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FIPS PUB 194

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION

OPEN DOCUMENT ARCHITECTURE (ODA) RASTER DOCUMENT APPLICATION PROFILE (DAP)

CATEGORY: SOFTWARE STANDARD **SUBCATEGORY:** GRAPHICS

1995 MARCH 13

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Computer Systems Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899-0001

Issued March 13, 1995

U.S. Department of Commerce
Ronald H. Brown, Secretary

Technology Administration
Mary L. Good, Under Secretary for Technology

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and Technology
Arati Prabhakar, Director

Foreword

The Federal Information Processing Standards Publication Series of the National Institute of Standards and Technology (NIST) is the official publication relating to standards and guidelines adopted and promulgated under the provisions of Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235. These mandates have given the Secretary of Commerce and NIST important responsibilities for improving the utilization and management of computer and related telecommunications systems in the Federal Government. The NIST, through its Computer Systems Laboratory, provides leadership, technical guidance, and coordination of Government efforts in the development of standards and guidelines in these areas.

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James H. Burrows, Director
Computer Systems Laboratory

Abstract

This FIPS PUB adopts the ISO/IEC 12064-1 International Standardized Profile (ISP) FOD112 which specifies the use of a subset of the ODA standard. It facilitates the interchange of raster documents among different raster graphics applications by specifying the constraints on document structure and content according to the rules of the ODA standard. The documents supported by this standard are based on a paradigm of an electronic engineering drawing, illustration, or other electronic image. The FIPS PUB specifies the structure and parameters for describing and interchanging bi-level untiled compressed images as well as tiled raster images.

Key words: Documents Application Profile (DAP); Federal Information Processing Standard (FIPS); interchange format; International Standardized Profile (ISP); Open Document Architecture (ODA); ODA Raster DAP; raster graphics.

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Federal Information Processing Standards Publication 194

1995 March 13

Announcing the Standard for

OPEN DOCUMENT ARCHITECTURE (ODA) RASTER DOCUMENT APPLICATION PROFILE (DAP)

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology (NIST) after approval by the Secretary of Commerce pursuant to Section 111 (d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

1. Name of Standard. Open Document Architecture (ODA) Raster Document Application Profile (DAP), (FIPS PUB 194).

2. Category of Standard. Software Standard, Graphics.

3. Explanation. This Federal Information Processing Standard adopts the International Organization for Standardization (ISO)/ International Electrotechnical Commission (IEC) 12064-1 International Standard Profile (ISP) FOD112, Open Document Format: Image Applications—Simple Document Structure—Raster Graphics content architecture, Part 1: Document Application Profile (DAP). This FIPS PUB defines three levels of conformance, the complete specification is in Section 10.

ISO/IEC 12064-1 specifies the use of a subset of the ODA standard and, in this FIPS PUB, is referred to as the ODA Raster DAP. The ODA standard is defined in a joint ISO/IEC and International Telecommunications Union Telecommunication Standardization Sector (ITU-T) document ISO/IEC 8613 ¦ ITU-T Recommendation T.410 Series, Open Document Architecture (ODA) and Interchange Format.

The ODA standard supports the interchange of compound documents containing up to three types of contents: character (text), raster graphics, and geometric graphics. Developed by international standards organizations, the ODA standard specifies rules for describing the logical and layout structures of documents as well as rules for specifying character, raster graphics, and geometric graphics content of documents, thus providing for the interchange of complex documents. The ODA standard was developed primarily by the ISO/IEC Joint Technical Committee (JTC1) and ITU-T, formerly the Consultative Committee on International Telephone and Telegraph (CCITT).

A DAP is a functional subset of the ODA standard and facilitates the interchange of documents among different document systems by specifying the constraints on document structure and content according to the rules of the ODA Standard. The ODA Raster DAP specifies an interchange format suitable for the transfer of formatted structured documents between systems designed for raster graphics applications. The documents supported by this standard are based on a paradigm of an electronic engineering drawing, illustration, or other electronic image. Within an ODA document, only raster graphics content is allowed and supported by this FIPS.

The ODA Raster DAP was initially developed by an ad-hoc Continuous Acquisition and Life-Cycle Support (CALS) Tiling Task Group. CALS, formerly known as the Computer-aided Acquisition and Logistic Support, is a Department of Defense (DoD) initiative. The ODA Raster DAP was further developed by vendors and users of computer networks/systems participating in the Open Systems Environment Implementors' Workshop (OIW), and finally harmonized with the International organizations participating in the Profile

Alignment Group for ODA (PAGODA). Finally, it was submitted to ISO/IEC JTC1/Special Group on Functional Standards (SGFS) for processing as part 1 of the ISP.

4. Approving Authority. Secretary of Commerce.

5. Maintenance Agency. U.S. Department of Commerce, National Institute of Standards and Technology (Computer Systems Laboratory).

6. Cross Index.

a. ISO/IEC 8613: 1994 | ITU-T 410 Recommendation Series (1993), Information Processing—Text and Office Systems Open Document Architecture (ODA) and Interchange Format Standard.

b. NIST Special Publication 500-224, Stable Implementation Agreements for Open Systems Interconnection Protocols, Version 8, Edition 1, December 1994.

c. ANSI/AIIM MS53-1993, Standard Recommended Practice—File Format for Storage and Exchange of Images—Bi-Level Image File Format.

7. Related Documents. Related ISO and ITU documents are listed in the normative reference section of the ODA Raster DAP. Other related documents are:

a. FIPS PUB 149, Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 3 Facsimile Apparatus.

b. FIPS PUB 150, Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus.

c. NISTIR 5108, Raster Graphics: A Tutorial and Implementation Guide.

d. Federal Information Resources Management Regulations (FIRMR) subpart 201-20.303, Standards and subpart 201-39-1002, Federal Standards.

8. Objectives. The FIPS for ODA Raster DAP permits Federal departments and agencies to exercise more effective control over the production, management, and use of Government's raster graphics applications. The primary objectives of this standard are:

- to promote interchange of structured documents containing raster graphics images between image processing systems of different manufacturers,
- to facilitate the use of advanced technology by the Federal Government,
- to contribute to the economic and efficient use of image and document processing system resources, and
- to avoid the proliferation of vendor-unique solutions.

9. Applicability. The ODA Raster DAP is available for use by Federal Government agencies when acquiring and developing ODA raster graphics applications. This FIPS applies to systems processing, generating, and receiving raster graphics images utilizing the ODA standard in a structured document environment. It specifies the structure and parameters for describing and interchanging bi-level untiled compressed images as well as tiled raster images. Each system acquired or developed by Federal agencies to support the ODA Raster DAP shall include appropriate system-to-DAP and DAP-to-system translators, such that incoming data streams are interpreted correctly and that outgoing data streams are generated correctly. These translators may be acquired separately from the acquisition of the application system when it is in the best interest of the Federal agency to do so. Use of the standard is independent of the communications used to transfer documents produced by these applications; that is, this standard may be used within the existing framework of communication protocols. There are three levels of applicability defined to satisfy different implementation requirements.

10. Specifications. This FIPS adopts the provisions of ISO/IEC 12064-1 by defining three levels of implementation support. All levels must conform to the document and raster layout specifications of [ITU-T Rec. T.410 series ¦ ISO/IEC 8613] and ISO/IEC ISP 12064-1 that are essential for raster graphics applications. The specifications for ODA data streams are also defined in [ITU-T Rec. T.410 series ¦ ISO/IEC 8613] and ISO/IEC ISP 12064-1 and apply to all levels defined in this FIPS. The levels are: ANSI/AIIM MS-53 (Untiled), Intermediated ODA Raster DAP, and Full ODA Raster DAP.

10.1. ANSI/AIIM MS-53 (Untiled). This level of implementation supports ANSI/AIIM MS-53-1993, Standard Recommended Practice—File Format for Storage and Exchange of Images—Bi-Level Image File Format: Part 1. Files written in conformance with any of the pre-defined file formats described in the ANSI/AIIM MS-53 standard can be imported into an ODA implementation. Each of six file formats can be implemented without either technical knowledge or understanding of the ODA format. This implementation does not support tiled raster images but does support both ITU-T Recommendation T.6 (Group 4) and ITU-T Recommendation T.4 (Group 3) compression algorithms.

10.2 Intermediate ODA Raster DAP. This level of implementation supports raster graphics images in either the untiled or tiled format. The following restrictions apply to this level of implementation.

a. The ITU-T Recommendation T.4 (Group 3) one-dimensional and two-dimensional compression algorithms are not supported.

b. If the image is tiled, the tile size must be restricted to 512 X 512 pels.

c. The uncompressed escape option defined in FIPS PUB 150 (ITU-T Recommendation T.6) will not be used.

d. The bit ordering will be restricted to only the most significant bit (MSB) to least significant bit (LSB), the "down" bit order.

e. Only the "Document-reference" attribute within the Document Profile Document Management attributes is supported.

10.3. Full ODA Raster DAP. This level of implementation supports raster graphics images in either the untiled or tiled format. It fully supports all aspects of the ODA Raster DAP.

