

Final Report – Old Dominion University Archive Ingest and Handling Test (AIHT)

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1.0 Project Summary

The Archive Ingest and Handling Test (AIHT) was a Library of Congress (LC) sponsored research project administered by Information Systems and Support Inc. (ISS). The project featured five participants:

- Old Dominion University Computer Science Department
- Harvard University Library
- Johns Hopkins University Library
- Stanford University Library
- Library of Congress

All five participants were to receive identical disk drives containing copies of the 911.gmu.edu web site, a collection of 9/11 materials maintained by George Mason University (GMU). The purpose of the experiment was to perform archival forensics to determine the nature of the archive, ingest it, simulate at least one of the file formats going out of scope, export a copy of the archive, and import another version of the archive. The AIHT is further described in Anderson & Shirky (2004) and Lamolinara (2004).

2.0 Research Performed

Old Dominion University (ODU) was the only non-library to participate in the AIHT. Consequently, whereas the other participants had (or were in the process of establishing) well-defined, production-level archiving systems, ODU did not have an established archiving system and process. Instead, our focus was on alternative archiving concepts. The areas investigated include:

- self-archiving objects (buckets)
- archive models & granularity
- archive ingest
- format conversion
- archive export & import

Another distinguishing characteristic of ODU's approach was the use of the MPEG-21 Digital Item Declaration Language (DIDL) complex object format. MPEG-21 DIDL is similar to the Metadata Encoding and Transmission Standard (METS, 2004). Digital library (DL) use of MPEG-21 DIDL was first introduced by the Los Alamos National Laboratory (LANL) (Bekaert et al., 2003). ODU has several collaborations with LANL, so we were eager to build our archives based on this format.

2.1 Buckets

Our original focus was to be on extending buckets (Nelson, 2000) to be true "self-archiving" digital objects. Our plan was to adapt the "flocking rules for birds" (Reynolds, 1987) so buckets could handle their own refreshing of bits. Unfortunately, we spent most of our time working on the archive models and MPEG-21 DIDL representations. Also, the display for buckets was previously optimized for small numbers of objects and not the 50k+ objects in the 9/11 GMU archive. We did perform considerable work on the bucket methods to adapt them to work on the large archives, although interactive access to the individual resources does not really match the intended use of the bucket display. API level access (admin method) to the bucket as an archival storage facility is the only thing that really makes sense (Figure 1). We did switch from a DOM to SAX parser for the display methods so that interactive display of the 9/11 GMU archive was possible. Figure 2 shows a bucket loaded with test MPEG-21 DIDL (8 objects) shown in Appendix 1. Appendix 2 has the MPEG-21 DIDL specification of the bucket itself.

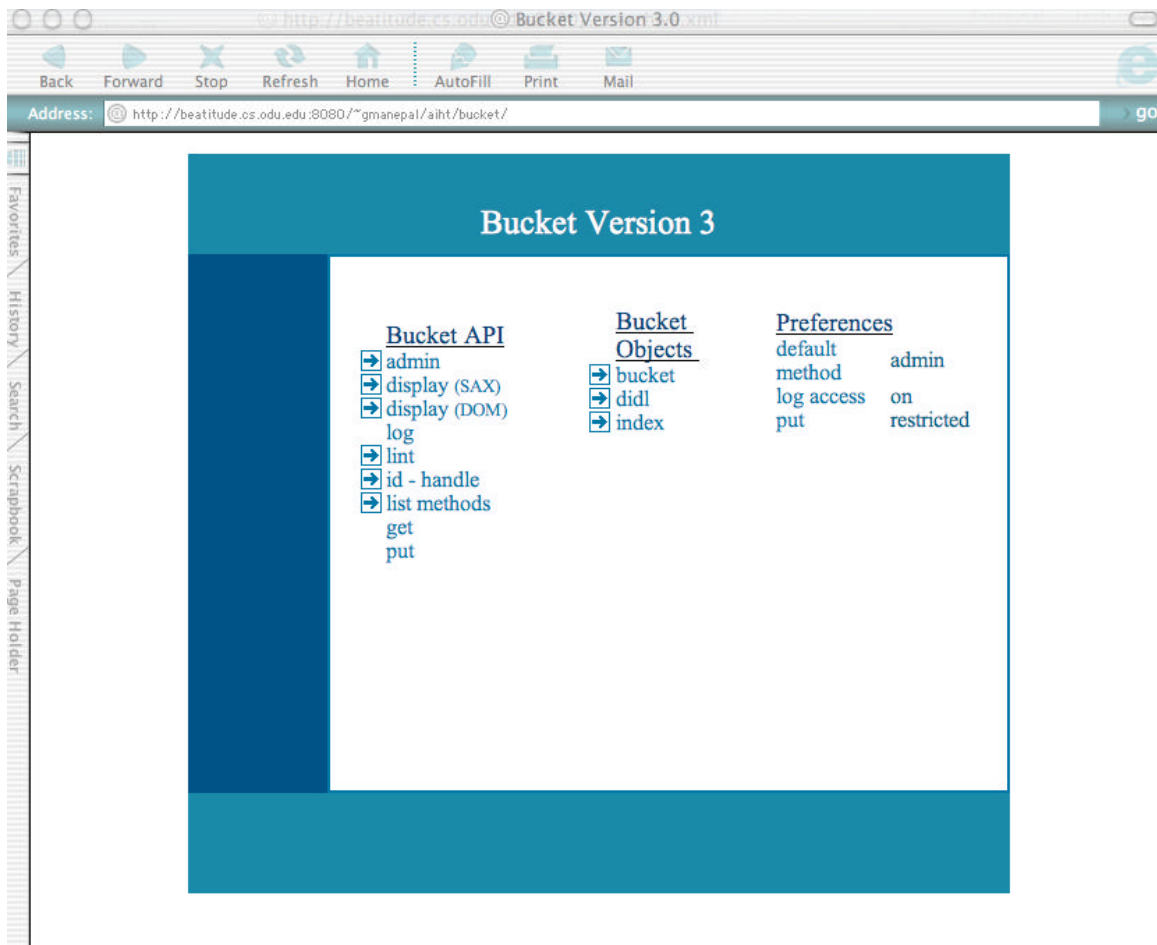


Figure 1. Bucket Methods Exposed as an Interactive Service

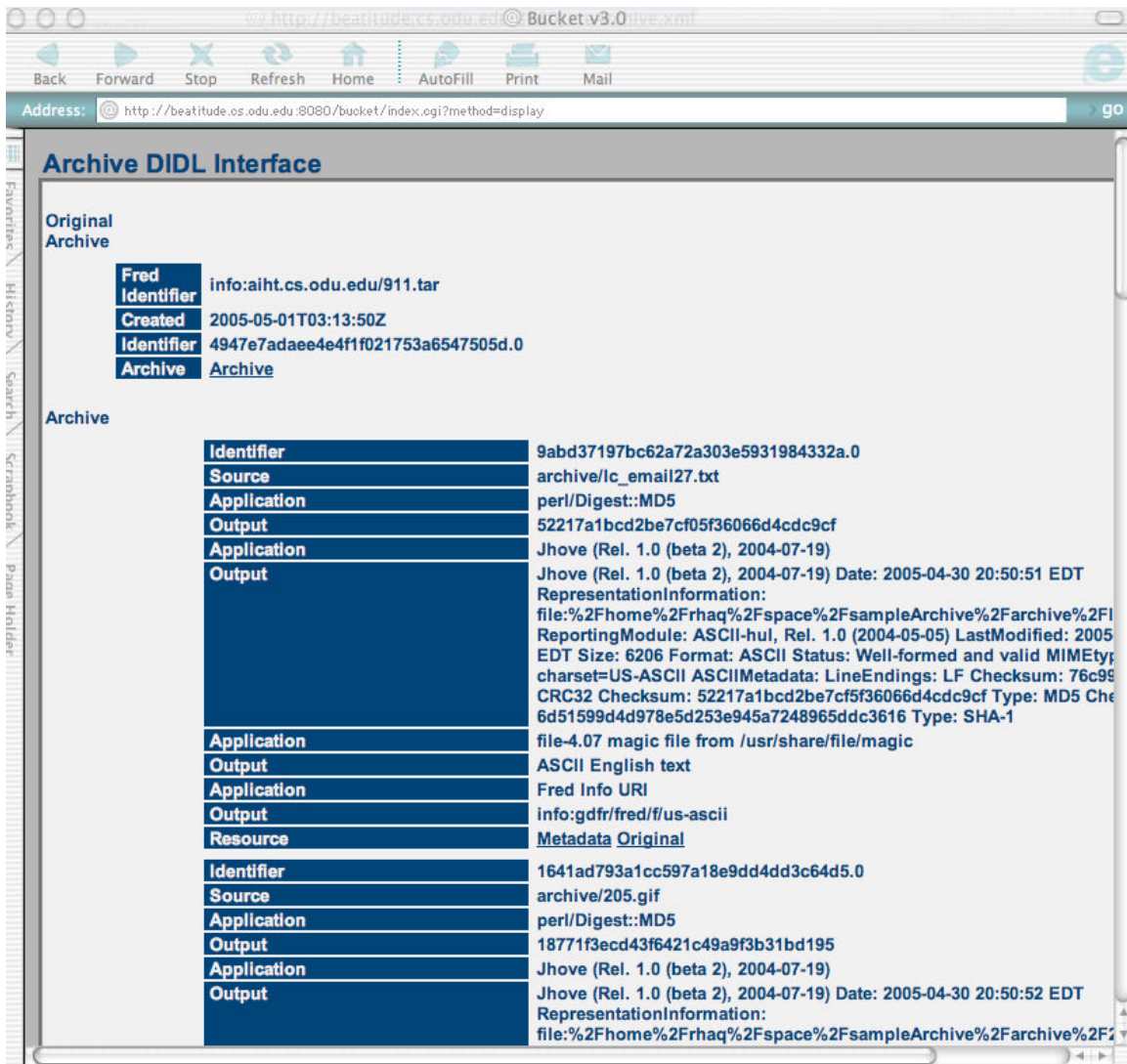


Figure 2. Interactive Bucket Display of the Test MPEG-21 DIDL

If the user clicks on the resource tag "original", they will see the resource displayed (Figure 3 shows one of the images from the test archive). Clicking "metadata" will display the results shown in Appendix 3. This bucket can be further explored at:

<http://beatitude.cs.odu.edu:8080/bucket/>

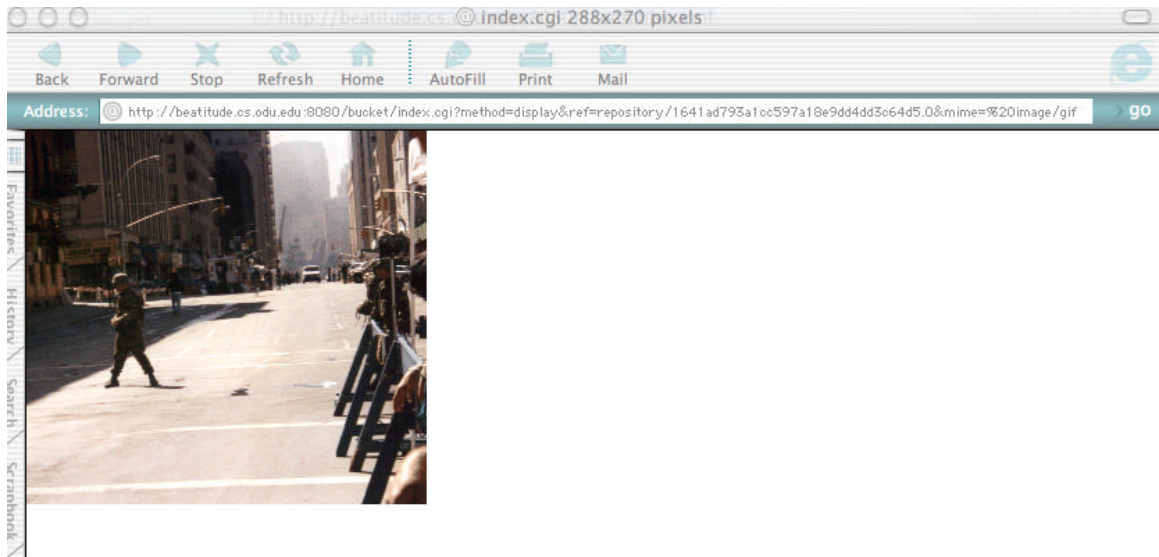


Figure 3. Display of a MPEG-21 Resource via a Bucket Display Method.

Work on the bucket API is incomplete and will continue after this project concludes. The AIHT drop box does not have the buckets themselves, just the archive DIDLs.

2.2 Archive Models & Granularity

Since we had no archive model dictated by an existing software system or institutional procedure, we evaluated several models of representing the archive in a DIDL. First, we begin with a short review of MPEG-21 DIDL terminology and its abstract data model.

