or share resources with another organization. This can be a mix depending on your collection.

Funding: Think about funding options and which will work best –Keep your budget and skill set in mind to determine which might work best. Think about future needs and wants.

Monitor: Technology changes over time. Be ready to change if necessary. Remember this is not just a one-time process plan to keep up with technology, determine where your comfort zone is, are you on the bleeding edge, the cutting edge, or a late adopter?

Evaluate: Before, during, and after the process, evaluate and review your selection process and decisions. Make sure you are achieving your goals, or if not, know what can be done to move closer to them. Going forward...your technologies will need to be periodically reviewed to make sure they still make sense as new technologies become available.

When moving to technology, organizations need to periodically review and make decisions about technologies that will help them preserve digital content – computers and servers, software tools and utilities, repository software packages. The process should be systematic and intentional. Documenting the process and outcomes may make the next time easier. Weighing options against requirements should be part of the process. Outsourcing to service providers is increasingly an option and decisions should be as thoughtful as the process to buy and implement technology. Technology changes, and organizations can plan to keep up with it, reflecting their resources and requirements.



The slide features a light blue and green background with abstract curved lines. The title 'What to Look For....' is in blue. The text 'Characteristics of sound software:' is in black. Below it is a bulleted list of seven characteristics. Logos for 'SERI State Electronic Records Initiative' and 'Library of Congress' are in the top right and bottom left respectively. A logo for 'Institute of Museum and Library Services' is in the bottom right.

What to Look For....

Characteristics of sound software:

- written in a well-documented language
- usable on a wide variety of platforms
- sustained support by creators/developers
- modular in design
- supports batch processing and workflows
- licenses support secondary use
- Has an exit path

If you decide you are going to invest in technologies, there should be a way to determine what good means for technology – this list suggests some of the characteristics to look for.

While the goal is to have a preservation solution that can preserve and protect your content and keep it accessible well into the future, many will not be able to start with a full blown system but will need to build out the pieces gradually over time. One archives started with hard drives, then locally managed RAID systems, then rented server space at a University, then transitioned into a preservation system. Various types of software were used on top of these devices to manage this content. If you take this route, there are things you can do to make the transitions easier. You have to evaluate your technological environment, understand what you have, what you can do, and once you have a grasp on that, you can start to evaluate what else is out there and what technology solutions might work for you.

So, here is a list of some of the characteristics that will help you decide what software will work for your institution. It does not matter what type of software.

If the software does not have these characteristics you could consider that a cue, a red flag that there is a weakness in the software that may negatively impact your institution in either the short or long term.

What I mean by modular in design: A computer is actually one of the best examples of modular design - typical modules are power supply units, processors, mainboards, graphics cards, hard

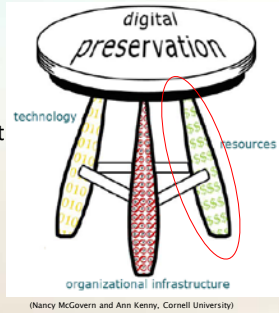
drives, optical drives, etc. All of these parts should be easily interchangeable as long as you use parts that support the same standard interface as the part you replaced.

What I mean by secondary use: you can use the software on more than one device (a home computer and a work computer for example).

Resources

Addresses:

- Organizational Infrastructure
- Technology
- Staff (number and skill set)
- Physical space and equipment
- Finances



(Nancy McGovern and Ann Kenny, Cornell University)

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Moving on to the third leg of the stool, Resources... which covers staff, technology, space and other possible needs. Just a point – as we talk about these 3 legs of the stool, you will hear the same things being discussed.

For resources – we are asking about

Organizational Infrastructure – Do you have the support to achieve your goals?

Staffing: make sure that you have the people that have or will learn the skills necessary to run your program, whether it is just one or two or a large staff.

We have spoken about these before – just from a different perspective

Equipment Resources

- Computers (desktops, laptops)
- Disk drives
- Servers
- Storage
- Desks, chairs
- Office supplies




Equipment: Obviously you will need the core computer and related equipment to process, store, preserve, and provide access to your collection, but do not forget that you will also need desks and chairs, tables, and all of the regular office equipment, plus you will have to have a place to put everyone and everything.

In many cases equipment and facilities are shared with other established functions of your institution, but you need to think about how this is accomplished.

