PRESERVING PERSONAL DIGITAL FILES

By Sarah Wingo
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A University of Michigan Library Instructional Technology Workshop

Preserving Personal Digital Files

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WHY DIGITAL PRESERVATION?

Our professional and personal documents serve as vital links to the past. While these documents have traditionally been tangible objects, much of the information we create is now digital and must be preserved using different methods. This document will guide you in keeping your digital materials safe, so that you will be able to access them into the future.

You will notice that the same plan is repeated in each section: **identify, decide, and organize.** The **backup** step will be handled as a separate section at the end of this handout. This method was developed by the Library of Congress and can be used whether you want to preserve documents, photos, email, personal records, audio recordings, or videos, although there are particular concerns for each type. In addition to the basic steps listed above, the concepts of **file migration** and **metadata** will be covered.

Several software programs and other products are mentioned by name. These are included as examples and should not be construed as specific endorsements by the University of Michigan Library.

RISKS TO DIGITAL FILES:

- File format obsolescence

- Software obsolescence

- Software or hardware failure

- Unintentional deletion

- File data corruption

- Malicious deletion or corruption

- Physical degradation of storage media

Northeast Document Conservation Center (NDCC): Digital Preservation
(http://www.nedcc.org/resources/leaflets/6Reformatting/05DigitalPreservation.php)

THE BASICS OF DIGITAL PRESERVATION:

1. Identify
2. Decide
3. Organize
   a. Metadata
4. Backup

IDENTIFY:

- What files are important to you?
  - Work/ research
  - Personal
- What types of files?
  - Word processing, spreadsheets, presentations, images, PDF, audio/audiovisual, emails, websites, bibliographic, note taking, etc.
- What file formats?
  - .doc, .docx, .msg, .txt, .ppt, .pptx, .xml, .mp3, .wav, .mov, .wmv, .pdf, .pdf/a, .jpg, .tiff, .raw etc.

DECIDE:

- What to keep
  - Editing/weeding
  - Make this choice as early as possible
- What to prioritize for preservation
  - What would you be most upset to lose?
  - What would be most problematic to lose?

ORGANIZE:

- Develop a folder system
- Develop a naming system
- Develop a backup system
- Develop a system for adding metadata

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BACKUP:

- "LOCKSS": Lots Of Copies Keeps Stuff Safe

- Have at least two backup copies

    o Best if these copies are stored in separate location from originals

    *for more information on how to backup files see the section on backing up at the end of this document.

THE FINER DETAILS:

MIGRATION:

- Transferring or rewriting data from an out-of-date medium to a current medium. For example, transferring newspapers onto microfilm is an analog example of migration.

- Only necessary for file formats which are obsolete or are in danger of becoming obsolete.

- Does not always allow for full renderability.

- For text files migration may involve updating them to the newest version of the software being used OR saving them as a .pdf or a .pdfA file.

DECIDING IF MIGRATION IS NECESSARY:

- Sustainability factors

    o Adoption

        ▪ How widely has the format been adopted?

    o Transparency

        ▪ How easy is it to use/render?

    o Self-documentation

        ▪ Does the file contain basic descriptive metadata (the analog to the title page of a book)?

    o External dependencies

        ▪ Does the format depend on a particular hardware, operating system, or software for rendering or use? And if so how complex is it?

The Library of Congress cites seven total factors for sustainability of digital objects, but for preservation of personal files these are the main four that will help with making decisions about the need for migration or the potential need for it in the future.

If a format is widely adopted, it is less likely to become obsolete rapidly, and tools for migration and emulation are more likely to emerge from industry without specific investment by individuals or archival institutions.

