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ACAP Media Type Dataset Class
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Abstract

With the definition of standardized media types in MIME it has become necessary to keep mapping tables which translate between the standard media type names, commonly used file name extensions, any platform specific typing mechanism, and helper applications to view, compose, edit or print media types. Supplying a set of site defaults is useful so that users won't have to configure well-known types. The mailcap mechanism provides some of this functionality in a homogeneous environment with a shared file system, and both the Macintosh program "Internet Config" and the Windows Registry have had some success in consolidating these tables for multiple applications

on a single machine. But neither of these addresses the problems of multi-platform users or a heterogeneous environment.

Application Configuration Access Protocol (ACAP) provides appropriate facilities for this need. ACAP's dataset structure is extensible and ACAP's inheritance feature provides for enterprise default settings with per-user customization. This memo defines an ACAP dataset class for media type mapping tables.

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1. Conventions used in this document

The key words "MUST", "MUST NOT", "SHOULD", "SHOULD NOT", and "MAY" in this document are to be interpreted as defined in "Key words for use in RFCs to Indicate Requirement Levels" [3].

The attribute syntax specifications use the Augmented Backus-Naur Form (ABNF) [5] notation including rules from ACAP [6].

2. Introduction

With the definition of standardized media types in MIME [2] it has become necessary to keep mapping tables which translate between the standard media type names, commonly used file name extensions, any platform specific typing mechanism, and helper applications to view, compose, edit or print media types. Supplying a set of site defaults is useful so that users won't have to configure well-known types. The mailcap [8] mechanism provides some of this functionality in a homogeneous environment with a shared file system, and both the Macintosh program "Internet Config" and the Windows Registry have had some success in consolidating these tables for multiple applications on a single machine. But neither of these addresses the problems of multi-platform users or a heterogeneous environment.

ACAP [6] provides appropriate facilities for this need. ACAP's dataset structure is extensible and ACAP's inheritance feature provides for enterprise default settings with per-user customization.

3. ACAP Media Type Dataset Class

3.1 ACAP Media Type Dataset Class Prefix

Datasets whose names begin with "/mediatype" are assumed to contain mediatype entries as defined in this specification.

3.2 ACAP Media Type Dataset Hierarchy

Each user may have a set of named media type profiles for use on different hosts. The default is "default" and is referenced with the path "/mediatype/user/<username>/default/". Inheritance is likely to be useful both for inheriting site or group defaults as well as for inheriting the default configuration when using different hosts.

4. Recommended ACAP Media Type Attributes

A mediatype entry MUST have an "entry" attribute. All other attributes are OPTIONAL.

The ABNF defines the content of the attribute values prior to their encoding as an ACAP string. Clients MUST conform to the syntax when generating these attributes, but MUST NOT assume that the attribute values will conform to this syntax on access. Servers SHOULD NOT enforce the syntax.

The OS-specific entries define a number of basic actions which may be performed on a media type. The intention is that additional actions may be added in the future following the same template as the existing actions.

4.1 Basic Attributes

These attributes are defined in ACAP [6] and have meaning in all dataset classes. This section describes how they are used in a mediatype dataset.

entry

The "entry" attribute is used to hold a short descriptive name of the media type. This name is used for inheritance, so when customizing a media type which has an entry in an inherited dataset, the entry name needs to remain the same.

subdataset

The "subdataset" attribute indicates there is another media type dataset underneath this entry.

4.2 System Independent Attributes

These attributes are likely to have meaning for all ACAP clients.

mediatype.common.type

This contains the MIME media type [2] of the entry. New MIME media types are registered according to the MIME registration procedures [11].

The ABNF terminals type and subtype are defined in MIME Internet Message Bodies [1]. Free insertion of linear-white-space is not permitted in this grammar.

