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Document management — AFP interchange for PDF

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National foreword

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Foreword

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This document was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 2, *Document file formats, EDMS systems and authenticity of information*.

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Introduction

Advanced Function Presentation (AFP) is a coordinated set of document creation, viewing, archiving and printing hardware, software, and services that is used heavily in the high-speed transactional printing market, which includes the printing of financial statements, utility bills, books, and marketing materials (brochures, etc.).

AFP has proven itself in these environments due to its performance, reliability, and flexibility.

— AFP performance comes from its hierarchical object-oriented structure, resulting in a condensed data stream size and efficient reuse of print resources (document objects). The document objects managed automatically by AFP include text, fonts, overlays, images, graphics, and other resource objects such as bar codes and ICC profiles for colour management.

— AFP reliability in print environments comes from an architected bi-directional printer data stream interface that manages every page through a print system, making sure that each page gets printed correctly for security, audit, and accounting purposes.

— AFP flexibility comes from its ability to include other standard document formats such as TIFF, JPEG, and PDF as included objects within an AFP object container. These included objects can then be used like any other document object in the AFP system and can be placed anywhere on a page where they can then be printed or viewed.

While AFP has had the ability to include PDF in object containers for many years, more customers in the transactional print environment are creating workflows that combine PDF content within AFP documents. This allows them to use PDF to create the document content and then embed these PDF pages in AFP to get the performance and management they need in high-speed print environments. These 'hybrid' workflows allow them to get the best of what both PDF and AFP have to offer.

AFP itself originated within IBM as a mainstream presentation architecture. In 2009, the AFP Consortium (AFPC) was formed as a peer-based open standards organization composed of companies from around the world with an interest in AFP. The entire AFP architecture is now developed and maintained by the AFP Consortium.

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Document management — AFP interchange for PDF

1 Scope

This document specifies Advanced Function Presentation (AFP) interchange as a container for document objects by defining the AFP file format [Mixed Object Document Content Architecture (MO:DCA)[1)]]. It includes a means of identifying support for specifically including single and multi-page Portable Document Format (PDF) document objects as a container function set. It also includes a mechanism for pairing and managing resources associated with PDF.

NOTE For an example of how PDF external file references map into AFP secondary resources, see Annex A.

The use of AFP is applicable to AFP and PDF workflows where the final production is managed within an Intelligent Printer Data Stream (IPDS) environment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12651-1, *Electronic document management — Vocabulary — Part 1: Electronic document imaging*

ISO 19005-2, *Document management — Electronic document file format for long-term preservation — Part 2: Use of ISO 32000-1 (PDF/A-2)*

ISO 32000-1, *Document management — Portable document format — Part 1: PDF 1.7*

Mixed Object Document Content Architecture. (MO:DCA) Reference. AFPC-0004-09. Tenth Edition. AFP Consortium, 2017[2)]

Bar Code Object Document Content Architecture Reference. AFPC-0005-09. Tenth Edition. AFP Consortium, 2015[3)]

Color Management Object Content Reference. AFPC-0006-01. Second Edition. AFP Consortium, 2012[4)]

Font Object Content Architecture Reference. AFPC-0007-06. Seventh Edition. AFP Consortium, 2015[5)].

Graphics Object Content Architecture for Advanced Function Presentation Reference. AFPC-0008-03. Fourth Edition. AFP Consortium, 2017[6)].

1) The Architecture references shown (MO:DCA as an example) are copyright of the AFP Consortium. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

2) Available at http://afpcinc.org/wp-content/uploads/2017/12/MODCA-Reference-09.pdf

3) Available at http://afpcinc.org/wp-content/uploads/2016/08/BCOCA-Reference-09.pdf

4) Available at http://afpcinc.org/wp-content/uploads/2016/08/cmoca_reference-01.pdf

5) Available at http://afpcinc.org/wp-content/uploads/2016/08/FOCA-Reference-Font-Object-Content-Architecture-Reference.pdf

6) Available at http://afpcinc.org/wp-content/uploads/2017/04/AFP-GOCA-Reference-Graphics-Object-Content-Architecture-for-AFP-Reference.pdf

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Image Object Content Architecture Reference. AFPC-0003-07. Seventh Edition. AFP Consortium, 2010[7].