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- Resources:
  - For more detailed information on sustainability factors see the Library of Congress resource guide (http://www.digitalpreservation.gov/formats/sustain/sustain.shtml)
  - Digital Formats for Library of Congress Collections: provides information on the suitability of various digital file formats for long-term preservation, assessing each format against named sustainability factors and content-type specific quality and functionality factors. (http://www.paradigm.ac.uk/workbook/preservation-strategies/file-formats.html)
  - Hoppla (http://www.ifs.tuwien.ac.at/dp/hoppla/)
    - A free open source archiving solution that combines back-up and fully automated migration services for data collection

ADVANCED ORGANIZATION:

METADATA:

- Metadata is a form of advanced organization.
  - Data about data
  - Facilitates searching and finding
- Types of metadata
  - File names (titles)
  - Other metadata can be embedded in file
    - "Keywords," "Subjects," etc.
    - Uses application software to create and search
    - Camera and imaging software can automatically add some types of metadata
- Embedded metadata creation
  - Automatic
    - Often date and time are automatically saved as metadata for most kinds of file formats. Digital camera information about that camera will also be written directly to the metadata.
  - Manual
    - Using software programs to add metadata into your files, like keywords such as the names of people or places in the image, or identifying information which may include things like the name of the author or photographer, and any relevant copyright information.

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HOW TO ADD METADATA:

- To a single file **Right Click** on a file, select **Properties**, select **Details** from the menu bar. In **Details** you can add title, subject, tags (keywords), authors, dates etc.

- Different software tools allow you to add metadata to one or more file at a time. You can also create templates and reusable keywords.

- Two examples of tools for embedding metadata are listed below.

    o XnView: Free, Mac & PC (http://www.xnview.com/)

    o Adobe Bridge: Mac & PC (http://www.adobe.com/products/bridge.html)

CITATION MANAGEMENT TOOLS

Citation management tools enable researchers to capture information about research materials, create bibliographies, add footnotes, and manage research collections. More information can be found at the University of Michigan Library's Knowledge Navigation Center (http://guides.lib.umich.edu/citationmanagementoptions)

- EndNote: $105 students, $195 faculty (http://www.endnote.com/)

- Mendeley: Free (http://www.mendeley.com/)

- Zotero: Free (http://www.zotero.org/)

- RefWorks: Free to UM students, faculty staff, and alumni (http://www.refworks.com/)

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PRESERVATION BY FILE TYPE:

TEXT FILES:

Library of Congress (LOC) *Keeping Personal Digital Records:*
(http://www.digitalpreservation.gov/personalarchiving/records.html)

- Word processing, spreadsheets, and slide shows.

- The more prevalent a file format is the "safer" it is. Thus it is less likely to become obsolete or to no longer be compatible with software updates. For more details see the LOC site: (http://www.digitalpreservation.gov/formats/content/text_quality.shtml).

- Be aware of what factors in a text file you may or may not consider important to preserve.

    o Normal rendering for textual items

    o Integrity of document structure and navigation

    o Integrity of layout, font, and other design features

    o Integrity of rendering for images, diagrams, etc.

1. **Identify**

    a. What files are important to you?

        i. Work / Research

        ii. Personal

    b. What file types? i.e. exactly what software used

        i. .txt, .doc, .docx, .xls, .ppt etc./Word processing, spreadsheets, or presentations

2. **Decide**

    a. What to keep.

        i. Are there files that can be deleted?

        ii. Are there files which do not need to be backed up?

        iii. Drafts or just final revisions?

    b. Is migration necessary? If the answer to either of the questions below is no, you may want to consider migration.

        i. Is the file format open?

        ii. Is it widely used?

    c. Creating an archival copy

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     i. You may not necessarily need to migrate a document, but if migrating forward is important you may want to create an archival copy in the form of a .PDF or .PDF/A.

.PDF vs. .PDF/A:

.PDF documents need external elements on your computer (or device) to work however, over time these elements may change or no longer exist. A .PDF/A document has all of the information it needs embedded within itself, so it doesn't rely on any external sources to be opened or rendered.

One important thing to note is that converting to a .PDF/A may change the look and feel of your document somewhat, and once it has been converted to .PDF/A the file becomes static and can no longer be edited.

- PDF: Portable Document Format
  - Relies on external information when storing documents such as font libraries. This may result in retrieval problems when switching platforms as well as when you move to a new computer or software in the future.