10.4. Miscellaneous Requirements. A bitmap image or tile represents the "information" in a document by one bits and the "background" by zero bits. This FIPS requires that the encoding programs exporting document images for interchange must produce the image with a pel line dimension which is a multiple of eight pels.

10.5. Conformance Requirements. All implementations, regardless of implementation level, claiming conformance to this FIPS must adhere to the specific requirements defined in the "Conformance" clause of the ODA Raster DAP and to the general rules below.

Conformance Rules for Data Streams. A conforming data stream shall be syntactically, semantically, and structurally correct as defined in this standard.

Conformance Rules for Generators. A generator which claims conformance to this standard shall create only conforming data streams which correctly represent the raster graphics image which was input to the generator.

Conformance Rules for Receivers. A receiver which claims conformance to this standard shall be capable of reading and correctly processing any conforming data stream without halting or aborting such that it produces the correct results.

11. Implementation. The implementation of this standard involves three areas of consideration: acquisition of raster graphics implementations, interpretations of the standard, and validation of ODA Raster DAP implementations.

11.1. Acquisition of Raster Graphics Applications. This standard becomes effective September 1, 1995. For a period of twelve (12) months after the effective date, agencies are permitted to acquire alternative software that provides equivalent functionality to the ODA Raster DAP. Agencies are encouraged

to use this standard for solicitation proposals for new raster processing systems to be acquired after the effective date. This standard is mandatory for use in all solicitation proposals for new ODA raster application products acquired twelve (12) months after the effective date.

11.2. Interpretation of the Standard. NIST provides for the resolution of questions regarding FIPS for ODA Raster DAP specifications and requirements, and issues official interpretations as needed. Procedures for interpretations are specified in FIPS PUB 29-3. All questions about the interpretation of FIPS for ODA Raster DAP should be addressed to: Computer Systems Laboratory, ATTN: Raster Graphics Interpretation, National Institute of Standards and Technology, Gaithersburg, MD 20899.

11.3. Validation of ODA Raster DAP Implementations. Implementations of FIPS ODA Raster DAP shall be validated in accordance with NIST Computer Systems Laboratory (CSL) validation procedures for FIPS ODA Raster DAP. The goal of the NIST ODA Raster DAP Validation Test Service is to maximize the probability of successful interchange between conforming systems.

Validation testing provides a way of determining the degree to which an implementation conforms to a standard. The testing of ODA Raster DAP implementations to determine the degree to which they conform to the standard may be required by Government agencies in accordance with Federal Information Resources Management Regulation (FIRMR) 201-20.303, 201-20.304, 201-39.1002, and the associated Federal ADP and Telecommunications Standard Index.

The agency is advised to refer to the NIST publication *Validated Products List* for information about the validation status of products.

Information concerning the NIST Raster Graphics Validation Test Service and validation procedures can be obtained by contacting the:

National Institute of Standards and Technology
Computer Systems Laboratory
ATTN: Raster Graphics Test Service
Building 225, Room A266
Gaithersburg, MD 20899
(301) 975-3257

12. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to FIPS. The head of such agency may redelegate such authority only to a senior official designated pursuant to section 3506(b) of Title 44, U.S. Code. Waivers shall be granted only when:

a. Compliance with a standard would adversely affect the accomplishment of the mission of an operator of a Federal computer system, or

b. Cause a major adverse financial impact on the operator which is not offset by Governmentwide savings.

Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement-sensitive or classified portions clearly identified, shall be sent to: National Institute of Standards and Technology; Attn: FIPS Waiver Decisions, Technology Building, Room B-154; Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the *Federal Register*.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the *Commerce Business Daily* as a part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after that notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Sec. 552(b), shall be part of the procurement documentation and retained by the agency.

13. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161. When ordering, refer to Federal Information Processing Standards Publication 194 (FIPSPUB194), and title. Specify microfiche, if desired. Payment may be made by check, money order, or NTIS deposit account.

FINAL VERSION OF STABLE IMPLEMENTATION AGREEMENTS, PART 23, ODA RASTER DAP, SUBMITTED TO ISO AS ISP 12064-1 (FOD112)

Information Technology
- International Standardized Profile FOD112
- Open Document Format: Image Applications
- Simple Document Structure
- Raster Graphics content architecture

Part 1:
Document Application Profile

Date: 1994-11-15
Source: OSE Implementors' Workshop (OIW)

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PART 23 - ODA RASTER DAP - STABLE IMPLEMENTATION AGREEMENTS

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, government and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC1. In addition to developing International Standards, ISO/IEC JTC1 has created a Special Group on Functional Standardization (SGFS) for the elaboration of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or a set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75% of the national bodies casting a vote.

Development of this International Standardized Profile (ISP) has been done in liaison with several organizations. These include ODA expert groups within the:

- Asia-Oceania Workshop (AOW);
- ITU-T Study Group 8;
- European Workshop for Open Systems (EWOS);
- OSE Implementors' Workshop (OIW).

The liaison between these organizations has occurred within the meetings of the Profile Alignment Group for ODA (PAGODA). These meetings have focused on the development of a single set of internationally aligned ODA document application profiles.

The profile defined in this ISP is a part of the ODA profile taxonomy defined in TR 10000-2, 4.4.4.3 and 5.4.1. This profile is specific to the profile identifier FOD112.

At present, this ISP consists of one part: Document application profile.

Further parts may be added to this ISP.

Annex A forms an integral part of this part of ISO/IEC 12064. Annexes B to D are for information only.

Introduction

The purpose of this International Standardized Profile is to facilitate the interworking of basic image applications interchanging documents based on [ITU-T Rec. T.410 series | ISO/IEC 8613], Open Document Architecture (ODA) and Interchange Format. This International Standardized Profile is suitable for interchanging documents in formatted form and has been defined in accordance with [ITU-T Rec. T.411 | ISO/IEC 8613-1]. The format of this International Standardized Profile is in accordance with ISO/IEC TR 10000-1 and with the standardized proforma and notation defined in Annex F of [ITU-T Rec. T.411 | ISO/IEC 8613-1].

INTERNATIONAL STANDARDIZED PROFILE (ISP) 12064-1 (FOD112)

Information Technology
- International Standardized Profile FOD112
- Open Document Format: Image Applications
- Simple Document Structure
- Raster Graphics content architecture

Part 1:
Document Application Profile (DAP)

1 Scope

This International Standardized Profile (ISP) specifies an interchange format suitable for transfer of structured documents between equipment designed for raster processing. The documents supported by this ISP are based on a paradigm of an electronic engineering drawing or illustration. Such documents contain one or more pages. Each page consists of an image in the form of a bi-tonal raster graphics content. There is no restriction on the minimum size of the image.

This document defines an ISP that allows large format raster documents to be interchanged in a formatted form in accordance with [ITU-T Rec. T.410 series | ISO/IEC 8613].

It is assumed that, when negotiation is performed by the service using this ISP, all non-basic values are subject to negotiation.

This ISP is independent of the processes carried out in an end system to create, edit, or reproduce raster documents. It is also independent of the means to transfer the document which, for example, may be by means of communication links or exchanged storage media.

The features of a document that can be interchanged using this ISP fall into the following categories:

a) Page format features - these concern how the layout of each page of a document will appear when reproduced;

b) Raster graphics layout and imaging features - these concern how the document content will appear within pages of the reproduced document;

c) Raster graphics coding - these concern the raster graphics representations and control functions that make up the document raster graphics content.

There are two DAP object identifiers supporting this ISP with the only difference being in the encoding of the data stream. One uses the ASN.1 based ODIF encoding. The other uses the SGML/SDIF based ODL encoding. When this document refers to *this profile*, it is referring to this specification regardless of which DAP identifier may be selected to create the data stream.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this ISP. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this ISP are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and ITU-T maintains published editions of its current Recommendations.

[1] ITU-T Recommendation T.4 : 1988, *Standardization of Group 3 Facsimile Apparatus for Document Transmission.*

[2] ITU-T Recommendation T.6 : 1988, *Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus.*

[3] ITU-T Recommendation T.411 (1993) | ISO/IEC 8613-1 : 1994, *Information processing - Text and Office Systems; Open Document Architecture (ODA) and Interchange Format - Part 1: Introduction and General Principles.*

[4] ITU-T Recommendation T.412 (1993) | ISO/IEC 8613-2 : 1994, *Information processing - Text and Office Systems; Open Document Architecture (ODA) and Interchange Format - Part 2: Document Structures.*

[5] ITU-T Recommendation T.414 (1993) | ISO/IEC 8613-4 : 1994, *Information processing - Text and Office Systems; Open Document Architecture (ODA) and Interchange Format - Part 4: Document Profile.*

[6] ITU-T Recommendation T.415 (1993) | ISO/IEC 8613-5 : 1994, *Information processing - Text and Office Systems; Open Document Architecture (ODA) and Interchange Format - Part 5: Open Document Interchange Format.*

[7] ITU-T Recommendation T.417 (1993) | ISO/IEC 8613-7 : 1994, *Information processing - Text and Office Systems; Open Document Architecture (ODA) and Interchange Format - Part 7: Raster Graphics Content Architectures.*

[8] ISO/IEC 646 : 1991, *Information technology - ISO 7-bit coded character set for information interchange.*

[9] ISO/IEC 2022 : 1986, *Information processing - ISO 7-bit and 8-bit coded character sets - Code extension techniques.*

[10] ISO 6937-2: 1983, *Information Processing - Coded character sets for text communication - Part 2: Latin alphabetic and non-alphabetic graphic characters.*

[11] ISO 8824 : 1990, *Information Processing Systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

[12] ISO 8825 : 1990, *Information Processing Systems - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

[13] ISO 8879 : 1986, *Information processing - Text and office systems - Standard Generalized Markup Language (SGML).*

[14] ISO 8879 : 1986, *Information processing - Text and office systems - Standard Generalized Markup Language (SGML), Amendment 1.*

[15] ISO 9069 : 1988, *Information processing - SGML support facilities - SGML Document Interchange Format (SDIF).*

[16] ISO/IEC TR 10000-1 : 1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1:Framework.*

[17] ISO/IEC TR 10000-2 : 1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2:Taxonomy of Profiles.*

3 Definitions

For the purposes of this ISP, the following definitions apply.