Other Potential Costs

- Technology
- Outsourcing storage to a vendor
- Onsite storage for digital files
- Internet access
- Software for online access
- Time
- Space



*Silver Dollars
Image ID: WHI-7250*

There are other potential costs:

[TECHNOLOGY]

Hardware
Software
Scanners
Cameras

[STORAGE]

- Could be outsourcing, onsite, or BOTH

[INTERNET]

- How are you going to provide access to the items you are preserving to the public?
- How are you going to let the public know what you have – web sites, social media

[TIME]

Paid staff time
“Free” volunteer time
Students/interns

[Space]

- For Technology
- For People to work



Designated Funding

- Funds set aside for digital preservation
 - Measurable indication of intent to preserve
 - Challenging to do, but important
 - Over time, contributes to track record
- May not be explicit (e.g., budget line item)
but often to get this you must be able to make a compelling case



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Identifying funding for digital preservation can be challenging, but any program in an organization needs sustained funding to develop and grow.

Funding is needed not only for the initial investment in Digital Preservation but also for the continued development and growth of the program. Digital collections are going to grow and the necessary support for them will only continue to increase over time. Here are some of the issues:

Digital preservation will need funding.

You need to make your case for funding to the people that approve the budget.

Documenting topics like your successes and repository growth and use (like web hits or downloads) will help.

Here is where we need to build a case as to why this is important. What is the loss to the institution if your digital content can no longer be accessed or used? How much money went into developing that content, including staffing resources and expertise? Documenting the value to the institution and to the targeted user audience will help you build your case, and convince administrators that it is important to protect their investment.

Build your case, and get your administration on board.

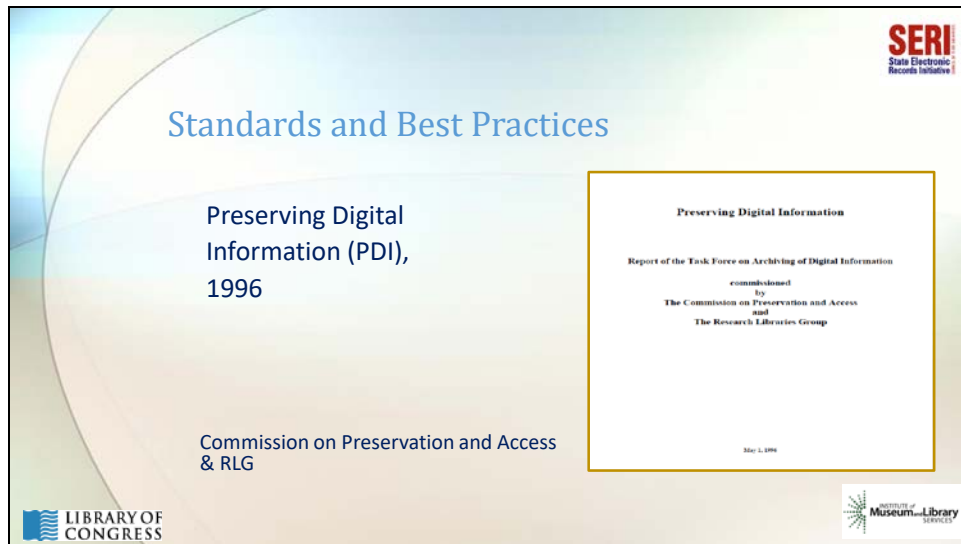
Possible Funding Sources

- Budget
- Grants
- In-kind contributions
 - Tech support
 - Equipment use
 - Legal



People Counting Pennies
Image ID: WHI-56206

So what are some of the possible funding sources that may be available? Could be your budget, grants, or in-kind contributions.



Moving away from the 3 legged stool and the overarching elements of infrastructure, resources and technology, we are going to focus down to look at the management of the content itself.

But the act of preservation requires a “show me” not “trust me” approach – and an organization needs to demonstrate that it’s following good practice.

In the previous section, I provided you with a lot of examples on how to create a balanced approach to managing a digital preservation plan. While it often seems daunting to take on a project of this size, there are foundational documents out there for you to review and reference while creating your plan.

The founding document is the Preserving Digital Information report. Published by the Commission on Preservation and Access and RLG, the document represents a seminal moment in digital preservation that contains examples of digital content preservation dating back to the 1960’s and really got everyone going in the digital preservation community. One of the things that it did was point out the obvious. In order to succeed in preserving digital information, there needs to be an organizational will and an economic commitment to the project. The findings from this document set the stage for the standards and best practices to come.



Standards and Best Practices

International Standards:

- Open Archival Information Systems (OAIS) Reference Model, 2003 and 2009 revision
- Trustworthy Repositories Audit and Certification (TRAC), 2011
- Audit and Certification of Trustworthy Digital Repositories (ISO 16363), 2012

Guidelines:

- Trusted Digital Repositories, 2002
- Preservation Metadata Implementation Strategies, 2005 plus updates

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Since the PDI in 1996, the digital community now has a foundation of standards as a basis for good practice – these are the most commonly cited.

