

## Defining OAIS requirements by Deconstructing the OAIS Reference Model

*Date last revised:* August 28, 2005

This table includes text extracted directly from the OAIS reference model (Blue Book, 2002 version) that suggests requirements. It is the result of an exercise conducted by the OAIS working group at Cornell University Library. Four members of the working group with a mix of organizational and technological expertise pertaining to digital preservation viewed the OAIS document and extracted text they found. The list was then processed to note the number of reviewers (between 1 and 4) that selected the text and remove duplicates.

### *Column definitions and purpose:*

*Number of reviewers* indicates the number of team members (up to 4) that selected the text in that entry, a plus sign indicates that other reviewers may have selected a subset of the text. The number might add weight to selecting the text. The largest chunk of meaningful text selected by the group was retained. If less text was selected by some viewers, a plus sign (+) appears after the number of reviewers.

*Section number* identifies the section in which the text occurred in the in the CCSDS 650.0-B-1 version of the OAIS reference model document.

*Sequence* identifies the order in which the selected text appears in that section of the document to allow sequential ordering of the entries.

*Page number* identifies the page number in the CCSDS 650.0-B-1 version of the OAIS reference model document on which the text occurs.

These three identifiers allow the selected text to be sorted in the exact order in which they occur in the OAIS document and to enable users of the document to return to that point in the OAIS document to review the context of the selected text.

*Meaningful text* is the text selected from the OAIS document by one or more members of the review team. Some entries contain square brackets [ ] around portions of the text to either clarify the portions that were selected or identify portions of the text that might be optional such as examples from the reference model document.

*Conditional* indicates if the requirement suggested by the selected text would be true all the time or only if certain conditions were true, e.g., if the OAIS implementation will engage in emulation as a preservation strategy. Y indicates the selected text suggests a conditional requirement, N indicates the selected text suggests a requirement that should be true for all OAIS. For the most part, the conditional column was added to allow for section 5 on preservation strategies, but there are other conditional entries.

*Level: High, medium, and low* indicates the nature of the suggested requirement: high-level indicates general and often abstract requirements that can be generally understood and require little familiarity with the OAIS document, medium indicates a more specific requirement that requires some familiarity with OAIS and provides some suggestion of implementation actions, and low level is the most specific and detailed. The intent of this column is to allow the table to be sorted to bring together all potential requirements related to a function, information package, or role. In practice, this column turned out to be very subjective and possibly not as useful as hoped. There are far fewer low level requirements than hoped at the start of the process.

*General* indicates potential requirements that pertain to the OAIS implementation overall or that cannot be linked specifically to a function, information package, or role.

The *Function* columns (*Common Services, Ingest, Archival Storage, Data Management, Administration, Preservation Planning, Access*) relate the selected text to one or more OAIS function.

The *IP* (or Information Package) columns relate the text to one or more type of information package (*SIP* - submission, *AIP* - archival, *DIP* - dissemination).

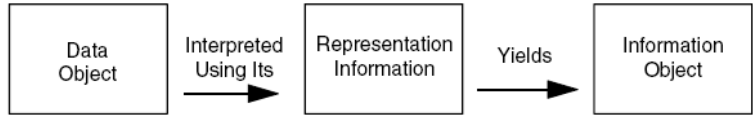
The *Role* columns (*Producer, Management, Consumer*) relate the selected text to one or more OAIS roles. References to *Designated Community* are identified as a role in the table.

Note: Management is a role external to the Archive that provides budgets and policies and receives reports. Archive is not specified as a role, but implicitly the bulk of the OAIS document defines the Archive role.

The Functions, IP, and Roles columns allow the table to be used to identify requirements pertaining to a specific function, type of information package, or role.

Number. of reviewers	Section #	Sequence	Page #	Meaningful text	Conditional: Yes / No	Level: High, Med, Low	General OAIS	Common services – F	Ingest - F	Archival Storage - F	Data Management - F	Administration - F	Preservation Planning - F	Access - F	IP - General	SIP - IP	AIP - IP	DIP - IP	Producer - Role	Management - Role	Consumer - Role	Designated Comm.
1	1.1	1	1-1	An OAIS is an archive, consisting of an organization of people and systems, that has accepted the responsibility to preserve information and make it available for a Designated Community.	N	H	X					X								X		X
1	1.1	2	1-1	It meets a set of such responsibilities as defined in this document, and this allows an OAIS archive to be distinguished from other uses of the term ‘archive’.	N	H	X															
2	1.1	3	1-1	The term ‘Open’ in OAIS is used to imply that this Recommendation, as well as future related Recommendations and standards, are developed in open forums, and it does not imply that access to the archive is unrestricted.	N	H	X							X								
1	1.1	4	1-1	The information being maintained has been deemed to need Long Term Preservation, even if the OAIS itself is not permanent. Long Term is long enough to be concerned with the impacts of changing technologies, including support for new media and data formats, or with a changing user community. Long Term may extend indefinitely.	N	H	X						X									
1	1.1	5	1-2	The reference model addresses a full range of archival information preservation functions including ingest, archival storage, data management, access, and dissemination.	N	H	X		X	X	X			X								
1	1.1	6	1-2	It also addresses the migration of digital information to new media and forms, the data models used to represent the information, the role of software in information preservation, and the exchange of digital information among archives.	N	H	X															
1	1.1	7	1-2	It identifies both internal and external interfaces to the archive functions, and it identifies a number of high-level services at these interfaces.	N	H	X															
1	1.1	8	1-2	It defines a minimal set of responsibilities for an archive to be called an OAIS	N	H	X															
2+	1.2	1	1-1	This reference model does not specify a design or an implementation. Actual implementations may group or break out functionality differently.	N	H	X															
2	1.4	1	1-3	A conforming OAIS archive implementation shall support the model of information described in 2.2.	N	H	X															

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2	1.4	2	1-3	A conforming OAIS archive shall fulfill the responsibilities listed in 3.1. Subsection 3.2 provides examples of the mechanisms that may be used to discharge the responsibilities identified in 3.1. These mechanisms are not required for conformance.	N	H	X															
1	1.4	3	1-3	This document does not assume or endorse any specific computing platform, system environment, system design paradigm, system development methodology, database management system, database design paradigm, data definition language, command language, system interface, user interface, technology, or media required for implementation.	N	H	X															
2	1.4	4	1-3	A conformant OAIS archive may provide additional services to users that are beyond those required of an OAIS.	N	H	X															
1	2	1	2-1	The explosion of computer processing power and digital media has resulted in many systems where the Producer role and the archive role are the responsibility of the same entity. These systems, which are sometimes known as Active Archives, should subscribe to the goals of Long Term Preservation discussed in this document. The design process must realize that some of the Long Term Preservation activities may conflict with the goals of rapid production and dissemination of products to Consumers. The designers and architects of such systems should document the solutions that have been reached.	N	H	X															
1	2	2	2-2	An OAIS archive is one that intends to preserve information for access and use by a Designated Community, and it meets the requirements given in section 3.	N	H	X															X
1	2.1	1	2-2	Producer is the role played by those persons, or client systems, which provide the information to be preserved.	N	H													X			
1	2.1	2	2-2	Management is the role played by those who set overall OAIS policy as one component in a broader policy domain. In other words, Management control of the OAIS is only one of Management’s responsibilities. Management is not involved in day-to-day archive operations.	N	H														X		

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1	2.1	3	2-2	Consumer is the role played by those persons, or client systems, that interact with OAIS services to find and acquire preserved information of interest. A special class of Consumers is the Designated Community. The Designated Community is the set of Consumers who should be able to understand the preserved information.	N	H															X	X		
1	2.1	4	2-3	Such archives may establish particular agreements among themselves consistent with Management and OAIS needs. Other archives may interact with a particular archive for a variety of reasons and with varying degrees of formalism for any pre-arranged agreements. One OAIS may take the role of Producer to another OAIS; an example is when the responsibility for preserving a type of information is to be moved to this other archive. One OAIS may take the role of Consumer to another OAIS; an example is when the first OAIS decides to rely on the other OAIS for a type of information it seldom needs and chooses not to preserve locally. Such reliance should have some formal basis that includes the requirement for communication between the archives of any policy changes that might affect this reliance. The range of possible interactions between OAIS archives is discussed in section 6, Archive Interoperability.	Y	H	X												X		X			
1	2.2.1	1	2-3	A clear definition of information is central to the ability of an OAIS to preserve it...Information is defined as any type of knowledge that can be exchanged, and this information is always expressed (i.e., represented) by some type of data.	N	H	X								X									
1	2.2.1	2	2-4	<p>...it can be said that Data interpreted using its Representation Information yields Information., and this is shown schematically in figure 2-2.</p>  <pre> graph LR     A[Data Object] -- "Interpreted Using Its" --&gt; B[Representation Information]     B -- "Yields" --&gt; C[Information Object] </pre>	N	H	X									X								
3	2.2.1	3	2-4	In order for this Information Object to be successfully preserved, it is critical for an OAIS to clearly identify and understand the Data Object and its associated Representation Information. For digital information, this means the OAIS must clearly identify the bits and the Representation Information that applies to those bits.	N	M	X								X									

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3+	2.2.1	4	2-4	Since a key purpose of an OAIS is to preserve information for a Designated Community, the OAIS must understand the Knowledge Base of its Designated Community to understand the minimum Representation Information that must be maintained. The OAIS should then make a decision between maintaining the minimum Representation Information needed for its Designated Community, or maintaining a larger amount of Representation Information that may allow understanding by a larger Consumer community with a less specialized Knowledge Base. Over time, evolution of the Designated Community's Knowledge Base may require updates to the Representation Information to ensure continued understanding.	N	M									X							X	X
1	2.2.1	5	2-5	...the OAIS reference model does not focus on these emerging techniques[for preserving look and feel], it should provide architectural basis for the prototyping and comparison of these techniques.	Y	H							X										
1	2.2.2	1	2-5	...they [information packages] all have associated Representation Information, although this is usually not shown explicitly.	N	M									X								
1	2.2.2	2	2-5	Every submission of information to an OAIS by a Producer, and every dissemination of information to a Consumer, occurs as one or more discrete transmissions.	N	M			X					X		X		X	X		X		
3	2.2.2	3	2-5	An Information Package is a conceptual container of two types of information called Content Information and Preservation Description Information (PDI). The Content Information and PDI are viewed as being encapsulated and identifiable by the Packaging Information. The resulting package is viewed as being discoverable by virtue of the Descriptive Information.	N	M									X								
1	2.2.2	4	2-5	The Content Information is that information which is the original target of preservation. It consists of the Content Data Object (Physical Object or Digital Object, i.e., bits) and its associated Representation Information needed to make the Content Data Object understandable to the Designated Community.	N	M									X								X