The definitions given in [ITU-T Rec. T.411 | ISO/IEC 8613-1] are applicable to this ISP.

Constituent constraint names

Each constituent that may be included in a document that conforms to this profile has been given a unique name which serves to identify that constituent throughout this profile.

The convention is that full names are used (i.e., no abbreviations are used), two or more words in a name are concatenated and each word begins with a capital. Examples of constituent names used in this profile are CompositePage, DocumentLayoutRoot, and SpecificBlock.

In clause 6, each constituent provided by this profile is underlined once at the point in the text at which the purpose of that constituent is defined. This also serves to identify all the constituents provided by this profile.

The same constituent names are also used in the technical specification in clause 7 so that there is a one-to-one correspondence between the use of these names in clauses 6 and 7.

Although the constituent names relate to the purpose of the constituents, the semantics of constituents must not be implied from the actual names that are used. Also, these names do not appear in an interchanged document but a mechanism for identifying constituents in an interchange document is provided. Thus in an application using this profile, the constituents may be known to the user by different names.

4 Relationship with other profiles

The raster graphics content portion of this ISP closely aligns with the FOD036 ISP. The primary exception is that this ISP supports tiled raster graphics and the additional bit order mapping.

> **NOTE** - Functionally, this ISP is a functional superset of an ITU-T profile, ITU-T Recommendation T.503, A Document Application Profile for the Interchange of Group 4 Facsimile Documents.

5 Conformance

In order to conform to this ISP, a data stream representing a document must meet the requirements specified in 5.1.

The requirements for implementations that originate and/or receive data streams conforming to this ISP are specified in 5.2.

5.1 Data stream conformance

The following requirements apply to the encoding of data streams that conform to these agreements:

a) The data stream shall be encoded in accordance with the ASN.1 encoding rules defined in ISO 8825 or the SGML grammar and syntax of ISO 8879;

b) The data stream shall be structured in accordance with the interchange format defined in clause 8;

c) The document shall be structured in accordance with only the formatted document architecture class specified in clause 7. In addition, the document shall contain all mandatory constituents specified for that class and may optionally contain constituents permitted for that class as specified in clause 7;

d) Each constituent shall contain all those attributes specified as required for that constituent in this profile. Other attributes may be specified provided they are permitted for that constituent;

e) The attributes shall have values within the range of permissible values specified in this profile;

f) The encoded document shall be structured in accordance with the abstract document architecture defined in [ITU-T Rec. T.412 | ISO/IEC 8613-2];

g) The encoded document shall be structured in accordance with the characteristics defined in clause 6 and shall contain only those features defined in clause 6.

5.2 Implementation conformance

This clause states the requirements for implementations claiming conformance to this ISP.

A conforming receiving implementation must be capable of receiving *either* any data streams conforming to this profile structured in accordance with ODIF *or* any data streams conforming to this profile structured in accordance with ODL *or* both of these. Receiving usually, but not always, involves recognizing and further processing the data stream elements.

6 Characteristics supported by this ISP

This clause describes the characteristics of documents that can be represented by data streams conforming to this profile. This clause also describes how these characteristics are represented in terms of divisional components of the data streams.

6.1 Overview

This ISP describes the features of [ITU-T Rec. T.410 series | ISO/IEC 8613] that are needed to support the interchange of documents containing only raster graphics content. It specifies interchange formats for the transfer of structured documents with simple layout structures.

This ISP describes documents that can be interchanged in the formatted form, which facilitates the reproduction of a document as intended by the originator.

Only one category of content is allowed within the document, that is, a raster graphics content in the formatted processable form. This is intended to facilitate the reproduction of the document content as intended by the originator.

This clause describes the layout features that can be represented in documents conforming to this ISP. The features are described in terms that are typical of the user-perceived capabilities and semantics found in a raster document interchange environment.

For the purpose of interchange, a document is represented as a collection of **constituents**, each of which is represented by a set of attributes. The constituents that make up a formatted document are defined below in this clause and are illustrated in figure 1.

Constituents defined as **required** must occur in any document that conforms to this profile. Constituents listed as **optional** may or may not be present in the document, depending on the requirements of the particular document.

The required constituents include:

a) a document profile;

b) layout object descriptions representing a specific layout structure;

c) content portion description.

The only optional constituent is the presentation style.

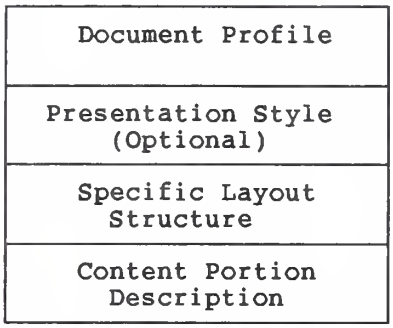

Figure 1 - Constituents

6.2 Logical constituents

Not applicable.

6.3 Layout constituents

This clause describes the features of the layout objects that can be represented in documents conforming to this ISP.

6.3.1 Overview of the layout characteristics

The document structure allows the document content to be laid out and presented in one or more pages. Each page in a document consists of only a single raster graphics content representing an engineering drawing, illustration, or other raster scanned image.

A specific layout structure of the document conforming to this application profile consists of a four-level hierarchy consisting of a document layout root, composite pages, frames, and blocks. The document can consist of multiple composite pages where each page represents a single image. Each composite page consists of a frame which in turn contains a block containing the content associated with the image.

Figure 2 is an illustration of the features of the document layout structure supported by this ISP.

6.3.2 DocumentLayoutRoot

A DocumentLayoutRoot is the top level in a document layout structure. A DocumentLayoutRoot consists of a sequence of one or more CompositePage constituent constraints.

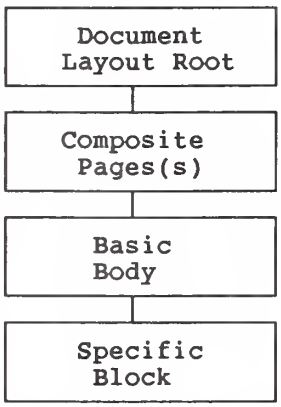

Figure 2 - Document layout structure

6.3.3 Page characteristics

Only one constituent constraint is provided to present pages within a document.

A document consists of a sequence of one or more composite pages. In a document's composite page, a frame is used to position a single raster graphics content representing the image on the page.

A document may consist of multiple pages of different sizes. Each page may be either landscape or portrait orientation. Both orientations are permitted in the document.

6.3.3.1 CompositePage

A CompositePage is a constituent constraint which defines a composite page that corresponds to the page area used for presenting the sequence of a BasicBody frame.

6.3.3.2 Page dimensions

A wide variety of page dimensions are supported including large format raster documents. The dimensions of the pages may be specified as any value, in BMU measurement units, including the larger sizes produced from foldout-size images and roll paper. These sizes apply to both portrait and landscape orientations. The page sizes include: ISO A0-A5, ANSI A-K, Japanese legal and letter, foldouts 27.94 cm (11 in.) X 35.56 cm (14 in.) and 27.94 cm (11 in.) X 43.18 cm (17 in.), and 27.94 cm (11 in.) roll paper. See table 1.

Dimensions equivalent to or less than the common assured reproduction area (CARA) of ISO A4 and North American Letter (NAL) in portrait or landscape orientation are basic values. Larger page sizes including those produced from roll paper are non-basic and their use must be indicated in the document profile (See table 2).

The default dimensions are the CARA of ISO A4 and North American Letter (A). Any default page dimensions may be specified in the document profile subject to the maximum dimensions defined above by using the "page dimensions" attribute. The "page position" attribute may be used to specify the position of the pel array image on the page. Although actual page dimensions may be used allowing for the raster content to completely fill a page leaving no borders, it is advised that the assured reproduction area (ARA) listed in table 1 be used wherever feasible. See clause 7 of [ITU-T Rec. T.412 | ISO/IEC 8613-2] for general rules for positioning pages on presentation surfaces.

6.3.3.3 Nominal page sizes

The nominal page sizes that may be specified are listed in table 1. In addition, 27.94 cm (11 inch) roll paper of any length is supported. These may be specified in portrait or landscape orientations. All values of nominal page size are non-basic and hence all values used in a document must be indicated in the document profile using the "medium type" attribute (See table 2).