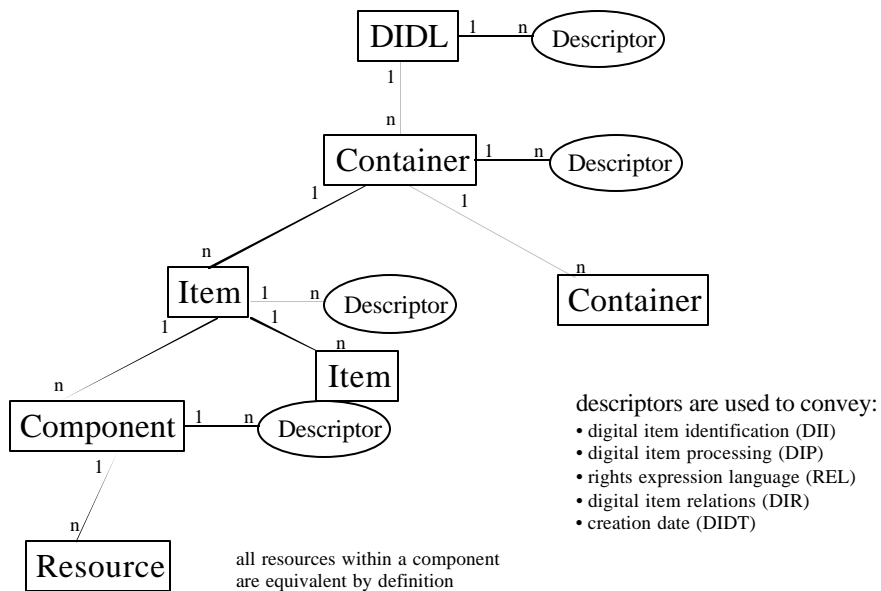


Figure 4. The MPEG-21 DIDL Abstract Data Model.

Unlike METS, MPEG-21 has an abstract data model that does not have specific semantics encoded in its declaration language. There are many nuances, but the most important concept is the definition of Containers, Items, Components and Resources. As Figure 4 shows, a DIDL contains at least 1 container and containers can be recursively defined. Containers eventually hold 1 or more Items, and Items hold 1 or more Components or Items. Components hold 1 or more Resources. Resources are the leaf nodes in the data model; they either contain URIs (by-reference representation) for data objects (PDFs, MPEGs, HTML, etc.) or contain the actual data objects in base64 encoded XML (by-value representation). Resources are the ultimate "thing" that we wish to convey, and the additional infrastructure allows the expression of the hierarchy and relationships between multiple data objects. Although a Component can contain multiple Resources, by definition the Components are considered to be equivalent representations; multiple Resources are generally specified in order to have by-reference or by-value representations, or possibly different encodings (e.g. .zip vs. tar.gz) of the same data object.

The other important consideration for understanding MPEG-21 DIDL is that every level in the hierarchy except for Resources can have extensible Descriptor elements (multiple Resources are bound together in a single Component, and the Component's Descriptors apply equally across all the Resources in the Component). Descriptors are simply wrapper elements; they can contain any XML encoded data. Some of the standard Descriptors that are defined by MPEG-21 include digital item identifiers (DII), digital item processing (DIP), rights expression language (REL), digital item relations (DIR), and digital item creation date (DIDT).

We considered several different granularity models before settling in on 1 file from the original tar file = 1 Component in the DIDL.

2.2.1 1 archive = 1 Component

We considered not separating the untarring the original tar file and simply storing changes in the tar file as a list of operations to apply to the original tar file in different Components. While this would have been simpler from a bucket-point-of-view, it would not have resulted in an easily accessible archive. Even though the AIHT had no provisions for actually using the original archive (or reconstituting it as a web site), there was an intuition among our team that storing a largely unprocessed tar file would not be useful.

2.2.2 1 archive = 1 Container

An almost opposite viewpoint to the above option was to represent each version of the archive (original, version at t_0 , version at t_1 , etc.) as a separate Container. This approach is optimized for access to different versions of the archive, and might be appropriate for

browsing and retrieving different versions at different timestamps. We also considered an optimization where would keep the original version of the archive, the current version, and a list of operations to perform to reproduce any intermediate versions. Again, although no access model was suggested in the AIHT parameters, we felt this approach would incur excessive overhead that did not match our anticipated access model.

2.2.3 1 file = 1 Component

Ultimately, we settled on a model where we considered the tar encoding a disposable artifact and focused on the individual files. The file granularity is also tightly tied with our ingestion process outlined below. It is important to stress that the model explained in this section represents our current thinking about archive representation in DIDL; other models are possible and further use might lead to refinements. Although Appendix 1 gives a fully "expanded" view of the 8 Component test archive, we will walk through the archive structure here using the "+" and "-" XML display conventions of Internet Explorer to illustrate the final architecture. Figure 5 shows the top-level view of the archive and the XML comments address the contents of the "collapsed" element immediately below it. Figure 5 shows 1 Container in the DIDL and 2 Descriptors (an identifier and creation date) for the container.

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- archive.xml -->
- <didl:DIDL xmlns:didl="urn:mpeg:mpeg21:2002:01-DIDL-NS">
- <didl:Container>
  <!-- Original Archive Identifier -->
+ <didl:Descriptor>
  <!-- Creation Date of this XML representation -->
+ <didl:Descriptor>
  <!-- Archive -->
- <didl:Item>
  <!-- Original Archive -->
+ <didl:Item>
  <!-- Item File Name Mapping -->
+ <didl:Item>
  <!-- Archive Contents -->
+ <didl:Item>
</didl:Item>
</didl:Container>
</didl:DIDL>
```

Figure 5. The Top-Level View of the Archive.

Figure 5 shows 1 top-level Item, and that Item contains 3 sub-Items: the contents of the original archive (unprocessed), a mapping table of the file names as they were originally read from the tar file and then mapped to the DIDL representation, and the per-file contents of the archive. Clicking on the last Item (per-file contents), Figure 6 illustrates 8 separate Components, one for each file in the test archive.


```

<?xml version="1.0" encoding="UTF-8" ?>
<!-- archive.xml -->
- <didl:DIDL xmlns:didl="urn:mpeg:mpeg21:2002:01-DIDL-NS">
- <didl:Container>
  <!-- Original Archive Identifier -->
+ <didl:Descriptor>
  <!-- Creation Date of this XML representation -->
+ <didl:Descriptor>
  <!-- Archive -->
- <didl:Item>
  <!-- Original Archive -->
+ <didl:Item>
  <!-- Item File Name Mapping -->
+ <didl:Item>
  <!-- Archive Contents -->
- <didl:Item>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
  </didl:Item>
</didl:Item>
</didl:Container>
</didl:DIDL>

```

Figure 6. Per-File Contents of the Archive.

Figure 7 shows a high-level view of a single component. There are 4 Descriptors associate with the Component, and although the test archive just has by-reference inclusion of the data objects in a single Resource, by-value and by-reference Resources are possible together or separately. The Descriptors associated with the Component reflect the introspection on the file performed at ingestion. The new file name is also described in the ingestion process.

```

<?xml version="1.0" encoding="UTF-8" ?>
<!-- archive.xml -->
- <didl:Didl xmlns:didl="urn:mpeg:mpeg21:2002:01-DIDL-NS">
- <didl:Container>
  <!-- Original Archive Identifier -->
+ <didl:Descriptor>
  <!-- Creation Data of this XML representation -->
+ <didl:Descriptor>
  <!-- Archive -->
- <didl:Item>
  <!-- Original Archive -->
+ <didl:Item>
  <!-- Item File Name Mapping -->
+ <didl:Item>
  <!-- Archive Contents -->
- <didl:Item>
- <didl:Component>
  <!-- File Identifier -->
+ <didl:Descriptor>
  <!-- MD5 Checksum of the File Contents -->
+ <didl:Descriptor>
  <!-- Output of Jhove -->
+ <didl:Descriptor>
  <!-- Output of file -->
+ <didl:Descriptor>
  <!-- Fred URI -->
+ <didl:Descriptor>
  <!-- File Resource -->
  <didl:Resource mimeType="text/plain" ref="repository/9abd37197bc62a72a303e5931984332a.0" />
</didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
+ <didl:Component>
</didl:Item>

```

Figure 7. A Top-Level View of a Single Component.

2.3 Archive Ingest

The purpose of our archive ingest process is to produce DIDLs. Ultimately, we intend for our DIDLs to be placed inside buckets, but where those buckets (and DIDLs) ultimately reside is a separate process. In short, we have no institutional repository for which we are ingesting; our process would likely be considered pre-ingest for traditional archiving operations. Figure 8 shows the top-level workflow diagram for the ODU ingest process. We parallelized our workflow process; Figure 9 shows the speed up experienced while processing on our 32-node Sun Solaris workstation cluster. For the AIHT, the speed-up leveled off after 16 nodes.



Figure 8. Archive Workflow.

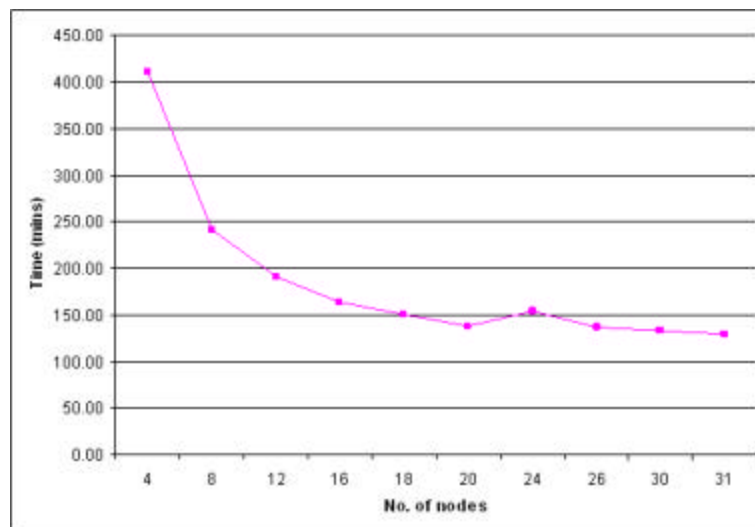


Figure 9. Speed Up for Parallel Ingest.

The Figure 8 node "file metadata processing" is expanded as a separate workflow process in Figure 10. This is the heart of the ingest process, and each part corresponds to the Component Descriptors shown in Figure 7. This process is designed to be expandable: both for future ingest processes and for post-archival introspection. The descriptors are explained further below, but have the general structure of importing Dublin Core semantics, with the program that is being run specified in DC.Creator and the program's output in DC.Description.

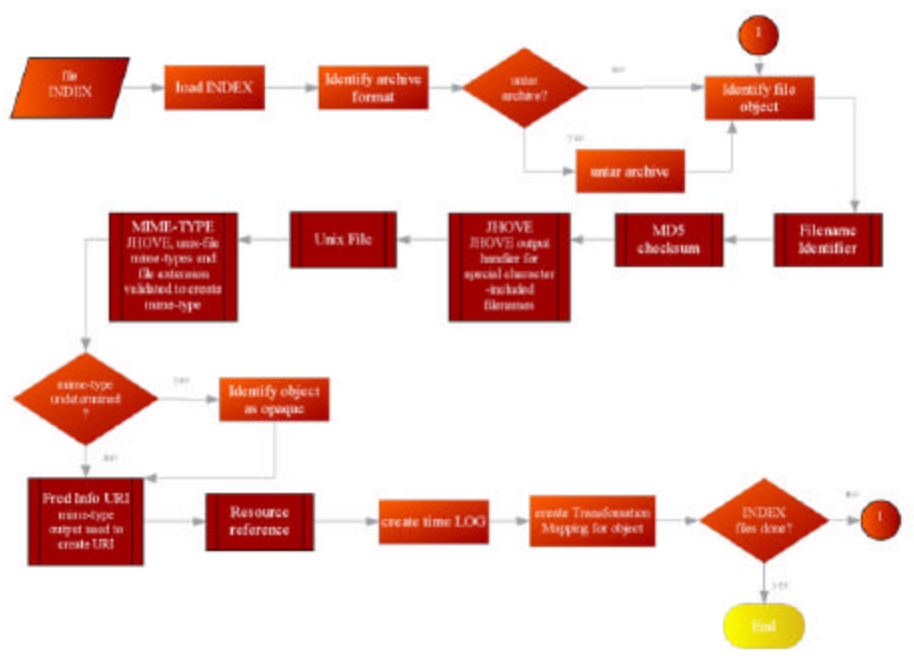


Figure 10. File Processing Workflow.

2.3.1 File Identifier

We assign a new file identifier to replace the given file name in the original tar file. It is based on the MD5 of the file name (not the file contents), appended with an integer indicating its revision level. This revision level is incremented if the file is updated (section 2.4 below). The purpose of the new name is to remove any operating system unfriendly characters that might be in the file name. The corresponding XML fragment is given below:

```

<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">9abd37197bc62a72a303e5931
984332a.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/lc_email27.txt</dc:sou
rce>
</didl:Statement>
</didl:Descriptor>

```

Although the (new, old) values are given above, a complete mapping file of all the old names to new names is created and inserted into the archive. This will aid services that

later try to reconstitute the archive and need to maintain referential integrity. This Descriptor follows a slightly different format than the others, with DC.Identifier (new) and DC.Source (old) used instead of DC.Creator and DC.Description.

2.3.2 MD5 Checksum of the File Contents

A checksum of the file contents is computed so the veracity of the original file can be verified. It is important to not confuse this MD5 value (file contents) with the MD5 value specified in 2.3.1 (file name). The corresponding XML fragment is given below:

```
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">52217a1bcd2be7cf05f36066d4
cdc9cf</dc:description>
</didl:Statement>
</didl:Descriptor>
```

2.3.3 Jhove Output

Each file was processed with JHOVE (JSTOR/ Harvard Object Validation Environment; hul.harvard.edu/jhove/) to create technical metadata about the file. JHOVE can provide voluminous technical metadata about a limited number of popular MIME types; it can be thought of as a "depth-first" approach to technical metadata. Although JHOVE can produce XML output, we used plain text output in our ingestion process. This is an artifact of trying to minimize the number of XML elements to speed up parsing when we had only a DOM-based parser. This could be changed in the ingest process configuration file. The corresponding XML fragment is given below:

```
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:51 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fic_email27%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:25:35 EDT
Size: 6206 Format: ASCII Status: Well-formed and valid MIMEtype: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF Checksum: 76c99b38 Type: CRC32 Checksum:
52217a1bcd2be7cf5f36066d4cdc9cf Type: MD5 Checksum:
6d51599d4d978e5d253e945a7248965ddc3616 Type: SHA-1</dc:description>
</didl:Statement>
</didl:Descriptor>
```

2.3.4 File Output

If JHOVE is used for depth-first technical metadata, then the Unix command "file" is used for breadth-first technical metadata. "file" knows very little about a wide variety of formats and would be a useful insight as to a file's format and purpose if JHOVE was unaware of the file type. The corresponding XML fragment is given below:

```
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ASCII English
text</dc:description>
</didl:Statement>
</didl:Descriptor>
```

2.3.5 Fred URI

As a further attempt to classify the file in question, we perform a lookup in the Format Registry Demonstrator (Fred) to get an Info: URI to classify the file type. Fred is a precursor to the Global Digital Format Registry (GDFR). The reasoning behind Fred and GDFR is that MIME types are biased toward engineering efficiency around a temporal bubble of today and are insufficient in a historical context for specifying the "type" of a file. For example, the MIME type "application/pdf" does not specify what version of PDF the file is, and different PDF versions have very different features and behaviors. The corresponding XML fragment is given below:

```
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdfr/fred/f/us-
ascii</dc:description>
</didl:Statement>
</didl:Descriptor>
```

2.3.6 Resource

While not a Descriptor, the actual Resource for the file should be discussed. In particular, despite the presence of JHOVE, "file" and Fred, we ultimately assign the

MIME type using the Perl module File::MMagic. This is because JHOVE is not good at guessing the MIME type of files that it does not know, "file" does not strictly return MIME types (cf. "ASCII English Text" in section 2.3.4) and few applications know how to process a Fred Info URI. Despite better alternatives, MIME types will be with us for some time. The corresponding XML fragment is given below:

```
<didl:Resource mimeType="text/plain"  
ref="repository/9abd37197bc62a72a303e5931984332a.0" />
```

2.3.7 In Vivo Preservation (deferred)

One research area we were especially interested in was the concept of "In Vivo" preservation, which is finding copies (or near copies) of the file in question in the living web. Since the original files came from a web site that is still in operation, we were interested in creating links from our archived (static) copies to copies that still exist in the living web. This is motivated by the fact that the collective Web is much larger than any archive a single institution will be able to construct, and the more "hooks" we could build from our archive to copies that exist on the Web, the greater the chance that we could find alternate copies, both exact duplicates or migrated formats (i.e., from an old format to a new format).

We wrote a script that would query Google based on the either file name (for images, video and other non-textual formats) or for keywords (textual files). The annotated links to the files found on the web were to be included in another Descriptor element. Unfortunately, the results did not match our expectations. Many of the files were short and described one of the most documented horrific events in modern history. While we were able to find related files, finding the original copies proved difficult; they were often buried deep in Google's list of returned URLs.

There are several related reasons for this. First, Google ranks its results based on page popularity, which corresponds to the number of pages in the web that point to a particular page. This tends to favor top-level sites and discriminate against pages that are buried deep in a web site. The deeper pages will surface if the search terms are able to isolate a particular page versus all other pages on the web, but if the search terms are "World Trade Center 9/11 Pentagon", then there are many more popular pages that will be returned first. In information retrieval, there is a concept called TFIDF. Term Frequency (TF) is a rank ordering of the most frequent terms in a given document. The Document Frequency (DF) is the ordering of term frequency across all documents. Finding a balance between TF and the Inverse DF (IDF, or least popular terms) helps find documents. In other words, "good" search terms will be frequent in a particular document, and infrequent in the entire corpus. Computing TF is easy since it only requires the original file. Computing IDF is difficult, since it presupposes knowledge of the entire corpus. In our case, the corpus was the web, so computing IDF is impossible. There are methods to estimate IDF, but this proved to be beyond the scope of this project. Our experiences with this approach did lead to additional research. A MS Thesis and

NSF proposal (section 4) have been the direct result of our attempt to perform In Vivo preservation on the AIHT archive.

2.4 Format Conversion

Format conversion is handled as a batch, post-archive process. We have a script that "walks" a DIDL and looks for MIME types matching the input parameter to convert to the specified output parameter. We have an additive, file-granularity model of additions to the archive. Figure 11 illustrates the process – we leave the original file in place, but increment the integer suffix on the file name. We also add a new Descriptor to the previous version that contains an XPath pointer to the new version.

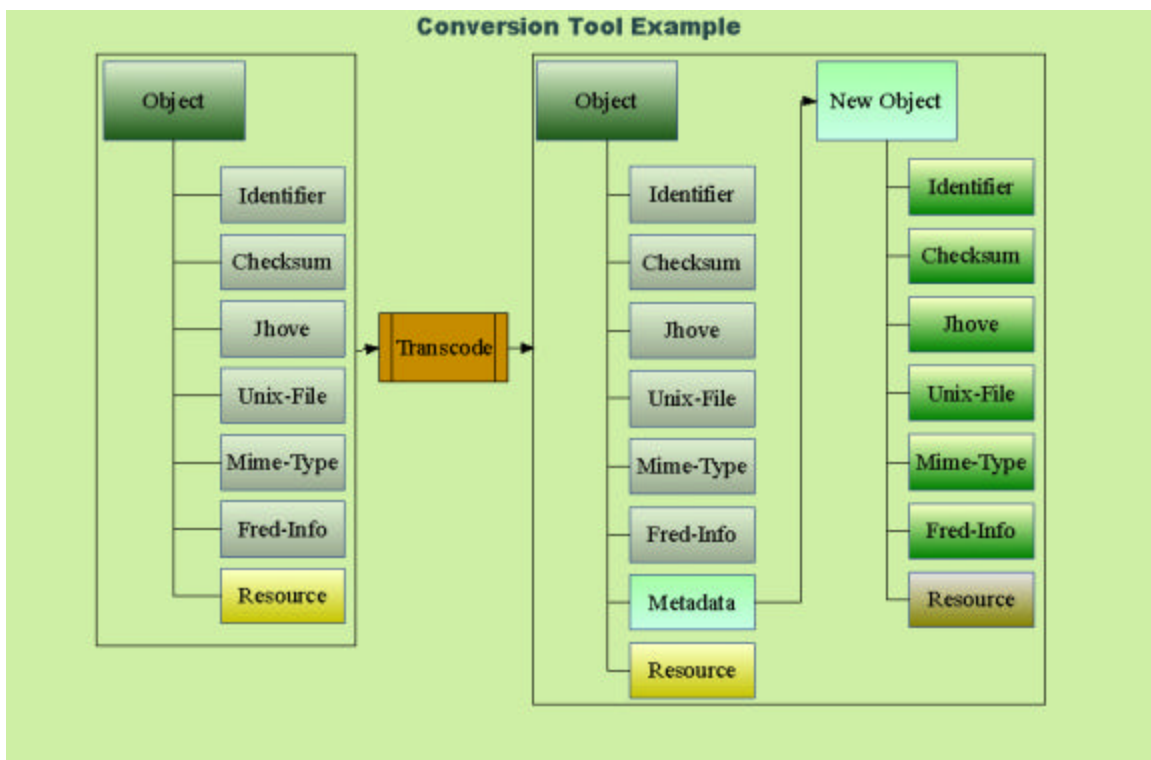


Figure 11. Conversion Process.

If the previous version of the Resource was specified as:

```
<didl:Resource mimeType="image/jpeg"
ref="repository/9abd37197bc62a72a303e5931984332a.0" />
```

then the new version of the resource is specified as:

```
<didl:Resource mimeType="image/png"
ref="repository/9abd37197bc62a72a303e5931984332a.1" />
```

We investigated converting PDF to Scalable Vector Graphics (SVG), an XML-based image format. But ultimately, the tools for SVG were not mature enough to make this

feasible. We eventually used "transcode" (www.transcoding.org) to convert AVI to the DVD profile of MPEG-2 (VOB). transcode successfully converting approximately 1/2 of the AVIs, and the resulting VOBs were a factor of 5 larger. The results of transcode are shown in Figure 12 and are available for interaction at:

<http://beatitude.cs.odu.edu:8080/~gmanepal/Transcode.html>

AVI	Done ?	Error Report	VOB
001-01	No	Video Stream Conversion Failure	001-01
001	No	Video Stream Conversion Failure	001
002-01	No	Video Stream Conversion Failure	002-01
002	No	Video Stream Conversion Failure	002
003-01	No	Video Stream Conversion Failure	003-01
003	No	Video Stream Conversion Failure	003
004-01	No	Video Stream Conversion Failure	004-01
004	No	Video Stream Conversion Failure	004
2nd-tower-goes-down-2	Yes		2nd-tower-goes-down-2
2nd-tower-goes-down	Yes		2nd-tower-goes-down
actual-crash	Yes		actual-crash
another-explosion-again	Yes		another-explosion-again
another-explosion	Yes		another-explosion
BUSH01	Yes		BUSH01
capitol-rumor	Yes		capitol-rumor
cnn-actual-crash	Yes		cnn-actual-crash
explosion-live	Yes		explosion-live
krash	No	Video Stream Conversion Failure	krash
NY_from_far	No	Video Stream Conversion Failure	NY_from_far
Pentagon_001	No	Video Stream Conversion Failure	Pentagon_001
pentagon-fire	Yes		pentagon-fire
pentagon-fire-confirmed	Yes		pentagon-fire-confirmed
ras	No	Video Stream Conversion Failure	ras
toren2	Yes		toren2
tower-on-smoke	Yes		tower-on-smoke
twc_towers_collapse[1]	Yes		twc_towers_collapse[1]
wtc	No	Video Stream Conversion Failure	wtc
wtc_divx	No	Audio Stream Conversion Failure	wtc_divx

Detailed Output Report [output.log](#)
Detailed Error Report [error.log](#)

Figure 12. Transcode AVI -> VOB Conversion Results.

Our conversion script also used Image Magick to convert between common graphics formats. The results of JPEG -> PNG conversion (no errors) are available at:

<http://beatitude.cs.odu.edu:8080/~gmanepal/aiht/convert/images/>

2.5 Archive Export and Import

In OAIS terminology, MPEG-21 DIDL was both our Archive Information Package (AIP) and our Dissemination Information Package (DIP). Archive export for us is as simple as removing the DIDL from the bucket using the bucket API:

<http://beatitude.cs.odu.edu:8080/bucket/?method=get&id=didl>

Our treatment of importing archives (Submission Information Packages (SIPs)) is both simple-minded and paranoid. Operating on a file-level granularity, we take whatever technical and descriptive metadata that comes with the file, save it into Descriptors, and then process the file as per the original ingest. If we imported our own DIDL repeatedly, it would grow with the same file, but increasing numbers of descriptors. We chose the Harvard export METS profile because it appeared most similar to ours in terms of file granularity. Our DIDL structure remains unchanged; it simply has more Descriptors. We make no attempt to understand the external metadata we import; parsing and provenance are problems for future users of the archive. The following XML fragment shows how we encapsulated Harvard's metadata into Descriptors:

```
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">External Metadata</dc:creator >
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:aes="http://www.aes.org/audioObject"
xmlns:app="http://hul.harvard.edu/ois/xml/ns/drs/app"
xmlns:mix="http://www.loc.gov/mix/" xmlns:tcf="http://www.aes.org/tcf"
xmlns:txt="http://www.loc.gov/METS/text/" xmlns:xlink="http://www.w3.org/TR/xlink"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">
<file ID="F1" MIMETYPE="image/jpeg" SEQ="1" SIZE="194914" ADMID="T1"
CHECKSUM="a7969810684c468525313b8282501405" CHECKSUMTYPE="MD5"
OWNERID="aiht/websites/chnm/september11/REPOSITORY/CONTRIBUTORS/1199_photos/w
tc_web/wetc5.jpg">
  <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///aiht/data/2004/12/17/0/122.jpg" />
  </file>

<mix:mix >
<mix:BasicImageParameters >
<mix:Format>
  <mix:MIMETYPE>image/jpeg</mix:MIMETYPE>
  </mix:Format>

<mix:Compression>
  <mix:CompressionType>6</mix:CompressionType>
  </mix:Compression>

<mix:PhotometricInterpretation>
  <mix:ColorSpace>6</mix:ColorSpace >
  </mix:PhotometricInterpretation >

<mix:File >
  <mix:Orientation >1</mix:Orientation>
  </mix:File>

  </mix:BasicImageParameters >

<mix:ImageCreation >
<mix:DigitalCameraCapture >
  <mix:DigitalCameraModel>Canon Canon EOS D30</mix:DigitalCameraModel>
```