- PDF/A: "A" for Archival
  - Does not rely on external information, any reader can open and read the documents

- Further information on the differences between .PDF and .PDF/A can be found at:
  - Very DOC Knowledge base (http://www.verydoc.com/blog/difference-between-pdf-and-pdfa.html)

  - LuraTech (http://www.luratech.com/blog/post/2009/09/11/difference-between-pdf-and-pdfa.html)

- Tools for converting to .PDF/A
  - VeryDOC PDF to PDF/A-1b (http://www.freedownloadscenter.com/Multimedia_and_Graphics/Misc__Graphics_Tools/PDF_to_PDF_A_1b_Converter.html)

  - Free PDF Creator (http://www.freepdfcreator.org/)

  - Document Converter (http://docupub.com/pdfconvert/)
  - Softpedia Document Converter (http://www.softpedia.com/get/Office-tools/PDF/PDF-A-Converter.shtml)

3. **Organize**
   a. Collect your files together on one computer or external hard drive so you can work from a single location.
   b. Create a directory/folder structure on your hard drive that allows you to organize your files in a way that makes sense to you. Some examples are:

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    i. Date-based: 2010/05

    ii. Subject-based: Conferences/New York City 2009

    iii. Combination: 2010/05/Conferences

c. Give your files descriptive file names

d. Software can help you to easily organize, describe, and add metadata to your files. By adding metadata such as keywords you will be able to easily search across multiple groups of files at once.

e. Write a brief description of the directory structure and the files.

EXAMPLE DIRECTORY NOTES

This is an example of a directory notes file for photographs, but the model can be applied to whatever you would like. Keeping notes about what is in each folder will allow you to more quickly find what you are looking for in the future:

\2009

    \10: New York City vacation; Karen's 12th birthday party; washing the dog

    \11: Cats doing funny things; people downtown; first snowfall

    \12: Christmas; Charlie with Santa

\2010

    \01: New Years Party; dog outside in snow

    \02: Kids playing with toys; HUGE snowfall

    \03: Dinner with grandma and grandpa; portraits of friends

    \04: First flowers blooming; ice cream with kids

IMAGE FILES:

Library of Congress *Keeping Personal Digital Photographs*:
(http://www.digitalpreservation.gov/personalarchiving/photos.html)

COMPRESSION:

One additional risk that must be taken into consideration with image files is **compression.** Each time an image is saved the information for that image is encoded using fewer bits than the original image, resulting in poorer quality images over time through generation loss.

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In the above image the number in the lower right-hand corner indicates the number of compressions the image has been subjected to. http://en.wikipedia.org/wiki/Digital_generation_loss#Digital_generation_loss

- Lossy vs. Lossless
  - Types of compression algorithms
  - Lossy compression loses information
    - Small amount over time
    - Every time file is saved
    - JPEG
  - Lossless compression loses nothing
    - TIFF
    - RAW

1. **Identify** where you have digital photos
   a. You might have digital photographs on cameras, various computers, memory cards, USB sticks, and on the web.

2. **Decide** which photos are the most important to you
   a. Select images you feel are especially important. This can be as many as you would like.
   b. If you have duplicates, you should save the version that is the highest quality.
   c. The selection process is helpful, as it allows you to focus your efforts on the photos with the greatest meaning and importance to you, instead of every photo you ever took. In the digital environment, photos can accumulate quickly!
   d. It is helpful to "weed" as you go, rather than attempting to go back and do it later. Weeding out a few images every time you add new pictures from you camera, is much easier than attempting to sort through hundreds or thousands of images all at once.

JPG vs. TIFF

- Decide what format to save your pictures in.
  - JPEG Lossy

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- o TIFF Lossless
- o RAW Lossless

- How many programs can use/convert it?

  - JPEG
    - o Ubiquitous

  - TIFF
    - o Not all browsers/programs can open
    - o Common in photography

  - RAW
    - o Proprietary - uses software from camera manufacturer
    - o DNG is open solution

Essentially you're asking some of the same questions you asked about migration and applying the same logic: the more open a file format is to use, the less likely it is to become obsolete.

- So why use JPEG over TIFF?

  - o JPEG
    - Smaller and easier to share
    - Lossy compression can lead to loss of quality
    - Can be used as preservation master
    - Save with low compression, do not edit

  - o TIFF
    - Huge file size, hard to share
    - Lossless compression makes it an ideal preservation master

Tiff is used by most large archival institutions, but the big difference between archival institutions and individuals is that institutions tend to have access to a lot more storage space.

