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# THE THREE ESSENTIALS OF DIGITAL PRESERVATION PART 1: FILE STORAGE

This document provides an introduction to three essential concepts in digital preservation: **File Storage**, **File Integrity**, and **File Access**, with a detailed focus on file storage. The “Three Essentials of Digital Preservation Pyramid” below identifies and describes the most important pieces of digital preservation for smaller institutions. Establishing a basic understanding of your institution’s digital preservation file storage needs will help to identify what your institution already has in place, and areas where preservation plans and policies need to be expanded.

This document begins with an **Introduction to the Three Essentials of Digital Preservation Pyramid**, providing a brief introduction to the concepts. After that, File Storage is divided into an **Introduction to File Storage** section, **Important Terms Related to File Storage** section, and section of **Questions to Ask Your Institution About File Storage**. Important related terms are in bold in each Introduction section.

For more information about digital preservation concepts, tools, and policies, view related items connected to this resource on the Sustainable Heritage Network in the [“Digital Preservation”](#) category.

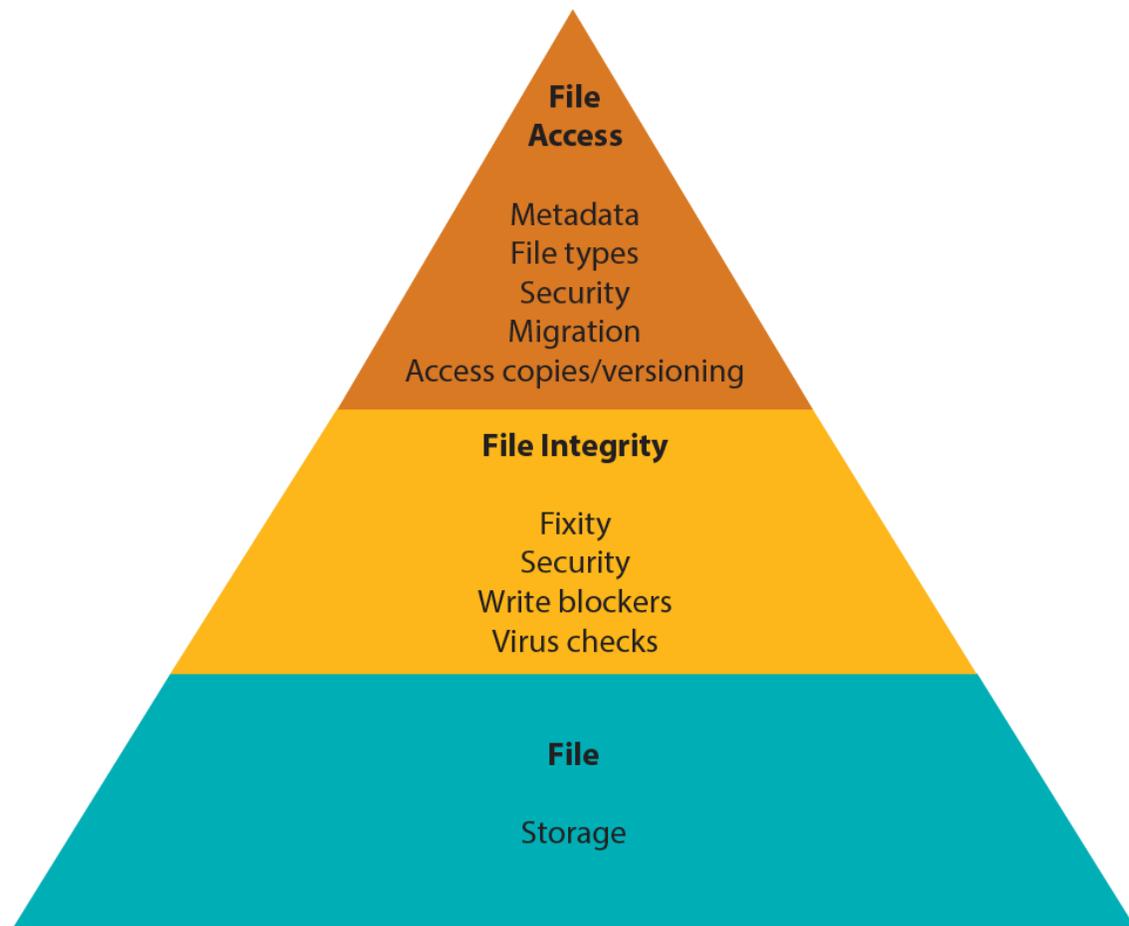
- The Three Essentials of Digital Preservation Part 2: File Integrity
- The Three Essentials of Digital Preservation Part 3: File Access
- Levels of Digital Preservation Preparedness
- Activities to Include in a Digital Preservation Plan
- Digital Preservation Glossary
- Developing a Digital Preservation Policy