The OAIS reference model is a conceptual overview of how a preservation system should ideally work.

TRAC certification has a lot of pieces to it. Some digital repositories have gone through TRAC certification in full, and others have passed certification in a specific area. For example, Chronopolis's (digital preservation network) certification applies specifically to their ability to preserve and manage at the bit level.

VERY few organizations have passed the full TRAC certification – they include Hathitrust, LOCKSS, Portico

I'll talk more about Trusted Digital Repositories in a minute.

Preservation Metadata Implementation Strategies seeks to identify which metadata is critical versus simply helpful, for standards are still being developed, still evolving and emerging. The important thing is to use these as guideposts, map out where you are in relation to them, and identify what you can and should implement.

Start With a Solid Foundation

Know where you are heading

- Standards and Best Practices – TRAC, OAIS
- Trusted Digital Repository

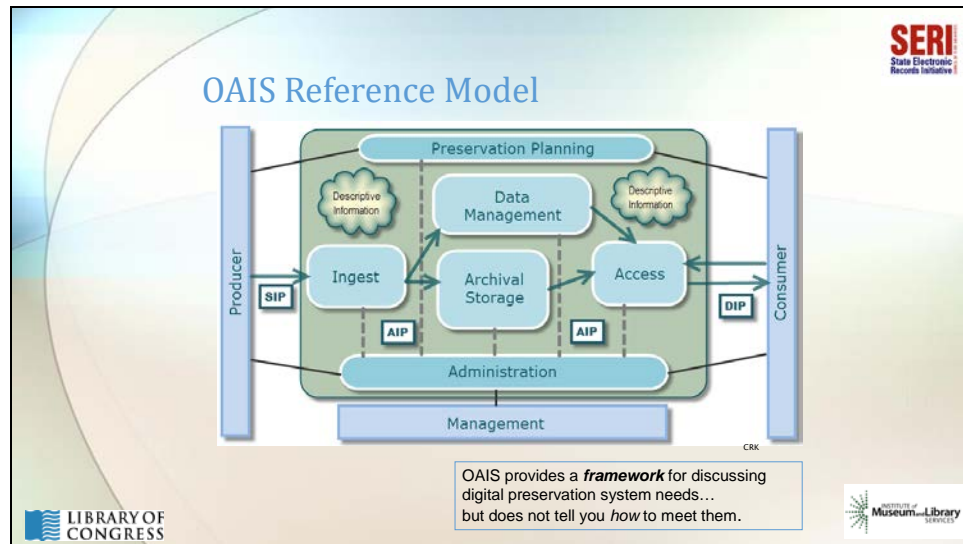
Know where you are starting

- Survey of Institutional Readiness
- NDSA Checklist
- Digital Preservation Capability Maturity Model

So how do you know what constitutes “Best Practices”? Become familiar with some of the basic best practices that are prevalent in digital preservation, which are the items listed in this first section, and then make some assessments as to where you are currently in meeting those goals.

Every organization should do periodic self-assessments and perhaps at some point include a formal audit of your program, perhaps by working with peer organizations. Having an outside viewpoint helps highlight things that we take for granted or forget to document and clarify.

Self assessments will provide you a roadmap of where to go next.



The OAIS Reference Model is also known as ISO 14721.

Many organizations use OAIS to determine how to address the characteristics and attributes of the trusted digital repository. The Reference Model provides a structure or framework for discussing preservation system needs. This is a simplified diagram that shows the main functions.

Looking at the diagram, the OAIS describes functions of a preservation system, but it does not specifically tell you how to do any of these functions. The main goal is to be able to put things in (Ingest), manage and preserve them (data management), and get things out (access). The processes of how you do this is not defined, but the characteristics of a trusted digital repository can be used to help develop procedures.

While all functions contribute to a complete system, the preservation-specific functional entities in this model include administration, archival storage, and preservation planning. The Management role works with the administration function to create and distribute policies that address all other functions and make decisions about technology and the technological environment.

So how do you tell if you are following OAIS or are on the right track of being a trusted digital repository?

A presentation slide titled "Trusted Digital Repository" in blue text. The slide features a list of characteristics and attributes for a TDR, including community standards, commitment, management, resources, infrastructure, protection and control, and documentation. Logos for the Library of Congress, SERI (State Electronic Records Initiative), and the Institute of Museum and Library Services are visible in the corners.