So let's take a look at a side by side comparison just to get an idea of how big a tiff file really is:

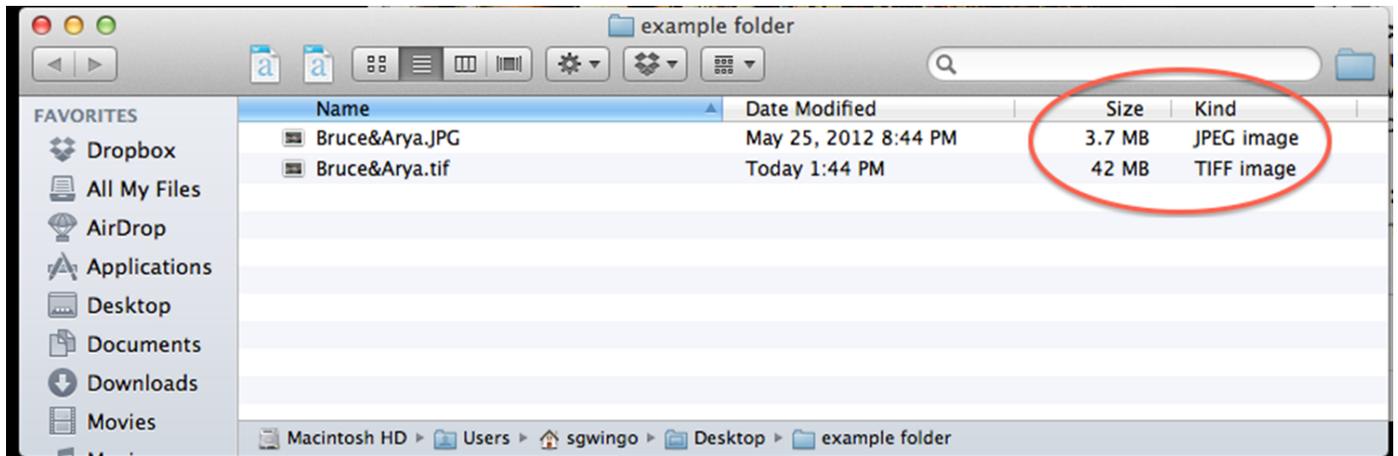**Need help?** Visit the Faculty Exploratory or Knowledge Navigation Center on the 2nd floor of the Graduate Library.

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3.7 vs. 42 Megabytes!

3. **Organize** the selected photos

   a. Collect your photos together on one computer or external hard drive so you can work from a single location.

   b. Create a directory/folder structure on your hard drive that allows you to organize your images in a way that makes sense to you. Some examples are:

      i. Date-based: 2010/05

      ii. Event-based: Vacations/New York City 2009

      iii. Combination: 2010/05/New York City Vacation

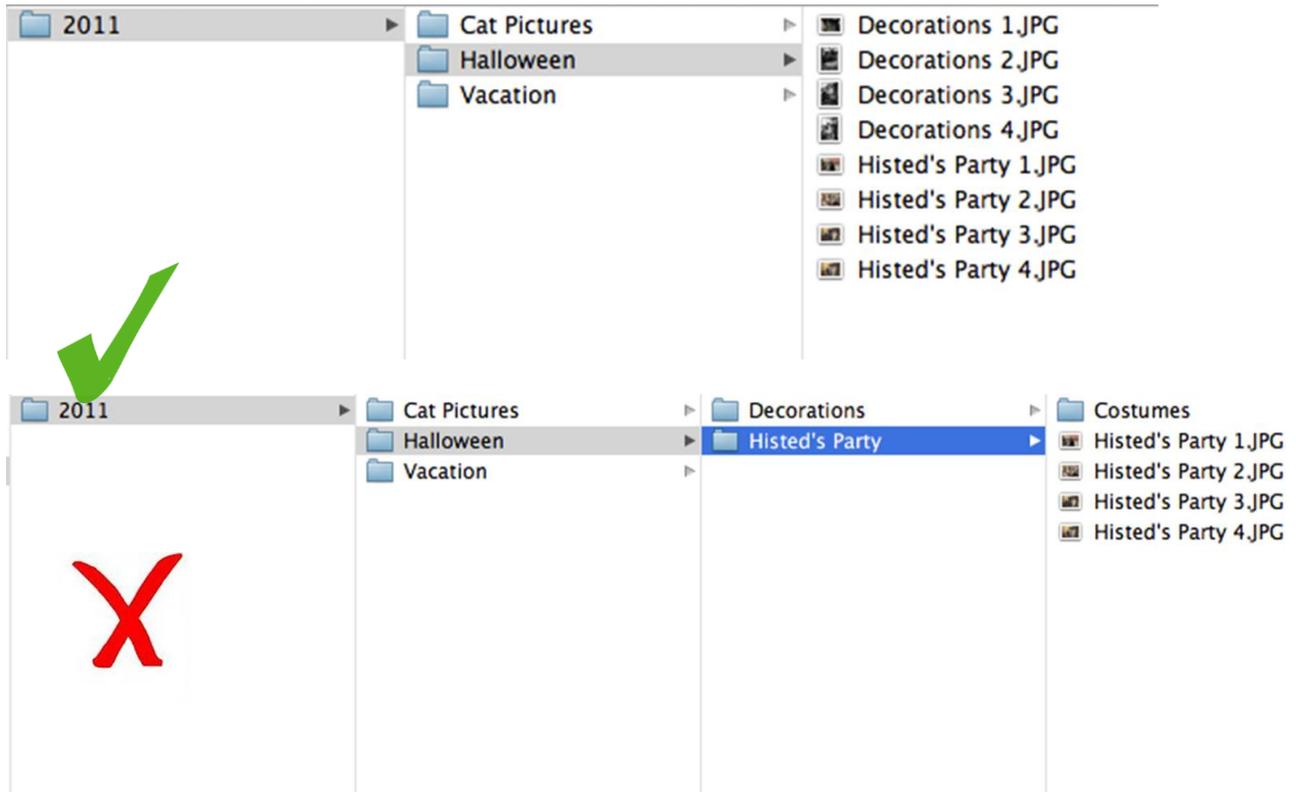**Need help?** Visit the Faculty Exploratory or Knowledge Navigation Center on the 2nd floor of the Graduate Library.

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Folder & File Organization Examples:

2011 ▶	Cat Pictures ▶	🖼 Decorations 1.JPG
	Halloween ▶	🖼 Decorations 2.JPG
	Vacation ▶	🖼 Decorations 3.JPG
		🖼 Decorations 4.JPG
		🖼 Histed's Party 1.JPG
		🖼 Histed's Party 2.JPG
		🖼 Histed's Party 3.JPG
		🖼 Histed's Party 4.JPG

✔

2011 ▶	Cat Pictures ▶	Decorations ▶	Costumes
	Halloween ▶	Histed's Party ▶	🖼 Histed's Party 1.JPG
	Vacation ▶		🖼 Histed's Party 2.JPG
			🖼 Histed's Party 3.JPG
			🖼 Histed's Party 4.JPG

✗

   c. Give your photos descriptive file names

   d. Write a brief description of the directory structure and the photos

   e. Photo editing and organizing software can allow you to easily organize, describe, and add metadata to your photos. By adding metadata such as keywords you will be able to easily search for images across multiple groups of images.

DIGITAL AUDIO

Library of Congress *Keeping Personal Digital Audio:*
(http://www.digitalpreservation.gov/personalarchiving/audio.html)

Your digital audio files might include music, lectures, and other important sound recordings. As they will have personal, professional, financial, educational, or other long-term value, you will likely wish to keep them for a long time.

Your audio files should be saved in open, non-proprietary and popular file formats, such as WAV or MP3. This will ensure the most flexibility for future use.

Also keep in mind that as with image files compression also occurs with audio and video files.

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1. **Identify** where you have digital audio files

    a. You might have digital sound recordings on audio players, various computers, memory cards, USB sticks, and so on.

    b. Be sure to include files you manage through audio software.

2. **Decide** which audio recordings have long-term value to you

    a. Select the recordings you feel are important.

    b. If you have duplicates, you should save the version that is the highest quality.