Any of the nominal page sizes defined in table 1, subject to the restriction specified above, may be specified as the default value in the document profile.

Table 1 also includes the recommended ARA. Information loss may occur when a document is reproduced if the dimensions of the CompositePage exceed the ARA for the specified nominal page size.

6.3.4 BasicBody

A BasicBody is a constituent constraint which defines a lowest level frame used for laying out the image of an engineering drawing, illustration, or other raster scanned image. This frame contains a single SpecificBlock containing a raster graphics content portion. Note that there must be exactly one BasicBody on each page and one block in the frame.

The frame has a fixed position that is equal to the origin of the page. The vertical and horizontal dimensions of this frame are fixed and equal to the maximum size that can be achieved for the position within the area of the page.

6.3.5 SpecificBlock

A SpecificBlock is a constituent constraint which defines a basic layout object used to position and image the content portions associated with a BasicBody.

The position of the block is fixed and defaults to the origin of the superior frame. The dimensions default to the maximum size that can be achieved for the position within the area of the superior frame.

Table 1 - Dimensions for various page sizes

Page type	Size	Size (BMU)	ARA (BMU)
ISO-A5	148mm x 210mm	7015 x 9920	not defined
ISO-A4	210mm x 297mm	9920 x 14030	9240 x 13200
ISO-A3	297mm x 420mm	14030 x 19840	13200 x 18480
ISO-A2	420mm x 594mm	19840 x 28060	18898 x 27118
ISO-A1	594mm x 841mm	28060 x 39680	26173 x 37843
ISO-A0	841mm x 1189mm	39680 x 56120	37843 x 54283
NA-A	215.9mm x 279.4mm (8.5in x 11in)	10200 x 13200	9240 x 12400
NA-B	279.4mm x 431.8mm (11in x 17in)	13200 x 20400	12744 x 19656
NA-C	431.8mm x 558.8mm (17in x 22in)	20400 x 26400	19500 x 25800
NA-D	558.8mm x 863.6mm (22in x 34in)	26400 x 40800	25800 x 39600
NA-E	863.6mm x 1117.6mm (34in x 44in)	40800 x 52800	39600 x 52200
NA-F	711.2mm x 1016mm (28in x 40in)	33600 x 48000	32400 x 47400
NA-G	279.4mm x 2286mm (11in x 90in)	13200 x 108000	12400 x 106800
NA-H	711.2mm x 3632.2mm (28in x 143in)	33600 x 171600	31400 x 170400
NA-J	863.6mm x 4470.4mm (34in x 176in)	40800 x 211200	39600 x 210000
NA-K	1016mm x 3632.2mm (40in x 143in)	48000 x 171600	47400 x 170400
NA-Legal	215.9mm x 355.6mm (8.5in x 14in)	10200 x 16800	9240 x 15480
Foldout-Small	279.4mm x 355.6mm (11in x 14in)	13200 x 16800	12744 x 15480
Foldout-Small open	279.4mm (11in) x open	13200 x open	12744 x open
Japan-Legal	257mm x 364mm	12141 x 17196	11200 x 15300
Japan-Letter	182mm x 257mm	8598 x 12141	7600 x 10200

Tutorial Note - These page sizes are for the portrait orientation.

6.4 Document layout characteristics

This ISP provides only for formatted documents. Hence, no provision is made for constraining the document layout process other than as implied in the formatted documents supported by this ISP. In particular, these formatted documents are characterized by the following:

a) Documents containing only composite pages;

b) Documents may contain one or more pages;

c) Pages may vary by orientation within a document;

d) Each page contains a single raster graphics content portion representing the image;

e) Content is positioned within fixed position and dimension frames.

Table 2 - Layout attributes

Attributes	Basic values	Permissible default values	Non-basic values
Page dimensions **	CARA NA A and ISO A4	CARA NA-A and ISO A4	ARA NA B-K, ISO A0-A3,Japan legal, 279.4 mm (11 in.) Roll Paper
Medium-type ** (Nominal page size)	None	NA A-K, ISO A0-A5, Japan letter & legal, 279.4 mm (11 in.) Roll Paper	NA A-K, ISO A0-A5, Japan letter & legal, 279.4 mm (11 in.) Roll Paper

Tutorial Note - See table 1 **

6.5 Content layout and imaging control

A document is modelled as an image represented by a raster graphics content portion, as specified in [ITU-T Rec. T.417 | ISO/IEC 8613-7].

The only content architecture that may be specified using the attribute "content architecture class" is formatted processable raster graphics. The formatted processable raster graphics content must be specified as the default in the document profile.

6.5.1 Raster graphics content

6.5.1.1 Introduction

This clause defines the features that are applicable to the raster graphics content.

The default values for the following features may be specified in the document profile:

a) type of coding (required);

b) compression;

c) pel path;

d) line progression;

e) pel spacing;

f) spacing ratio;

g) number of pels per tile line;

h) number of lines per tile;

i) tiling offset;

j) tiling type.

The specification in a document of a non-basic value by a presentation or coding attribute must be indicated in the document profile.

6.5.1.2 Raster graphics content architecture

The formatted processable raster graphics content is the only content architecture class supported by this ISP and is the only default content architecture class that can be specified in the document profile.

In a composite page, only one content portion can be associated with the image.

6.5.1.3 Raster graphics encoding methods

The content may be encoded in accordance with the encoding schemes defined in CCITT Recommendations T.4 and T.6. In the case of T.4, either the one-dimensional or two-dimensional encoding scheme may be used. Also the bitmap encoding scheme defined in [ITU-T Rec. T.417 | ISO/IEC 8613-7] may be used. All these forms of encoding may be used in a single document and all are basic values. 'Uncompressed' mode of encoding may also be used but only as a non-basic value.

In a content portion, it is required that the coding attribute "number of pels per line" be specified. The coding attribute "number of lines" may also be specified. No restriction is placed on the values that may be specified for these coding attributes. This profile places no constraints on the size of the pel arrays that may be used.

The type of coding method used is specified by the attribute "type of coding". The use of this attribute is mandatory in the "document architecture defaults" of the document profile to define the default value of either 'T.6 encoding' (untiled), 'T.6 encoding - MSB' (untiled), or 'tiled encoding'. The use of this attribute in the description of the content portions is non-mandatory. If this attribute is not specified for a particular content portion, then the default value specified in the "document architecture defaults" of the document profile is used.

When the tiled encoding method is used and if the default value of 512 for the "number of pels per tile line" and "number of lines per tile" is to be used, these two attributes do not need to be specified. All other values are non-basic. If the "tile types" attribute is not present, then all tiles will default to T.6 encoded unless another default value has been specified in the document profile. If it is present, then there must be a value specified for each tile in which case only 'null background', 'null foreground', 'Rec. T.6 encoded', 'Rec. T.6 encoded - MSB', or 'bitmap encoded' values are supported. The T.4 encodings are not supported. There are no restrictions on the use of the "tiling offset" attribute other than that specified in [ITU-T Rec. T.417 | ISO/IEC 8613-7].

See table D.1, Annex D, for a tabulated list of the attributes and their basic, default, and non-basic values.

NOTE - 'T.6 encoded - MSB' is included in ITU-T Rec. T.417 (1993) but not included in ISO/IEC 8613-7 : 1994.

6.5.1.4 Raster presentation

Raster presentation is controlled by the presentation attributes specified in [ITU-T Rec. T.417 | ISO/IEC 8613-7]. This ISP provides for additional constraints on these presentation attributes as specified below.

The basic values for the attribute "pel path" supported by this profile are 0° and 90°. The "pel path" values of 180 and 270 degrees are non-basic.

The basic values for the attribute "line progression" supported by this profile is 270 degrees. The "line progression" value of 90° is non-basic.

Any value may be explicitly specified for pel spacing provided that the spacing between pels is not less than 1 BMU. The pel spacing need not be an integer value. The value of 'null' may not be specified because the scalable layout process is not supported. The specification of the spacings of 16, 12, 8, 6, 5, 4, 3, 2, and 1 BMU between adjacent pels are basic. The specification of any other spacing is non-basic and must be specified in the document profile.

NOTES

1 The basic pel spacing values listed above are equivalent to resolutions of 75, 100, 150, 200, 240, 300, 400, 600, and 1200 pels per 25.4 mm respectively when the BMU is interpreted as 1/1200 inch.

2 The attribute "pel spacing" specifies two integers, the ratio of which determines the pel spacing. No restriction is placed on the values of these integers.

There are no restrictions on the use of the "clipping" attribute. The "image dimensions" attribute is not supported.

There are no restrictions placed on the value of the "spacing ratio" attribute providing that the resultant line spacing is not less than 1 BMU. Also, the line spacing need not be an integral number of BMUs. All values are basic.

See table D.2, Annex D, for a tabulated list of the attributes and their basic, default, and non-basic values.

NOTE - In accordance with the content imaging process for formatted processable raster graphics content defined in the ODA base standard, the values for pel spacing and spacing ratio will be determined from the dimensions of the SpecificBlock and the values for the number of pels per line and the number of lines. They will have no effect on documents interchanged using this ISP.