Trusted Digital Repository

- Characteristics and Attributes
 - Community standards (OAIS Compliance)
 - Commitment (Administrative Responsibility)
 - Management (Organizational Viability)
 - Resources (Financial Stability)
 - Infrastructure (Technological Stability)
 - Protection and Control (System Security)
 - Documentation (Procedural Accountability)

*Trusted Digital Repositories: Attributes and Responsibilities

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These attributes of a Trusted Digital Repository (TDR) have been used since 2002 by organizations to guide the development of their digital preservation programs. The TDR document is worth reviewing if you have not already done so.

Looking at these documents in more detail, we can use TDR document to help define organizational needs.

The characteristics and attributes of a trusted digital repository include:

- following community standards (such as the OAIS reference model)
- Demonstrating commitment (from administration)
- Being well organized and managed
- Having enough (financial) resources
- Having the infrastructure that supports technological stability
- Having a system that is secured, protected, and controlled, and
- Having documentation for all the procedures and decisions that have been made.

This shows that there are a lot of different areas that must be addressed to build any successful program.... If we then look at TRAC...



ISO 16363 specifies auditing criteria for the certification of trustworthy repositories

The Trustworthy Repositories and Audit Certification Criteria and Checklist document is divided into three areas, provides you ways to help you meet those criteria and is very similar to the three legged stool

- Organizational Infrastructure
- Digital Object management
- Technologies, Technical Infrastructure, and security...

There are further divisions under each of these which provide information on specific topics as well as what you might want to have in place to reach the goal.

The other point I would make here is that these documents provide you with a “To-Do list” of things like policies and procedures, that will put key things in place even before you have a fully functioning repository – These are the things that go AROUND the repository. Not that you need ALL of them (some may not apply), but it gives you something to shoot for.



The slide features a light blue and green background with abstract curved lines. In the top right corner is the SERI logo (State Electronic Records Initiative). In the bottom left is the Library of Congress logo. In the bottom right is the Institute of Museum and Library Services logo.

Organizational Infrastructure

A4. Financial sustainability

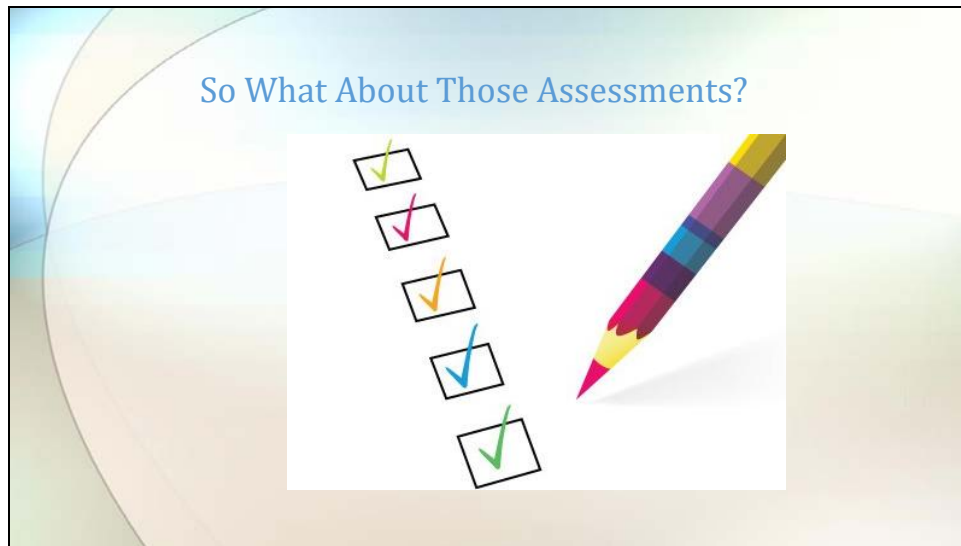
A4.4 Repository has ongoing commitment to analyze and report on risk, benefit, investment, and expenditure (including assets, licenses, and liabilities).

The repository must commit to at least these categories of analysis and reporting, and maintain an appropriate balance between them. The repository should be able to demonstrate that it has identified and documented these categories, and actively manages them, including identifying and responding to risks, describing and leveraging benefits, specifying and balancing investments, and anticipating and preparing for expenditures.