```

</mix:DigitalCameraCapture >

</mix:ImageCreation>

<mix:ImagingPerformanceAssessment >
<mix:SpatialMetrics >
  <mix:SamplingFrequencyUnit>2</mix:SamplingFrequencyUnit>
  <mix:ImageWidth>540</mix:ImageWidth>
  <mix:ImageLength>360</mix:ImageLength>
</mix:SpatialMetrics >

<mix:Energetics>
  <mix:BitsPerSample>8 8 8</mix:BitsPerSample >
</mix:Energetics>

</mix:ImagingPerformanceAssessment >

</mix:mix >
</dc:description >
</didl:Statement>
</didl:Descriptor>

```

We also experimented with exporting our archive as a METS document. Appendix 4 shows the conversion of test archive (Appendix 1) into METS.

3.0 Lessons Learned

3.1 Large XML Files

We began this process rather stubbornly regarding large XML files. The current state of most XML enforces file size limits (most parsers are DOM-based and consume memory greedily). We consider these limitations to be an artifact of the here-and-now and we tried to resist any engineering approach to subdivide the files into manageable chunks. We believed that the physical structure should more closely resemble the logical structure, and in a few years the concept of what constitutes a "large" XML file will likely be very different. It was not that long ago that file systems limited *any* file to 2GB.

We deviated from this approach slightly. Table 1 shows the various DIDLs we uploaded to the AIHT drop box. The first two were completely by-value inclusions of all files. The others retreated slightly to by-reference inclusion of the files, having a flat directory of md5 named files (tarred for uploading to the drop box). As Table 1 shows, the by-reference files are much smaller, but still quite large for commonly available tools.

Name	XML File Size (bytes)	Notes
DIDL.xml	15382712841 (15 GB)	By-Value. This first upload did not contain the files "outside" of the original tar file.
DIDL2.xml	35633037513 (35 GB)	By-Value. This upload contained all files (tar file + database files)

DIDL3.xml	322653621 (322 MB)	By-Reference. All files. File size does not include tar file (26 GB).
DIDL4.xml	407093487 (407 MB)	By-Reference. Harvard Import. File size does not include tar file (24 GB).

Table 1. XML File Sizes.

Our ingestion process used a SAX-based parser, so XML files were not a problem. But buckets originally used a DOM-based parser and needed to be converted to a SAX-based parser in order to process the files. More importantly, the display method for buckets was biased toward interactive access to the bucket contents. This does not match well with archives of any size, so "overview" adjustments needed to be made to insure that archive display was even possible. In the future we need to create a display method that will generally handle large files so that interactive display of contents (or at least a highly summarized view of the contents) is possible.

3.2 Acquisition Models

Perhaps the most important thing we learned during the AIHT dealt with the archive acquisition model. To some extent, the AIHT was an exercise in file forensics, and it served that purpose well. But there was a mismatch between a web crawler acquisition model and an institutional repository model.

With an institutional repository, there is controlled input and an internal data model. The content presumably is ultimately manifested in a web site, but any archive export would derive from the internal data model, not the web site representation. This is in contrast to a web crawling model, where the web site is traversed and the relationship between pages and links is used to recreate a model of the web site, if not the internal data model.

However, what we received was neither fish nor fowl. We received a file system based representation that had both web crawls and bits of an internal data model strewn throughout the file system. Although we did not have time to verify this, we believe it would have been ultimately easier to crawl the 911.gmu.edu web site ourselves to get the data in a web normalized form. The AIHT tar file might have represented the most general case (one cannot focus on just web sites that are still active), but it probably represented the most difficult non-byzantine case.

If we could assume cooperation on the part of the web site maintainer, then the easiest thing for them to do is to install `mod_oai`, an Apache module that streams out web site contents using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) and complex object formats such as MPEG-21 DIDL (Nelson et al., 2005). `mod_oai` essentially converts web sites into OAI DIPs. We cannot assume that all web sites will have `mod_oai` installed, but those web sites that would like to be archived by third parties could certainly use `mod_oai` to facilitate archiving. It would have been

interesting to investigate GMU's use of mod_oai to see if it would make there web site dissemination task easier and the other AIHT participants' tasks easier as well.

Finally, this leads to our experiences with the Transfer Metadata (TMD). We did not use the TMD at any point in our ingest process. The only reason we would have used it would be for verifying the checksums of individual files. However, rather than further developing a TMD format, along with all the creeping featurisms that would inevitably result, we would like to see future attempts use complex object formats, such as METS or MPEG-21 DIDL. In essence, these formats are both the archived object and the TMD. If a TMD surrogate is needed, it can be computed from the complex object format.

4.0 New Research Directions

4.1 AIHT Spinoff Student Projects

This project supported two MS students for 1 year: Rabia Haq and Giridhar Manepalli. Rabia is still approximately 1 year from graduation, but Giridhar will likely graduate summer 2005. Hopefully Rabia's MS project will be influenced by the AIHT experience, but this research has already directly resulted in 1 MS project and 1 MS thesis.

4.1.1 Terry Harrison, MS Thesis, summer 2005

We were unable to successfully find "live" copies of the 9/11 files on the web. While we could find related documents, we could not (easily) find exactly the same document. This was because although we could find the most common terms in a particular file (term frequency), we did not know the frequency of the terms in the web (document frequency). Without document frequency, it is difficult to find the terms that uniquely specify the document out of the entire web.

Terry's MS thesis is about mining document frequency from Google to generate lexical signatures (Phelps & Wilensky, 2000; Park et al., 2004) that can be used to find duplicate and near-duplicate copies of files on the web. Terry's thesis has formed the basis for a NSF proposal for alternative preservation models.

4.1.2 Giridhar Manepalli, MS Project, summer 2005

During the Stanford AIHT meeting in March 2005, the idea for a conversion tool to create MPEG-21 DIDLs or METS from tar files was suggested. Giridhar will investigate the issues surrounding the conversion from tar, zip, shar and other traditional Unix/DOS

utilities to create MPEG-21 DIDLs and METS files. This tool will be made available to the AIHT project members and the general public.

4.2 *mod_jhove*

We were impressed with JHOVE during the AIHT and are interested in incorporating its output in a variety of different (primarily batch) situations. This is motivated by the idea that http servers should do more to describe their holdings. The power of http arguably derives from its simplicity, but our experiences with *mod_oai* have shown that http servers can be extended to provide additional details about their holdings.

One such project could be the integration of an Apache module, *mod_jhove*, that would provide technical metadata (or perhaps a simplified profile) as http headers to a web crawler's request. The user agent field could be modified so that interactive users do not receive the technical metadata, but web crawlers do. The http headers in the response are typically saved during a crawling session, so the results would likely be saved even if the web crawlers do not immediately understand the headers. Caching could be investigated to save on the overhead of generating these headers to minimize the server load and response delay.

Similarly, JHOVE output could be integrated in *mod_oai*'s *oai_didl* format. This would result in a stronger case for *oai_didl* as a preservation format and OAI SIP/DIP.

References

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- Reynolds, C. W. (1987). Flocks, herds and schools: A distributed behavioral model, *Proceedings of SIGGRAPH 87*, pp. 25-34.

Appendix 1 – Sample MPEG-21 DIDL (8 Resources)

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- archive.xml -->
<didl: DIDL xmlns:didl="urn:mpeg:mpeg21:2002:01-DIDL-NS">
<didl: Container>
<!-- Original Archive Identifier -->
<didl: Descriptor>
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dii: Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">info:aiht.cs.odu.edu/911.tar</dii: Identifier>
</didl: Statement>

</didl: Descriptor>

<!-- Creation Date of this XML representation -->
<didl: Descriptor>
<didl: Statement mimeType="text/xml; charset=UTF-8">
<didt: Created xmlns:didt="http://library.lanl.gov/2003-09/MPEG-21/DIDT">2005-05-
01T03:13:50Z</didt: Created>
</didl: Statement>

</didl: Descriptor>

<!-- Archive -->
<didl: Item>
<!-- Original Archive -->
<didl: Item>
<didl: Descriptor>
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dc: description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Original
Archive</dc: description>
</didl: Statement>

</didl: Descriptor>

<didl: Descriptor>
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dii: Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">4947e7adaee4e4f1f021753a6547505d.0</dii: Identifier>
</didl: Statement>

</didl: Descriptor>

<didl: Component>
<didl: Resource mimeType="application/tar"
ref="repository/4947e7adaee4e4f1f021753a6547505d.0" />
</didl: Component>

</didl: Item>

<!-- Item File Name Mapping -->
<didl: Item>
<!-- Mapping Table Identifier -->
<didl: Descriptor>
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dii: Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">5af1a3a285c2bdee4192223e31e1f833.0</dii: Identifier>
```



```

</didl:Statement>

</didl:Descriptor>

<!-- Mapping Table Description -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">The Mapping Table maps
original filenames to their updated MD5 signature filenames</dc:description>
  </didl:Statement>

  </didl:Descriptor>

<didl:Component>
  <didl:Resource mimeType="text/plain"
ref="repository/5af1a3a285c2bdee4192223e31e1f833.0" />
  </didl:Component>

</didl:Item>

<!-- Archive Contents -->
<didl:Item>
<didl:Component>
<!-- File Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">9abd37197bc62a72a303e5931
984332a.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/lc_email27.txt</dc:source>
  </didl:Statement>

  </didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">52217a1bcd2be7cf05f36066d4
cdc9cf</dc:description>
  </didl:Statement>

  </didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```

```

xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:51 EDT Representation Information:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fic_email27%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:25:35 EDT
Size: 6206 Format: ASCII Status: Well-formed and valid MIMEtype: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF Checksum: 76c99b38 Type: CRC32 Checksum:
52217a1bcd2be7cf5f36066d4cdc9cf Type: MD5 Checksum:
6d51599d4d978e5d253e945a7248965ddc3616 Type: SHA-1</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ASCII English
text</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/us-
ascii</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
  <didl:Resource mimeType="text/plain"
ref="repository/9abd37197bc62a72a303e5931984332a.0" />
  </didl:Component>

<didl:Component>
<!-- File Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/

```

```

http://dublincore.org/schemas/xmls/simpledc20021212.xsd">1641ad793a1cc597a18e9dd4d
d3c64d5.0</dc:identifier>
<dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/205.gif</dc:source>
</didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">18771f3ecd43f6421c49a9f3b3
1bd195</dc:description>
</didl:Statement>

</didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:52 EDT RepresentationInformation:
file:%2Fhome%2Frlhaq%2Fspace%2FsampleArchive%2F205%2Egif
ReportingModule: GIF-hul, Rel. 1.1 (2004-06-23) LastModified: 2005-04-10 20:24:59 EDT Size:
74736 Format: GIF Version: 89a Status: Well-formed and valid MIMETYPE: image/gif Profile:
GIF 89a GIFMetadata: GraphicRenderingBlocks: 1 Blocks: LogicalScreenDescriptor:
LogicalScreenWidth: 288 LogicalScreenHeight: 270 ColorResolution: 6 BackgroundColorIndex:
0 PixelAspectRatio: 0 GlobalColorTableFlag: Global color table follows; background color index
meaningful GlobalColorTableSortFlag: Not ordered GlobalColorTableSize: 7 GlobalColorTable:
230, 210, 196, 254, 254, 252, 234, 214, 204, 22, 18, 20, 26, 22, 20, 22, 22, 20, 18, 14, 12, 234,
218, 204, 234, 214, 196, 230, 214, 196, 14, 14, 12, 238, 218, 204, 14, 10, 12, 18, 18, 20, 230,
214, 204, 226, 206, 187, 51, 33, 23, 254, 242, 229, 212, 203, 203, 151, 142, 143, 223, 197,
183, 46, 43, 41, 250, 234, 218, 18, 22, 20, 70, 40, 28, 118, 99, 92, 226, 210, 196, 165, 153,
154, 38, 30, 26, 217, 198, 183, 237, 222, 212, 41, 43, 42, 254, 240, 219, 10, 5, 7, 119, 110,
114, 184, 170, 163, 42, 29, 25, 13, 16, 20, 222, 202, 186, 149, 124, 101, 30, 22, 21, 52, 37, 37,
238, 222, 203, 37, 34, 27, 210, 184, 166, 226, 206, 196, 22, 18, 12, 34, 30, 26, 242, 226, 213,
238, 214, 201, 94, 83, 84, 35, 20, 15, 254, 246, 231, 234, 210, 196, 138, 129, 131, 247, 225,
213, 67, 52, 48, 6, 4, 6, 217, 203, 185, 230, 205, 187, 216, 193, 181, 254, 252, 235, 190, 181,
184, 230, 206, 197, 42, 38, 39, 141, 100, 81, 28, 31, 37, 226, 202, 186, 46, 38, 38, 216, 193,
171, 24, 22, 12, 57, 56, 63, 18, 10, 10, 26, 17, 11, 46, 34, 28, 104, 84, 78, 42, 34, 28, 60, 51,
43, 254, 254, 244, 199, 195, 196, 246, 234, 217, 30, 26, 20, 18, 18, 11, 27, 18, 20, 10, 10, 12,
240, 226, 204, 242, 221, 213, 222, 208, 197, 115, 86, 76, 105, 68, 54, 168, 147, 132, 50, 42,
39, 54, 51, 49, 248, 225, 201, 58, 45, 40, 230, 210, 204, 22, 14, 11, 230, 218, 205, 34, 36, 38,
237, 227, 214, 30, 30, 26, 59, 52, 52, 26, 20, 250, 239, 219, 250, 230, 216, 246, 230, 212,
249, 240, 230, 225, 202, 196, 74, 64, 56, 22, 26, 24, 30, 26, 28, 198, 174, 159, 10, 14, 10, 86,
57, 42, 51, 38, 26, 234, 218, 196, 18, 14, 20, 242, 222, 203, 34, 26, 20, 73, 67, 73, 46, 29, 25,
14, 6, 7, 225, 210, 187, 230, 210, 188, 26, 26, 28, 222, 206, 187, 38, 38, 40, 225, 216, 208, 87,
71, 72, 238, 217, 212, 234, 222, 203, 254, 238, 229, 149, 130, 127, 226, 214, 195, 54, 42, 39,