6.6 Miscellaneous features

Specification and use of the attribute "application comments" is mandatory for all of the layout constituent constraints contained in a document that conforms to this ISP.

This attribute is structured so that it contains two fields. The first field is mandatory and contains a numeric string which uniquely identifies the constituent constraint applicable to the constituent for which the attribute is specified. This structure is compatible with other ISPs and facilities the processing of documents. The identifiers are as follows:

a) DocumentLayoutRoot 0;

b) CompositePage 2;

c) BasicBody 28;

d) SpecificBlock 30.

The second field, "external-data", is optional. It is used to contain any type of data outside the scope of ODA, i.e., tile offsets. When used in a SpecificBlock in conjunction with the "type of coding" of 'tiled encoding', it optionally may contain a sequence of positive integers, one for each tile in the content portion. The sequence of integers contains the octet offsets to the beginning of the respective tiles. The beginning of the "content information" is an offset of zero (0). An octet offset of zero(0) indicates that the respective tile is null. The integers will be sequenced in the same order as the tiles. The tiles will be sequenced primarily in the pel path and secondarily in the line progression direction as defined by the presentation attributes.

6.7 Document management features

Every document interchanged in accordance with this ISP must include a document profile containing information which relates to the document as a whole.

The features specified by the document profile are listed below. A definition of the information contained in these features is given in the corresponding attribute definitions in [ITU-T Rec. T.414 | ISO/IEC 8613-4].

6.7.1 Document constituent information

This information specifies which constituents are used to represent the document, specifically it indicates which constituents are included in the document. The two available attributes are:

a) specific layout structure;

b) presentation styles (optional).

6.7.2 Document characteristics

This information provides document identification information and specifies default values for attributes used in the document. The available attributes are:

a) document application profile;

b) document application profile defaults;

c) document architecture class;

d) content architecture class;

e) interchange format class;

f) ODA version date;

g) raster graphics content defaults.

6.7.3 Non-basic document characteristics

This information specifies the non-basic attribute values specified in the document. The following types of non-basic attribute values may be specified.

a) profile character sets;

b) page dimensions;

c) medium type;

d) raster graphics presentation features;

e) raster graphics coding attributes.

6.7.3.1 Profile character sets

Some document profile attributes have values consisting of character strings, for example, the document management attributes. The character sets used in these character strings are specified by the document profile attribute "profile character sets".

This attribute "profile character sets" specifies a code extension announcer and designations of character sets, which are subject to the following restrictions:

a) the code extension announcer shall be 04/03 when specified. This code extension announcer means to use G0 and G1 sets in an 8-bit environment and also the invocation of G0 and G1 sets into GL and GR, respectively. Thus, in each attribute to which this attribute applies, invocation shift functions are not necessary because G0 and G1 sets are implicitly invoked by this code extension announcer.

b) G0 set: only ISO-IR6 (the IRV of ISO 646 revised 1991), ISO-IR2 (the primary set of ISO 6937-2), or any other version of ISO 646 may be designated for this set; these graphic character sets are implicitly invoked in GL.

c) G1 set: no restrictions are placed on the graphic character sets that may be designated for this set. These graphic character sets are implicitly invoked in GR.

d) the empty set shall be designated into G1 and invoked into GR if no other specific character set is invoked in GR.

If the attribute "profile character sets" is not specified, then the default defined in [ITU-T Rec. T.410 series | ISO/IEC 8613] is assumed.

6.7.4 Document management attributes

Document management attributes contain information about the content of the document and its purpose. Information relating to the following may be specified:

a) document description (includes document reference).;

b) dates and times;

c) originators;

d) other user information;

e) external references;

f) local file references;

g) content attributes;

h) security information.

The attributes that may be used to specify this information are defined in [ITU-T Rec. T.414 | ISO/IEC 8613-4].

The string of characters used in the document management attributes shall belong to the character set indicated in the document profile attribute "profile character sets" (see 6.7.3.1). If the latter attribute is not explicitly specified in the document profile, then the default character set is the minimum subrepertoire of ISO 6937-2.

The control functions space (SP), carriage return (CR) and line feed (LF) may also be used within the character strings, but no other control functions are allowed. Therefore, the graphic character set cannot be changed in the document management attributes.

NOTE - The attributes applicable to the document profile are defined in table D.3, Annex D.