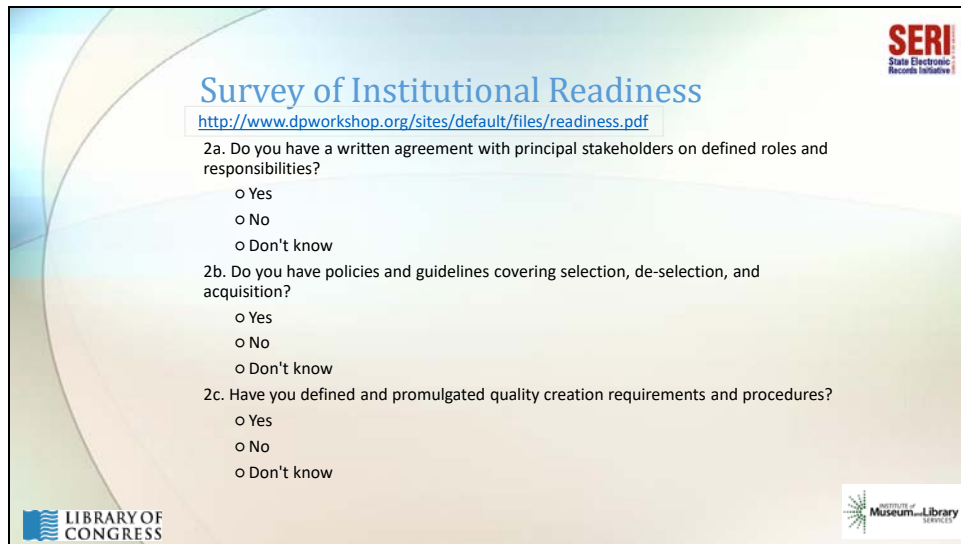
Evidence: Risk management documents that identify perceived and potential threats and planned or implemented responses (a risk register); technology infrastructure investment planning documents; cost-benefit analyses; financial investment documents and portfolios; requirements for and examples of licenses, contracts, and asset management; evidence of revision based on risk.

An example under organizational infrastructure is financial sustainability.

The evidence section talks about risk management documents, technology infrastructure planning documents, and more...



So what about those assessments?




Let's start with this one....

This checklist was designed to help people think about their organization's digital assets in terms of scope, priorities, resources, and overall readiness to address digital preservation concerns. The questions are pretty simple and help you figure out where you are in terms of organizational support, technology, and resources – again – back to that 3-legged stool.


<http://www.dpworkshop.org/sites/default/files/readiness.pdf>

These are some of the questions in part 2 which cover Policies & Procedures

This is a very quick assessment and is a really good way to see where your gaps are and where you've made some headway. What are doing right, what are we kind of doing but maybe not correctly, and what had we not thought of yet.



NDSA Levels of Preservation



- Practical Steps
 - Storage
 - Data integrity
 - Information security
 - Metadata
 - File formats
 - Access *
- Watch for updates:
<http://ndsa.org/activities/levels-of-digital-preservation/>

Table 1: Version 1 of the Levels of Digital Preservation

	Level 1 (Protect your data)	Level 2 (Secure your data)	Level 3 (Monitor your data)	Level 4 (Repair your data)
Storage and Geographic Location	<ul style="list-style-type: none"> Two complete copies that are not collocated For data on heterogeneous media (optical discs, hard drives, etc.) get the content off the medium and into your storage system 	<ul style="list-style-type: none"> At least three complete copies At least one copy in a different geographic location Document your storage system(s) and storage media and what you need to use them 	<ul style="list-style-type: none"> At least one copy in a geographic location with a different disaster threat Obsolescence monitoring process for your storage system(s) and media 	<ul style="list-style-type: none"> At least three copies in geographic locations with different disaster threats Have a comprehensive plan in place that will keep files and metadata on currently accessible media or systems
File Fidelity and Data Integrity	<ul style="list-style-type: none"> Check file fidelity on ingest if it has been provided with the content Create fidelity info if it wasn't provided with the content 	<ul style="list-style-type: none"> Check fidelity on all ingests Use write-checkers when working with original media Write-check high-risk content 	<ul style="list-style-type: none"> Check fidelity at fixed intervals Maintain logs of fidelity info, supply audit on demand Ability to detect corrupt data Write-check all content 	<ul style="list-style-type: none"> Check fidelity of all content in response to specific events or activities Ability to replace/regenerate corrupted data Ensure no one person has write access to all copies
Information Security	<ul style="list-style-type: none"> Identify who has read, write, move and delete authorization to individual files Restrict who has those authorizations to individual files 	<ul style="list-style-type: none"> Document access restrictions for content 	<ul style="list-style-type: none"> Maintain logs of who performed what actions on files, including deletions and preservation actions 	<ul style="list-style-type: none"> Perform audit of logs
Metadata	<ul style="list-style-type: none"> Inventory of content and its storage location Ensure backup and non-corruption of inventory 	<ul style="list-style-type: none"> Store administrative metadata Store transformational metadata and log events 	<ul style="list-style-type: none"> Store standard technical and descriptive metadata 	<ul style="list-style-type: none"> Store standard preservation metadata
File Formats	<ul style="list-style-type: none"> Where you can give input into the creation of digital files encourage use of a limited set of known open formats and codings 	<ul style="list-style-type: none"> Inventory of file formats in use 	<ul style="list-style-type: none"> Monitor file format obsolescence issues 	<ul style="list-style-type: none"> Perform format migrations, emulation and similar activities as needed

Here's another one....