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2+	2.2.2	5	2-6	The Preservation Description Information applies to the Content Information and is needed to preserve the Content Information, to ensure it is clearly identified, and to understand the environment in which the Content Information was created. The Preservation Description Information is divided into four types of preserving information called Provenance, Context, Reference, and Fixity.	N	M										X	X					
1	2.2.2	6	2-6	Provenance describes the source of the Content Information, who has had custody of it since its origination, and its history (including processing history).	N	M									X							
1	2.2.2	7	2-6	Context describes how the Content Information relates to other information outside the Information Package. For example, it would describe why the Content Information was produced, and it may include a description of how it relates to another Content Information object that is available.	N	M									X							
1	2.2.2	8	2-6	Reference provides one or more identifiers, or systems of identifiers, by which the Content Information may be uniquely identified. Examples include an ISBN number for a book, or a set of attributes that distinguish one instance of Content Information from another.	N	M									X							
1	2.2.2	9	2-6	Fixity provides a wrapper, or protective shield, that protects the Content Information from undocumented alteration. For example, it may involve a check sum over the Content Information of a digital Information Package.	N	M									X							
2	2.2.2	10	2-6	The Packaging Information is that information which, either actually or logically, binds, identifies and relates the Content Information and PDI.	N	M									X							
1	2.2.2	11	2-6	The Descriptive Information is that information which is used to discover which package has the Content Information of interest.	N	M									X							
2	2.2.3	1	2-7	The Submission Information Package (SIP) is that package that is sent to an OAIS by a Producer...Most SIPs will have some Content Information and some PDI, but it may require several SIPs to provide a complete set of Content Information and associated PDI to form an AIP. A single SIP may contain information that is to be included in several AIPs. The Packaging Information will always be present in some form.	N	M			X							X	X		X			

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2	2.2.3	2	2-7	Within the OAIS one or more SIPs are transformed into one or more Archival Information Packages (AIP) for preservation. The AIP has a complete set of PDI for the associated Content Information... The Packaging Information of the AIP will conform to OAIS internal standards, and it may vary as it is managed by the OAIS.	N	M			X	X						X	X					
2	2.2.3	3	2-7	In response to a request, the OAIS provides all or a part of an AIP to a Consumer in the form of a Dissemination Information Package (DIP)... The Packaging Information will necessarily be present in some form so that the Consumer can clearly distinguish the information that was requested.	N	M								X			X	X			X	
2	2.3.1	1	2-8	Management provides the OAIS with its charter and scope. The charter may be developed by the archive, but it is important that Management formally endorse archive activities.	N	M	X													X		
2	2.3.1	2	2-8	Effective Management should also provide support for the OAIS by establishing procedures that assure OAIS utilization within its sphere of influence.	N	M	X													X		
2	2.3.2	1	2-9	The Producer establishes a Submission Agreement with the OAIS, which identifies the SIPs to be submitted and may span any length of time for this submission.	N	M			X			X			X				X			
1	2.3.2	2	2-9	Within the Submission Agreement, one or more Data Submission Sessions are specified.	N	M			X			X				X			X			
2	2.3.2	3	2-9	A Data Submission Session will contain one or more SIPs and may be a delivered set of media or a single telecommunications session.	N	M			X			X				X			X			
2	2.3.2	4	2-9	The Data Submission Session content is based on a data model negotiated between the OAIS and the Producer in the Submission Agreement. This data model identifies the logical components of the SIP (e.g., the Content Information, PDI, Packaging Information, and Descriptive Information) that are to be provided and how (and whether) they are represented in each Data Submission Session.	N	M			X			X				X			X			
1	2.3.2	5	2-9	All data deliveries within a Submission Agreement are recognized as belonging to that Submission Agreement and will generally have a consistent data model, which is specified in the Submission Agreement.	N	M			X			X				X			X			

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1	2.3.2	6	2-9	Each SIP in a Data Submission Session is expected to meet minimum OAIS requirements for completeness.	N	M			X		X					X			X			
2	2.3.2	7	2-9	A Submission Agreement also includes, or references, the procedures and protocols by which an OAIS will either verify the arrival and completeness of a Data Submission Session with the Producer or question the Producer on the contents of the Data Submission Session.	N	M			X			X				X			X			
3	2.3.3	1	2-10	The Consumer establishes an Order Agreement with the OAIS for information. This information may currently exist in the archive or be expected to be ingested in the future. The Order Agreement may span any length of time, and under it one or more Data Dissemination Sessions may take place.	N	M					X	X		X			X				X	
1	2.3.3	2	2-10	A Data Dissemination Session may involve the transfer of a set of media or a single telecommunications session.	Y	M								X				X			X	
2	2.3.3	3	2-10	The Order Agreement identifies one or more AIPs of interest, how those AIPs are to be transformed and mapped into Dissemination Information Packages (DIPs) and how those DIPs will be packaged in a Data Dissemination Session.	N	M					X			X			X	X			X	
1	2.3.3	4	2-10	The Order Agreement will also specify other needed information such as delivery information (e.g., name or mailing address), and any pricing agreements as applicable.	N	M								X				X			X	
1	2.3.3	5	2-10	In the case of an Adhoc Order, the Consumer establishes an Order Agreement with the OAIS for information available from the archive.	Y	M								X							X	
1	2.3.3	6	2-10	In the case of an Event Based Order, the Consumer establishes an Order Agreement with the OAIS for information expected to be received on the basis of some triggering event.	Y	M								X							X	
1	2.3.3	7	2-10	In general an OAIS will have a general pricing policy and maintain an information base of the electronic and physical mailing addresses of its users.	N	M						X		X								
4	3.1	1	3-1	The OAIS must...Negotiate for and accept appropriate information from information Producers. [3.2.1]	N	H			X			X							X			



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4	3.1	2	3-1	The OAIS must...Obtain sufficient control of the information provided to the level needed to ensure Long-Term Preservation. [3.2.2]	N	H			X	X	X	X	X	X			X		X			
4	3.1	3	3-1	The OAIS must...Determine, either by itself or in conjunction with other parties, which communities should become the Designated Community and, therefore, should be able to understand the information provided. [3.2.3]	N	H						X	X	X			X	X	X		X	X
4	3.1	4	3-1	The OAIS must...Ensure that the information to be preserved is Independently Understandable to the Designated Community. In other words, the community should be able to understand the information without needing the assistance of the experts who produced the information. [3.2.4]	N	H							X	X		X	X	X	X		X	X
4+	3.1	5	3-1	The OAIS must...Follow documented policies and procedures which ensure that the information is preserved against all reasonable contingencies, and which enable the information to be disseminated as authenticated copies of the original, or as traceable to the original. [3.2.5]	N	H		X		X		X	X	X			X	X				
4	3.1	6	3-1	The OAIS must...Make the preserved information available to the Designated Community. [3.2.6]	N	H								X				X				X
2	3.2.1	1	3-1	An organization operating an OAIS will have established some criteria that aids in determining the types of information that it is willing to, or it is required to, accept.	N	H						X	X						X	X		
1	3.2.1	2	3-2	The OAIS negotiates with the Producer to ensure it acquires appropriate Content Information and associated PDI for its mission and the Designated Community.	N	H			X			X				X	X		X			X
4	3.2.1	3	3-2	The OAIS should extract, or otherwise obtain, sufficient Descriptive Information to assist the Designated Community in finding the Content Information of interest.	N	H					X			X			X					X
3	3.2.1	4	3-2	It [the OAIS] also should ensure that the information meets all OAIS internal standards.	N	H					X	X										
1	3.2.2	1	3-2	It is important for the OAIS to recognize the separation that can exist between physical ownership or possession of Content Information and ownership of intellectual property rights in this information. If it has created the information and is the legal owner of the Content Information, the OAIS already has the independence to do what is required to preserve the information and make it available.	N	H						X		X						X		

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2+	3.2.2	2	3-2	When acquiring the Content Information from any other producer or entity, the OAIS must ensure that there is a legally valid transfer agreement that either transfers intellectual property rights to the OAIS, or clearly specifies the rights granted to the OAIS and any limitations imposed by the rightsholder(s). The OAIS must ensure that its subsequent actions to preserve the information and make it available conform with these rights and limitations. When the OAIS does not acquire the intellectual property rights, the agreement should specify what involvement the rightsholder(s) will have in preservation, management or release of the information.	N	H						X					X		X			
2	3.2.2	3	3-2	The OAIS must assume sufficient control over the Content Information and Preservation Description Information so that it is able to preserve it for the Long Term.	N	H			X	X	X	X	X	X			X					
2+	3.2.2	4	3-2	Copyright implications, intellectual property and other legal restrictions on use: An archive will honor all applicable legal restrictions. These issues occur when the OAIS acts as a custodian. An OAIS should understand the copyright concepts and applicable laws prior to accepting copyright materials into the OAIS. It can establish guidelines for ingestion of information and rules for dissemination and duplication of the information when necessary.	N	H			X			X		X						X		
4+	3.2.2	5	3-3	Authority to modify Representation Information: Although the Fixity information within the Preservation Description Information of an AIP ensures that the Content Information- related bits have not been altered...The OAIS needs the authority to migrate the Content Information to new representation forms. If it is acting as a custodian, it may need to seek additional permission to make such changes. If the information is copyrighted, the OAIS should already have negotiated permission to make the changes needed to meet preservation objectives. ...Ideally, when this situation arises, both the original AIPs (fully described) and new AIPs will be retained.	N	H			X	X	X	X	X				X		X			
2+	3.2.2	6	3-3	Agreements with external organizations: An OAIS may establish a variety of agreements with other organizations to assist in its preservation objectives. ...Agreements with other organizations should be monitored to be sure they are being followed and remain useful.	Y	H						X							X	X		

