HPSF THUMBNAIL HOW-TO

by Drew Varner

1. The VT_CF Format

Thumbnail information is stored as a VT_CF, or Thumbnail Variant. The Thumbnail Variant is used to store various types of information in a clipboard. The VT_CF can store information in formats for the Macintosh or Windows clipboard.

There are many types of data that can be copied to the clipboard, but the only types of information needed for thumbnail manipulation are the image formats.

The `VT_CF` structure looks like this:

Element:	Clipboard Size	Clipboard Format Tag	Clipboard Data
Size:	32 bit unsigned integer (DWord)	32 bit signed integer (DWord)	variable length (byte array)

The Clipboard Size refers to the size (in bytes) of Clipboard Data (variable size) plus the Clipboard Format (four bytes).

Clipboard Format Tag has four possible values:

Value	Identifier	Description
`-1L`	`CFTAG_WINDOWS`	a built-in Windows© clipboard format value
`-2L`	`CFTAG_MACINTOSH`	a Macintosh clipboard format value
`-3L`	`CFTAG_FMTID`	a format identifier (FMTID) This is rarely used.
`0L`	`CFTAG_NODATA`	No data This is rarely used.

2. Windows Clipboard Data

Windows clipboard data has four image formats for thumbnails:

Value	Identifier	Description
3	`CF_METAFILEPICT`	Windows metafile format - recommended
8	`CF_DIB`	Device Independent Bitmap
14	`CF_ENHMETAFILE`	Enhanced Windows metafile format
2	`CF_BITMAP`	Bitmap - Obsolete - Use `CF_DIB` instead

3. Windows Metafile Format

The most common format for thumbnails on the Windows platform is the Windows metafile format. The Clipboard places and extra header in front of a the standard Windows Metafile Format data.

The Clipboard Data byte array looks like this when an image is stored in Windows' Clipboard WMF format.

Identifier	CF_METAFILEPICT	mm	width	height	handle	WMF data
Size	32 bit unsigned int	16 bit unsigned(?) int	16 bit unsigned(?) int	16 bit unsigned(?) int	16 bit unsigned(?) int	byte array - variable length
Description	Clipboard WMF	Mapping Mode	Image Width	Image Height	handle to the WMF data array in memory, or 0	standard WMF byte stream

4. Device Independent Bitmap

FIXME: Describe the Device Independent Bitmap format!

5. Macintosh Clipboard Data

FIXME: Describe the Macintosh clipboard formats!