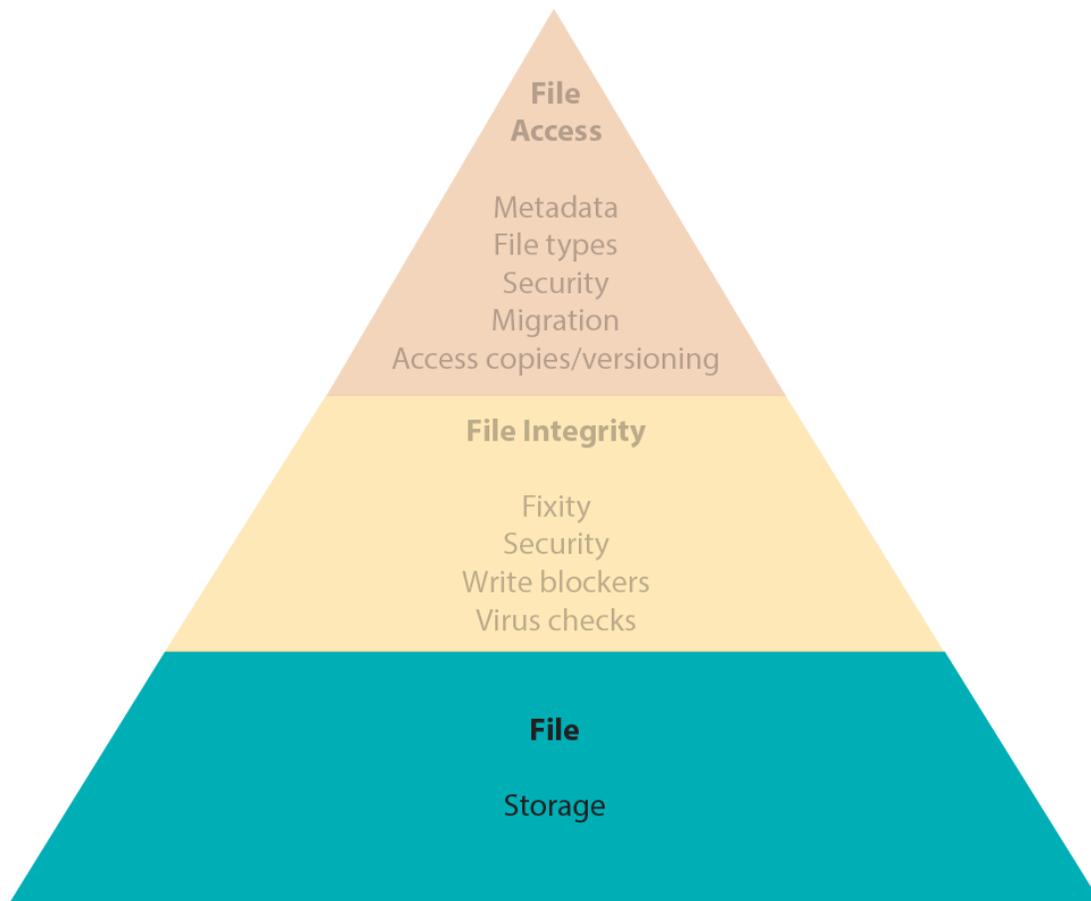
# INTRODUCTION TO THE THREE ESSENTIALS OF DIGITAL PRESERVATION PYRAMID

**File Storage:** *Ensuring that digital content chosen for long term preservation is stored safely and securely.* File storage addresses physical storage systems, location of storage, and use of multiple physical storage locations to prevent or minimize data loss due to storage device failure or natural disaster.

**File Integrity:** *Ensuring the stability of digital content over time.* File integrity addresses stability of data, concerns about data corruption and alteration, as well as prevention, detection, and recovery of changed data.

**File Access:** *Organizing and describing digital files so that all staff (now and in the future) will be able to find, access, understand, and use digital content.* File access addresses security of data, documentation of data, file formats, data structures and naming conventions.





## INTRODUCTION TO FILE STORAGE

Digital preservation is a combination of policies, strategies, and activities that ensure access to digital content over time. Digital preservation involves many layers of planning, technology, and day-to-day management. File storage is the base of the Three Essentials of Digital Preservation Pyramid and is generally the first step of digital preservation planning. Plan for storage of digital files before adding in other steps of digital file management.