Presentation Text Object Content Architecture Reference. AFPC-0009-03. Fourth Edition. AFP Consortium, 2016[8].

Presentation Object Subsets for AFP. AFPC-0002-03. Third Edition. AFP Consortium, 2016[9].

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12651-1, ISO 19005-1, ISO 32000-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 AFP description

This clause introduces and defines the AFP Interchange Set and Function set for PDF used for containing PDF objects in AFP documents. AFP includes a base AFP presentation interchange set (MO:DCA IS/3) augmented with a function set for graphic arts (MO:DCA GA) that supports modern PDF objects within AFP. The base interchange set (hereafter referred to as IS/3) can contain native and non-native content, while the additional graphic art function set is essentially a non-native container for single and multi-page PDF.

For detailed definitions of native AFP content within IS/3, refer to the Object Content Architecture (OCA) documents listed in Clause 2.

Non-native content in IS/3 includes presentation object containers with defined subsets for TIFF and JPEG:

— AFPC TIFF;

— AFPC JPEG.

These are formally defined in Presentation Object Subsets for AFP. AFPC-0002-03. AFP Consortium, 2016. AFP full function document object container support is achieved by the inclusion of an additional presentation object container for PDF.

5 Compliance

5.1 General

The definition of compliance with this interchange set is limited to integrity of the resulting AFP MO:DCA file. The definition of what constitutes an AFP compliant product is not within the scope of this architecture definition.

7) Available at http://afpcinc.org/wp-content/uploads/2016/08/IOCA-Reference-Image-Object-Content-Architecture-Reference.pdf

8) Available at http://afpcinc.org/wp-content/uploads/2016/08/PTOCA-Reference-Presentation-Text-Object-Content-Architecture-Reference.pdf

9) Available at http://afpcinc.org/wp-content/uploads/2016/08/Presentation-Object-Subsets-for-AFPC-0002-03.pdf

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An AFP MO:DCA file is compliant with the AFP interchange set definition if all the following conditions are met:

— all objects and their content shall be defined in AFP and shall comply with the AFP object structure definitions;

— all structured fields shall be defined in AFP and shall comply with the AFP parameter and triplet definitions;

— all structured field triplets shall be defined in AFP and shall comply with applicable IS/3 (AFP) restrictions;

— all parameter values shall fall within the ranges defined by AFP;

— the print file shall not include any obsolete, retired or coexistence migration functions (as defined in the MO:DCA Reference, 2017, Appendix C.);

— the maximum structured field length shall be limited to X'7FF0' = 32,752;

— all Begin Document (BDT) structured fields shall specify the MO:DCA Interchange Set (X'18') triplet with ISid = X'0D80' (MO:DCA IS/3 with FS) or X'0D00' (MO:DCA IS/3 only) if there is no PDF content;

— the print file shall be enveloped with the Begin Print File (BPF) and End Print File (EPF) structured fields and the BPF structured field shall specify the MO:DCA Interchange Set (X'18') triplet with ISid = X'0D80' (MO:DCA IS/3 with FS) or X'0D00' (MO:DCA IS/3 only) if there is no PDF content;

— the print file shall identify AFP with PDF using the MO:DCA Function set (X’8F’) triplet with 2-byte FctSetID = X'0001' - MO:DCA GA function set on both BPF and BDT.

5.2 Structured Field Introducer

The Flag byte (byte 5) in the Structured Field Introducer (SFI) shall be set to X’00’. AFP interchange set does not include support for the following MO:DCA functions:

— SFI extension;

— Structured field segmentation;

— Structured field padding.

The maximum structured field length in AFP is limited to X’7FF0’ = 32,752.

5.3 Exception conditions

No additional exception conditions are defined within AFP for the structured fields or their parameters above and beyond what is defined in the general MO:DCA architecture.