3. **Organize** the selected audio recordings

    a. Collect your audio files together on a single computer or external hard drive so you can work from a single location

    b. Create a directory/folder structure on your hard drive that allows you to organize your audio files in a way that makes sense to you. Some examples are:

        i. Date-based: 2004/03

        ii. Event-based: Interviews/John Smith 2004-03-12

        iii. Combination: 2004/03/Interview with John Smith

    c. Give your files descriptive names

    d. Write a brief description of the directory structure and the audio files

- If your files are in unpopular or older formats, you might consider encoding them in, or converting them to, more open formats such as WAV or MP3, which have a wide amount of support. Some software packages that can help you with this are:

    o Switch Audio File Converter – free version available for non-commercial use (http://www.nch.com.au/switch/index.html)

    o River Past Audio Converter - $29.95-49.95 (http://www.riverpast.com/en/prod/audioconverter/)

    o NoteBurner - $34.95 (http://noteburner.com/noteburner-audio-converter.html)

    o ImTOO Audio Encoder – $39.95 (http://www.imtoo.com/audio-converter-pro.html)

    o Audio Commander - $64.95 (http://www.mystikmedia.com/audiocommander.asp)

DIGITAL VIDEO

Library of Congress *Keeping Personal Digital Video*: (http://www.digitalpreservation.gov/personalarchiving/video.html)

Your digital video files might include home movies, vacations, lectures, interviews, or other important events. As they will have personal, professional, financial, educational, or other long-term value, you will likely wish to keep them for a long time.

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Preserving Personal Digital Files

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Digital video files offer particular problems compared to digital photos or audio files. Not only are they frequently much larger than images or audio, the encoding formats for video are far more complicated and change more quickly than images or audio. Just like audio files, video files should be saved in "open" and popular file formats. Using open or popular file formats will ensure the most flexibility for future use. In practice, however, this can be difficult, as encoding video files in open formats is not always easy if your camera or video editing software does not allow for it. In general, open formats like MPEG-2 (.mpg, .mpeg) and MPEG-4 (.mp4) are good choices for your digital video files.

For an example of compression in video files see: *1000 uploads later: Generation loss, Youtube-style,* by Sal Cangeloso (http://www.geek.com/articles/geek-cetera/1000-uploads-later-generation-loss-youtube-style-2010064/)

1. **Identify** where you have digital video files

    a. You might have digital photographs on video cameras, various computers, memory cards, USB sticks, and so on.

    b. Be sure to include videos you may have on the Web.

2. **Decide** which video recordings have long-term value to you

    a. Select the videos you feel are important.

    b. If you have duplicates, you should save the version that is the highest quality.

    c. If you edit your own videos, you might wish to save the originals, the edited versions, or both.

3. **Organize** the selected videos

    a. Collect your video files together on one computer or external hard drive so you can work from a single location

    b. Create a directory/folder structure on your hard drive that allows you to organize your videos in a way that makes sense to you. Some examples are:

        i. Date-based: 2005/10

        ii. Event-based: Vacations/Disney World 2005

        iii. Combination: 2005/10/Disney World Vacation

    c. Give your files descriptive names

    d. Write a brief description of the directory structure and the video files

- If your files are in unpopular or older formats, you might consider encoding them in, or converting them to, a more open format such as MP4 (suggested by the Library of Congress), which has a wide amount of support. Some software packages that can help you with this are:

    o AVS Video Converter - free, open source (http://www.avs4you.com/AVS-Video-Converter.aspx)

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- o Any Video Converter Pro - $30 (http://www.any-video-converter.com/products/for_video/)

- o ImTOO Video Converter - $35 (http://www.imtoo.com/video-converter.html)

- o Aimersoft Video Converter - $36 (http://www.aimersoft.com/video-converter.html)

- o Xilisoft Video Converter - $40 (http://www.xilisoft.com/video-converter.html)

PERSONAL ELECTRONIC MAIL

Library of Congress *Keeping Personal Electronic Mail:*
(http://www.digitalpreservation.gov/personalarchiving/email.html)

Just like paper letters, your email messages document events, transactions, and relationships. Saving an email involves archiving it outside of your email program or online email provider. Email platforms are not meant to keep information for a long time – they can change or stop providing support at any time!

1. **Identify** all your email sources

    a. Identify each of your personal email accounts.

    b. Within each account, locate each folder, including "archived" messages that might be separate from your inbox.