The National Digital Stewardship Alliance (NDSA) Levels of Preservation uses specific steps or details to walk through different levels. This model is not so theoretical. It is all about what you are doing or can strive to do...

The goal of this document is to provide a basic tool for helping organizations manage and mitigate digital preservation risks.

These categories should look pretty familiar to you now – storage, information security, metadata, and file formats.

Fortunately - The NDSA group working on this is continually working on making this a better tool. In 2015, they were working on the fixity category and in April of 2016 they presented a new updated version that now includes a metric for access.

Looking at this, it is important to understand that there can be various levels of preservation activities you perform.

Storage Example				
	Level One (Protect Your Data)	Level Two (Know Your data)	Level Three (Monitor Your Data)	Level Four (Repair Your Data)
Storage and Geographic Location	Two complete copies that are not collocated For data on heterogeneous media (optical disks, hard drives, etc.) get the content off the medium and into your storage system	At least three complete copies At least one copy in a different geographic location/ Document your storage system(s) and storage media and what you need to use them	At least one copy in a geographic location with a different disaster threat Obsolescence monitoring process for your storage system (s) and media	At least 3 copies in geographic locations with different disaster threats Have a comprehensive plan in place that will keep files and metadata on currently accessible media or systems

Use this to see where you stand. How do your current practices fall on this chart? What can you do to improve your activities? For example, under

Storage and Geographic Location - look at how you can move from level 1 to level 4.

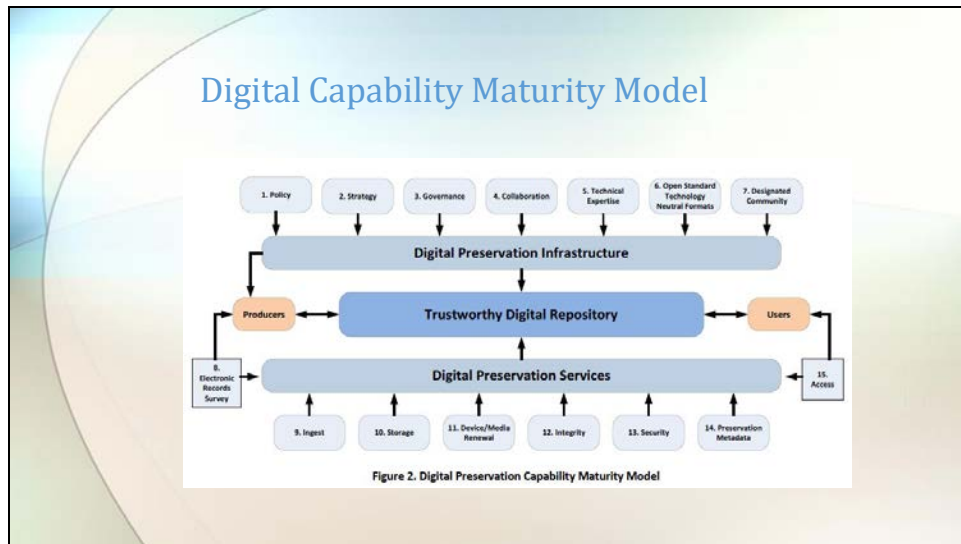
Level 1 states that you should have two complete copies that are not co-located and to get content off of media – CDS, floppies, etc

Level 2 should have at least three complete copies – one of those in a different geographic location and your systems are documented (you know where your content is)

Level 3 At least one copy in a different geographic location with a different disaster threat and you are monitoring your storage system for obsolescence – not the content but the hardware

Level 4 At least 3 copies in geographic locations with different disaster threats + plan to keep files and metadata on accessible media or systems.

Some of these leaps between levels will be easier than others. You also may never reach the highest level in each category due to finances and resources, but you can verify you are doing the best you can with what you have NOW. This can help you request more resources for specific projects to get you from one level to another in these categories.