6 Data Stream object structure

This clause defines the objects that make up the AFP Data Stream, including the base IS/3 structured fields and native content objects given in Table 1, the non-native presentation objects given in Tables 2 and 4, the non-presentation objects given in Table 3 and the related secondary resources given in Table 5.

a) The BPF and EPF structured fields are required in the AFP Data Stream.

b) The BDT and EDT structured fields are required in the AFP Data Stream.

c) The NOP structured field may appear within any begin-end domain and thus is not listed in the structured field groupings.

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d) Object content shall not include functions that are not in AFP, i.e. a print file is not AFP compliant if it includes such content.

e) Table 1 contains summaries of the base AFP object structure derived from IS/3. All syntax, semantics and notes in the object structure definitions in the MO:DCA Reference, 2017, Chapter 4, apply, unless explicitly specified otherwise.

Table 1 — AFP base IS/3 objects

AFP Data Stream object structure		
Object name	**Object envelope**	**Summary of AFP object structure; differences from general MO:DCA architecture noted**

Print File	Begin Print File (BPF) X'D3A8A5' to End Print File (EPF) X'D3A9A5'	The Print File shall:
		— be enveloped by the BPF and EPF structured fields;
		— specify the MO:DCA Interchange Set X'18' triplet on the BPF and
		— indicate ISid = X'0D80' (MO:DCA IS/3 with FS) or X'0D00' (MO:DCA IS/3 only) if there is no PDF content.
		The Print File shall contain nothing except the following structured fields and objects, as defined in the general architecture subject to all applicable IS/3 restrictions.
		Print File
		`(BPF, D3A8A5)`
		`[ (Resource Grp) ]`
		`(Index + Doc) (S)`
		`(EPF, D3A9A5)`
		Index + Document
		`[ (Index ) ]`
		`(Document ) (S)`
		A compliant IS/3 Print File is subject to a single Form Definition and shall contain at most one BPF/EPF pair and at most one Print File level resource group.

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Table 1 *(continued)*

AFP Data Stream object structure		
Object name	**Object envelope**	**Summary of AFP object structure; differences from general MO:DCA architecture noted**

Resource Group (Print File)	Begin Resource Group (BRG) X'D3A8C6' to End Resource Group (ERG) X'D3A9C6'	The Resource Group shall contain nothing except the following structured fields and resource objects, as defined in the general architecture subject to all applicable IS/3 restrictions.
		`(BRG, D3A8C6)`
		`+ [ (Overlay ) (S) ]`
		`+ [ (MO:DCA Pseg ) (S) ]`
		`+ [ (Form Map ) (S) ]`
		`+ [ (BCOCA ) (S) ]`
		`+ [ (GOCA ) (S) ]`
		`+ [ (IOCA ) (S) ]`
		`+ [ (Object Cont ) (S) ]`
		`+ [ (FOCA Object ) (S) ]`
		`(ERG, D3A9C6)`
		
		The only FOCA objects that may be included are:
		— FOCA code page object;
		— FOCA Unicode-extended code page object.
		IS/3 may limit function in the Resource Objects; for details, see the individual object definitions in this table.

Resource Object (in Print File Resource Group)	Begin Resource (BRS) X'D3A8CE' to End Resource (ERS) X'D3A9CE'	The Resource Object shall be enveloped by the BRS and ERS structured fields:
		`(BRS, D3A8CE)`
		`(Res Object )`
		`(ERS, D3A9CE)`

Document Index	Begin Document Index (BDI) X'D3A8A7' to End Document Index (EDI) X'D3A9A7'	The Document Index shall contain nothing except the following structured fields, as defined in the general architecture subject to all applicable IS/3 restrictions.
		`(BDI, D3A8A7)`
		`+ (IEL, D3B2A7) (S)`
		`+ [ (LLE, D3B490) (S) ]`
		`+ [ (TLE, D3A090) (S) ]`
		`(EDI, D3A9A7)`

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