2. **Decide** which messages have long-term value

    a. Select the messages you feel are especially important.

    b. Remember to include attachments as part of your selections; attachments must be preserved separately from the message

    c. Export the selected messages

        i. Online email providers do not offer the same exporting functionality as standalone software on your personal computer. You may need to investigate downloading your online email to standalone software, such as Microsoft Outlook which will allow you to export messages.

    d. Use the "Save As" or "Export" command in your email software to export individual emails as text files. Unfortunately there are no easy options at present to batch this process.

    e. Save messages in an open format, such as plain text.

    f. Save the information about the messages, such as the "header," which includes the subject, sender, recipient, and the time and date of the message.

3. **Organize** the saved messages

    a. Give groups of messages, individual messages, and attachments meaningful names.

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b. Create a directory/folder structure on your hard drive that allows you to organize your messages in a way that makes sense to you.

c. Write a brief description of the directory structure and the message files

WEBSITES:

Library of Congress *Keeping Personal Websites, Blogs and Social Media:* (http://www.digitalpreservation.gov/personalarchiving/websites.html)

- Average lifespan of a website 44-75 days

- For those that make it beyond the first few months, 2-3 years.

Because options for archiving websites at a personal level are not very advanced, this section will attempt to offer some tips and a few options for saving personal web content.

The only real difference in the basic steps for preserving websites is that the information isn't already on your computer, so you need to export/download it. Organizing and backing up follow the same concepts as with all other files once you have exported the files to your computer.

1. **Identify** where you have your digital document files

    a. Locate your personal web presence, blogs, social media etc.

2. **Decide** what information has long term value

    a. This can be individual pieces of information such as images or blog posts, or entire websites.

    b. Export the information you have decided is important to you using:

        i. Screen Shots

        ii. **Save As….**command in your browser, to export a website as individual files.

        iii. Save as PDF

        iv. Save individual items such as images.

        v. Use service provided by the site or external site to back up your information.

If saving entire pages or sites, check into automatically exporting them as a series of linked files.

Very important for saving websites: don't forget to save metadata with the site name, URL, and the date/time saved.

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BACKUP:

THE BASICS:

- LOCKSS

    o Lots Of Copies Keep Stuff Safe

    o Make at least two copies to start, preferably three with one located "off site."

- Multiple storage mediums

    o Mitigates risk of using only one medium

    o One copy should stay on your computer or external hard drive. Put other copies on writeable DVDs, CDs, other hard drives, or store them on the Internet (there is a list of online backup solutions at the end of this handout).

- Multiple storage locations

    o Once you have them organized, make copies and store your files in different places

- Check and refresh media

    o Check all files once a year:

    o Make new copies every five years

Sometimes, for a few text files or photos that you want to keep for decades or more, the most secure way is to print out copies of the file and preserve the hard copy. However, printing out hard copies means that those files lose their functionality and images can be distorted slightly by imperfections common in most printers. Moreover, digital prints often have their own preservation problems, such as color shift or sensitivity to water or light damage. Ultimately the best way to preserve your digital files is digitally, but it is good to be aware of all of your options.

DIGITAL STORAGE CHOICES

- Hard drives (internal or external)

    o Easy error checking and backup

    o Lifespan of five years, ten being the absolute limit, but easier to retrieve information from than CDs or DVDs

    o Easy to accidently delete files

- Optical disks (CD, DVD)

    o Portable and hard to overwrite

    o Lifespan of five years, ten being the absolute limit (even in so called "archival" CDs and DVDs)

    o Multiple failure points

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- Online solutions (syncing, sharing, THE CLOUD)

  o Very convenient and offsite

  o Can be expensive

  o Lack of control

  o Possible security issues

- Analog (print out physical copies)

  o Allows for stable storage

  o Not practical on a large scale.

  o Removes functionality

  o Printers may not produce high enough quality copy (especially for images)

THE CLOUD

Cloud computing is when users entrust a third party service with their data over a network

Many people are made nervous by the cloud and it is important to remember that you lack a certain amount of control over information which you choose to store in the cloud. It is recommended that if you choose to use cloud storage it not be your only backup. Instead cloud services are best utilized as secondary backup systems.