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3	3.2.3	1	3-3	The submission, or planned submission, of Content Information and associated PDI requires a determination as to who the expected Consumers, or Designated Community, of this information will be. This is necessary in order to determine if the information, as represented, will be understandable to that community.	N	H						X	X	X		X	X		X		X	X	
1	3.2.3	2	3-3	The possible evolution of the definition of the Designated Community also needs consideration. Information originally intended for a narrowly defined community may need to be made more widely understandable at some future date. ... This is likely to mean adding explanations in support of the Representation Information and the Preservation Description Information, and it can become increasingly difficult to obtain this information over time...	N	H		X			X	X	X	X			X		X			X	
4+	3.2.4	1	3-4	The degree to which Content Information and its associated PDI conveys information to a Designated Community is, in general, quite subjective. Nevertheless, it is essential that an archive make this determination in order to maximize information preservation. Digital Content Information and PDI need adequate Representation Information to be Independently Understandable to the Designated Community. Typically there are multiple Representation Information objects involved, and this is discussed in 4.2.	N	H						X	X	X			X					X	
1	3.2.4	2	3-4	Even when a set of information has been determined to be understandable to a particular Designated Community, over time the Knowledge Base of this community may evolve to the point that important aspects of the information may no longer be readily understandable. At this point it may be necessary for the OAIS to enhance the associated Representation Information so that it is again readily understandable to the Designated Community.	N	H			X		X	X	X	X			X						X
1	3.2.4	3	3-4	The danger of information loss is great when such software is relied upon for information preservation and understanding because it may cease to function under only small changes to the hardware and software environment. This may not be recognized unless there is a vigorous, ongoing, testing and validation program.	N	H						X	X	X									X

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4	3.2.5	1	3-5	It is essential for an OAIS to have documented policies and procedures for preserving its AIPs, and it should follow those procedures. The appropriate policies and procedures will depend, at minimum, on the nature of the AIPs and any backup relationships the archive may have with other archives.	N	H						X	X				X					
3	3.2.5	2	3-5	The Producer and Consumer communities should be provided with submission and dissemination standards, policies, and procedures to support the preservation objectives of the OAIS.	N	H						X	X	X					X		X	
3	3.2.5	3	3-5	The Designated Community should be monitored to be sure the Content Information is still understandable to them.	N	H						X	X	X								X
3	3.2.5	4	3-5	A long-term technology usage plan, updated as technology evolves, is essential to avoid being caught with very costly system maintenance, emergency system replacements, and costly data representation transformations.	N	H		X				X	X									
3	3.2.6	1	3-5	By definition, an OAIS makes its AIPs visible and available to its Designated Communities. Multiple views of its holdings, supported by various search aids that may cut across collections of AIPs, may be provided.	N	H						X		X				X			X	X
1	3.2.6	2	3-5	Some AIPs may only exist as the output of algorithms operating on other AIPs. They appear as DIPs that, upon dissemination, should include documentation on how they were derived from other AIPs.	N	H						X		X			X	X			X	X
1	3.2.6	3	3-5	Pressures for more effective access must be balanced with the requirements for preservation under the available resource constraints.	N	H						X	X	X							X	X
2+	3.2.6	4	3-5	Some AIPs may have restricted access and therefore may only be disseminated to Consumers who meet access restrictions. The OAIS should have published policies on access and restrictions so that the rights of all parties are protected.	N	H						X		X			X	X			X	X
1	3.2.6	5	3-5	In general, DIPs may be distributed by all varieties of communication paths, including networks and physical media.	N	H						X		X				X			X	X

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2	4.1	1	4-1	Ingest: This entity provides the services and functions to accept Submission Information Packages (SIPs) from Producers (or from internal elements under Administration control) and prepare the contents for storage and management within the archive. Ingest functions include receiving SIPs, performing quality assurance on SIPs, generating an Archival Information Package (AIP) which complies with the archive's data formatting and documentation standards, extracting Descriptive Information from the AIPs for inclusion in the archive database, and coordinating updates to Archival Storage and Data Management.	N	H			X	X	X				X	X	X						
2	4.1	2	4-1	Archival Storage: This entity provides the services and functions for the storage, maintenance and retrieval of AIPs. Archival Storage functions include receiving AIPs from Ingest and adding them to permanent storage, managing the storage hierarchy, refreshing the media on which archive holdings are stored, performing routine and special error checking, providing disaster recovery capabilities, and providing AIPs to Access to fulfill orders.	N	H			X	X				X			X						
2	4.1	3	4-1	Data Management: This entity provides the services and functions for populating, maintaining, and accessing both Descriptive Information which identifies and documents archive holdings and administrative data used to manage the archive. Data Management functions include administering the archive database functions (maintaining schema and view definitions, and referential integrity), performing database updates (loading new descriptive information or archive administrative data), performing queries on the data management data to generate result sets, and producing reports from these result sets.	N	H					X	X			X								
2	4.1	4	4-1	Administration: This entity provides the services and functions for the overall operation of the archive system. Administration functions include soliciting and negotiating submission agreements with Producers, auditing submissions to ensure that they meet archive standards, and maintaining configuration management of system hardware and software. It also provides system engineering functions to monitor and improve archive operations, and to inventory, report on, and migrate/update the contents of the archive. It is also responsible for establishing and maintaining archive standards and policies, providing customer support, and activating stored requests.	N	H		X	X	X	X	X	X	X					X				

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2	4.1	5	4-1	Preservation Planning: This entity provides the services and functions for monitoring environment of the OAIS and providing recommendations to ensure that the information stored in the OAIS remains accessible to the Designated User Community over the term, even if the original computing environment becomes obsolete. Preservation Planning functions include evaluating the contents of the archive and periodically recommending archival information updates to migrate current archive holdings, developing recommendations for archive standards and policies, and monitoring changes in technology environment and in the Designated Community's service requirements and Knowledge Base. Preservation Planning also designs IP templates and provides design assistance and review to specialize these templates into SIPs and AIPs for specific submissions. Preservation Planning also develops detailed Migration plans, software prototypes and test plans to enable implementation of Administration migration goals.	N	H						X	X			X	X						X
2	4.1	6	4-1	Access: This entity provides the services and functions that support Consumers in determining the existence, description, location and availability of information stored in the OAIS, and allowing Consumers to request and receive information products. Access functions include communicating with Consumers to receive requests, applying controls to limit access to specially protected information, coordinating the execution of requests to successful completion, generating responses (Dissemination Information Packages, result sets, reports) and delivering the responses to Consumers.	N	H								X				X			X		
2+	4.1	7	4-1	In addition to the entities described above, there are various Common Services assumed to be available. These services are considered to constitute another functional entity in this model. This entity is so pervasive that, for clarity, it is not shown in figure 4-1.	N	H		X															
2	4.1.1.1	1	4-3	Operating system services provide the core services needed to operate and administer the application platform, and provide an interface between application software and the platform.	N	M		X															
2	4.1.1.1	2	4-4	Network services provide the capabilities and mechanisms to support distributed applications requiring data access and applications interoperability in heterogeneous, networked environments.	N	M		X															

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2	4.1.1.1.	3	4-4	Security services capabilities and mechanisms to protect sensitive information and treatments in the information system.	N	M		X															
3	4.1.1.2	1	4-5	The Receive Submission function provides the appropriate storage capability or devices to receive a SIP from the Producer (or from Administration). This function provides a confirmation of receipt of a SIP to the Producer, which may include a request to resubmit a SIP in the case of errors resulting from the SIP submission.	N	L			X			X				X			X				
2	4.1.1.2	2	4-5	The Quality Assurance function validates (QA results) the successful transfer of the SIP to the staging area.	N	M			X							X							
3+	4.1.1.2	3	4-6	The Generate AIP function transforms one or more SIPs into one or more AIPs that conform to the archive's data formatting and documentation standards. This may involve file format conversions, data representation conversions or reorganization of the content information in the SIPs. The Generate AIP function may issue report requests to Data Management to obtain reports of information needed by the Generate AIP function to produce the Descriptive Information that completes the AIP. This function sends SIPs or AIPs for audit to the Audit Submission function in Administration, and receives back an audit report.	N	M			X		X	X					X	X					
2	4.1.1.2	4	4-6	The Generate Descriptive Information function extracts Descriptive Information from the AIPs and collects Descriptive Information from other sources to provide to Coordinate Updates, and ultimately Data Management.	N	M			X		X						X						

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3+	4.1.1.2	5	4-6	The Coordinate Updates function is responsible for transferring the AIPs to Archival Storage and the Descriptive Information to Data Management. Transfer of the AIP includes a storage request and may represent an electronic, physical, or a virtual (i.e., data stays in place) transfer. After the transfer is completed and verified, Archival Storage returns a storage confirmation indicating (or verifying) the storage identification information for the AIP. The Coordinate Updates function also incorporates the storage identification information into the Descriptive Information for the AIP and transfers it to the Data Management entity along with a database update request. In return, Data Management provides a database update response indicating the status of the update. Data Management updates may take place without a corresponding Archival Storage transfer when the SIP contains Descriptive Information for an AIP already in Archival Storage.	N	L			X	X	X							X					
3+	4.1.1.3	1	4-7	The Receive Data function receives a storage request and an AIP from Ingest and moves the AIP to permanent storage within the archive. The transfer request may need to indicate the anticipated frequency of utilization of the data objects comprising the AIP in order to allow the appropriate storage devices or media to be selected for storing the AIP. This function will select the media type, prepare the devices or volumes, and perform the physical transfer to the Archival Storage volumes. Upon completion of the transfer, this function sends a storage confirmation message to Ingest, including the storage identification of the AIPs.	N	L			X	X							X						
3+	4.1.1.3	2	4-7	The Manage Storage Hierarchy function positions, via commands, the contents of the AIPs on the appropriate media based on storage management policies, operational statistics, or directions from Ingest via the storage request. It will also conform to any special levels of service required for the AIP, or any special security measures that are required, and ensures the appropriate level of protection for the AIP. These include on-line, off-line or near-line storage, required throughput rate, maximum allowed bit error rate, or special handling or backup procedures. It monitors error logs to ensure AIPs are not corrupted during transfers. This function also provides operational statistics to Administration summarizing the inventory of media on-hand, available storage capacity in the various tiers of the storage hierarchy, and usage statistics.	N	M			X	X		X						X					