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242, 217, 202, 190, 148, 123, 134, 120, 123, 234, 217, 212, 49, 50, 49, 171, 164, 164, 54, 46,
41, 235, 210, 204, 48, 45, 52, 38, 34, 38, 88, 68, 56, 82, 82, 86, 254, 233, 217, 50, 46, 42, 242,
230, 215, 22, 22, 28, 38, 26, 24, 25, 30, 26, 75, 56, 51, 68, 58, 54, 34, 26, 28, 251, 245, 246,
46, 38, 28, 54, 43, 26, 246, 230, 220, 55, 23, 17, 209, 194, 182, 254, 250, 248, 14, 18, 11, 59,
35, 22, 62, 45, 40, 42, 34, 37, 10, 10, 4, 14, 10, 4, 199, 184, 167, 36, 30, 36, 6, 10, 8, 26, 22,
28, 250, 233, 228, 238, 218, 196, 101, 96, 96, 250, 251, 250, 209, 191, 170, 164, 134, 125, 2,
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226, 210, 204, 234, 206, 192, 42, 38, 28, 72, 52, 33, 22, 14, 20, 22, 10, 9, 19, 6, 7, 44, 35, 19,
191, 165, 136, 234, 210, 188, 44, 27, 12, 102, 99, 110, 216, 215, 218, 27, 9, 9, 18, 14, 4, 29,
34, 28, 224, 195, 171, 246, 238, 218, 36, 27, 11, 220, 176, 139, 13, 10, 20, 230, 214, 188, 54,
46, 52, 85, 42, 28, 60, 59, 51, 14, 14, 4, 230, 222, 207, 238, 210, 194, 124, 124, 130, 14, 23,
21, 242, 205, 173, 226, 206, 204, 59, 46, 52, 122, 118, 94, 242, 234, 217, 18, 18, 28, 141, 139,
140, 43, 30, 36, 230, 214, 212, 210, 185, 181, 22, 18, 28, 6, 14, 11, 33, 43, 42, 19, 10, 20, 241,
240, 236, 254, 246, 220, 227, 210, 213, 238, 191, 162, 34, 22, 28, 225, 220, 229, 228, 228,
226, 209, 172, 157, 225, 203, 170, 44, 38, 52, 37, 36, 52, 230, 198, 184, 239, 232, 237, 242,
228, 228, 225, 183, 161, 69, 102, 115, 12, 6, 20, 236, 201, 193, 248, 209, 191, 253, 238, 202,
229, 214, 177, 149, 151, 172, 230, 222, 196, 242, 210, 191, 230, 218, 220 ImageDescriptor:
ImageLeftPosition: 0 ImageTopPosition: 0 InterlaceFlag: Image is not interlaced
LocalColorTableFlag: No local color table; use global table if available LocalColorTableSortFlag:
Not ordered LocalColorTableSize: 0 NisoImageMetadata: MIMEType: image/gif ByteOrder:
little-endian CompressionScheme: LZW ColorSpace: palette color Orientation: normal
ImageWidth: 288 ImageLength: 270 Checksum: c309714d Type: CRC32 Checksum:
18771f3ecd43f6421c49a9f3b31bd195 Type: MD5 Checksum:
dfba78b0c6865f7ceef6c1c39273e29ecef3f3 Type: SHA-1 </dc:description>
</didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">GIF image data, version 89a,
288 x 270</dc:description>
</didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/gif</dc:descrip
tion>
</didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
<didl:Resource mimeType="image/gif"
ref="repository/1641ad793a1cc597a18e9dd4dd3c64d5.0" />
</didl:Component>

```

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<didl:Component>
<!-- File Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">4005d223a3aeabf6860e3dc89c
54e409.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/nmah2288.txt</dc:sour
ce>
  </didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">37b7e822db8cf3d0629480d94
53172e0</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:53 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fnmah2288%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:26:51 EDT
Size: 2939 Format: ASCII Status: Well-formed and valid MIMEtype: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF Checksum: e668b7fe Type: CRC32 Checksum:
37b7e822db8cf3d0629480d9453172e0 Type: MD5 Checksum:
88db863b162fc88360607db08038914ee8452dde Type: SHA-1</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/

```

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http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ASCII English
text</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/us-
ascii</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
  <didl:Resource mimeType="text/plain"
ref="repository/4005d223a3aeabf6860e3dc89c54e409.0" />
  </didl:Component>

<didl:Component>
<!-- File Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">d12d67155c546aea96718fb93
Of96bea.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/lc_story192.txt</dc:so
urce>
  </didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">f79800024a73f25f5f7748f951d
a309c</dc:description>
  </didl:Statement>

```

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</didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:54 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fic_story192%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:25:49 EDT
Size: 4285 Format: ASCII Status: Well-formed and valid MIMEtype: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF Checksum: 8a9f7520 Type: CRC32 Checksum:
f798024a73f25f5f7748f951da309c Type: MD5 Checksum:
ce138c681ecf6c16f56f276fcac641d6498 Type: SHA-1</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ASCII English text, with very
long lines</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/us-
ascii</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
  <didl:Resource mimeType="text/plain"
ref="repository/d12d67155c546aea96718fb930f96bea.0" />
  </didl:Component>

<didl:Component>

```

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<!-- File Identifier -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">97469cd3d96f2cfe3cb27a8e20f
bcc92.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/email223.txt</dc:source>
</didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">dec44e5b2ed5e19741644d96d
b64c4e2</dc:description>
</didl:Statement>

</didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:55 EDT RepresentationInformation:
file:%2Fhome%2Frho%2Fspace%2FsampleArchive%2Farchive%2Femail223%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:26:32 EDT
Size: 5958 Format: ASCII Status: Well-formed and valid MIMEtype: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF, CRLF Checksum: 8ba57aae Type: CRC32 Checksum:
dec44e5b2ed5e19741644d96db64c4e2 Type: MD5 Checksum:
b25dd13b6fa0cb40f652bfc66576ab6c6c9a22d4 Type: SHA-1</dc:description>
</didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>

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    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ASCII English text, with CRLF,
LF line terminators</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/us-
ascii</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
<didl:Resource mimeType="text/plain" ref="repository/97469cd3d96f2cfe3cb27a8e20fbcc92.0"
/>
  </didl:Component>

<didl:Component >
<!-- File Identifier -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">10c80d92671b9c4b09c21a963
c2a192b.0</dc:identifier>
  <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/1718.waf</dc:source>
  </didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">193e2945e34141434eb83722a
464b9d8</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of Jhove -->

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<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:56 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2F1718%2Ewaf
ReportingModule: BYTESTREAM, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:25:06 EDT
Size: 8886 Format: bytestream Status: Well-formed and valid MIMEtype: application/octet-
stream Checksum: 180f925 Type: CRC32 Checksum: 193e2945e34141434eb83722a464b9d8
Type: MD5 Checksum: 179b8d243d5d65be1083e6ba6f6a95fbc2156a35 Type: SHA-
1</dc:description>
  </didl:Statement>

  </didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">data</dc:description>
  </didl:Statement>

  </didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">application/octet-
stream</dc:description>
  </didl:Statement>

  </didl:Descriptor>

<!-- File Resource -->
  <didl:Resource mimeType="application/octet-stream"
ref="repository/10c80d92671b9c4b09c21a963c2a192b.0" />
  </didl:Component>

</didl:Component>
<!-- File Identifier -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">

```

```

    <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">e0e65ea5543090c2badd80989
2398230.0</dc:identifier>
    <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/1727.jpeg</dc:source>
    </didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">9efec6246ec5d21ad47ea15a65
c0cc7f</dc:description>
    </didl:Statement>

</didl:Descriptor>

<!-- Output of Jhove -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:57 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2F1727%2Ejpeg
ReportingModule: JPEG-hul, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:25:19 EDT
Size: 17284 Format: JPEG Version: 1.01 Status: Well-formed and valid MIMEType: image/jpeg
Profile: JFIF JPEGMetadata: CompressionType: Huffman coding, Baseline DCT Images: Image:
NisoImageMetadata: MIMEType: image/jpeg ByteOrder: big-endian CompressionScheme: JPEG
ColorSpace: YCbCr SamplingFrequencyUnit: inch ImageWidth: 640 ImageLength: 205
BitsPerSample: 8 SamplesPerPixel: 3 Scans: 1 QuantizationTables: QuantizationTable:
Precision: 8-bit DestinationIdentifier: 0 QuantizationTable: Precision: 8-bit
DestinationIdentifier: 1 ApplicationSegments: APP0 Checksum: c8bdef6a Type: CRC32
Checksum: 9efec6246ec5d21ad47ea15a65c0cc7f Type: MD5 Checksum:
9b29cb41454541a4afe2d05fa5c40ae53605cf0 Type: SHA-1</dc:description>
    </didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>

```

```

    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">JPEG image data, JFIF standard
1.01, resolution (DPI), 71 x 71</dc:description>
    </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">info:gdf/fred/f/jpeg</dc:descr
iption>
    </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
    <didl:Resource mimeType="image/jpeg"
ref="repository/e0e65ea5543090c2badd809892398230.0" />
    </didl:Component>

</didl:Component>
<!-- File Identifier -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">478606aa585cc628611bb4fb2
4468877.0</dc:identifier>
    <dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/satan270.txt</dc:sourc
e>
    </didl:Statement>

</didl:Descriptor>

<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
    <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
    <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">613022744039531623041a98c
fe5e7eb</dc:description>
    </didl:Statement>

</didl:Descriptor>

```

```

<!-- Output of Jhove -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19) Date: 2005-04-30 20:50:58 EDT RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fsatan270%2Etxt
ReportingModule: BYTESTREAM, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:27:05 EDT
Size: 5592 Format: bytestream Status: Well-formed and valid MIMEtype: application/octet-
stream Checksum: c96e391a Type: CRC32 Checksum: 61302274403953162341a98cfe5e7eb
Type: MD5 Checksum: 677e57b041a491cf2e85cf33d2ec3a90577f17 Type: SHA-
1</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Output of file -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic</dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">ISO-8859 English text, with
very long lines</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- Fred URI -->
<didl:Descriptor >
<didl:Statement mimeType="text/xml; charset=UTF-8">
  <dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI </dc:creator>
  <dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">application/octet-
stream</dc:description>
  </didl:Statement>

</didl:Descriptor>

<!-- File Resource -->
  <didl:Resource mimeType="application/octet-stream"
ref="repository/478606aa585cc628611bb4fb24468877.0" />
  </didl:Component>

</didl:Item>

</didl:Item>

```

</didl:Container>

</didl:DIDL>

Appendix 2 – Bucket MPEG-21 DIDL

```
<?xml version="1.0" encoding="UTF-8" ?>
<didl: DIDL xmlns: didl="urn:mpeg:mpeg21:2002:01-DIDL-NS">
<didl: Container >
<!-- Bucket Identifier -->
<didl: Descriptor >
<didl: Statement mimeType="text/html">
<dii: Identifier xmlns: dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/index.cgi</dii: Identifier>
</didl: Statement>

</didl: Descriptor>

<!-- Bucket Type -->
<didl: Descriptor >
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dc: type xmlns: dc="http://purl.org/dc/elements/1.1/"
xmlns: xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi: schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket</dc: type >
</didl: Statement>

</didl: Descriptor>

<!-- Item for methods -->
<didl: Item >
<!-- Item Identifier -->
<didl: Descriptor >
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dii: Identifier xmlns: dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/methods</dii: Identifier>
</didl: Statement>

</didl: Descriptor>

<!-- Item Type -->
<didl: Descriptor >
<didl: Statement mimeType="text/xml; charset=UTF-8">
<dc: type xmlns: dc="http://purl.org/dc/elements/1.1/"
xmlns: xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi: schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket/methods</dc: type >
</didl: Statement>

</didl: Descriptor>

<!-- admin method -->
<didl: Component >
<!-- Component Identifier -->
<didl: Descriptor >
<didl: Statement mimeType="application/octet-stream">
<dii: Identifier xmlns: dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/methods/admin</dii: Identifier>
</didl: Statement>

</didl: Descriptor>

<!-- Component Type -->
```

```
<didl:Descriptor >
<didl:Statement mimeType="text/plain">
  <dc:type xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket/methods/admin</dc:type>
  </didl:Statement>