A subtype of "*" indicates a catch-all entry for a type. Clients SHOULD check for a catch-all entry after checking for a regular entry. Catch-all entries are used only for locating a helper application, so the extension attributes SHOULD be NIL.

mtime-typenam = type "/" mtype-subtype

mtime-subtype = subtype / "*"

mediatype.common.param.<MIME-attribute>

This contains a MIME parameter for the entry. For example, there might be multiple entries for text media types with different charset parameters. The <MIME-attribute> portion of the attribute name matches the ABNF for the "attribute" rule in [1] but MUST be all lower case. MIME parameter value encodings [4] SHOULD be decoded prior to use of these attributes.

mtime-param = *UTF8-CHAR

mediatype.common.extension

This contains the primary file name extension used with this media type. Extensions should be converted to lower case to simplify searching. The leading "." before an extension is not included in this attribute value.

mtime-ext = 1*ATOM-CHAR

mediatype.common.extensionOther

This is a multi-valued attribute which contains additional file name extension(s) that are commonly associated with this media type. For example, with JPEG files (image/jpeg), a number of extensions have been observed: "jpg", "jpeg", "jfif", "jpe" and "jfi". Extensions should be converted to lower case to simplify searching.

mtime-extother = 1*ATOM-CHAR

mediatype.common.magicNumber.bin

This contains the magic number(s) of the media type. A magic number is a set of octets at the beginning of the file which are always the same for that media type. For example, all image/gif objects begin with the four-octet sequence (71, 73, 70, 56 or "GIF8"). As this is a binary field, it may contain any octet value including 0. This can be used to attempt to locate a type

for an untyped file.

mtime-magic = 1*OCTET

mediatype.common.textualNewlines

If this is "1" it indicates that the media type is line oriented and subject to newline canonicalization. If this is "0" it indicates newlines should be preserved. If NIL, the client should default this to "0" for non-text types and "1" for text types.

mtime-text = "0" / "1"

mediatype.common.description

This is a longer textual description of the mediatype. Newlines are represented by a CRLF sequence.

mtime-desc = *UTF8-CHAR

mediatype.common.suppressWarning

If this is "1" then no security warnings will be issued to the user on any platform. Values other than "1" SHOULD be treated as equivalent to NIL.

mtime-suppress = "0" / "1"

mediatype.common.preferred

If this is "1" it indicates that this is the preferred entry for a media type with multiple entries. If this is "0", it indicates this is not the preferred entry. NIL indicates an unspecified preference. For example, the "text/plain" media type may be used to represent multiple file types including plain text and C source files. Thus there can be multiple text/plain entries in the mediatypes list and this attribute is used to identify which one to use by preference when a single choice must be made. As ACAP does not enforce uniqueness of this attribute, software which uses this attribute needs a strategy to deal with multiple preferred types, such as choosing the type whose "entry" appears first using the client's comparator preference.

mtime-preferred = "0" / "1"

mediatype.common.MIME

If this is a "1" it indicates the type is represented as a MIME entity (including headers) rather than as a MIME body. If this is "0", it indicates the type is represented only as a MIME body. If this is NIL, the client should treat it as "0" for non-multipart types and "1" for multipart types. Action-specific ".MIME" attributes take precedence over this when they are non-NIL.

mtype-mime = "0" / "1"

[4.3](#) MacOS Attributes

These are attributes which apply to MacOS systems.

mediatype.macOS.type.bin

This contains the 4-octet MacOS type code for this media type.

mtype-mactype = 4OCTET

mediatype.macOS.creator.bin

This contains the 4-octet MacOS creator code which the user prefers for use with documents of this type.

mtype-maccreat = 4OCTET

mediatype.macOS.creator.name

This contains the name of the application whose creator code is stored in mediatype.macOS.creator.bin. This value MUST be UTF-8 and not in another MacOS script or character set.

mtype-maccname = 1*UTF8-CHAR

mediatype.macOS.creator.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the application referenced by the creator code. Values other than "1" SHOULD be treated as equivalent to NIL.

mtype-maccsuppress = "0" / "1"

`mediatype.macOS.action.postProcess.bin`

This contains the 4-octet MacOS creator code of an application which the user wishes to use when post-processing documents of this type. If NIL, then no post-processing is required. This is primarily used for encapsulating formats such as application/applefile.

`mtype-macpost` = 4OCTET

`mediatype.macOS.action.postProcess.name`

This contains the filename of the application whose creator code is stored in `mediatype.macOS.postProcess.bin`. This value MUST be UTF-8 and not in another MacOS script or character set.

`mtype-macpname` = 1*UTF8-CHAR

`mediatype.macOS.action.postProcess.MIME`

If this is "1", it indicates that the post processor takes a MIME entity (with MIME headers) as input, rather than just a body part.

`mtype-macmime` = "0" / "1"

`mediatype.macOS.action.edit.bin`

This contains the 4-octet MacOS creator code of an application which the user wishes to use when editing documents of this type. If NIL, then the application referenced by the creator code is used.