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3+	4.1.1.3	3	4-7	The Replace Media function provides the capability to reproduce the AIPs over time. Within the Replace Media function the Content Information and Preservation Description Information (PDI) must not be altered. However, the data constituting the Packaging Information may be changed as long as it continues to perform the same function and there is a straight forward implementation that does not cause information loss. The migration strategy must select a storage medium, taking into consideration the expected and actual rates of errors encountered in various media types, their performance, and their costs of ownership. If media-dependent attributes (e.g., tape block sizes, CD-ROM volume information) have been included as part of the Content Information, a way must be found to preserve this information when migrating to higher capacity media with different storage architectures. [Anticipating the terminology of section 0, this function may perform ‘Refreshment’, ‘Replication’, and ‘Repackaging’ that is straightforward. An example of such ‘Repackaging’ is migration to new media under a new operating system and file system, where the Content Information and PDI are independent of the file systems. However, complex ‘Repackaging’ and all ‘Transformation’ are performed under Administration supervision by the Archival Information Update function to ensure information preservation. Refer to section 0 for a detailed description of migration issues.]	N	M				X								X					
3+	4.1.1.3	4	4-8	The Error Checking function provides statistically acceptable assurance that no components of the AIP are corrupted during any internal Archival Storage data transfer. This function requires that all hardware and software within the archive provide notification of potential errors and that these errors are routed to standard error logs that are checked by the Archival Storage staff. The PDI Fixity Information provides some assurance that the Content Information has not been altered as the AIP is moved and accessed. Similar information is needed to protect the PDI itself. A standard mechanism for tracking and verifying the validity of all data objects within the archive may also be used. [For example, CRCs could be maintained for every individual data file. A higher level of service, such as Reed-Solomon coding to support combined error detection and correction, could also be provided. The storage facility procedures should provide for random verification of the integrity of data objects using CRCs or some other error checking mechanism.]	N	L				X								X					

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3+	4.1.1.3	5	4-8	The Disaster Recovery function provides a mechanism for duplicating the digital contents of the archive collection and storing the duplicate in a physically separate facility. This function is normally accomplished by copying the archive contents to some form of removable storage media (e.g., digital linear tape, compact disc), but may also be performed via hardware transport or network data transfers. The details of disaster recovery policies are specified by Administration.	N	M				X		X											
3+	4.1.1.3	6	4-8	The Provide Data function provides copies of stored AIPs to Access. This function receives an AIP request that identifies the requested AIP(s) and provides them on the requested media type or transfers them to a staging area. This function also sends a notice of data transfer to Access upon completion of an order.	N	M				X				X			X						
3+	4.1.1.4	1	4-9	The Administer Database function is responsible for maintaining the integrity of the Data Management database, which contains both Descriptive Information and system information. Descriptive Information identifies and describes the archive holdings, and system information is used to support archive operations. The Administer Database function is responsible for creating any schema or table definitions required to support Data Management functions; for providing the capability to create, maintain and access customized user views of the contents of this storage; and for providing internal validation (e.g., referential integrity) of the contents of the database. The Administer Database function is carried out in accordance with policies received from Administration.	N	M					X	X											
2	4.1.1.4	2	4-9	The Perform Queries function receives a query request from Access and executes the query to generate a result set that is transmitted to the requester.	N	L					X			X									
3+	4.1.1.4	3	4-9	The Generate Report function receives a report request from Ingest, Access or Administration and executes any queries or other processes necessary to generate the report that it supplies to the requester. It may also receive a report request from Access and provides descriptive information for a specific AIP.	N	L			X		X	X		X			X						

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3+	4.1.1.4	4	4-9	The Receive Database Updates function adds, modifies or deletes information in the Data Management persistent storage. The main sources of updates are Ingest, which provides Descriptive Information for the new AIPs, and Administration, which provides system updates and review updates. Ingest transactions consist of Descriptive Information which identifies new AIPs stored in the archive. System updates include all system-related information (operational statistics, Consumer information, and request status). Review updates are generated by periodic reviewing and updating of information values (e.g., contact names, and addresses). The Receive Database Updates function provides regular reports to Administration summarizing the status of updates to the database, and also sends a database update response to Ingest.	N	M					X	X						X					
3+	4.1.1.5	1	4-10	The Negotiate Submission Agreement function solicits desirable archival information for the OAIS and negotiates Submission Agreements with Producers. This function also negotiates a data submission schedule with the Producer. It maintains a calendar of expected Data Submission Sessions that will be needed to transfer one or more SIPs to the OAIS and the resource requirements to support their ingestion. This function receives AIP/SIP templates and customization advise from Preservation Planning and sends SIP designs and SIPs to the Audit Submission function as part of the submission approval process. The data submission formats and procedures must be clearly documented in the archive's data submission policies, and the deliverables must be identified by the Producer in the Submission Agreement.	N	M			X			X	X			X	X		X				

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3+	4.1.1.5	2	4-11	The Manage System Configuration function provides system engineering for the archive system to continuously monitor the functionality of the entire archive system and systematically control changes to the configuration. This function maintains integrity and tractability of the configuration during all phases of the system life cycle. It also audits system operations, system performance, and system usage. It sends report requests for system information to Data Management and receives reports; it receives operational statistics from Archival Storage. It summarizes those reports and periodically provides OAIS performance information and archive holding inventory reports to Preservation Planning. It sends performance information to Establish Standards and Policies. It receives migration packages from Preservation Planning. It receives system evolution policies from the Establish Standards and Procedures function. Based on these inputs it develops and implements plans for system evolution. It sends change requests, procedures and tools to Archive Information Update.	N	M				X	X	X	X										
3+	4.1.1.5	3	4-11	The Archival Information Update function provides a mechanism for updating the contents of the archive. It receives change requests, procedures and tools from Manage System Configuration. It provides updates by sending a dissemination request to Access, updating the contents of the resulting DIPs and resubmitting them as SIPs to Ingest.	N	M			X			X		X		X	X						
3+	4.1.1.5	4	4-11	The Physical Access Control function provides mechanisms to restrict or allow physical access (doors, locks, guards) to elements of the archive, as determined by archive policies.	Y	M						X											

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3+	4.1.1.5	5	4-11	The Establish Standards and Policies function is responsible for establishing and maintaining the archive system standards and policies. It receives budget information and policies such as the OAIS charter, scope, resource utilization guidelines, and pricing policies from Management. It provides Management with periodic reports. It receives recommendations for archive system enhancement, and proposals for new archive data standards from Preservation Planning. It also receives performance information and archive holding inventories from Manage System Configuration. Based on these inputs, archive standards and policies are established and sent to other Administration functions and the other Functional Entities for implementation. The standards include format standards, documentation standards and the procedures to be followed during the Ingest process. It provides approved standards and migration goals to Preservation Planning. This function will also develop storage management policies (for the Archival Storage hierarchy), including migration policies to assure that archive storage formats do not become obsolete, and database administration policies. It will develop disaster recovery policies. It will also determine security policies for the contents of the archive, including those affecting Physical Access Control and the application of error control techniques throughout the archive.	N	M		X	X	X	X	X	X	X						X			
3+	4.1.1.5	6	4-11	The Audit Submission function will verify that submissions (SIP or AIP) meet the specifications of the Submission Agreement. This function receives AIP/SIP reviews from Preservation Planning and may also involve an outside committee (e.g., science and technical review). The audit process must verify that the quality of the data meets the requirements of the archive and the review committee. It must verify that there is adequate Representation Information and PDI to ensure that the Content Information is understandable and independently usable to the Designated Community. The formality of the review will vary depending on internal archive policies. The Audit process may determine that some portions of the SIP are not appropriate for inclusion in the archive and must be resubmitted or excluded. An audit report is provided to Ingest. After the audit process is completed, any liens are reported to the Producer, who will then resubmit the SIP to Ingest or appeal the decision to Administration. After the audit is completed, a final ingest report is prepared and provided to the Producer and to Negotiate Submission Agreement. Audit methods potentially include sampling, periodic review, and peer review.	N	M			X			X	X			X	X		X				X

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3+	4.1.1.5	7	4-12	The Activate Requests function maintains a record of event-driven requests and periodically compares it to the contents of the archive to determine if all needed data is available. If needed data is available, this function generates a dissemination request that is sent to Access. This function can also generate orders on a periodic basis where the length of the period is defined by the Consumers or on the occurrence of an event (e.g., a database update).	N	L						X		X							X		
3+	4.1.1.5	8	4-12	The Customer Service function will create, maintain and delete Consumer accounts. It will collect billing information from Access and will send bills and collect payment from Consumers for the utilization of archive system resources. It will respond to general information requests. This function will also collect and respond to feedback on Access services and products. Customer Service will summarize these comments and make them available.	Y	M						X		X							X		
3+	4.1.1.6	1	4-13	The Monitor Designated Community function interacts with archive Consumers and Producers to track changes in their service requirements and available product technologies. Such requirements might include data formats, media choices, preferences for software packages, new computing platforms, and mechanisms for communicating with the archive. This function may be accomplished via surveys, via a periodic formal review process, via community workshops where feedback is solicited or by individual interactions. It provides reports, requirements alerts and emerging standards to the Develop Preservation Strategies and Standards function. It sends preservation requirements to Develop Packaging Designs.	N	M							X						X		X		
3+	4.1.1.6	2	4-13	The Monitor Technology function is responsible for tracking emerging digital technologies, information standards and computing platforms (i.e., hardware and software) to identify technologies which could cause obsolescence in the archive’s computing environment and prevent access to some of the archives current holdings. This function may contain a prototyping capability for better evaluation of emerging technologies and receive prototype requests from Develop Preservation Strategies and Standards and from Develop Package Designs and Migration Plans. This function sends reports, external data standards, prototype results and technology alerts to Develop Preservation Strategies and Standards. It also sends prototype results to Develop Package Designs and Migration Plans.	N	M							X										