7 Specification of constituent constraints

7.1 Document profile constraints

7.1.1 Macro definitions

```
-- General macros --
DEFINE(FDA, "{'formatted'}")

DEFINE(DAC, "DocumentProfile (Document-architecture-class)")

DEFINE(FPR,"ASN.1{2 8 2 7 2}")  -- Raster formatted processable --

-- Basic page dimensions. --
DEFINE(BasicPageDimension,"
    REQ #horizontal-dimension {REQ #fixed-dimension { 1..9240 }},
      REQ #vertical-dimension {REQ #fixed-dimension { 1..12400 }}
    | REQ #horizontal-dimension {REQ #fixed-dimension { 1..12400 }},
      REQ #vertical-dimension {REQ #fixed-dimension { 1..9240 }}
    ")
    -- Any size equal to or smaller than CARA (Common Assured Reproduction Area) of ISO A4 and NA A.
    Both Portrait and Landscape may be specified. --
```

```
-- Non-basic page dimensions. --
DEFINE(NonBasicPageDimensions,"
    REQ #horizontal-dimension {REQ #fixed-dimension {1..39680}},
      REQ #vertical-dimension {REQ #fixed-dimension {12401..56120}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {9241..39680}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..56120}}
                        -- up to ISO A0 portrait  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..56120}},
      REQ #vertical-dimension {REQ #fixed-dimension {9241..39680}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {12401..56120}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..39680}}
                        --  up to ISO A0 landscape  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..48000}},
      REQ #vertical-dimension {REQ #fixed-dimension {12401..211200}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {9241..48000}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..211200}}
                        -- up to ANSI J/K portrait  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..211200}},
      REQ #vertical-dimension {REQ #fixed-dimension {9241..48000}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {12401..211200}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..48000}}
                        --  up to ANSI J/K landscape  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..12141}},
      REQ #vertical-dimension {REQ #fixed-dimension {12401..17196}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {9241..12141}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..17196}}
                        -- up to Japanese legal portrait  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..17196}},
      REQ #vertical-dimension {REQ #fixed-dimension {9241..12141}}
    | REQ #horizontal-dimension {REQ #fixed-dimension {12401..17196}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..12141}}
                        --  up to Japanese legal landscape  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {13200}},
      REQ #vertical-dimension {REQ #fixed-dimension {>= 16801}}
     -- Any portrait size larger than the typical foldout size (11 in x 14 in) including 11 inch roll paper.  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {>= 16801}},
      REQ #vertical-dimension {REQ #fixed-dimension {13200}}
     -- Any landscape size larger than the typical foldout size (14 in x 11 in) including 11 inch roll paper --
    ")

DEFINE(PermissiblePageDimensions,"
    REQ #horizontal-dimension {REQ #fixed-dimension {1..39680}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..56120}}
                        -- up to ISO A0 portrait  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..56120}},
      REQ #vertical-dimension {REQ #fixed-dimension {1..39680}}
                        --  up to ISO A0 landscape  --
    | REQ #horizontal-dimension {REQ #fixed-dimension {1..48000}},
```

```
    REQ #vertical-dimension {REQ #fixed-dimension {1..211200}}
                    -- up to ANSI J/K portrait --
  | REQ #horizontal-dimension {REQ #fixed-dimension {1..211200}},
    REQ #vertical-dimension {REQ #fixed-dimension {1..48000}}
                    -- up to ANSI J/K landscape --
  | REQ #horizontal-dimension {REQ #fixed-dimension {1..12141}},
    REQ #vertical-dimension {REQ #fixed-dimension {1..17196}}
                    -- up to Japanese legal portrait --
  | REQ #horizontal-dimension {REQ #fixed-dimension {1..17196}},
    REQ #vertical-dimension {REQ #fixed-dimension {1..12141}}
                    -- up to Japanese legal landscape --
  ")

DEFINE(NominalPageSizes,"

  REQ #horizontal-dimension {7015}, REQ #vertical-dimension {9920}
                    -- ISO A5 Portrait --
  | REQ #horizontal-dimension {9920}, REQ #vertical-dimension {7015}
                    -- ISO A5 Landscape --
  | REQ #horizontal-dimension {9920}, REQ #vertical-dimension {14030}
                    -- ISO A4 Portrait --
  | REQ #horizontal-dimension {14030}, REQ #vertical-dimension {9920}
                    -- ISO A4 Landscape --
  | REQ #horizontal-dimension {14030}, REQ #vertical-dimension {19840}
                    -- ISO A3 Portrait --
  | REQ #horizontal-dimension {19840}, REQ #vertical-dimension {14030}
                    -- ISO A3 Landscape --
  | REQ #horizontal-dimension {19840}, REQ #vertical-dimension {28060}
                    -- ISO A2 Portrait --
  | REQ #horizontal-dimension {28060}, REQ #vertical-dimension {19840}
                    -- ISO A2 Landscape --
  | REQ #horizontal-dimension {28060}, REQ #vertical-dimension {39680}
                    -- ISO A1 Portrait --
  | REQ #horizontal-dimension {39680}, REQ #vertical-dimension {28060}
                    -- ISO A1 Landscape --
  | REQ #horizontal-dimension {39680}, REQ #vertical-dimension {56120}
                    -- ISO A0 Portrait --
  | REQ #horizontal-dimension {56120}, REQ #vertical-dimension {39680}
                    -- ISO A0 Landscape --
  | REQ #horizontal-dimension {10200}, REQ #vertical-dimension {13200}
                    -- ANSI A Portrait --
  | REQ #horizontal-dimension {13200}, REQ #vertical-dimension {10200}
                    -- ANSI A Landscape --
  | REQ #horizontal-dimension {10200}, REQ #vertical-dimension {16800}
                    -- ANSI Legal Portrait --
  | REQ #horizontal-dimension {16800}, REQ #vertical-dimension {10200}
                    -- ANSI Legal Landscape --
  | REQ #horizontal-dimension {13200}, REQ #vertical-dimension {20400}
```

```
                    -- ANSI B Portrait --
| REQ #horizontal-dimension {20400}, REQ #vertical-dimension {13200}
                    -- ANSI B Landscape --
| REQ #horizontal-dimension {20400}, REQ #vertical-dimension {26400}
                    -- ANSI C Portrait --
| REQ #horizontal-dimension {26400}, REQ #vertical-dimension {20400}
                    -- ANSI C Landscape --
| REQ #horizontal-dimension {26400}, REQ #vertical-dimension {40800}
                    -- ANSI D Portrait --
| REQ #horizontal-dimension {40800}, REQ #vertical-dimension {26400}
                    -- ANSI D Landscape --
| REQ #horizontal-dimension {40800}, REQ #vertical-dimension {52800}
                    -- ANSI E Portrait --
| REQ #horizontal-dimension {52800}, REQ #vertical-dimension {40800}
                    -- ANSI E Landscape --
| REQ #horizontal-dimension {33600}, REQ #vertical-dimension {48000}
                    -- ANSI F Portrait --
| REQ #horizontal-dimension {48000}, REQ #vertical-dimension {33600}
                    -- ANSI F Landscape --
| REQ #horizontal-dimension {13200}, REQ #vertical-dimension {108000}
                    -- ANSI G Portrait --
| REQ #horizontal-dimension {108000}, REQ #vertical-dimension {13200}
                    -- ANSI G Landscape --
| REQ #horizontal-dimension {33600}, REQ #vertical-dimension {171600}
                    -- ANSI H Portrait --
| REQ #horizontal-dimension {171600}, REQ #vertical-dimension {33600}
                    -- ANSI H Landscape --
| REQ #horizontal-dimension {40800}, REQ #vertical-dimension {211200}
                    -- ANSI J Portrait --
| REQ #horizontal-dimension {211200}, REQ #vertical-dimension {40800}
                    -- ANSI J Landscape --
| REQ #horizontal-dimension {48000}, REQ #vertical-dimension {171600}
                    -- ANSI K Portrait --
| REQ #horizontal-dimension {171600}, REQ #vertical-dimension {48000}
                    -- ANSI K Landscape --
| REQ #horizontal-dimension {12141}, REQ #vertical-dimension {17196}
                    -- JIS B4 (Japanese legal) Portrait --
| REQ #horizontal-dimension {17196}, REQ #vertical-dimension {12141}
                    -- JIS B4 (Japanese legal) Landscape --
| REQ #horizontal-dimension {8598}, REQ #vertical-dimension {12141}
                    -- JIS B5 (Japanese letter) Portrait --
| REQ #horizontal-dimension {12141}, REQ #vertical-dimension {8598}
                    -- JIS B5 (Japanese letter) Landscape --
| REQ #horizontal-dimension {13200}, REQ #vertical-dimension {16800}
                    -- Foldout Portrait --
| REQ #horizontal-dimension {16800}, REQ #vertical-dimension {13200}
                    -- Foldout Landscape --
| REQ #horizontal-dimension {13200}, REQ #vertical-dimension {>= 16801}
```

```
                -- Any portrait size larger than the typical foldout size (11 in x 14 in) including 11
                inch roll paper --
    | REQ #horizontal-dimension {> = 16801}, REQ #vertical-dimension {13200}
                -- Any landscape size larger than the typical foldout size (14 in x 11 in) including 11
                inch roll paper --
")

-- Macros defining final character for designation --

DEFINE(FCORE, "04/02                -- A final character designating ISO-IR 6 (the IRV of ISO 646
                                    revised 1991, i.e., ASCII) --")

DEFINE(F646, "      -- A final character designating any version of ISO 646 except ISO-IR 6 --")

DEFINE(F94S, "      -- A final character designating any registered 94 single byte graphic character set,
                optionally preceded by one or more intermediate characters as defined in Annex C
                of ISO 2022 --")

DEFINE(F94M, "      -- A final character designating any registered 94 multi byte graphic character set,
                optionally preceded by one or more intermediate characters as defined in Annex C
                of ISO 2022 --")

DEFINE(F96S, "      -- A final character designating any registered 96 single byte graphic character set,
                optionally preceded by one or more intermediate characters as defined in Annex C
                of ISO 2022 --")

DEFINE(F96M, "      -- A final character designating any registered 96 multi byte graphic character set,
                optionally preceded by one or more intermediate characters as defined in Annex C
                of ISO 2022 --")

DEFINE(FEMPTY, "07/14 -- The empty set --")

-- Macro defining a revision number of a character set --

DEFINE(REV, "       -- An octet between 04/00 and 07/14, which represents a revision number as
                defined in ISO 2022. --")

-- Macros defining designation sequences --

DEFINE(DEG-CORE-G0,             "ESC 02/08 $FCORE")
                -- Designate 94 characters of ISO-IR 6 (the IRV of ISO 646 revised 1991) to G0 --

DEFINE(DEG-646-G0,  "ESC 02/08 $F646")
                -- Designate any version of ISO 646, except ISO-IR 6, to G0 --

DEFINE(DEG-ANY-G1,              "{[ESC 02/06 $REV]
                { ESC 02/09 $F94S
                | ESC 02/04 02/09 $F94M
```

```
                    | ESC 02/13 $F96S
                    | ESC 02/04 02/13 $F96M}}")
                    -- Designate any character set to G1 --

DEFINE(DEG-EMPTY-G1,                "ESC 02/09 $FEMPTY")
                    -- Designate the empty set to G1 --

-- Macro defining character sets used in document profile attributes --

DEFINE(PROFCHAR, "
    ESC 02/00 04/03                 -- announcement of use of G0 and G1, and invocation into GI
                                    and GR respectively.  (no shift functions are necessary) --
    {$DEG-CORE-G0 | $DEG-646-G0}    -- designate G0 --
    {$DEG-ANY-G1 | $DEG-EMPTY-G1}   -- designate G1 --
")
```