`mtype-macpost` = 4OCTET

`mediatype.macOS.action.edit.name`

This contains the filename of the application whose creator code is stored in `mediatype.macOS.edit.bin`. This value MUST be UTF-8 and not in another MacOS script or character set.

`mtype-macpname` = 1*UTF8-CHAR

`mediatype.macOS.action.edit.MIME`

If this is "1", it indicates that the editor takes a MIME entity (with MIME headers) as input, rather than just a body part.

`mtype-macmime` = "0" / "1"

`mediatype.macOS.action.edit.suppressWarning`

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the application referenced by the `mediatype.macOS.action.edit` attribute. Values other than "1" SHOULD be treated as equivalent to NIL.

`mtype-maccsuppress = "0" / "1"`

`mediatype.macOS.action.edit.alwaysUseHelper`

If this is "1", it states a user preference to use the specified helper application rather than any internal viewer contained in the dispatching application.

`mtype-macalways = "0" / "1"`

`mediatype.macOS.stripResource`

If this is "1", it indicates a preference to strip the resource fork from this media type prior to transmission.

`mtype-macstripres = "0" / "1"`

4.4 Unix Attributes

These attributes are used to launch Unix helper applications similar to the mailcap [8] mechanism.

When a client executes a Unix command line helper it runs under the Bourne shell (usually by using the `system()` function call). Prior to execution, the client SHOULD perform the following substitutions into the command line: the string "%s" is replaced by a temporary file name for the body part or MIME part (if %s is absent, the body part or MIME part is passed through standard input). The string "%t" is replaced by the media type and subtype, the string "%{<param>}" is replaced by the media type parameter with name <param>. The character "%" is quoted with "%\". By default, multi-part types are left intact with MIME headers prior to dispatching. A dispatching application MAY support the %n and %F options of mailcap [8] for backwards compatibility.

`mediatype.unix.action.view`

This contains a command to execute a viewer for the media type.

`mtype-unixview = *UTF8-CHAR`

`mediatype.unix.action.view.MIME`

If this is non-NIL it indicates that the viewer uses MIME entities (with complete headers) rather than body parts.

`mtype-unixvmime = "0" / "1"`

`mediatype.unix.action.view.suppressWarning`

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the viewer. Values other than "1" SHOULD be treated as equivalent to NIL.

`mtype-unixvsuppress = "0" / "1"`

`mediatype.unix.action.view.output`

This indicates any output assistance which the viewer command needs. The "terminal" option indicates an interactive terminal is needed and the dispatcher should create a terminal window or the equivalent. The "pager" option indicates the output may be more than 24 lines and the viewer does not have a built-in pager.

`mtype-unixout = "terminal" / "pager"`

`mediatype.unix.action.compose`

This contains a command to execute a program to compose a new body part of the specified media type. If not set, it is assumed to be the same as `mediatype.unix.editor`.

`mtype-unixcomp = *UTF8-CHAR`

`mediatype.unix.action.compose.MIME`

If this is non-NIL it indicates that the composer uses MIME entities (with complete headers) rather than body parts.

`mtype-unixcmime = "0" / "1"`

`mediatype.unix.action.edit`

This contains a command to execute a program to edit body parts of the specified media type. If not set, it is assumed to be the same as `mediatype.unix.view`.

`mtype-unixedit = *UTF8-CHAR`

mediatype.unix.action.edit.MIME

If this is non-NIL it indicates that the editor uses MIME entities (with complete headers) rather than body parts.

mtime-unixmime = "0" / "1"

mediatype.unix.action.edit.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the viewer. Values other than "1" SHOULD be treated as equivalent to NIL.

mtime-unixsuppress = "0" / "1"

mediatype.unix.action.print

This contains a command to print a body part of the specified type.

mtime-unixprint = *UTF8-CHAR

mediatype.unix.action.print.MIME

If this is non-NIL it indicates that the print command uses MIME entities (with complete headers) rather than body parts.

mtime-unixmime = "0" / "1"

mediatype.unix.action.print.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the viewer. Values other than "1" SHOULD be treated as equivalent to NIL.

mtime-unixsuppress = "0" / "1"

mediatype.unix.alwaysUseHelper

If this is non-NIL, it states a user preference to use the specified helper application rather than any internal viewer contained in the dispatching application.

mtime-unixalways = "0" / "1"

4.5 Microsoft Windows Attributes

These attributes are used to launch Windows helper applications.