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3+	4.1.1.6	3	4-14	The Develop Preservation Strategies and Standards function is responsible for developing and recommending strategies and standards to enable the archive to better anticipate future changes in the Designated Community service requirements or technology trends that would require migration of some current archive holdings or new submissions. This function receives reports from the Monitor Designated Communities and Monitor Technology functions, and it receives performance information, inventory reports and summarized consumer comments from Administration. This function sends recommendations on system evolution to Administration. This function also receives external data standards from Monitor Technology and produces profiles of those standards that are sent to Administration as proposals on their potential usage. This function also receives issues from Develop Packaging Designs and Migration Plans in the case of unanticipated submission requirements, and responds with advice to handle the new requirements.	N	M						X	X										X

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3+	4.1.1.6	4	4-14	<p>The Develop Packaging Designs and Migration Plans function develops new IP designs and detailed migration plans and prototypes, to implement Administration policies and directives. This activity also provides advice on the application of these IP designs and Migration plans to specific archive holdings and submissions. This function receives archive approved standards and migration goals from Administration. The standards include format standards, metadata standards and documentation standards. It applies these standards to preservation requirements and provides AIP and SIP template designs to Administration. This function also provides customization advice and AIP/SIP review to Administration on the application of those designs. If this function encounters submissions that are not covered by existing standards and procedures, it can send issues to Develop Preservation Strategies and Standards and receive advice, including new standards, to assist in meeting the new submission requirements.</p> <p>The migration goals received by this function tend to involve transformations of the AIP, including transformations of the Content Information to avoid loss of access due to technology obsolescence. The response to the migration goals may involve the development of new AIP designs, prototype software, test plans, community review plans and implementation plans for phasing in the new AIPs. This process may call on expertise or resources from other functions within Preservation Planning, such as prototype development from the Monitor Technology. This effort also will require consultation from the other functional areas and from the Designated Community. Once the migration plan, associated AIP designs, and software have been tested and approved, this function will send the entire migration package to Administration, which will schedule and perform the actual migration.</p>	N	M						X	X		X	X	X					



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3+	4.1.1.7	1	4-15	The Coordinate Access Activities function provides a single user interface to the information holdings of the archive. This interface will normally be via computer network or dial-up link to an on-line service, but might also be implemented in the form of a walk-in facility, printed catalog ordering service, or fax-back type service. Three categories of Consumer requests are distinguished: query requests, which are executed in Data Management and return immediate result sets for presentation to the user; report requests, which may require a number of queries and produce formatted reports for delivery to the Consumer; and orders, which may access either or both Data Management and Archival Storage to prepare a formal Dissemination Information Package (DIP) for on- or off-line delivery. An order may be an Adhoc Order that is executed only once, or an Event Based Order that will be maintained by the Activate Requests function in Administration, and initiated by a dissemination request that may result in periodic deliveries of requested items. The Archival Information Update function in Administration also submits dissemination requests to obtain DIPs needed to perform its update functions. Other special request types are allowed, but are not detailed. This function will determine if resources are available to perform a request, assure that the user is authorized to access and receive the requested items, and notify the Consumer that a request has been accepted or rejected (possibly with an estimate of request cost and an option to cancel the request). It will then transfer the request to Data Management or to the Generate DIP function for execution. This function also provides assistance to OAIS Consumers including providing status of orders and other Consumer support activities in response to an assistance request.	N	M				X	X	X		X				X			X	
3+	4.1.1.7	2	4-15	The Generate DIP function accepts a dissemination request, retrieves the AIP from Archival Storage, and moves a copy of the data to a staging area for further processing. This function also transmits a report request to Data Management to obtain Descriptive Information needed for the DIP. If special processing is required, the Generate DIP function accesses data objects in staging storage and applies the requested processes. The types of operations, which may be carried out, include statistical functions, sub-sampling in temporal or spatial dimensions, conversions between different data types or output formats, and other specialized processing (e.g., image processing). This function places the completed DIP response in the staging area and notifies the Coordinate Access Activities function that the DIP is ready for delivery.	N	M				X	X			X				X				

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3+	4.1.1.7	3	4-16	The Deliver Response function handles both on-line and off-line deliveries of responses (DIPs, result sets, reports and assistance) to Consumers. For on-line delivery, it accepts a response from Coordinate Access Activities and prepares it for on-line distribution in real time via communication links. It identifies the intended recipient, determines the transmission procedure requested, places the response in the staging area to be transmitted, and supports the on-line transmission of the response. For off-line delivery it retrieves the response from the Coordinate Access Activities function, prepares packing lists and other shipping records, and then ships the response. When the response has been shipped, a notice of shipped order is returned to the Coordinate Access Activities function and billing information is submitted to Administration.	N	L						X		X				X			X	
2+	4.2	1	4-18	This more detailed model of OAIS-related Information Objects is intended to aid the architect or designer of future OAIS systems. The objects discussed in this subsection are conceptual and should not be taken to imply any specific implementations.	N	H						X			X					X		
1	4.2.1.1	1	4-19	The Information Object is composed of a Data Object that is either physical or digital, and the Representation Information that allows for the full interpretation of the data into meaningful information. This model is valid for all the types of information in an OAIS.	N	H									X							
1	4.2.1.2	1	4-20	The Data Object may be expressed as either a physical object (e.g., a moon rock) together with some Representation Information, or it may be expressed as a digital object (i.e., a sequence of bits) together with the Representation Information giving meaning to those bits.	N	H									X							
1	4.2.1.3	1	4-20	The Representation Information accompanying a physical object like a moon rock may give additional meaning, as a result of some analysis, to the physically observable attributes of the rock. This information may have been developed over time and the results, if provided, would be part of the Information Object.  The Representation Information accompanying a digital object, or sequence of bits, is used to provide additional meaning. It typically maps the bits into commonly recognized data types such as character, integer, and real and into groups of these data types. It associates these with higher-level meanings that can have complex inter-relationships that are also described.	M	H									X							

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1	4.2.1.3.1	1	4-21	The purpose of the Representation Information object is to convert the bit sequences into more meaningful information. It does this by describing the format, or data structure concepts, which are to be applied to the bit sequences and that in turn result in more meaningful values such as characters, numbers, pixels, arrays, tables, etc. These common computer data types, aggregations of these data types, and mapping rules which map from the underlying data types to the higher level concepts needed to understand the Digital Object are referred to as the Structure Information of the Representation Information object.	N	M									X								
1	4.2.1.3.1	2	4-21	The Representation Information provided by the Structure Information is seldom sufficient. Even in the case where the Digital Object is interpreted as a sequence of text characters, and described as such in the Structure Information, the additional information as to which language was being expressed should be provided. This type of additional required information is referred to as the Semantic Information.	N	M									X								
1	4.2.1.3.1	3	4-21	This figure also shows that Representation Information may contain references to other Representation Information. When this is coupled with the fact that Representation Information is an Information Object that may have its own Digital Object and other Representation Information associated with understanding each Digital Object, as shown in a compact form by the ‘interpreted using’ association, the resulting set of objects can be referred to as a Representation Network.	N	M									X								
1	4.2.1.4.1	1	4-24	As a practical matter, the OAIS needs to have enough Representation Information associated with the bits of the Content Data Object in the Content Information that it feels confident that the members of the Designated Community can enter the Representation Network with enough knowledge to begin accurately interpreting the Representation Information.	N	M									X								X
2	4.2.1.4.1	2	4-25	Indefinite long-term information preservation requires a full and understandable description of the Representation Information.	N	M									X								
2	4.2.1.4.1	3	4-25	An important function of the OAIS is deciding what parts of the Content Information are the Content Data Object and what parts are the Representation Information. This aspect is critical to a clear understanding of what is being preserved.	N	M									X								

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2	4.2.1.4.2	1	4-27	In addition to Content Information, the Archival Information must include information that will allow the understanding of the Content Information over an indefinite period of time. The specific set of Information Objects, which are required for this function, is collectively called Preservation Description Information (PDI). The PDI must include information that is necessary to adequately preserve the particular Content Information with which it is associated. It is specifically focused on describing the past and present states of the Content Information, ensuring it is uniquely identifiable, and ensuring it has not been unknowingly altered.	N	M									X								

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1	4.2.1.4.2	1	4-28	<p>The following definitions are based on the categories discussed in the paper “Preserving Digital Information” (reference [2])...</p> <ul style="list-style-type: none"> <li>- Reference Information: This information identifies, and if necessary describes, one or more mechanisms used to provide assigned identifiers for the Content Information. It also provides those identifiers that allow outside systems to refer, unambiguously, to this particular Content Information. Examples of these systems include taxonomic systems, reference systems and registration systems. In the OAIS Reference Model most if not all of this information is replicated in Package Descriptions, which enable Consumers to access Content Information of interest.</li> <li>- Context Information: This information documents the relationships of the Content Information to its environment. This includes why the Content Information was created and how it relates to other Content Information objects existing elsewhere.</li> <li>- Provenance Information: This information documents the history of the Content Information. This tells the origin or source of the Content Information, any changes that may have taken place since it was originated, and who has had custody of it since it was originated. This gives future users some assurance as to the likely reliability of the Content Information. Provenance can be viewed as a special type of context information.</li> <li>- Fixity Information: This information provides the Data Integrity checks or Validation/Verification keys used to ensure that the particular Content Information object has not been altered in an undocumented manner. Fixity Information includes special encoding and error detection schemes that are specific to instances of Content Objects. Fixity Information does not include the integrity preserving mechanisms provided by the OAIS underlying services, error protection supplied by the media and device drivers used by Archival Storage. The Fixity Information may specify minimum quality of service requirements for these mechanisms.</li> </ul>	N	M									X								
2	4.2.1.4.3	1	4-29	The Packaging Information is that information which, either actually or logically, binds or relates the components of the package into an identifiable entity on specific media.	N	M									X								