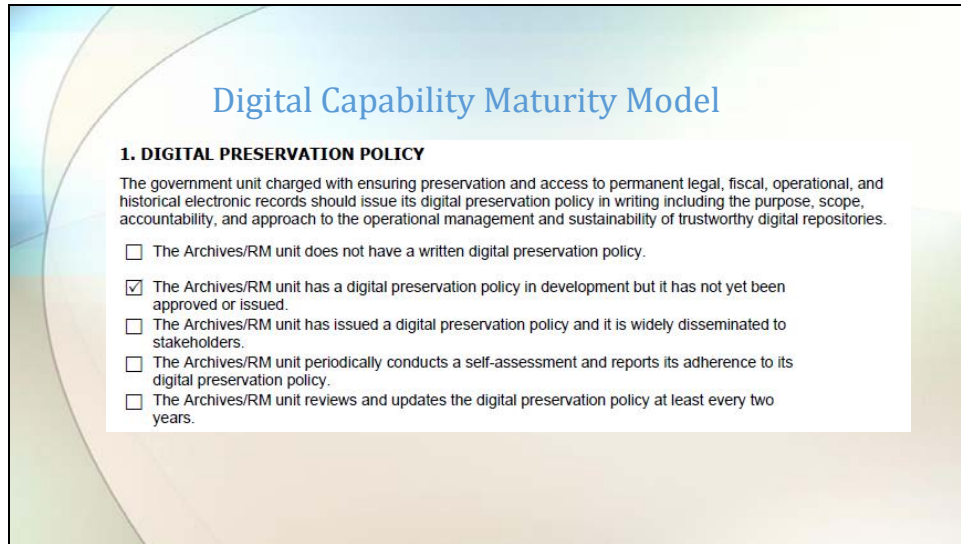


http://www.nycarchivists.org/Resources/Documents/Dollar-Ashley_2013_DPCMM%20White%20Paper_NAGARA%20Digital%20Judicial%20Records_8Feb2013-1.pdf

This assessment organizes the digital preservation requirements of the OAIS and TRAC ISO Standards into fifteen components with metrics to assess maturity.

The Top Part features seven (7) components that are essential to ensuring sustained organizational commitment including human, technical and financial resources, to the long-term preservation of digital records that are created, received, or acquired by the organization.

The Bottom 8 components - are required for continuous monitoring of external and internal environments to plan and take necessary preservation actions that sustain the integrity, security, usability and accessibility of digital records stored in repositories.

The slide features a decorative background with overlapping curved shapes in shades of blue, green, and yellow. The title "Digital Capability Maturity Model" is centered at the top in a blue serif font. Below the title, the section "1. DIGITAL PRESERVATION POLICY" is highlighted in a light yellow box. This section includes a descriptive paragraph and a list of five self-assessment items, each preceded by a checkbox. The first checkbox is empty, while the second is checked.

Digital Capability Maturity Model

1. DIGITAL PRESERVATION POLICY

The government unit charged with ensuring preservation and access to permanent legal, fiscal, operational, and historical electronic records should issue its digital preservation policy in writing including the purpose, scope, accountability, and approach to the operational management and sustainability of trustworthy digital repositories.

- ☐ The Archives/RM unit does not have a written digital preservation policy.
- ☒ The Archives/RM unit has a digital preservation policy in development but it has not yet been approved or issued.
- ☐ The Archives/RM unit has issued a digital preservation policy and it is widely disseminated to stakeholders.
- ☐ The Archives/RM unit periodically conducts a self-assessment and reports its adherence to its digital preservation policy.
- ☐ The Archives/RM unit reviews and updates the digital preservation policy at least every two years.

For each area – you can assess yourself on how you are doing

Level	Capability Description
0	The organization has little or no capability or resources to collect and analyze information about the volume, location, media, format types, and life cycle management requirements for electronic records.
1	The organization relies on existing retention schedules to identify electronic records of permanent historical, fiscal, and legal value in the custody of Records Producing units. It may also conduct ad hoc, one-time interviews and surveys to identify other electronic records of permanent historical, fiscal, and legal value.
2	The organization uses systematic interviews, surveys, and retrospective analysis of existing retention schedules to identify electronic records of permanent historical, fiscal, and legal value in the custody of selected records producing units. This may be enhanced by focusing on identifying "at risk" electronic records in the custody of selected Records Producing units.
3	The organization supplements analysis of "at risk" electronic records through collection of information about the volume and location (e.g., shared drives, databases, applications), media and format types of electronic records of long-term and permanent historical, fiscal and legal value in the custody of Records Producing units. The organization has identified preservation-ready and non preservation-ready electronic records in the custody of <i>most</i> records producing units.
4	The organization has identified preservation-ready and non preservation-ready permanent electronic records in the custody of <i>all</i> Records Producing units. It uses this information along with other information collected from Records Producing units to systematically manage the transfer and ingest of electronic records.