When planning for file storage, ensure that all digital content chosen for long term preservation is stored safely and securely. A storage plan will need to include **storage media** for all digital content that is already stored, and for digital files created in the future. Digital preservation requires multiple backups of files, with a plan for **migration** when storage media fails. Develop workflows for backing up content consistently, using the **3-2-1 Rule** of saving **three copies** of digital files, on at least **two types of storage media**, in at least **one different disaster risk zone**. Many types of storage media are

available, including physical storage media like a hard drive or server, or **hosted** or **cloud storage** through a third party.

File storage for long term digital preservation is different from regular day-to-day office files. Careful selection of what digital files are accepted, digitized, and preserved is important to making sure your preservation plan is sustainable. Decide and document what types of **born-digital** content your institution will accept as donations in a collections development policy. Decide and document what quality **preservation master files** are in a digitization policy. For more information on writing policies, see the resource Strategic Digitization Goals Part 3: Digitization Policy Worksheet on the SHN.

File storage is incredibly important. Without careful planning and backups, files can be easily lost during emergencies like natural disasters, through storage media failure, or through human error. Storage planning may involve work with other departments such as, Information Technology, Administration, or others to define and meet your storage needs and goals. Ensure that your file storage plan fits in with what is already set up in your institution. Some institutions have storage space on multiple servers, or have a system of multiple backups for existing office computer storage, or may have staff with the knowledge to help. If there is nothing set up or available already, develop a plan for storage with support from other departments.

## IMPORTANT TERMS RELATED TO FILE STORAGE

**Storage Media:** Media on which digital files are stored. Some examples are internal or external hard drives, RAID hard drive array, Network Attached Server, LTO Tape, or hosted storage (also called “cloud storage”). When planning for long term storage, choose storage media that least prone to failure and data loss, manageable by your staff, and within budget. An example of *temporary* storage media that can easily fail is a flash drive.

**Hosted Storage or Cloud Storage:** A service where data is remotely maintained, managed, and backed up. The service is available to users over a network, usually the Internet. Hosted storage is a popular option for *one part* of an overall digital preservation plan, but requires careful thought and negotiation in order to ensure access to files when you need them and that the storage meets cultural or institutional needs.

**Migrating Storage Media:** Replacing storage media and transferring files to the new media. No storage media will last forever, so it is important to plan for storage media failure by replacing media according to manufacturer recommendations. Plan for

advances in technology and be ready to purchase new types of storage media if current storage becomes outdated.

**3-2-1 Rule:** Saving 3 copies of your digital files, on at least 2 types of storage media, in at least 1 different disaster risk zone.

**Preservation Master Files:** High quality files that are preserved for the long term. Not all files will be chosen for long term storage. Preservation masters are often used to make other copies including reproduction and distribution copies.

**Born Digital Files:** Files that come into your institution already in a digital format. Examples of born digital files might be emails that need to be preserved, a donation of digital files on a hard drive from a community member, oral history files created on a digital recorder, and other examples.

## QUESTIONS TO ASK YOUR INSTITUTION ABOUT FILE STORAGE

- What types of storage media are currently used in your institution?
- Are your digital files saved on more than one type of storage media?
  - Does your institution follow the 3-2-1 rule (3 copies of digital content, on at least 2 types of storage media, in at least 1 different disaster risk zone)?
- What funding is available to purchase storage media?
- Are you creating digital files that are the highest quality you are able to capture and save?
  - Define the balance between quality of files and size of files, that will need to be stored and managed.
  - Consider if files you are creating will be high enough quality to save long term, or if they will need to be digitized again in the future.
- Do you currently have enough space to save your files chosen for long term preservation? What about future digital files you may create or accept in the future?
- How often are storage media devices migrated?
- What risks are present in your geographic region?
  - Some examples might include: Power outages, earthquakes, tornadoes, hurricanes, flooding. Determine what might threaten storage media stored locally.

## CONCLUSION

Digital preservation is a unique challenge for every institution. The three concepts within the Three Essentials of Digital Preservation Pyramid: **File Storage**, **File Integrity**, and **File Access** provide a framework and ideas for creating a structured system of digital preservation. This document provides file storage background, important terminology, and questions to help with the first planning steps. Decide the best path forward for digital preservation based on resources available, including staff time, funding, and technology support. Consider the questions in this document, bring others into the conversation, start creating digital preservation policies and other documentation, and continue learning about digital preservation through resources on the Sustainable Heritage Network.