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2+	4.2.1.4.4	1	4-30	In addition to preserving information, the OAIS must provide adequate features to allow Consumers to locate information of potential interest, analyze that information, and order desired information. This is accomplished through a specialization of the Information Object called Descriptive Information, which contain the data that serves as the input to documents or applications called Access Aids. The Descriptive Information is generally derived from the Content Information and PDI.	N	M									X							X	
2+	4.2.2.2	1	4-32	The Submission Information Package (SIP) is that package that is sent to an OAIS by a Producer. Its form and detailed content is typically negotiated between the Producer and the OAIS.	N	H			X							X			X	X			
1	4.2.2.2	2	4-32	The Packaging Information will always be present in some form.	N	H			X							X							
1	4.2.2.2	3	4-32	The Descriptive Information associated with a SIP is likely to be provided prior to submitting the SIP to the OAIS, but it may be provided at any time.	N	H			X							X							
2	4.2.2.2	4	4-33	Within the OAIS, one or more SIPs are transformed into one or more Archival Information Packages (AIP) for preservation. The AIP has a complete set of PDI for the associated Content Information.	N	H			X							X	X						
2	4.2.2.2	5	4-33	The Packaging Information of the AIP will conform to OAIS internal standards, and will be managed by the OAIS so that Consumers can find and order the Content Information of interest.	N	H				X							X				X		
2	4.2.2.2	6	4-33	In response to an Order, the OAIS provides all or a part of an AIP to a Consumer in the form of a Dissemination Information Package (DIP).	N	H				X							X	X			X		
2	4.2.2.2	7	4-33	The Packaging Information will always be present in some form so that the Consumer can clearly distinguish the information ordered.	N	H				X							X				X		
2	4.2.2.3	1	4-33	The AIP is defined to provide a concise way of referring to a set of information that has, in principle, all the qualities needed for permanent, or indefinite, Long Term Preservation of a designated Information Object.	N	H				X							X						
1	4.2.2.3	2	4-33	The AIP is itself an Information Object that is a container of other Information Objects.	N	H				X							X						

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1	4.2.2.3	3	4-34	Also within the AIP is an Information Object called the Preservation Description Information (PDI).	N	H				X							X					
2	4.2.2.3	4	4-34	The PDI contains additional information about the Content Information and is needed to make the Content Information meaningful for the indefinite long-term.	N	H				X							X					
2	4.2.2.3	5	4-34	...all classes of PDI information must be present in an AIP	N	H				X							X					
3+	4.2.2.3	6	4-34	The AIP is delimited and identified by the Packaging Information. The Packaging Information may actually be present as a structure on the media that contains the AIP, or it may be virtual in that it is contained in the OAIS Archival Storage function. However, the delimitation and internal identification functions must be well defined in an OAIS.	N	M				X							X					
2+	4.2.2.3	7	4-35	Each AIP is associated with a structured form of Descriptive Information called the Package Description, which enables the Consumer to locate information of potential interest, analyze that information, and order desired information. The information needed for one Access Aid is called an Associated Description.	N	M				X							X					
1	4.2.2.3	8	4-35	A single Package Description may contain several Associated Descriptions depending on the number of different Access Aids that can locate, visualize, retrieve or order the associated Content Information and PDI.	N	M				X							X					
3+	4.2.2.3	9	4-35	Package Description must contain one Associated Description that supplies data for a Retrieval Aid that allows authorized users to retrieve the Content Information and PDI described by the Package Description. This Retrieval Aid is generally part of the Archival Storage functional area. This Retrieval Aid is generally part of the Archival Storage functional area. It translates from the unique identifier assigned by the OAIS to identify the AIP into the set of operations and filenames needed to retrieve the AIP from the file management system used in Archival Storage, then returns the Content Information and PDI for the requested AIP.	N	M				X							X					
1	4.2.2.3	10	4-36	The Package Description may also contain any number of Associated Descriptions, each of which contains data for one or more Access Aids. Two additional subtypes of Access Aid are Finding Aid and Ordering Aid.	Y	M								X			X					

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1	4.2.2.3	11	4-36	An Ordering Aid is an application that assists the Consumer to discover the cost of and order AIPs of interest. The Ordering Aids also allow users to specify transformations to be applied to the AIPs prior to dissemination. These transformations can include data object transformations such as subsetting, subsampling or format transformations. The transformations can also involve modifying the PDI in the AIP prior to dissemination.	N	M								X			X				X	
1	4.2.2.4	1	4-38	The Content Information could consist of several input files (or pointers to the AIPs containing these data files) and an algorithm which uses these files to create the data object of interest.	N	M				X							X					
1	4.2.2.5	1	4-39	When an Information Object is ingested into the OAIS a Unit Description, which is a subtype of a Package Description, is created by extracting information from the Content Information and the PDI and adding OAIS specific information such as a unique identifier.	N	M				X							X					
1	4.2.2.5	2	4-39	[Since the OAIS reference model is implementation independent, each of these objects could be implemented as one file or multiple files.] This type of implementation dependent information is contained in the Packaging Information.	N	M				X							X					
2	4.2.2.6	1	4-40	The Unit Description is a specialization of the Package Description that always contains a set of Associated Descriptions each of which describe the AIU Content Information from the point of view of a single Access Aid.	N	M				X				X			X					
2	4.2.2.6	2	4-41	All Unit Descriptions must supply an Associated Description for a Retrieval Aid that enables authorized users to retrieve the AIU described by the Unit Description from Archival Storage	N	M				X				X			X					
1	4.2.2.7	1	4-42	The AIU and its associated Unit Description provide the information necessary for a Consumer to locate and order AIUs of interest.	N	M				X				X			X				X	
2	4.2.2.7	2	4-42	The content information of an AIC is composed of complete AIPs each of which have their own Content Information, PDI, and associated Packaging Information and Package Descriptions.	N	M				X				X			X					
1	4.2.2.7	3	4-42	These AIPs are then aggregated into Archive Information Collections (AIC) using criteria determined by the archivist.	N	M				X				X			X					
2	4.2.2.7	4	4-42	A single AIP can belong to any number of AICs.	N	M				X				X			X					



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1	4.2.2.7	5	4-43	An important feature of the AIC, as shown in figure 4-23, is the fact that an AIC is a complete AIP which contains PDI. The PDI provides further information about the AIC such as Provenance on when and why it was created, Context to related AICs, and the desired level of security/Fixity information.	N	M				X				X									
2+	4.2.2.8	1	4-44	The Collection Description is a subtype of the Package Description that has added structures to better handle the complex content information of an AIC. The Collection Description, which is modeled in figure 4-24, contains the information classes that are contained in the Unit Description.	N	M				X				X									
1	4.2.2.8	2	4-44	There are two types of Associated Description in a Collection Description: <ul style="list-style-type: none"> <li>- There is one Overview Description that describes the collection as a whole..</li> <li>- There are zero or more Member Descriptions that separately describe each member of the collection.</li> </ul>	N	M				X				X									
2	4.2.2.8	3	4-44	The required Associated Description in a Collection Description provides information for Ordering Aids that provide a user with access to the entire set of Content Information of the associated AIC and the PDI for the AIC, but not necessarily to the individual AIPs contained in the AIC	N	M				X				X									
2	4.2.2.8	4	4-44	The Collection Description may contain the Package Descriptions of the AIPs contained in the AIC.	N	M				X				X									
1	4.2.2.8	5	4-45	An Access Collection may be based on new data mining results or it may reflect current phenomena or areas of interest that may not be of permanent interest.	N	M				X				X									
2	4.2.2.8	6	4-45	If an OAIS decides that an Access Collection is valuable enough to be preserved for the long-term, it can store the required Content Information and PDI in Archival Storage thus creating a new AIC.	Y	M				X				X									
2	4.2.3	1	4-46	The Archive Administration Information represents the entire range of information required for the day-to-day operation of the archive.	N	H					X	X											

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2	4.2.3	2	4-46	Policy information which provides pricing information and availability constraints for ordering archived information.	N	M					X	X		X								
2	4.2.3	3	4-46	Request tracking information that records the progress of each user transaction with an archive. The request tracking process can be very complicated, involving database events and triggers, or as simple as a flat file tracking Order Requests.	N	M					X	X		X								
2	4.2.3	4	4-46	Security information that includes user names and any passwords or other mechanisms needed to authenticate the identity and privileges of archive users.	N	M					X	X		X								
2	4.2.3	5	4-46	Event Based Order information that provides the information needed to support repeating or future requests.	N	M					X	X		X								
2+	4.2.3	6	4-46	Statistical information needed by archive administration and Management to determine future policies and performance tuning for more effective archive operation.	N	M					X	X								X		
2	4.2.3	7	4-46	Preservation process history information that tracks the migrations of AIPs, including media replacements and AIP transformations	N	M			X	X	X						X					
2	4.2.3	8	4-46	Customer profile information that enables the archive to maintain facts such as user name and address to avoid the user having to reenter these facts each time he enters a request.	N	M					X	X		X								
2	4.2.3	9	4-46	Accounting information that includes the data necessary for the operation of the archive as a business. The accounting data include payroll data, accounts payable data and accounts receivable data.	N	M					X	X										
2+	4.3.1	1	4-49	The data within the data Producer entity are private and may be in any format the Producer desires. However, when the decision is made to store the data in an OAIS, the Producer who is responsible for the data meets with archivists to negotiate a Submission Agreement as discussed in 2.3.2 of this document. This agreement defines information such as the content, format, and scheduled arrival times of the Submission Information Package (SIP). This agreement defines information such as the content, format, and scheduled arrival times of the Submission Information Package (SIP).	N	M			X			X	X			X			X	X		