WHAT TO LOOK FOR WHEN EVALUATING A CLOUD SERVICE

- Security

  o Find out how the services measures security for your files, its data center and its servers.

  o Find out how they handle potential security breaches.

  o Look for features like double encryption, password protection, and real time backups.

- Service

  o Look into their customer service, what kinds of services do they provide? How quickly do they respond to emails if you are having a problem? Etc.

  o Should provide solutions for all operating systems windows, mac, mobile etc.

  o You shouldn't pay for more space than you need.

  o Look for custom features like different levels of access, sharing, etc.

- Innovation

  o Make sure they are up to date on the latest technologies and that they continue to update their services as technologies change.

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- Reliability
  - If you are able, ask someone you know about their experience with the service. Do the servers ever go down? Is there ever an issue retrieving data? Does data ever get lost?

- Reputation
  - Look at the company's reputation within the industry and with users.

- Also see
  - *The Best Cloud Sync Storage Services*, by Suzanne Kantra (http://www.techlicious.com/guide/best-cloud-sync-storage-services/)
  - *How to Evaluate Cloud Computing Providers*, by Jason Baker (http://www.datacenterknowledge.com/archives/2010/06/01/how-to-evaluate-cloud-computing-providers/)
  - Five Criteria to Use in Evaluating Cloud Storage Service Providers (http://bestsprout.com/five-criteria-to-use-in-evaluating-cloud-storage-service-providers/#)
  - 5 Hallmarks of the Best Cloud Storage, Best Cloud Storage Site (http://bestcloudstoragesite.com/5-hallmarks-of-the-best-cloud-storage/)

ONLINE "CLOUD" BACKUP SOLUTIONS

(Reminder: Do your research before you choose or use an online backup solution!)

- University of Michigan supported services.
  - Department or School server.
    - Check with your department or school IT staff for locally-supported server space and conditions of use.
  - IFS (http://mfile.umich.edu)
    - 10GB per user. For information see (http://www.itd.umich.edu/help/faq/ifs.php)
  - Google Docs for University of Michigan (http://google.umich.edu)
    - 5GB for files not in Google formats
  - BOX (http://nextgen.umich.edu/storage/faq/.php)
    - 50GB (5GB per file upload max)
  - ITS storage (http://www.itcs.umich.edu/storage/)
    - Large file storage available at a charge to departments or researchers

- Commercial

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- o Carbonite (http://www.carbonite.com/en/)
  - Unlimited backup capacity, $59/year
- o Dropbox Pro (http://dropbox.com/)
  - Various storage and pricing plans.
- o IBackup (http://www.ibackup.com/)
  - Various storage and pricing plans
- o iDrive Pro (http://www.idrive.com/)
  - Various storage and pricing plans
- o Mozy (http://mozy.com/)
  - Unlimited capacity, $5.99/month
- o MyOtherDrive Pro (http://www.myotherdrive.com/)
  - 100GB: $5/month
  - 500GB: $240/year
- Free
  - o ADrive (http://www.adrive.com/)
    - 50GB of free storage
  - o Box (https://www.box.net/home)
    - 5GB of free storage
  - o DriveHQ (http://www.drivehq.com/)
    - 1GB of free storage, free access to file management system
  - o Dropbox Basic (http://www.dropbox.com)
    - 2GB of free storage, up to 100gb for paying customers
  - o iDrive Basic (http://www.idrive.com/)
    - 5GB of free storage
  - o MyOtherDrive (http://www.myotherdrive.com/)
    - 2GB of free storage

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STRATEGY

- Set up a backup strategy
  - Automatic
    - Time Machine: Mac (http://support.apple.com/kb/HT1427)
    - SyncBack: PC (http://www.2brightsparks.com/downloads.html)
    - Automated cloud backup service.
      - Many cloud services offer automated backup with paid subscriptions.
  - Manual
    - Backup to external hard drive or other backup device on a set schedule. Weekly, monthly, or seasonally. Do one large backup yearly.
    - Set reminders in your email calendar, to help you remember when to backup.

Because hardware such as external hard drives will degrade over time you should also check your backed up files every 3-5 years, and where possible transfer it to new hardware. You don't need to check each file you have saved; for quality control simply pick a sampling to check. This would also be a good time to identify any files which may be at risk of obsolescence and in need of migration.

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