</didl:Descriptor>

<!-- Value Resource -->
  <didl:Resource mimeType="application/octet-stream"
encoding="base64">IyBXcmI0dGVuIkJ5IEdpcmlkaGFyIE1hbmVwYWxsaSBmb3IlgQnVja2V0IFYz
LjAKJmFkbWluOwpz
dWIgYWRtaW4gewoJnNOYXJ0X3hodG1sOwoKCW15ICR1cmwgPSAkVVJMOwoKCW15IEBsaXN
OX2Nv
bnRhaW5lcnMgPSAkcm9vdCO+Z2V0RWxlbWVudHNCeVRhZ05hbWUoJONvbnRhaW5lcicsMCK7Cg
It
eSBAbGldF9pdGVtcyA9I CRsaXNOX2NvbnRhaW5lcnNbMF0tPmdlIdEVsZW1lbnRzQnIUYWdOYW11
KCdJdGVtJywwKTsKCgkjI FNOYXJ0LVRhYmxiCglwcmIudCAiPHVsPil sICRimVhazsKCXByaW50
IHFxez0YwJszBjBGFzc0iQm9yZGVyIiBjZWxscGFkZGluZz0iMSI gY2VsbHNwYWVnpbmc9IjEi
Pn0sI CRimVhazsKCXByaW50IHFxez0YwJszBjBGFzc0iQm9yZGVyIiBjZWxscGFkZGluZz0iMSI
cHJpbmQgIkJ1Y2tldCBEZXRhaWxzIiwgJGJyZWFrOwoJcHJpbmQgIjwvY2FwdGlvbj4iLCAkYnJl
YWs7CgoJl yBEaXNwbGF5aW5nI GxpbtmZlGZvciBidWNrZXQueG1sI GFuZCBkaWRsLnhtbAoJcHJp
bnQgcXF7PHRyPjx0ZD5PYmplY3Q8L3RkPjwvdHI +fSwgJGJyZWFrOwoJcHJpbmQgcXF7PHRyPjx0
ZD48dGFibGUgY2xhc3M9IklubmVYQm9yZGVyIj59LCAkYnJlYWs7CglwcmIudCBxcXs8dHI +PHRk
PjxsaT48YSBocmVmPSJ9LiR1cmwucXF7P21ldGhvZD1nZXQmaWQ9YnVja2V0Ij59LiJidWNrZXQi
LnFxezwwYT48L2xpPjwvdGQ+PC90cj59LCAkYnJlYWs7CglwcmIudCBxcXs8dHI +PHRkPjxsaT48
YSBocmVmPSJ9LiR1cmwucXF7P21ldGhvZD1nZXQmaWQ9ZGlkbCI +fS4iZGlkbCIucXF7PC9hPjww
bGk+PC90ZD48L3RyPn0sI CRimVhazsKCXByaW50IHFxez0c0j48dGQ+PGxpPjxhI GhyZWY9In0u
JHVybC5xcXs/bWV0aG9kPWdlldCZpZD1pbmRleCI +fS4iaW5kZXgiLnFxezwwYT48L2xpPjwvdGQ+
PC90cj59LCAkYnJlYWs7CglwcmIudCBxcXs8L3RkPjwvdGQ+PC90cj59LCAkYnJlYWs7CgoJ
Zm9yZWFrjaCBteSAkXRlbSAoQGxpc3RfaXRlbXMpI HsKCQlIteSBAaXRlbV9kZXNjcmlwdG9ycyA9
ICRpdGVtLT5nZXRFBGVtZW50c0J5VGFnTmFtZSgnRGVzY3JpcHRvcicsMCK7CgkjbXkgQGI0ZW1f
aWRlbnRpZmllcnMgPSAkXRlbV9kZXNjcmlwdG9yc1swXS0+Z2V0RWxlbWVudHNCeVRhZ05hbWUo
Uo
J0lkZW50aWZpZXI nLDEpOwoJCW15ICRpdGVtX2IkID0gJGI0ZW1faWRlbnRpZmllcnNbMF0tPmdl
dEZpcnNOQ2hpbGQoKS0+Z2V0RGF0YScgpOwoJCW15ICR0b2t1bl9pdGVtX2IkID0gc3Vic3RyKCRp
dGVtX2IkLHJpbmRleCgkaXRlbV9pZCwiLyl pKzEpOwoJCW15IEBpdGVtX2NvbXBvbmVudHMgPSAk
aXRlbS0+Z2V0RWxlbWVudHNCeVRhZ05hbWUoJONvbnRhaW5lcicsMCK7CgkjaWYoJHRva2VuX2I
2IO
ZW1faWQgcXF7PC90ZD48L3RyPn0sI CRimVhazsKCQkKJcHJpbmQgcXF7PHRyPjx0ZD48dGFibGUg
Y2xhc3M9IklubmVYQm9yZGVyIj59LCAkYnJlYWs7CgkKJWZvcmludCBxcXs8dHI +PHRkPn0uJHRva2VuX2I
0
ZW1faWQgcXF7PC90ZD48L3RyPn0sI CRimVhazsKCQkKJcHJpbmQgcXF7PHRyPjx0ZD48dGFibGUg
Y2xhc3M9IklubmVYQm9yZGVyIj59LCAkYnJlYWs7CgkKJWZvcmludCBxcXs8dHI +PHRkPn0uJHRva2VuX2I
0
QGI0ZW1fY29tcG9uZW50cykgewoJCQkjbXkgQGNvbXBvbmVudF9kZXNjcmlwdG9ycyA9ICRjb21
w
b25lbnQtPmdlIdEVsZW1lbnRzQnIUYWdOYW11KCDZXRjcmlwdG9yJywwKTsKCQkKJW15IEBjb21
w b25lbnRfc3RhdGVtZW50cyA9ICRjb21wb25lbnRfZGVzY3JpcHRvcnNbMF0tPmdlIdEVsZW1lbnRz
QnIUYWdOYW11KCDtGF0ZW1lbnQnLDApOwoJCQkjbXkgJGtleSA9ICRjb21wb25lbnRfc3RhdGVt
ZW50c1swXS0+Z2V0Rmlyc3RDaGlsZCgplLT5nZXRREYXRhKkCk7CgkKJWZvcmludCBxcXs8dHI +PHRk
Pn0uJGtleS5xcXs8L3RkPjx0ZD59
LiR2YWx1ZS5xcXs8L3RkPjwvdHI +fSwgJGJyZWFrOwoJCQl9CgkKJfQoJCWVsc2UgewoJCQlwcmlu
dCBxcXs8dHI +PHRkPjxhI GhyZWY9In0uIiR1cmw/bWV0aG9kPWdlldCZpZD0kdG9rZW5faXRlbV9
pZCIucXF7Ij59LiR0b2t1bl9pdGVtX2IkLnFxezwwYT48L3RkPjwvdHI +fSwgJGJyZWFrOwoJCQlw
cmIudCBxcXs8dHI +PHRkPjx0YwJszBjBGFzc0iSW5uZXJCb3JkZXIiPn0sI CRimVhazsKCQkK
CgkKJWZvcmludCBxcXs8dHI +PHRkPjx0YwJszBjBGFzc0iSW5uZXJCb3JkZXIiPn0sI CRimVhazsKCQkK
Nv
bXBvbmVudF9kZXNjcmlwdG9ycyA9ICRjb21wb25lbnQtPmdlIdEVsZW1lbnRzQnIUYWdOYW11KCD
E
ZXNjcmlwdG9yJywwKTsKCQkKJW15IEBjb21wb25lbnRfaWRlbnRpZmllcnMgPSAkY29tcG9uZW50
X2Rlc2NyaXB0b3JzWzBdLT5nZXRFBGVtZW50c0J5VGFnTmFtZSgnSWRlbnRpZmllcicsMCK7CgkK
CQlIteSAkY29tcG9uZW50X2IkID0gJGNvbXBvbmVudF9pZGVudGlmawVWyc1swXS0+Z2V0Rmlyc3R
D aGlsZCgplLT5nZXRREYXRhKkCk7CgkKJWZvcmludCBxcXs8dHI +PHRkPn0uJHRva2VuX2I2IO
```



```

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dHk6IE1BSU5UQUIORURcbilgaWYoSRkdXApOwoKCXByaW50ICJcbil7CgoJlyBDaGVjayAtIDQK
CXBYaW50ICJWZXJpZnlpbmkgdGhllCdnZXQnYWJpbG10eSBvZiB0aGUgbW0aG9kc1xuljsKCSMg
VE9ETwoJcHJpbnQgIIN0aWxslHRvIGJlIEFkZlJlc3NiZlFuljsKCgImb3JIYWNolG15ICRpdGVt
KEBsaXNOX2IOZW1zKSB7CgkJbXkgQGI0ZW1fZGVzY3JpcHRvcnMgPSAkaXRlSO+Z2VORWxlWV
u
dHNCeVRhZ05hbWUoJ0Rlc2NyaXB0b3InLDAPoOwoJCW15IEBpdGVtX2IkZW50aWZpZXJzID0gJGI
O
ZW1fZGVzY3JpcHRvcnNbMfOtPmdlIdEVsZW1lbnRzQnlUYWd0YUW1IKCdJZGVudGlmaWVyJywwKTS
sK
CQlTeSAkaXRlV9pZCA9ICRpdGVtX2IkZW50aWZpZXJzWzBdLT5nZXRGaXJzdENoaWxkKCKtPmdl
dERhdGEoKTSKCQkkaXRlV9pZCA9IH1N1YnN0cigkaXRlV9pZCYaW5kZXgoJGI0ZW1faWQsli8i
KSsxKTsKCQlPZigkaXRlV9pZCBlcSANCWV0aG9kcycpIHskCQkJbXkgQGI0ZW1fY29tcG9uZW50
cyA9ICRpdGVtLT5nZXRFbGVtZW50c0J5VGFnTmFtZSgnQ29tcG9uZW50JywwKTSKCQkZm9yZW
Fj
aCBTeSAK Y29tcG9uZW50KEBpdGVtX2NvbXBvbmVudHMpIHskCQkCkVZcmVhY2ggbXkgJGNvb
Z
Y3JpcHRvcnMgPSAKY29tcG9uZW50LT5nZXRFbGVtZW50c0J5VGFnTmFtZSgnRGVzY3JpcHRvcics
MCK7CgkCQlTeSBAY29tcG9uZW50X2IkZW50aWZpZXJzID0gJGNvbXBvbmVudF9kZXNjcm1wdG9
y
c1swXS0+Z2VORWxlWVudHNCeVRhZ05hbWUoJ0IkZW50aWZpZXInLDAPoOwoJCQkJbXkgJGNvb
XBv
bmVudF9pZCA9ICRjb2Iwb25lbnRfaWRlbnRpZmllcnNbMfOtPmdlIdEZpcnN0Q2hpbGQoKS0+Z2VOR
GF0YSgpOwoJCQkJbXkgJGNvbXBvbmVudF9pZl90b2I0biA9IH1N1YnN0cigkaXRlV9pZCYaW5kZX
LHJpbnRleCgkY29tcG9uZW50X2IkLClvIkrMSk7CgoJCQkJcHJpbnQgIEx0TVW0aG9kICRjb2Iw
b25lbnRfaWRfdG9rZW5cbil7CgoJCQkJbXkgQGNvbXBvbmVudF9yZXNvdXJjZXMGPSAKY29tcG9u
ZW50LT5nZXRFbGVtZW50c0J5VGFnTmFtZSgnUmVzbnVz3VyY2UnLDAPoOwoJCQkJm9yZWFjaCBTeS
Ak
cmVzbnVz3VyY2UoQGNvbXBvbmVudF9yZXNvdXJjZXMPIHskCQkCkVZcmVhY2ggbXkgJGNvbXBv
dHJpYnV0ZSgnbWltZVR5cGUkSbIcSAnYXBwGijYXRpb24vb2N0ZXQtc3RyZWFTjykgewoJCQkJ
CQlTeSAK Y29tcZSA9ICRyZXNvdXJjZS0+Z2VORmlyc3RDaGlsZCgplT5nZXREYXRhKck7CgkCQkJ
CSRjb2RIID1+IHMVXHMRLy9nOwoJCQkJCQlTeSAKZGVjb2RIZCA9IGRIY29kZV9iYXNlNjQoJGNv


```

    <didl:Resource mimeType="text/html"
ref="http://master.bucket.method.repository/method=list_methods" />
    </didl:Component>

</didl:Item>

<!-- Item for library -->
<!-- Item for logs -->
<didl:Item>
<!-- Item Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/html">
    <dii:Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/logs</dii:Identifier>
    </didl:Statement>

    </didl:Descriptor>

<!-- Item Type -->
<didl:Descriptor>
<didl:Statement mimeType="text/html">
    <dc:type xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket/logs</dc:type>
    </didl:Statement>

    </didl:Descriptor>

<!-- Access Log -->
<didl:Component>
<!-- Component Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/plain">
    <dii:Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/access</dii:Identifier>
    </didl:Statement>

    </didl:Descriptor>

<!-- Component Type -->
<didl:Descriptor>
<didl:Statement mimeType="text/plain">
    <dc:type xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket/logs/access</dc:type>
    </didl:Statement>

    </didl:Descriptor>

<!-- Reference Resource -->
    <didl:Resource mimeType="text/plain"
ref="http://master.bucket.log.repository/bucket/logs/access.log" />
    </didl:Component>

</didl:Item>

<!-- Item for preferences -->
<didl:Item>
<!-- Preference Identifier -->

