

# **A Brief Overview and Report on the Library of Congress BagIt Tool and its OAIS Functionalities**

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## **Introduction**

The Library of Congress BagIt Tool is an open-source software designed to facilitate the transfer, management, and preservation of digital content. The tool follows the “BagIt” specification, which is a standardized format for packaging digital content for transfer and long-term preservation. The primary goal of the tool is to ensure that digital objects, regardless of type or size, can be reliably stored and later verified for integrity. This tool is particularly useful in contexts such as archival repositories, libraries, and other information and preservation-forward institutions; typically where the management and long-term access to digital resources are critical. This report delves into the functionalities of the BagIt Tool, its usage for managing digital resources, and how it aligns with the Open Archival Information System (OAIS) reference model.

## **What is the BagIt Tool?**

The BagIt Tool is designed to create "bags" that package files and metadata in a way that protects their integrity, authenticity, and retrievability. A "bag" of a digital object contains the following: (1) Data Files, (2) Metadata, (3) Checksums, and (4) a Manifest. These four categories bring a unique context and tag to the digital object that allows it to be searchable and established in our digital spaces. The data files are the digital objects themselves that are being transferred or preserved into a database or repository. The metadata will be a variety of descriptive tags that help identify the object and manage its content. This not only helps create a unique ability to find this digital item based on related search terms but can also link one object to another object or topic. Checksums are the fingerprints of digital objects, utilizing a unique set of alphanumerical chains that help identify the original content and guarantee that the file has not been altered or corrupted. Lastly, the manifest is a complete list of the digital object; it contains everything that would have been “bagged” by the software, ensuring consistency and completeness of the transfer, digitization, or preservation of a digital object. The BagIt Tool supports the creation, verification, and validation of these "bags," ensuring the preservation and integrity of the digital objects packaged inside them.

## **BagIt Tool’s Role in Managing Digital Resources and Objects**

The BagIt Tool is most commonly used in digital preservation systems to ensure that digital resources can be safely and efficiently transferred, stored, and accessed over time by the system’s patrons. It plays a central role in ensuring the reliability of long-term archiving systems and data storage, including institutional repositories and digital archives. Within its multiple

roles and abilities, the BagIt tool has incredible abilities and functions within digital resource management. Some of these functions will include: (1) Packaging Digital Resources, (2) Data Integrity and Verification, (3) Ensuring Source, (4) Interoperability, and (5) Long-Term Storage. Packaging digital resources takes the system back through the four-step process mentioned earlier; its main purpose in managing digital resources is creating “bags” of digital objects that can be stored, searched, accessed, and transferred long-term. Data integrity and verification extend past the creation of the “bags,” as it is an available resource to safeguard the original file against any damage or alteration to the object or its information as it is being used or stored within the repository.

Relatedly, to ensure the integrity of the digital object, BagIt is also capable of ensuring an object’s source, describing its origin and history, which plays its part in its authentication and accurate historical context. Interoperability is arguably one of the most important functions of BagIt within its respective areas of online digital resource management as it operates to not only prepare and store the object within its system but also creates it in a multi-systemic and standardized fashion that will the object to be shared, moved, and accessed through multiple platforms and institutions. Cross-platform readability and preservation are incredibly important with the quick evolution of our needs and uses of curated digital spaces and systems. Lastly, BagIt can capture its multifaceted system and facilitate it into long-term storage of its objects. This allows for comprehensive policy and uniformity of large collections of data and digital objects over long periods of time.

### **OAIS Functionalities Supported by the BagIt Tool**

The Open Archival Information System (OAIS) reference model provides a framework for the design and management of digital archives, highlighting the need to preserve the authenticity, integrity, and accessibility of digital resources over time. The BagIt Tool directly and indirectly supports several key OAIS functionalities, ensuring that digital resources are maintained in a trustworthy, accessible, and verifiable manner. These key interoperable functions of BagIt and OAIS are: (1) Ingest, (2) Archival Storage, (3) Data Management, (4) Preservation Planning, (5) Access, and (6) Administration.

The Ingest function involves the actual attainment and package creation of digital objects for addition in an archival repository or database. The BagIt Tool plays a vital support role by allowing digital resources to be packaged with associated metadata, checksums, and manifest files. The BagIt Tool primarily supports the OAIS Ingest function by ensuring digital resources are accurately described and validated, allowing the package to be transferred between systems

or organizations without data loss or corruption, and by facilitating the capture of descriptive, technical, and administrative metadata. This previously explained process ensures that all relevant information is collected and validated before entering the archive, ultimately verifying and safeguarding uploaded materials. It is the foundation of a successful archival process. Additionally, the BagIt tool indirectly supports the Archival Storage function in OAIS and is responsible for maintaining the digital objects over time. This function is reinforced by BagIt by providing a standardized format for packaging data that ensures the veracity of the files and makes it easier to organize and store the resources. The ability to create self-regulated "bags" simplifies the process of preserving digital assets and makes them easier to manage, retrieve, and search for over the long term.

Under Data Management, OAIS highlights the need for continued observation of stored resources to ensure their accessibility and usability within their current repository and standard practices. The function is secondarily aided by allowing the creation of bags that include checksums to verify that files remain unaltered over time. Additionally, metadata encapsulated within the bags allows for improved data tracking, facilitating better management of digital resources. Similarly, the Preservation Planning function assures that the resources remain usable and accessible over time and platform, despite changes in technical operations, standards, or resource destruction. By using the BagIt Tool, institutions can build reliable preservation plans that include the evolution of BagIt-compliant packages that will remain compatible with OAIS systems. This aligns with OAIS requirements for managing the lifecycle of digital resources and the assurance of their long-term sustainability.

OAIS addresses maintaining access and administration to preserved digital resources. While the BagIt Tool itself does not directly enable user access to the content, it indirectly aids resources that are preserved with the necessary elements for maintaining future use and governance. When properly used, BagIt provides a reliable source of tools and procedures to ensure that the objects are accessible and certifiable over time, which in turn supports the Access functionality. The Administration function within OAIS is more dedicated to managing the processes and policies that govern the preservation and maintenance of the digital objects. The BagIt Tool adds to this function by delivering a standardization and user-friendly tool for managing and transferring digital objects. Its role in warranting data integrity and origin, and curating metadata profiles supports the overarching administrative policies of an archive.

## **Conclusion**

The BagIt Tool from the Library of Congress is an incredibly valuable resource for managing and processing digital content, ensuring the integrity, authenticity, and long-term accessibility of digital resources for many institutions. By creating a universal system that can support many OAIS functionalities, while maintaining its own practices and storage, the BagIt Tool plays a vital role in modern digital preservation workflows. The tool's use of multi-platform recognized formats and its open-source nature also make it highly adaptable for a wide range of use cases in digital archiving and resource management. Institutions seeking to manage large-scale digital collections can rely on the BagIt Tool to streamline the process and ensure their digital resources are reliably packaged, transferred, and preserved in a monitored digital space. Advancements and evolution in our preservation and digital curation fields will facilitate future access and compliance with preservation standards.

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