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2	4.3.1	2	4-49	The SIP is an Information Package that is provided to the OAIS by the Producer	N	H			X			X				X			X				
2	4.3.1	3	4-49	The SIP consists of the Content Information plus the data that is necessary to assure that those data can be maintained by the OAIS and that the data can be interpreted and used by Consumers who withdraw them from the OAIS in the future.	N	H			X			X		X		X			X		X		
2	4.3.1	4	4-49	These SIPs are periodically transferred to the OAIS in a Data Submission Session.	N	H			X			X	X			X			X				
1	4.3.1	5	4-49	In addition to the logical view of data (the SIP), the specification of a data delivery session must also include the mapping of the objects to the media on which they are delivered. This mapping includes the encoding of the object and description and the allocation of logical objects to files.	N	M			X							X			X				
2+	4.3.2	1	4-49	Once the SIP is within the OAIS, their form and content may change. An OAIS is not always required to retain the information submitted to it in precisely the same format as in the SIP. Indeed, preserving the original information exactly as submitted may not be desirable.	N	M			X	X		X	X			X	X						
2+	4.3.2	2	4-49	The mapping between SIPs and AIPs is not one-to-one. Here are some examples: One SIP - One AIP... Many SIPs - One AIP... One SIP - Many AIPs... Many SIPs - Many AIPs... One SIP - No AIPs...	N	M			X	X		X	X			X	X						
1	4.3.2	3	4-50	The ingest process transforms the SIPs received in the Data Submission Session into a set of AIPs and Package Descriptors which can be stored and accepted by the Archival Storage and Data Management functional entities.	N	M			X	X	X	X	X			X	X						
2	4.3.2	4	4-50	When many SIPs are required for the creation of one AIP, the Ingest functional area will provide staging storage for the SIPs until all the SIPs required for the AIP arrive.	N	M			X			X	X			X	X						

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2	4.3.2	5	4-50	In addition, the Ingest functional entity will classify incoming information objects and determine in what existing collection or collections each object belongs and will create messages to update the appropriate Collections Descriptions after the AIPs are stored in Archival Storage.	N	M			X	X	X	X	X			X	X					
2	4.3.2	6	4-51	It is expected that the Ingest functional entity will coordinate the updates between Data Management and Archival Storage and provide appropriate coordination and error recovery. The AIP should first be stored in Archival Storage. The confirmation of that operation will include a unique identification to retrieve that AIP from Storage. This identifier should be merged into the Package Description prior to the addition of the Collection Description to Data Management.	N	M			X	X	X	X	X			X	X					
2	4.3.3	1	4-51	The Archival Storage functional entity takes the AIPs produced by the Ingest process and merges it into the permanent archive holdings.	N	M			X	X	X	X					X					
2	4.3.3	2	4-51	The Data Management functional entity takes the Package Descriptions produced by Ingest and augments the existing Collection Descriptions to include their contents	N	M			X	X	X	X	X				X					
2+	4.3.3	3	4-51	Thus the major transformation that occurs in this step is the mapping of the acquisition session from the ingest physical data model. [This will tend to be on staging storage, to the permanent storage of the OAIS, which could range from Database Management Systems (DBMS) to Hierarchical File Management Systems (HFMS), or any mixture of the above. ]	N	M			X	X	X	X					X					
3+	4.3.3	4	4-51	The internal view of the OAIS is the permanent representation of the archived data, so all encoding and mappings must be well documented and understood. [The process of transferring the ingest objects is frequently by a software process such as an HFMS driver or a DBMS. In this case, it is the responsibility of the OAIS to maintain an active copy of the software or careful documentation of the internal formats so the data can be transferred to other systems in the future without loss of information.]	N	M			X	X	X	X					X					
2	4.3.4	1	4-51	These Finding Aids present Consumers with the logical view of the OAIS holdings so the Consumers can decide which AIPs to acquire.	N	M					X			X			X				X	

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2	4.3.4	2	4-51	At a minimum, the access view is the high-level logical view of the Collection Descriptions discussed in 4.2.2.8.	N	M					X			X			X				X	
2	4.3.4	3	4-51	A Consumer will establish a Search Session with the Access entity. During this Search Session, the Consumer will use the OAIS Finding Aids to identify and investigate potential holdings of interest	N	M					X			X			X				X	
2	4.3.4	4	4-52	Once the Consumer identifies the OAIS holdings to acquire, the Consumer uses an OAIS supplied Ordering Aid to develop an order request to acquire the data.	N	M					X			X			X				X	
2	4.3.4	5	4-52	The Consumer produces a logical view of the desired AIPs and associated Package Descriptions to be included in the Dissemination Information Package and specifies the physical details of the Data Dissemination Session such as media type and object format. This process may involve no visible interaction between the Consumer and the OAIS if adequate defaults exist. This order can also specify any transformations the Consumer wishes applied to the AIPs in creating the DIP.	N	M					X			X			X	X			X	
2+	4.3.4	6	4-52	The Access functional area then records the Order Agreement in the Data Management functional area. When the conditions required to satisfy a recorded Order Agreement are met... the Access functional area coordinates the response.	N	M					X			X							X	
1	4.3.4	7	4-52	Access contacts the Storage and Data Management functional areas and requests the AIPs and associated Package Descriptions necessary to populate the DIP requested by the Consumer.	N	M					X			X			X	X			X	
2	4.3.4	8	4-52	The Storage and Data Management functional areas create copies of the requested objects in staging storage.	N	M				X	X			X			X					
2	4.3.4	9	4-52	Access then transforms this set of the AIPs and associated Package Descriptions into a set of DIPs and stores those DIPs onto physical distribution (either physical or communications) media to be delivered to the Consumer in a Data Dissemination Session.	N	M					X			X			X	X			X	
1	5.1	1	5-1	It [an OAIS] will eventually need to migrate much of its holdings to different media and/or to a different hardware or software environment to keep them accessible.	Y	H							X									

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3	5.1	2	5-1	Digital Migration is defined to be the transfer of digital information, while intending to preserve it, within the OAIS. It is distinguished from transfers in general by three attributes: a focus on the preservation of the full information content; a perspective that the new archival implementation of the information is a replacement for the old; and full control and responsibility over all aspects of the transfer resides with the OAIS.	Y	M							X										
1	5.1.1	1	5-2	...an OAIS must take advantage of these technologies.	Y	H							X										
2	5.1.1	2	5-2	Therefore, an OAIS has a strong incentive to consider Digital Migration issues and approaches.	Y	H							X										
3	5.1.2	1	5-3	The OAIS Consumer interface in Access provides one or more Content Information IDs, with associated name spaces, to assist in identifying a particular Content Information object of interest.	Y	M							X	X			X				X		
2	5.1.2	2	5-3	One or more of these Content Information IDs will be included in the PDI Reference Information associated with that Content Information object. The Descriptive Information in Data Management will map each of these IDs to the same AIP ID.	Y	L					X		X				X						
2	5.1.2	3	5-3	The Access Function uses this information to obtain the AIP ID and gives it to Archival Storage to retrieve the associated AIP.	Y	L				X			X	X			X						
1	5.1.2	4	5-4	The associated Archival Storage mapping infrastructure might then be implemented as a database which relates the AIP ID to the location of the encapsulating data structure.	Y	M				X			X				X						
3	5.1.2	5	5-4	Within Archival Storage, the AIP ID is mapped to the location of AIP Packaging Information by the Archival Storage mapping infrastructure. The AIP Packaging Information, in turn, logically delimits and identifies the Content Information and the PDI, and binds them into a single entity for preservation.	Y	M				X			X				X						
2	5.1.2	6	5-4	The transfer of any part of the Content Information, PDI, or Packaging Information to the same or new media, with the intent that it replaces that part of the previous AIP, is considered to be a Digital Migration of the AIP.	Y	M				X			X				X						

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3	5.1.2	7	5-4	Note that a change to the Archival Storage mapping information only, which is outside of the AIP concept, is not considered to be a migration of the associated AIP, although such changes need to be carefully controlled to ensure that access to the AIP is maintained.	Y	M				X			X				X					
1	5.1.3	1	5-4	...it is possible to identify four primary digital migration types.	Y	H				X			X				X					
2	5.1.3	2	5-4	Refreshment: A Digital Migration where a media instance, holding one or more AIPs or parts of AIPs, is replaced by a media instance of the same type by copying the bits on the medium used to hold AIPs and to manage and access the medium. As a result, the existing Archival Storage mapping infrastructure, without alteration, is able to continue to locate and access the AIP.	Y	M				X			X				X					
2	5.1.3	3	5-4	Replication: A Digital Migration where there is no change to the Packaging Information, the Content Information and the PDI. The bits used to convey these information objects are preserved in the transfer to the same or new media-type instance. Note that Refreshment is also a Replication, but Replication may require changes to the Archival Storage mapping infrastructure.	Y	M				X			X				X					
2	5.1.3	4	5-4	Repackaging: A Digital Migration where there is some change in the bits of the Packaging Information.	Y	M				X			X				X					
2	5.1.3	5	5-5	Transformation: A Digital Migration where there is some change in the Content Information or PDI bits while attempting to preserve the full information content.	Y	M				X			X				X					
2	5.1.3.1	1	5-5	A migration involves Refreshment when the effect is to replace a media instance with a copy that is sufficiently exact that all Archival Storage hardware and software continues to run as before.	Y	L				X			X				X					
1	5.1.3.2	1	5-5	A migration involves Replication when there are no bit changes to the Packaging Information, the Content Information, and the PDI.	Y	L				X			X				X					
2	5.1.3.3	1	5-6	A migration involves Repackaging when there is some change to the Packaging Information during the transfer.	Y	L				X			X				X					