7.1.2 Constituent constraints

7.1.2.1 DocumentProfile

```
{

-- Presence of document constituents --

        REQ   Specific-layout-structure       {'present'},
        PERM  Presentation-styles             {'present'},

-- Document characteristics --

        REQ   Document-application-profile    {-- See clause 8 for a definition of the permitted values for
                                              this attribute. --},

        REQ   Document-application-profile-defaults   {

        -- Document architecture defaults --

              REQ   #content-architecture-class     {$FPR},
              PERM  #dimensions                     {$PermissiblePageDimensions},
              PERM  #medium-type                    {
                    PERM  #nominal-page-size        {$NominalPageSizes},
                    PERM  #side-of-sheet            {ANY_VALUE}},

                    -- Any permitted medium type. Both landscape and portrait may be specified. --
              REQ   #type-of-coding                 {ASN.1 {2 8 3 7 0} -- T6 encoding --
                                                    | ASN.1 {2 8 3 7 5} -- tiled encoding --
                                                    | ASN.1 {2 8 3 7 6}  -- T6 encoding - MSB -- },
```

```
        PERM #page-position                    {ANY_VALUE},
        PERM #raster-graphics-content-defaults  {
            PERM #pel-path                     {ANY_VALUE},
            PERM #line-progression             {ANY_VALUE},
            PERM #pel-spacing                  {REQ #length {ANY_VALUE},
                                               REQ #pel-spaces {ANY_VALUE}},
            PERM #spacing-ratio
                {REQ #line-spacing-value       {ANY_VALUE},
                REQ #pel-spacing-value         {ANY_VALUE}},
            PERM #compression                  {ANY_VALUE},
            PERM #number-of-pels-per-tile-line {ANY_VALUE},
            PERM #number-of-lines-per-tile          {ANY_VALUE},
            PERM #tiling-offset                     {ANY_VALUE},
            PERM #tiling-type                       {ANY_VALUE}}},

REQ     Document-architecture-class        {$FDA},
REQ     Content-architecture-classes       {$FPR},
REQ     Interchange-format-class           {-- This attribute required only for ODIF
                                           interchange. See clause 8 for a definition of the
                                           permitted value for this attribute. --},
REQ     ODA-version
        {REQ #standard-or-recommendation   {
            "ITU-T Rec. T.410 series (1993) | ISO/IEC 8613:1994; version 2.00"},
        REQ #publication-date              {"1992-05-01"}},
            -- This date represents the date that this ISP was approved. This is the --
            -- only approved value, however, the date will be changed if the ISP is --
            -- significantly revised. If the date is revised, use of the new date is --
            -- required only when the additional functionality is being used. That is, --
            -- legacy products may continue to support the earlier ISP. --

-- Non-basic document characteristics --

        PERM Profile-character-sets        {$PROFCHAR},
        PERM Page-dimensions               {MUL {$NonBasicPageDimensions}},
        PERM Medium-types                  {MUL{
            PERM   #nominal-page-size      {$NominalPageSizes},
            PERM   #side-of-sheet          {ANY_VALUE}}},
            -- All values of "medium type" are non-basic --
        PERM Coding-attributes             {
            REQ #raster-graphics-coding-attributes {
                    PERM #compression      {'uncompressed'},
                    PERM #number-of-pels-per-tile-line      {ANY_VALUE} EXCEPT {512},
                    PERM #number-of-lines-per-tile {ANY_VALUE} EXCEPT {512}}},

        PERM Presentation-features         {
            PERM #Raster-graphics-presentation-features  { PMUL {
                    REQ    #pel-path                     {'180-degrees' |
                                                         '270-degrees'}
```

```
                | REQ  #line-progression        {'90-degrees'}
                                                | REQ          #pel-spacing{ANY_VALUE}
                                                      EXCEPT {16,12,8,6,5,4,3,2,1}
                -- Any value of #pel-spaces is permitted as basic --
                -- Basic values of #length are multiples of #pel-spaces as listed --
                | REQ  #spacing-ratio
                              {REQ #line-spacing-value      {ANY_VALUE} EXCEPT
                                                            {1},
                               REQ #pel-spacing-value       {ANY_VALUE} EXCEPT

                {1}}}}},


-- Document management attributes --

        -- Document description --
        PERM   Title                          {ANY_STRING},
        PERM   Subject                        {ANY_STRING},
        PERM   Document-type                  {ANY_STRING},
        PERM   Abstract                       {ANY_STRING},
        PERM   Keywords                       {ANY_STRING...},
        REQ    Document-reference             {ANY_VALUE},

        -- Dates and times --
        PERM   Document-date-and-time         {ANY_STRING},
        PERM   Creation-date-and-time         {ANY_STRING},
        PERM   Local-filing-date-and-time     {ANY_VALUE},
        PERM   Expiry-date-and-time           {ANY_STRING},
        PERM   Start-date-and-time            {ANY_STRING},
        PERM   Purge-date-and-time            {ANY_STRING},
        PERM   Release-date-and-time          {ANY_STRING},
        PERM   Revision-history               {ANY_VALUE},

        -- Originators --
        PERM   Organizations                  {ANY_STRING...},
        PERM   Preparers                      {ANY_VALUE},
        PERM   Owners                         {ANY_VALUE},
        PERM   Authors                        {ANY_VALUE},

        -- Other user information --
        PERM   Copyright                      {ANY_VALUE},
        PERM   Status                         {ANY_STRING},
        PERM   User-specific-codes            {ANY_STRING...},
        PERM   Distribution-list              {ANY_VALUE},
        PERM   Additional-information         {ANY_VALUE},
```

```
        -- External references --
        PERM   References-to-other-documents        {ANY_VALUE},
        PERM   Superseded-documents                 {ANY_VALUE},

        -- Local file references --
        PERM   Local-file-references                {ANY_VALUE},

        -- Content attributes --
        PERM   Document-size                        {ANY_INTEGER},
        PERM   Number-of-pages                      {ANY_INTEGER},
        PERM   Languages                            {ANY_STRING...},

        -- Security information --
        PERM   Authorization                        {ANY_VALUE},
        PERM   Security-classification              {ANY_STRING},
        PERM   Access-rights                        {ANY_STRING...}
}
```

7.2 Logical constituent constraints

-- No logical constituents applicable in this clause. --

7.3 Layout constituent constraints

7.3.1 Macro definitions

DEFINE(RAST," CONTENT_ID_OF(Raster-graphics-content-portion)")

7.3.2 Factor constraints

7.3.2.1 FACTOR ANY-LAYOUT

```
{
SPECIFIC:
PERM   Object-type                          {VIRTUAL},
REQ    Object-identifier                    {ANY_VALUE},
PERM   Subordinates                         {VIRTUAL},
PERM   User-visible-name                    {ANY_VALUE},
PERM   User-readable-comments               {ANY_VALUE}
}
```

7.3.3 Constituent constraints

7.3.3.1 DocumentLayoutRoot

```
:ANY-LAYOUT {
SPECIFIC:
REQ   Object-type                 { 'document-layout-root'},
REQ   Subordinates                {SUB_ID_OF(CompositePage)+},
REQ   Application-comments        {REQ #constraint-name {"0"},
                                  PERM #external-data {ANY_VALUE}}

}
```

7.3.3.2 CompositePage

```
:ANY-LAYOUT {
SPECIFIC:
REQ   Object-type                 {'page'},
REQ   Subordinates                {SUB_ID_OF(BasicBody)},
PERM  Dimensions                  {$PermissiblePageDimensions},
PERM  Page-position               {ANY_VALUE},
PERM  Medium-type                 {PERM #nominal-page-size {$NominalPageSizes},
                                   PERM #side-of-sheet {ANY_VALUE}},
REQ   Application-comments        {REQ #constraint-name {"2"},
                                  PERM #external-data {ANY_VALUE}}

}
```

7.3.3.3 BasicBody

```
:ANY-LAYOUT {
SPECIFIC:
REQ   Object-type                 {'frame'},
REQ   Subordinates                {SUB_ID_OF(SpecificBlock)},
REQ   Application-comments        {REQ #constraint-name {"28"},
                                  PERM #external-data {ANY_VALUE}}

}
```

7.3.3.4 SpecificBlock

```
{
SPECIFIC:
REQ   Object-type                 {'block'},
REQ   Object-identifier           {ANY_VALUE},
REQ   Content-portions            {$RAST},
```

```
PERM  Position                          {REQ #fixed-position    {
                                              REQ #horizontal-position  {ANY_VALUE},
                                              REQ #vertical-position  {ANY_VALUE}}},
PERM  Dimensions                        {REQ #horizontal-dimension
                                              {REQ #fixed-dimension{ANY_VALUE}},
                                        REQ #vertical-dimension
                                              {REQ #fixed-dimension{ANY_VALUE}}},
PERM  Content-architecture-class        {$FPR},
PERM  User-readable-comments            {ANY_STRING},
PERM  User-visible-name                 {ANY_STRING},
REQ   Application-comments              {REQ #constraint-name {"30"},
                                        PERM #external-data {ANY_VALUE}},
                                        -- If tiled encoding, see 8.1.3 and 8.2.3 --
PERM  Presentation-style                {STYLE_ID_OF(PStyle)},
            -- PStyle for raster content --
PERM  Presentation-attributes           {
      PERM  #raster-graphics-attributes       {
            PERM  #pel-path             {ANY_VALUE},
            PERM  #line-progression     {ANY_VALUE},
            PERM  #pel-spacing          {REQ #length {ANY_VALUE},
                                        REQ #pel-spaces {ANY_VALUE}},
            PERM  #spacing-ratio        {REQ #line-spacing-value {ANY_VALUE},
                                        REQ #pel-spacing-value {ANY_VALUE}},
            PERM  #clipping             {ANY_VALUE}}}
}
```

7.4 Layout style constraints

-- No layout style constraints applicable in this clause. --

7.5 Presentation style constraints

7.5.1 Macro definitions

-- No macro definitions are applicable to this clause. --

7.5.2 Factor constraints

7.5.2.1 FACTOR ANY-PRESENTATION-STYLE

```
{
REQ   Presentation-style-identifier     {ANY_VALUE},
```

```
PERM  User-readable-comments          {ANY_STRING},
PERM  User-visible-name               {ANY_STRING}
}
```

7.5.3 Presentation style constituent constraint

7.5.3.1 PStyle

```
:ANY-PRESENTATION-STYLE {

        -- This style is used for raster graphics content --

PERM  Presentation-attributes                 {
        PERM  #raster-graphics-attributes     {
                PERM  #pel-path               {ANY_VALUE},
                PERM  #line-progression       {ANY_VALUE},
                PERM  #pel-spacing            {REQ #length {ANY_VALUE},
                                              REQ #pel-spaces {ANY_VALUE}},
                PERM  #spacing-ratio          {REQ #line-spacing-value {ANY_VALUE},
                                              REQ #pel-spacing-value {ANY_VALUE}},
                PERM  #clipping               {ANY_VALUE}}}
}
```