```

```

<didl:Descriptor >
<didl:Statement mimeType="text/html">
  <dii:Identifier xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-
NS">http://beatitude.cs.odu.edu:8080/bucket/preferences </dii:Identifier>
  </didl:Statement>

  </didl:Descriptor>

<!-- Preference Type -->
<didl:Descriptor >
<didl:Statement mimeType="text/html">
  <dc:type xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">http://buckets.cs.odu.edu/3.0
/bucket/preferences </dc:type>
  </didl:Statement>

  </didl:Descriptor>

<!-- Default Method -->
<didl:Component >
<didl:Descriptor >
  <didl:Statement mimeType="text/plain">default_method </didl:Statement>
  </didl:Descriptor>

<didl:Descriptor >
  <didl:Statement mimeType="text/plain">admin</didl:Statement>
  </didl:Descriptor>

  </didl:Component >

<!-- Access Log -->
<didl:Component >
<didl:Descriptor >
  <didl:Statement mimeType="text/plain">log_access </didl:Statement>
  </didl:Descriptor>

<didl:Descriptor >
  <didl:Statement mimeType="text/plain">on</didl:Statement>
  </didl:Descriptor>

  </didl:Component >

<!-- Restricted Method -->
<didl:Component >
<didl:Descriptor >
  <didl:Statement mimeType="text/plain">put</didl:Statement>
  </didl:Descriptor>

<didl:Descriptor >
  <didl:Statement mimeType="text/plain">restricted </didl:Statement>
  </didl:Descriptor>

  </didl:Component >

</didl:Item >

</didl:Container >

</didl:DIDL >

```


Appendix 3 – Image Metadata Returned via the Bucket API (XML Fragment)

```
<didl:Component>
<!-- File Identifier -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:identifier xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">1641ad793a1cc597a18e9dd4dd3c64d5
.0</dc:identifier>
<dc:source xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">archive/205.gif</dc:source>
</didl:Statement>
</didl:Descriptor>
<!-- MD5 Checksum of the File Contents -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">perl/Digest::MD5</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">
18771f3ecd43f6421c49a9f3b31bd195</dc:description>
</didl:Statement>
</didl:Descriptor>
<!-- Output of Jhove -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Jhove (Rel. 1.0 (beta 2), 2004-
07-19)
</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">
Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:52 EDT
RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2F205%2Egif ReportingModule: GIF-
hul, Rel. 1.1 (2004-06-23) LastModified: 2005-04-10 20:24:59 EDT Size: 74736 Format:
GIF Version: 89a Status: Well-formed and valid MIMETYPE: image/gif Profile: GIF 89a
GIFMetadata: GraphicRenderingBlocks: 1 Blocks: LogicalScreenDescriptor:
LogicalScreenWidth: 288 LogicalScreenHeight: 270 ColorResolution: 6
BackgroundColorIndex: 0 PixelAspectRatio: 0 GlobalColorTableFlag: Global color
table follows; background color index meaningful GlobalColorTableSortFlag: Not
ordered GlobalColorTableSize: 7 GlobalColorTable: 230, 210, 196, 254, 252,
234, 214, 204, 22, 18, 20, 26, 22, 20, 22, 22, 20, 18, 14, 12, 234, 218, 204, 234, 214,
196, 230, 214, 196, 14, 14, 12, 238, 218, 204, 14, 10, 12, 18, 18, 20, 230, 214, 204,
226, 206, 187, 51, 33, 23, 254, 242, 229, 212, 203, 203, 151, 142, 143, 223, 197, 183,
46, 43, 41, 250, 234, 218, 18, 22, 20, 70, 40, 28, 118, 99, 92, 226, 210, 196, 165, 153,
154, 38, 30, 26, 217, 198, 183, 237, 222, 212, 41, 43, 42, 254, 240, 219, 10, 5, 7, 119,
110, 114, 184, 170, 163, 42, 29, 25, 13, 16, 20, 222, 202, 186, 149, 124, 101, 30, 22,
21, 52, 37, 37, 238, 222, 203, 37, 34, 27, 210, 184, 166, 226, 206, 196, 22, 18, 12, 34,
30, 26, 242, 226, 213, 238, 214, 201, 94, 83, 84, 35, 20, 15, 254, 246, 231, 234, 210,
196, 138, 129, 131, 247, 225, 213, 67, 52, 48, 6, 4, 6, 217, 203, 185, 230, 205, 187,
216, 193, 181, 254, 252, 235, 190, 181, 184, 230, 206, 197, 42, 38, 39, 141, 100, 81, 28,
31, 37, 226, 202, 186, 46, 38, 38, 216, 193, 171, 24, 22, 12, 57, 56, 63, 18, 10, 10, 26,
```

```

17, 11, 46, 34, 28, 104, 84, 78, 42, 34, 28, 60, 51, 43, 254, 254, 244, 199, 195, 196,
246, 234, 217, 30, 26, 20, 18, 18, 11, 27, 18, 20, 10, 10, 12, 240, 226, 204, 242, 221,
213, 222, 208, 197, 115, 86, 76, 105, 68, 54, 168, 147, 132, 50, 42, 39, 54, 51, 49, 248,
225, 201, 58, 45, 40, 230, 210, 204, 22, 14, 11, 230, 218, 205, 34, 36, 38, 237, 227,
214, 30, 30, 26, 59, 52, 52, 26, 26, 20, 250, 239, 219, 250, 230, 216, 246, 230, 212,
249, 240, 230, 225, 202, 196, 74, 64, 56, 22, 26, 24, 30, 26, 28, 198, 174, 159, 10, 14,
10, 86, 57, 42, 51, 38, 26, 234, 218, 196, 18, 14, 20, 242, 222, 203, 34, 26, 20, 73, 67,
73, 46, 29, 25, 14, 6, 7, 225, 210, 187, 230, 210, 188, 26, 26, 28, 222, 206, 187, 38,
38, 40, 225, 216, 208, 87, 71, 72, 238, 217, 212, 234, 222, 203, 254, 238, 229, 149, 130,
127, 226, 214, 195, 54, 42, 39, 242, 217, 202, 190, 148, 123, 134, 120, 123, 234, 217,
212, 49, 50, 49, 171, 164, 164, 54, 46, 41, 235, 210, 204, 48, 45, 52, 38, 34, 38, 88,
68, 56, 82, 82, 86, 254, 233, 217, 50, 46, 42, 242, 230, 215, 22, 28, 38, 26, 24, 25,
30, 26, 75, 56, 51, 68, 58, 54, 34, 26, 28, 251, 245, 246, 46, 38, 28, 54, 43, 26, 246,
230, 220, 55, 23, 17, 209, 194, 182, 254, 250, 248, 14, 18, 11, 59, 35, 22, 62, 45, 40,
42, 34, 37, 10, 10, 4, 14, 10, 4, 199, 184, 167, 36, 30, 36, 6, 10, 8, 26, 22, 28, 250,
233, 228, 238, 218, 196, 101, 96, 96, 250, 251, 250, 209, 191, 170, 164, 134, 125, 2, 3,
4, 230, 218, 196, 46, 34, 36, 30, 23, 12, 235, 215, 188, 108, 81, 57, 30, 17, 11, 43, 21,
15, 226, 210, 204, 234, 206, 192, 42, 38, 28, 72, 52, 33, 22, 14, 20, 22, 10, 9, 19, 6,
7, 44, 35, 19, 191, 165, 136, 234, 210, 188, 44, 27, 12, 102, 99, 110, 216, 215, 218, 27,
9, 9, 18, 14, 4, 29, 34, 28, 224, 195, 171, 246, 238, 218, 36, 27, 11, 220, 176, 139, 13,
10, 20, 230, 214, 188, 54, 46, 52, 85, 42, 28, 60, 59, 51, 14, 14, 4, 230, 222, 207, 238,
210, 194, 124, 124, 130, 14, 23, 21, 242, 205, 173, 226, 206, 204, 59, 46, 52, 122, 118,
94, 242, 234, 217, 18, 18, 28, 141, 139, 140, 43, 30, 36, 230, 214, 212, 210, 185, 181,
22, 18, 28, 6, 14, 11, 33, 43, 42, 19, 10, 20, 241, 240, 236, 254, 246, 220, 227, 210,
213, 238, 191, 162, 34, 22, 28, 225, 220, 229, 228, 228, 226, 209, 172, 157, 225, 203,
170, 44, 38, 52, 37, 36, 52, 230, 198, 184, 239, 232, 237, 242, 228, 228, 225, 183, 161,
69, 102, 115, 12, 6, 20, 236, 201, 193, 248, 209, 191, 253, 238, 202, 229, 214, 177, 149,
151, 172, 230, 222, 196, 242, 210, 191, 230, 218, 220
ImageDescriptor:
ImageLeftPosition: 0 ImageTopPosition: 0 InterlaceFlag: Image is not interlaced
LocalColorTableFlag: No local color table; use global table if available
LocalColorTableSortFlag: Not ordered LocalColorTableSize: 0 NisoImageMetadata:
MIMEType: image/gif ByteOrder: little-endian CompressionScheme: LZW
ColorSpace: palette color Orientation: normal ImageWidth: 288 ImageLength:
270 Checksum: c309714d Type: CRC32 Checksum: 18771f3ecd43f6421c49a9f3b31bd195 Type:
MD5 Checksum: dfba78b0c6865f7ceef6c1c39273e29ecef3f3 Type: SHA-1</dc:description>
</didl:Statement>
</didl:Descriptor>
<!-- Output of file -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">file-4.07 magic file from
/usr/share/file/magic </dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">
GIF image data, version 89a, 288 x 270
</dc:description>
</didl:Statement>
</didl:Descriptor>
<!-- Fred URI -->
<didl:Descriptor>
<didl:Statement mimeType="text/xml; charset=UTF-8">
<dc:creator xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">Fred Info URI</dc:creator>
<dc:description xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://purl.org/dc/elements/1.1/
http://dublincore.org/schemas/xmls/simpledc20021212.xsd">
info:gdr/fred/f/gif</dc:description>
</didl:Statement>
</didl:Descriptor>
<!-- File Resource -->
<didl:Resource mimeType=" image/gif" ref="repository/1641ad793a1cc597a18e9dd4dd3c64d5.0"
/>
</didl:Component>

```

Appendix 4 – METS Version of Test Archive Specified in Appendix 1

```
<?xml version="1.0" encoding="utf-8" ?>
<mets xmlns="http://www.loc.gov/METS/"
xmlns:app="http://hul.harvard.edu/ois/xml/ns/drs/app"
xmlns:txt="http://www.loc.gov/METS/text/" xmlns:xlink="http://www.w3.org/TR/xlink"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.loc.gov/METS/
http://www.loc.gov/standards/mets/mets.xsd" LABEL="ODU AIHT DIDL to METS conversion"
TYPE="DIP">
<!-- METS Header -->
<metsHdr CREATEDATE="2005-04-16T20:33:41Z">
<agent ROLE="DISSEMINATOR" TYPE="ORGANIZATION">
  <name>Old Dominion University</name>
</agent>

</metsHdr>

<!-- Descriptive Metadata Section -->
<dmdSec ID="D0">
<mdWrap MIMETYPE="text/xml" MDTYPE="DC">
<xmlData>
  <dc:identifier>info:aiht.cs.odu.edu/911.tar</dc:identifier>
  <dc:title>ODU AIHT DIDL to METS conversion</dc:title>
  <dc:description>A conversion of the AIHT Archive from DIDL archival format to METS
format</dc:description>
  <dc:type>Collection</dc:type>
</xmlData>

</mdWrap>

</dmdSec>

<!-- Administrative Metadata Section -->
<rightsMD ID="R0" />
<amdSec>
<techMD ID="T1">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>52217a1bcd2be7cf05f36066d4cdc9cf</xmlData>
</mdWrap>

</techMD>

<techMD ID="T2">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:51 EDT
Representation Information:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fic_email27%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:25:35 EDT
Size: 6206 Format: ASCII Status: Well-formed and valid MIMETYPE: text/plain; charset=US-
ASCII ASCII Metadata: LineEndings: LF Checksum: 76c99b38 Type: CRC32 Checksum:
52217a1bcd2be7cf05f36066d4cdc9cf Type: MD5 Checksum:
6d51599d4d978e5d253e945a7248965ddc3616 Type: SHA-1</xmlData>
</mdWrap>

</techMD>
```

```
<techMD ID="T3">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
  <xmlData>ASCII English text</xmlData >
</mdWrap>
```

</techMD >

```
<techMD ID="T4">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
  <xmlData>info:gdfir/fred/f/us-ascii</xmlData >
</mdWrap>
```

</techMD >

```
<techMD ID="T5">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>18771f3ecd43f6421c49a9f3b31bd195</xmlData >
</mdWrap>
```

</techMD >

```
<techMD ID="T6">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:52 EDT
```