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Performance Metrics

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Each category is scored based on the answers via these Performance Metrics



And then you are presented with a final report showing where you sit in each category.

http://www.nycarchivists.org/Resources/Documents/Dollar-Ashley_2013_DPCMM%20White%20Paper_NAGARA%20Digital%20Judicial%20Records_8Feb2013-1.pdf

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The Glue – Planning and Acting

Planning


- Preservation planning
 - Ongoing
 - Multifaceted

Follow up on actions

- Self-assessments (internal review of project/program)
- Audits (external, peer review)

Other types of planning

- Business continuity (protect module)
- Disaster planning (protect module)



(Nancy McGovern and Ann Kenny, Cornell University)

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So how do you put it all together? Preservation planning (and acting on those plans) is the glue that holds the three legged stool together.

Planning for digital preservation is not a one-time thing, it is an ongoing part of managing digital content over time. It involves planning for the digital preservation program as well as identifying strategies for preserving the specific kinds of digital content the organization is preserving.

But when looking at the technology leg of the stool...preservation planning also includes preparing for new and unfamiliar digital content types, format obsolescence, and monitoring any technology that would improve or inhibit preservation (making sure to have the right equipment and it is stable).

Preservation planning itself also has the organizational aspects (for instance, policy development, planning, training, legal issues) and resources (designated funding and sustainability) to be taken into consideration [the other two legs of the stool].

For long-term management of digital content to be effective, Management needs to reflect holistic and sustained effort in all areas to ensure the longevity of digital content.

Follow up Actions

To determine if the program and/or strategies are successful, each organization should do a self-assessment to see if things are working. This can be as formal or informal as you like, but the

results should be documented so they can be learned from. (One suggestion is to use the Levels of Preservation or the 10 principles of community expectations – which are on the next slide - to see how things stand.) A more formal audit can take place by using an external or peer review process.

Either way, preservation requires a “show me” not “trust me” approach – an organization needs to demonstrate that it’s following good practice.

Business continuity and disaster planning should also be considered – these were discussed in the Protect module.



Wrap Up / Summary

- Balanced Management Approach
 - Address technology, resources and organizational infrastructure
 - Plan and act
- Standards and Best Practices
- Make time for planning, policy development, and training, but keep moving!

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The slide features a background with abstract curved lines in shades of blue, green, and yellow. On the right side, there is a small black and white photograph of a person sitting on a chair that is balanced on a narrow beam or ledge, with a cityscape visible in the background. The logos for SERI, Library of Congress, and the Institute of Museum Library Services are positioned in the corners.

Management of digital preservation is truly a balancing act. You must address technology, organizational infrastructure, and resources.

For example, organizations sometimes focus simply on the technology – looking for a solution – and don’t address the organizational issues, or pay attention to their current or required resources for the solution. Digital preservation itself is not a technology. Technology offers solutions to digital preservation problems. Technology needs to be addressed, but don’t focus on just the technological issues.

And you must also know when (and how) to plan and when to act. Too often, it is one or the other. Some organizations want to plan, plan, plan... and while they are working on the best plan possible, digital materials are not being preserved. Other organizations jump right in without devoting time to planning, policy development, and other key areas. Organizations need to balance planning and doing. They need to understand the importance of these key organizational aspects and take the appropriate amount of time to work on them, but can’t be frozen by the idea of not having the perfect plan. If you don’t act, things will not be preserved.

It’s OK to take baby steps, just keep moving forward.

Gravity Glue: http://www.gravityglue.com/portfolio/fall-12/#/gallery_7298/23

Gravity Glue: 3 piles: http://www.gravityglue.com/portfolio/fall-12/#/gallery_7298/65

Gravity Glue: black and white: http://www.gravityglue.com/portfolio/fall-12/#/gallery_7298/112



Next Steps

- What can you do right now?
 - Start working on / reviewing your preservation plan.
 - Think about each leg of the stool – how balanced are you?
 - Use Gap Analysis as a management approach – Where are you in those assessments and where to you want to be?
- How will my organization demonstrate good practice?
 - What are others like you doing?
 - Follow best practices and standards.

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Think about what you can do now. Start working on or reviewing your preservation plan and related policies. Look at each leg of the stool and think about if you are well balanced, or is there a particular aspect you need to work on. Use Gap analysis to assist in this process. See where you are and determine where you want to be and set goals accordingly.

As you move forward, follow best practices and standards.



This completes module 5, Manage. If you are using these modules in order, the next one is module 6, Provide. For additional resources on electronic records preservation and management, please visit the State Electronic Records Initiative webpage. This link is on your screen.