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2	5.1.3.4	1	5-6	Digital Migrations that require some changes to the Content Information or PDI are referred to as Transformations. These changes will be to some of the bits in the Content Data Object of the Content Information or PDI with corresponding changes in the associated Representation Information. In all cases the intent is to provide maximum information preservation. The resulting AIP is intended to be a full replacement for the AIP that is undergoing Transformation. The new AIP qualifies as a new Version of the previous AIP. The first Version of the API[sic] is referred to as the original AIP and may be retained for verification of information preservation... [reversible and non-reversible examples]	Y	L				X			X					X					
3	5.1.4	1	5-9	Unless a Digital Migration involves Transformation, it is not considered to create a new AIP Version and it is not required that its PDI be updated... the AIP version is considered to be independent of Refreshment, Replication, and Repackaging that does not affect the Content Information or PDI ... If this process is carried out entirely within Archival Storage, the AIP ID remains the same and there is no implied impact to Associated Descriptions or Access Aids.	Y	M				X			X				X						
2	5.1.4	2	5-9	A Digital Migration that involves Transformation results in a new Version of the AIP as defined in 5.1.3.4. In this case, the PDI needs to be updated to identify the source AIP and its Version, and to describe what was done and why. The new AIP is viewed as a replacement for the source AIP where the information has been preserved to the maximum extent practical. The AIP is also new, and the Associated Description must be updated. This does not imply any changes are needed to Access Aids unless they have been implemented with 'hardcoded' AIP IDs.	Y	M				X			X				X						
2	5.1.4	3	5-9	An AIP may, in some environments, be subject to upgrading or improvement over time. This is not a Digital Migration in that the intent is not to preserve information, but to increase or improve it. This type of AIP change may be referred to as creating a new Edition. The new Edition is viewed as a replacement for the previous Edition, but it may be of historical interest to retain the previous Edition. This also results in a new AIP ID with the same impacts on Associated Descriptions and Access Aids as a Digital Migration Transformation.	Y	M				X			X				X						



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2	5.1.4	4	5-9	An OAIS may also find it convenient to provide an AIP that is derived from an existing AIP. It may do this by extracting some information, or by aggregating information from multiple AIPs, to better serve Consumers. This type of resulting AIP may be referred to as a Derived AIP. It does not replace any of the AIPs that it was derived from and it is not a result of a Digital Migration. This also results in a new AIP ID and a new Associated Descriptions. This may also require updates to, or new, Access Aids depending on how they have been implemented.	Y	M				X			X				X						
1	5.2.1	1	5-10	The OAIS may choose to provide this API as an implementation alternative to the production and delivery of a physical DIP for dissemination. This type of service allows the Consumer, as a client, to develop applications that appear to directly access the AIPs.	Y	M							X	X			X	X			X		
1	5.2.2	1	5-10	...to maintain the original ‘look and fee’ of the Content Information of a set of AIUs as presented by a specified application or set of applications. Conceptually, the OAIS provides an environment that allows the Consumer to view the AIUs Content Information through the application’s transformation and presentation capabilities.	Y	M							X								X		
1	5.2.2.1	1	5-11	The OAIS response to preserving an Access Software application execution service would likely depend, in part, on whether or not it had the source code for the application.	Y	M							X	X									
1	5.2.2.1	2	5-11	If the OAIS had the source code and adequate documentation on the application, the expected approach would be to port the application to the new environment and attempt to test it adequately to ensure it was functioning correctly...	Y	M							X										
1	5.2.2.1	3	5-11	Ideally all possible output values would have been recorded initially so they could be used as the basis for ensuring correct functioning following the port. However, this level of testing is likely to result in an unacceptable cost/benefit ratio for the OAIS. Given that the application was compiled from original source code, it is probable that the algorithms are correct; the production of a test suite, or reuse of a test suite that was provided with the design documentation is probably adequate.	Y	M							X										

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1	5.2.2.1	4	5-11	If the Access Software was a proprietary package, which was widely used and available commercially, it is likely that there will be commercially provided bridge (i.e., conversion) software which Transforms the current Content Data Objects to other forms used by the new Access Software having a similar look and feel.	Y	M							X	X									
2	5.2.2.1	5	5-11	If no commercial alternative is seen, the OAIS may contract with the owner of the original Access Software to develop and provide source code for a simplified tool that can read but not modify instances of data written using the format. This approach might not be viable due to cost or legal issues... This requires that criteria have been established to clearly define what constitutes the Content Information as discussed in 5.1. ...	Y	M							X	X									
2	5.2.2.2	1	5-11	There may be a mandatory requirement from the Designated Community to maintain the look and feel of proprietary Access software due to the large number of AIUs that are dependent on that Access Software. In this case, if the OAIS is unable to obtain the source code, it may find it necessary to investigate use of an emulation approach... The OAIS could consider emulating the application. If the application provides a well-known set of operations and a well-defined API for access, the API could be adequately documented and tested to attempt an emulation of the application. ... Another approach is emulation of the underlying hardware.... There have been investigations of alternative emulation approaches, such as the development of a virtual machine architecture or emulation at the operating system level.	Y	M							X	X									X
1	5.2.2.2	2	5-12	None of the emulation techniques is mature enough for significant comment. In addition, the current emulation research efforts involve a centralized architecture with control over all peripherals. The level of complexity of the interfaces and interactions with a ubiquitous distributed computing environment (i.e., WWW and JAVA) with heterogeneous clients may introduce requirements that go beyond the scope of current emulation efforts.	Y	M							X										

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1	6	1	6-1	Users of multiple OAIS archives may have reasons to wish for some uniformity or cooperation among them. For example, Consumers of several archives may wish to have: common finding aids to aid in locating information across several archives; a common Package Description schema for access; a common DIP schema for dissemination; or a single global access site. Producers may wish to have: a common SIP schema for submission to different archives; or a single depository for all their products. Managers may wish to have means for cost reduction through sharing of expensive hardware, software, and preservation efforts; and increasing the uniformity and quality of interactions with several archives.	Y	H			X			X	X	X		X		X	X	X	X	X	
1	6.1	1	6-2	OAIS associations can be categorized technically by both external and internal factors. External factors include characteristics of the Producer and Consumer communities. Internal factors could include common implementations of the information models presented in 4.2, or multi-archive sharing of one or more of the functional areas presented in 4.1. ... four categories of archive association: <i>Independent:</i> Archives motivated by local concerns with no management or technical interaction among them <i>Cooperating:</i> Archives with potential common producers, common submission standards, and common dissemination standards, but no common finding aids <i>Federated:</i> Archives with both a Local Community (i.e., the original Designated Community served by the archive) and a Global community (i.e., an extended Designated Community) which has interests in the holdings of several OAIS archives and has influenced those archives to provide access to their holdings via one or more common finding aids. The Access needs of the Local community usually have priority over those of the Global community. Global dissemination and Ingest are optional features <i>Shared resources:</i> Archives that have entered into agreements with other archives to share resources, perhaps to reduce cost. This requires various standards internal to the archive (such as ingest-storage and access-storage interface standards), but does not alter the user community's view of the archive.	Y	M						X		X					X	X	X	X	
1	6.1.1	1	6-2	An independent archive is assumed to serve only a single Designated Community.	Y	H					X								X		X		

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1	6.1.1	2	6-2	The classification of an archive as independent is not based on its size or distributed functionality. An independent archive may occupy one site, or may be physically distributed over many sites. It may use many standards for a given internal element. However, if there is no interaction with other archives, the archive is independent.	Y	H						X								X		
1	6.1.2	1	6-3	Cooperating archives are based on standards agreements among two or more archives.	Y	H						X								X		
1	6.1.2	2	6-3	The only requirement for this architecture is that the cooperating groups support at least one common SIP and DIP format for inter-archive requests... The essential requirement for this federation is a set of mutual Submission Agreements, Event Based Orders, and user interface standards to allow DIPs from one archive to be ingested as SIPs by another ... OAIS archives that have standardized their submission and dissemination methods for the benefit of users.	Y	M						X		X		X		X		X		
1	6.1.3	1	6-4	Federated Archives are conceptually Consumer-oriented. In addition to the Local Community (i.e., the original Designated Community served by the archive), a Global community (i.e., an extended Designated Community) exists which has interests in the holdings of several OAIS archives and has influenced those archives to provide access to their holdings via one or more common finding aids. However, the Local Consumers are likely to have access priority over the global Consumers.	Y	M						X		X							X	X

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1	6.1.3	2	6-5	<p>Federated archives may be further classified into three levels of functionality.</p> <ul style="list-style-type: none"> <li>• <i>Central Site</i>: Global access is accomplished by the export of a standard-format Associated Description to a global site...</li> <li>• <i>Distributed Finding Aid</i>: Global access is accomplished by having a global node that can distribute a query to multiple local archives...</li> <li>• <i>Distributed Access Aid</i>: This adds a standard ordering and dissemination mechanism, available through the global nodes to the functionality of the Distributed Finding Aids discussed above...</li> </ul> <p>There are several major policy/technology issues that must be addressed when an OAIS joins a Federation or several independent OAIS decide to create a Federation.</p> <ul style="list-style-type: none"> <li>• Unique AIP Names for each AIP in the Federation.</li> <li>• Duplicate AIPs in several different OAIS with different AIP names.</li> <li>• The Preservation of Federation Access to AIPs when an OAIS terminates operations.</li> <li>• User Authentication and Access Management for global users.</li> </ul>	Y	M						X		X			X			X		
1	6.1.4	1	6-7	<p>[shared resources] In this type of association, Management has entered into agreements with archives to share or integrate functional areas. The motive for this may be to share expensive resources such as hierarchical file management system for Archive Storage, peripheral device for Ingest or dissemination of Information Packages or super computers for complicated transformations between SIPs, AIPs or DIPs. This association is fundamentally different from the previous examples, in that we can no longer ignore the internal architecture of the archive.</p>	Y	M						X		X		X	X	X		X		
1	6.2	1	6-9	<p>... the autonomy dimension is a key one for interacting archives, determining the ease with which each can effect changes in the nature of the association and the impact/penalty to each for recovering full autonomy.</p>	Y	H						X								X		