RepresentationInformation:

file:%2Fhome%2Frhoq%2Fspace%2FsampleArchive%2Farchive%2F205%2Egif
ReportingModule: GIF-hul, Rel. 1.1 (2004-06-23) LastModified: 2005-04-10 20:24:59 EDT Size:
74736 Format: GIF Version: 89a Status: Well-formed and valid MIMETYPE: image/gif Profile:
GIF 89a GIFMetadata: GraphicRenderingBlocks: 1 Blocks: LogicalScreenDescriptor:
LogicalScreenWidth: 288 LogicalScreenHeight: 270 ColorResolution: 6 BackgroundColorIndex:
0 PixelAspectRatio: 0 GlobalColorTableFlag: Global color table follows; background color index
meaningful GlobalColorTableSortFlag: Not ordered GlobalColorTableSize: 7 GlobalColorTable:
230, 210, 196, 254, 254, 252, 234, 214, 204, 22, 18, 20, 26, 22, 20, 22, 22, 20, 18, 14, 12, 234,
218, 204, 234, 214, 196, 230, 214, 196, 14, 14, 12, 238, 218, 204, 14, 10, 12, 18, 18, 20, 230,
214, 204, 226, 206, 187, 51, 33, 23, 254, 242, 229, 212, 203, 203, 151, 142, 143, 223, 197,
183, 46, 43, 41, 250, 234, 218, 18, 22, 20, 70, 40, 28, 118, 99, 92, 226, 210, 196, 165, 153,
154, 38, 30, 26, 217, 198, 183, 237, 222, 212, 41, 43, 42, 254, 240, 219, 10, 5, 7, 119, 110,
114, 184, 170, 163, 42, 29, 25, 13, 16, 20, 222, 202, 186, 149, 124, 101, 30, 22, 21, 52, 37, 37,
238, 222, 203, 37, 34, 27, 210, 184, 166, 226, 206, 196, 22, 18, 12, 34, 30, 26, 242, 226, 213,
238, 214, 201, 94, 83, 84, 35, 20, 15, 254, 246, 231, 234, 210, 196, 138, 129, 131, 247, 225,
213, 67, 52, 48, 6, 4, 6, 217, 203, 185, 230, 205, 187, 216, 193, 181, 254, 252, 235, 190, 181,
184, 230, 206, 197, 42, 38, 39, 141, 100, 81, 28, 31, 37, 226, 202, 186, 46, 38, 38, 216, 193,
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140, 43, 30, 36, 230, 214, 212, 210, 185, 181, 22, 18, 28, 6, 14, 11, 33, 43, 42, 19, 10, 20, 241,
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226, 209, 172, 157, 225, 203, 170, 44, 38, 52, 37, 36, 52, 230, 198, 184, 239, 232, 237, 242, 228, 228, 225, 183, 161, 69, 102, 115, 12, 6, 20, 236, 201, 193, 248, 209, 191, 253, 238, 202, 229, 214, 177, 149, 151, 172, 230, 222, 196, 242, 210, 191, 230, 218, 220 ImageDescriptor: ImageLeftPosition: 0 ImageTopPosition: 0 InterlaceFlag: Image is not interlaced LocalColorTableFlag: No local color table; use global table if available LocalColorTableSortFlag: Not ordered LocalColorTableSize: 0 NisoImageMetadata: MIMEType: image/gif ByteOrder: little-endian CompressionScheme: LZW ColorSpace: palette color Orientation: normal ImageWidth: 288 ImageLength: 270 Checksum: c309714d Type: CRC32 Checksum: 18771f3ecd43f6421c49a9f3b31bd195 Type: MD5 Checksum: dfba78b0c6865f7ceef6c1c39273e29ecef3f3 Type: SHA-1 </xmlData >
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<techMD ID="T8">
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<xmlData>info:gdf/fred/f/gif</xmlData >
</mdWrap >
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<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
<xmlData>37b7e822db8cf3d0629480d9453172e0</xmlData >
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<xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:53 EDT
RepresentationInformation:
file:%2Fhome%2Frrhaq%2Fspace%2FsampleArchive%2Farchive%2Fmah2288%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:26:51 EDT
Size: 2939 Format: ASCII Status: Well-formed and valid MIMEType: text/plain; charset=US-ASCII ASCII Metadata: LineEndings: LF Checksum: e668b7fe Type: CRC32 Checksum:
37b7e822db8cf3d0629480d9453172e0 Type: MD5 Checksum:
88db863b162fc88360607db08038914ee8452dde Type: SHA-1</xmlData >
</mdWrap >
</techMD >
<techMD ID="T11">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
<xmlData>ASCII English text</xmlData >
</mdWrap >
</techMD >
<techMD ID="T12">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
<xmlData>info:gdf/fred/f/us-ascii</xmlData >
</mdWrap >
</techMD >
<techMD ID="T13">

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<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>f79800024a73f25f5f7748f951da309c</xmlData >
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</techMD >

<techMD ID="T14">
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  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:54 EDT
RepresentationInformation:
file:%2Fhome%2Fhq%2Fspace%2FsampleArchive%2Farchive%2Ffile_story192%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:25:49 EDT
Size: 4285 Format: ASCII Status: Well-formed and valid MIMETYPE: text/plain; charset=US-ASCII
ASCII Metadata: LineEndings: LF Checksum: 8a9f7520 Type: CRC32 Checksum:
f798024a73f25f5f7748f951da309c Type: MD5 Checksum:
ce138c681ecf6c16f56f276fcac641d6498 Type: SHA-1</xmlData >
</mdWrap>

</techMD >

<techMD ID="T15">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
  <xmlData>ASCII English text, with very long lines</xmlData >
</mdWrap>

</techMD >

<techMD ID="T16">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
  <xmlData>info:gdf/fred/f/us-ascii</xmlData >
</mdWrap>

</techMD >

<techMD ID="T17">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>dec44e5b2ed5e19741644d96db64c4e2</xmlData >
</mdWrap>

</techMD >

<techMD ID="T18">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:55 EDT
RepresentationInformation:
file:%2Fhome%2Fhq%2Fspace%2FsampleArchive%2Farchive%2Femail223%2Etxt
ReportingModule: ASCII-hul, Rel. 1.0 (2004-05-05) LastModified: 2005-04-10 20:26:32 EDT
Size: 5958 Format: ASCII Status: Well-formed and valid MIMETYPE: text/plain; charset=US-ASCII
ASCII Metadata: LineEndings: LF, CRLF Checksum: 8ba57aae Type: CRC32 Checksum:
dec44e5b2ed5e19741644d96db64c4e2 Type: MD5 Checksum:
b25dd13b6fa0cb40f652bfc66576ab6c6c9a22d4 Type: SHA-1</xmlData >
</mdWrap>

</techMD >

<techMD ID="T19">
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  <xmlData>ASCII English text, with CRLF, LF line terminators</xmlData >
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</techMD >

<techMD ID="T20">

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  <xmlData>info:gdfir/fred/f/us-ascii</xmlData >
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</techMD >

<techMD ID="T21">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>193e2945e34141434eb83722a464b9d8</xmlData >
</mdWrap >

</techMD >

<techMD ID="T22">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:56 EDT
RepresentationInformation:
file:%2Fhome%2Frhaq%2Fspace%2FsampleArchive%2Farchive%2F1718%2Ewaf
ReportingModule: BYTESTREAM, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:25:06 EDT
Size: 8886 Format: bytestream Status: Well-formed and valid MIMEType: application/octet-
stream Checksum: 180f925 Type: CRC32 Checksum: 193e2945e34141434eb83722a464b9d8
Type: MD5 Checksum: 179b8d243d5d65be1083e6ba6f6a95fbc2156a35 Type: SHA-1</xmlData >
</mdWrap >

</techMD >

<techMD ID="T23">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
  <xmlData>data </xmlData >
</mdWrap >

</techMD >

<techMD ID="T24">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
  <xmlData>application/octet-stream</xmlData >
</mdWrap >

</techMD >

<techMD ID="T25">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>9efec6246ec5d21ad47ea15a65c0cc7f</xmlData >
</mdWrap >

</techMD >

<techMD ID="T26">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:57 EDT
RepresentationInformation:
file:%2Fhome%2Frhaq%2Fspace%2FsampleArchive%2Farchive%2F1727%2Ejpeg
ReportingModule: JPEG-hul, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:25:19 EDT
Size: 17284 Format: JPEG Version: 1.01 Status: Well-formed and valid MIMEType: image/jpeg
Profile: JFIF JPEGMetadata: CompressionType: Huffman coding, Baseline DCT Images: Image:
NisoImageMetadata: MIMEType: image/jpeg ByteOrder: big-endian CompressionScheme: JPEG
ColorSpace: YCbCr SamplingFrequencyUnit: inch ImageWidth: 640 ImageLength: 205
BitsPerSample: 8 SamplesPerPixel: 3 Scans: 1 QuantizationTables: QuantizationTable:
Precision: 8-bit DestinationIdentifier: 0 QuantizationTable: Precision: 8-bit
DestinationIdentifier: 1 ApplicationSegments: APP0 Checksum: c8bdef6a Type: CRC32
Checksum: 9efec6246ec5d21ad47ea15a65c0cc7f Type: MD5 Checksum:
9b29cb41454541a4afe2d05fa5c40ae53605cf0 Type: SHA-1 </xmlData >
</mdWrap >

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</techMD >

<techMD ID="T27">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
  <xmlData>JPEG image data, JFIF standard 1.01, resolution (DPI), 71 x 71 </xmlData>
</mdWrap>

</techMD >

<techMD ID="T28">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
  <xmlData>info:gdf/fred/f/jpeg</xmlData >
</mdWrap>

</techMD >

<techMD ID="T29">
<mdWrap MIMETYPE="text/xml" MDTYPE="perl/Digest::MD5">
  <xmlData>613022744039531623041a98cfe5e7eb</xmlData >
</mdWrap>

</techMD >

<techMD ID="T30">
<mdWrap MIMETYPE="text/xml" MDTYPE="Jhove (Rel. 1.0 (beta 2), 2004-07-19)">
  <xmlData>Jhove (Rel. 1.0 (beta 2), 2004-07-19) Date: 2005-04-30 20:50:58 EDT
Representation Information:
file:%2Fhome%2Frho%2Fspace%2FsampleArchive%2Farchive%2Fsatan270%2Etxt
ReportingModule: BYTESTREAM, Rel. 1.0 (2004-06-23) LastModified: 2005-04-10 20:27:05 EDT
Size: 5592 Format: bytestream Status: Well-formed and valid MIMETYPE: application/octet-
stream Checksum: c96e391a Type: CRC32 Checksum: 61302274403953162341a98cfe5e7eb
Type: MD5 Checksum: 677e57b041a491cf2e85cf33d2ec3a90577f17 Type: SHA-1 </xmlData>
</mdWrap>

</techMD >

<techMD ID="T31">
<mdWrap MIMETYPE="text/xml" MDTYPE="file-4.07 magic file from /usr/share/file/magic">
  <xmlData>ISO-8859 English text, with very long lines</xmlData >
</mdWrap>

</techMD >

<techMD ID="T32">
<mdWrap MIMETYPE="text/xml" MDTYPE="Fred Info URI ">
  <xmlData>application/octet-stream</xmlData >
</mdWrap>

</techMD >

</amdSec>

<!-- File Section -->
<fileSec>
<fileGrp AMDID="R0" USE="ARCHIVAL">
<file ID="9abd37197bc62a72a303e5931984332a.0" MIMETYPE="text/plain"
AMDID="T1,T2,T3,T4" OWNERID="archive/lc_email27.txt">
  <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/9abd37197bc62a72a303e5931984332a.0" />
  </file>

<file ID="1641ad793a1cc597a18e9dd4dd3c64d5.0" MIMETYPE="image/gif" AMDID="T5,T6,T7,T8"
OWNERID="archive/205.gif">

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    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/1641ad793a1cc597a18e9dd4dd3c64d5.0" />
    </file>

<file ID="4005d223a3aeabf6860e3dc89c54e409.0" MIMETYPE="text/plain"
AMDID="T9,T10,T11,T12" OWNERID="archive/nmah2288.txt">
    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/4005d223a3aeabf6860e3dc89c54e409.0" />
    </file>

<file ID="d12d67155c546aea96718fb930f96bea.0" MIMETYPE="text/plain"
AMDID="T13,T14,T15,T16" OWNERID="archive/lc_story192.txt">
    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/d12d67155c546aea96718fb930f96bea.0" />
    </file>

<file ID="97469cd3d96f2cfe3cb27a8e20fbcc92.0" MIMETYPE="text/plain"
AMDID="T17,T18,T19,T20" OWNERID="archive/email223.txt">
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xlink:href="file:///repository/97469cd3d96f2cfe3cb27a8e20fbcc92.0" />
    </file>

<file ID="10c80d92671b9c4b09c21a963c2a192b.0" MIMETYPE="application/octet-stream"
AMDID="T21,T22,T23,T24" OWNERID="archive/1718.waf">
    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/10c80d92671b9c4b09c21a963c2a192b.0" />
    </file>

<file ID="e0e65ea5543090c2badd809892398230.0" MIMETYPE="image/jpeg"
AMDID="T25,T26,T27,T28" OWNERID="archive/1727.jpeg">
    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/e0e65ea5543090c2badd809892398230.0" />
    </file>

<file ID="478606aa585cc628611bb4fb24468877.0" MIMETYPE="application/octet-stream"
AMDID="T29,T30,T31,T32" OWNERID="archive/satan270.txt">
    <Flocat LOCTYPE="URL" xlink:type="simple"
xlink:href="file:///repository/478606aa585cc628611bb4fb24468877.0" />
    </file>

</fileGrp>

</fileSec>

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    <fptr FILEID="4005d223a3aeabf6860e3dc89c54e409.0" />
    <fptr FILEID="d12d67155c546aea96718fb930f96bea.0" />
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    <fptr FILEID="e0e65ea5543090c2badd809892398230.0" />
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</div>

</structMap>

</mets>

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