Prior to execution of the action attributes, the client MUST perform the following substitutions into the command line:

The strings "%r" and "%p" are replaced by the Windows System Directory and the Program Files Directory respectively (The Program Files Directory name can be obtained from the registry key "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion" attribute "ProgramFilesDir").

The string "%s" is replaced by a temporary file name for the body part or MIME part (if %s is absent, the body part or MIME part is passed through standard input).

The string "%t" is replaced by the media type and subtype, the string "%{<param>}" is replaced by the media type parameter with name <param>. The character "%" is quoted with "%". By default, multi-part types are left intact with MIME headers prior to dispatching.

In order to simplify configuration of multiple PCs %r and %p are used instead of explicit directory names, because different PCs may store the Windows System Directory on different drives.

For example it is better to use "%r\system32\notepad.exe" instead of "E:\WinNT\system32\notepad.exe", where %r is equal to "E:\WinNT" on a specific PC.

mediatype.win32.action.view

This contains a command to execute a viewer for the media type.

mtype-win32view = *UTF8-CHAR

mediatype.win32.action.view.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when launching the viewer. Values other than "1" SHOULD be treated as equivalent to NIL.

mtype-win32vsuppress = "0" / "1"

mediatype.win32.action.view.MIME

If this is "1" then it indicates that the viewer uses MIME entities (with complete headers) rather than body parts.

mtype-win32vmime = "0" / "1"

mediatype.win32.action.compose

This contains a command to execute a program to compose a new body part of the specified media type. If not set, it is assumed to be the same as mediatype.win32.action.edit.

mtype-win32comp = *UTF8-CHAR

mediatype.win32.action.compose.MIME

This contains a command to execute a program to compose a new body part of the specified media type. If not set, it is assumed to be the same as mediatype.win32.editor.

mtype-win32cmime = "0" / "1"

mediatype.win32.action.edit

This contains a command to execute a program to edit body parts of the specified media type. If not set, it is assumed to be the same as mediatype.win32.action.view.

mtype-win32edit = *UTF8-CHAR

mediatype.win32.action.edit.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when editing the media type. Values other than "1" SHOULD be treated as equivalent to NIL.

mtype-win32editSup = "0" / "1"

mediatype.win32.action.edit.MIME

If this is "1" then the data will be sent as a MIME entity (including the MIME headers) rather than as just the body part.

mtype-win32editMIME = "0" / "1"

mediatype.win32.action.print

This contains a command to print a body part of the specified media type.

mtype-win32print = *UTF8-CHAR

mediatype.win32.action.print.suppressWarning

If this is "1", it indicates a preference to suppress any security warnings for this media type when printing the media type. Values other than "1" SHOULD be treated as equivalent to NIL.

mtype-win32printSup = "0" / "1"

mediatype.win32.action.print.MIME

If this is "1" then the data will be sent as a MIME entity (including the MIME headers) rather than as just the body part.

mtype-win32printMIME = "0" / "1"

mediatype.win32.alwaysUseHelper

If this is non-NIL, it states a user preference to use the specified helper application rather than any internal viewer contained in the dispatching application.

mtype-win32always = "0" / "1"

mediatype.win32.icon

If this is non-NIL, it contains a path and index to an icon representing the media type. An ACAP client MAY use local information in preference to this attribute.

mtype-win32icon = *UTF8-CHAR "," number
; file name and zero based index of icon in this file

4.5.1 Mapping MediaTypes to Windows Registry

Many of the attributes in this dataset class correspond closely to attributes in the Windows registry. The following list describes how this mapping aligns.

```
entry:
  Key      HKEY_CLASSES_ROOT\<extension>
  Attribute ""
mediatype.common.type:
  Key      HKEY_CLASSES_ROOT\<extension>
  Attribute "Content Type"
mediatype.common.description:
  Key      HKEY_CLASSES_ROOT\<mtype>
  Attribute ""
mediatype.win32.action.view:
  Key      HKEY_CLASSES_ROOT\<mtype>\shell\open\command
  Attribute ""
mediatype.win32.action.compose:
  Key      HKEY_CLASSES_ROOT\<mtype>\shell\new\command
  Attribute ""
mediatype.win32.action.edit:
  Key      HKEY_CLASSES_ROOT\<mtype>\shell\edit\command
  Attribute ""
mediatype.win32.action.print:
  Key      HKEY_CLASSES_ROOT\<mtype>\shell\print\command
  Attribute ""
mediatype.win32.icon:
  Key      HKEY_CLASSES_ROOT\<mtype>\DefaultIcon
  Attribute ""
mediatype.common.extension:
  Key      HKEY_CLASSES_ROOT\MIME\Database\
           Content Type\<content_type>
  Attribute "Extension"
```

Where <extension> is a file extension (with leading dot), and <mtype> is the value of the key HKEY_CLASSES_ROOT\<extension>, attribute "".

5. Usage Procedures

In order to locate the entry to use with a MIME entity, the following procedure is taken; stopping whenever a single entry remains in the list after a step.

1. If the media type is application/octet-stream and there is a filename with extension present, search for entries with a matching extension or extensionOther field and skip to step 5.

2. Search for entries with a `mediatype.common.type` of "`<type>/<subtype>`". Exclude any entries where the parameter on the media type doesn't match the parameters in `mediatype.common.param.*` attributes. For example, a "`text/plain; charset=iso-2022-jp`" media type does not match an entry with a "`mediatype.common.param.charset`" value of "`utf-8`".
3. If no matching entries result, look for a `mediatype.common.type` of "`<type>/*`" and repeat step 1.
4. If there is a filename with extension present, use the extension to reduce the number of matches.
5. If any entry has a `mediatype.common.preferred` value other than "`0`", then exclude all entries with a `mediatype.common.preferred` value of "`0`".
6. If any entry has a `mediatype.common.preferred` attribute of "`1`" exclude all entries which have a NIL `mediatype.common.preferred` attribute.
7. If multiple matching entries remain, pick one at random or prompt the user.

When launching the appropriate helper application, a security warning SHOULD be issued if the MIME entity arrived from an external source and the appropriate `suppressWarning` attribute is not "`1`". A security warning MAY be issued under any circumstances.

6. Examples

Here is an example mediatype entry. Multi-valued attributes are represented with parenthesis around the multiple values.

attribute	value
-----	-----
entry	JPEG image
mediatype.common.type	image/jpeg
mediatype.common.extension	jpg
mediatype.common.extensionOther	(jpeg jpe jfif jfi)
mediatype.common.description	JPEG is an image format most suitable for compressing photographs
mediatype.common.suppressWarning	1
mediatype.macOS.type.bin	JPEG
mediatype.macOS.creator.bin	JVWR
mediatype.macOS.creator.name	JPEG View
mediatype.macOS.action.edit.bin	8BIM
mediatype.macOS.action.edit.name	Adobe Photoshop
mediatype.unix.action.view	xv

Here is an example use of ACAP to fetch information about a media type by name:

```
C: A047 SEARCH "/mediatype/~/default/" RETURN ("*")
    EQUAL "entry" "i;octet" "WinZip File"
S: A047 ENTRY "WinZip File" (("modtime" "19980309102226")
    ("mediatype.common.extension" ("zip")))
    ("mediatype.common.type" ("application/x-zip-compressed"))
    ("mediatype.common.description" ("Zip archive file"))
    ("mediatype.common.textualNewlines" "0")
    ("mediatype.win32.action.view" "%r\WinZip\winzip32.exe")
    ("mediatype.win32.icon" "%r\WinZip\winzip32.exe,0")
    ("mediatype.win32.alwaysUseHelper" "1"))
S: A047 MODTIME "19980309105258"
S: A047 OK "SEARCH completed"
```

7. Security Considerations

This dataset provides the ability to identify a helper application to process a media type. Such helper applications may be subject to serious security considerations related to active content as discussed in MIME [2]. It is expected that programs which launch helper applications will display a security warning to the user unless the media type is known to be safe or the appropriate suppressWarning attribute is set.

The suppressWarning attributes express security policy. The Unix and win32 action attributes are extremely security sensitive as they contain active content. These attributes are subject to a variety of active attacks. The CRAM-MD5 [12] authentication mechanism used by ACAP is inadequate both because it fails to authenticate the server and fails to provide integrity protection. This dataset class SHOULD only be used with a security layer such as STARTTLS [13] or DIGEST-MD5 [14].

8. IANA Considerations

This document constitutes the registration for the "mediatype" dataset class per section 7.3 of [6].

Dataset class name/attribute prefix: mediatype

Purpose: Media Type Mappings

Published Specification(s): This specification

Person and email address to contact for further information:

See Authors' Addresses section of this specification.

Normative References

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