7.6 Content portion constituent constraints

7.6.1 Macro definitions

```
DEFINE(TILED,"        ASN.1{2 8 3 7 5}")  -- Tiled raster encoding --
```

7.6.2 Factor constraints

-- No factor constraints are applicable to this clause. --

7.6.3 Constituent constraints

7.6.3.1 Raster-graphics-content-portion

```
{
REQ   Content-identifier-layout       {ANY_VALUE},
PERM  Type-of-coding                  { ASN.1{2 8 3 7 0}  -- T.6 encoding --
                                      | ASN.1{2 8 3 7 1}  -- T.4 one dimensional --
```

```
                                        | ASN.1{2 8 3 7 2}  -- T.4 two dimensional --
                                        | ASN.1{2 8 3 7 3}  -- bitmap encoding --
                                        | ASN.1{2 8 3 7 5}  -- tiled encoding --
                                        | ASN.1{2 8 3 7 6}  -- T.6 encoding - MSB --
                                        | ASN.1{2 8 3 7 7}  -- T.4 one dimensional - MSB --
                                        | ASN.1{2 8 3 7 8}  -- T.4 two dimensional - MSB -- },

CASE Raster-graphics-content-portion (Type-of-coding) OF {
        {$TILED}:
                PERM    Coding-attributes {
                        REQ #raster-graphics-coding-attributes {
                        PERM #compression                       {ANY_VALUE},
                        PERM #number-of-lines                   {>0},
                        REQ  #number-of-pels-per-line           {>0},
                        PERM #number-of-pels-per-tile-line      {ANY_VALUE},
                        PERM #number-of-lines-per-tile          {ANY_VALUE},
                        PERM #tiling-offset                     {ANY_VALUE},
                        PERM #tile-types                {
                                {'null-background'      |
                                'null-foreground'       |
                                't6-encoded'            |
                                'bitmap-encoded'        |
                                't6-encoded-msb'        } ...
                        }
                }
        }
        VOID:
                PERM    Coding-attributes {
                REQ #raster-graphics-coding-attributes {
                        PERM #compression               {ANY_VALUE},
                        PERM #number-of-lines           {>0},
                        REQ  #number-of-pels-per-line   {>0}
                        }
                }
        },
PERM    Alternative-representation              {ANY_STRING},
PERM    Content-information                     {RASTER}
}
```

8 Interchange format

Two interchange formats are supported by this profile. The interchange format ODIF (class A) can be used by applications requiring a binary encoding based on ASN.1. The Interchange Format SDIF can be used by applications requiring a SGML based clear text encoding. This latter interchange format is an SGML application, called Office Document Language (ODL). For the purposes of interchange, the ODL ENTITIES are placed in an ASN.1 wrapper, as defined by SDIF. Each encoding form has inherent advantages. Conversion of document encoded in one interchange format into the other should not produce the loss of semantic document information.

8.1 Interchange format ODIF (class A)

8.1.1 Interchange format

The value of the document profile attribute "interchange format" for this interchange format is 'if-a'. This form of ODIF is defined in [ITU-T Rec. T.415 | ISO/IEC 8613-5].

The encoding is in accordance with the Basic Encoding Rules for Abstract Syntax Notation One (ASN.1), as defined in ISO 8825.

8.1.2 DAP identifier

The value for the document profile attribute "document application profile" for this interchange format is represented by the following object identifier.

ASN.1 {2 8 4 1 12 0}

8.1.3 Encoding of application comments

[ITU-T Rec. T.415 | ISO/IEC 8613-5] define the encoding of the attribute "application comments" as an octet string. This document application profile requires that the encoding within that octet string be in accordance with the ASN.1 syntax specified in the following module definition:

```
FOD_DAPSpecification
DEFINITIONS ::= BEGIN
EXPORTS  Appl-Comm-Encoding;

Appl-Comm-Encoding ::=  SEQUENCE {
        constraint-name         [0] IMPLICIT Printable String OPTIONAL,
        external-data           [1] IMFLICIT Appl-External-Data OPTIONAL}

Appl-External-Data      ::=     CHOICE {
        non-specific-block      [0]     IMPLICIT OCTET STRING,
```

```
        tiled-raster-index          [1]     IMPLICIT Octet-Index-Encoding}

Octet-Index-Encoding ::=  SEQUENCE OF INTEGER

END
```

8.2 Interchange format SDIF

8.2.1 Interchange format

The document profile attribute "interchange format" does not apply for this interchange format. The SDIF encoding of ODA is defined in Annex E of [ITU-T Rec. T.415 | ISO/IEC 8613-5]. In addition, [ITU-T Rec. T.417 | ISO/IEC 8613-7] contains additional specifications for this encoding of ODA.

8.2.2 DAP identifier

The value for this attribute "document application profile" for this interchange format is represented by the following object identifier.

ASN.1 {1 0 12064 1 12 0}

8.2.3 Encoding of application comments

For SpecificBlock containing a content portion with a "type of coding" of 'tiled encoding', the encoding of the attribute "application comments" is defined in a data stream conforming to this profile with the following DTD definition:

```
<!-- Public document type definition.  Typical invocation:
        <!DOCTYPE fodapc PUBLIC "FOD112 pDISP//DTD
                        Application Comments//EN">
    -->
    <!ELEMENT fodapc    - O     (externl?)>
    <!ATTLIST fodapc    consname CDATA  #IMPLIED>
    <!ELEMENT externl   - O     (#PCDATA)>
    <!ATTLIST externl   loc  ENTITY  #CONREF>
```

For example, a typical SUBDOC for representing the "application comments" of the tile offsets in the SpecificBlock then would look like:

```
    <!DOCTYPE fodapc PUBLIC "FOD112 pDISP//DTD
          Application Comments//EN">
    <fodapc consname="30">
```

8.3 Encoding of raster content information

The encoding of raster content information in the bitmap encoding scheme is that specified in clause 11.3 of the raster graphics content architecture part of [ITU-T Rec. T.417 | ISO/IEC 8613-7], that is, the first pel in the order of bits is allocated to the most significant bit of an octet. The encoding of the code words in the CCITT Recommendation T.4 and T.6 encoding schemes may be done in either the **up** or **down** bit order. The bit order is specified by the attributes "type of coding" or "tile types". The attribute "tile types" is used only when the value for "type of coding" is 'tiled encoded'. For the **up** order, it is such that the first or only bit of the first code word shall be placed in the least significant bit of the first octet. Subsequent bits of the first and following code words are placed in the direction of more significant bits in the first and following octets. For the **down** order, it is such that the first or only bit of the first code word shall be placed in the most significant bit (MSB) of the first octet. Subsequent bits of the first and following code words are placed in the direction of least significant bits in the first and following octets.

Annex A

Amendments and technical corrigenda

(Normative)

A.1 Amendments

A.1.1 Amendments to the base standard

There are no amendments specific to this ISP.

A.2 Corrigenda

A.2.1 Corrigenda to this ISP

There is no corrigendum specific to this ISP.

Annex B

Recommended practices

(Informative)

B.1 Transfer methods for ODA

B.1.1 Conveyance of ODA over CCITT X.400-1984

This recommendation describes how ODA body parts are to be encoded for transmission over a CCITT X.400-1984 service.

An ODA body part is encoded as OdaBodyPart in the definition given below:

```
OdaBodyPart ::= SEQUENCE { OdaBodyPartParameters, OdaData }
OdaBodyPartParameters ::= SET {
        document-application-profile
                [0] IMPLICIT OBJECT IDENTIFIER,
        document-architecture-class
                [1] IMPLICIT INTEGER {
                        formatted (0),
                        processable (1),
                        formatted-processable (2) }
OdaData ::=    SEQUENCE OF Interchange-Data-Element
```

NOTE - It is recommended to transfer an ODA document as a single body part with tag 12:

Oda [12] IMPLICIT OCTETSTRING

The content of the octet string is encoded as OdaBodyPart, defined above. However, this is out of the scope of this profile.

B.1.2 Conveyance of ODA over FTAM

This recommendation describes the File Transfer, Access, and Management (FTAM) Document Type to be used for minimal storage and transfer capabilities of ODA data streams. It is recognized that enhanced capabilities may at some point be added.

When using FTAM to transfer an ODA file, the FTAM-3, "ISO FTAM Unstructured Binary", document type should be specified. However, since files that do not contain ODA data streams can have the same document type, it is left up to the user of application programs that remotely access files using FTAM to know that a given file contains an ODA data stream.

B.1.3 Conveyance of ODA over DTAM

This recommendation provides for information concerning the interchange of ODA based documents with Document Transfer and Manipulation (DTAM) protocols.

DTAM is defined in the T.430-Series of recommendations and is, like ODA, an integral part of the T.400-Series of CCITT Recommendations named *Open Document Architecture, Transfer and Manipulation.*

The T.520-Series of recommendations contain *Communication Application Profiles (CAP).* Recommendation T.522 describes the Communication Application Profile BT1 for document bulk transfer. Recommendation T.522 is applicable for the Office Document Format Profile (FOD) published in this ISP.

> **NOTE -** The use of BT1 within the end-to-end oriented Telematic Services Telefax 4 and Teletex is described in 7.1 of Recommendation T.561 and 7.1 of Recommendation T.562.

B.1.4 Conveyance of ODA over flexible disks

The recommended practice for interchanging ODA documents between systems by the exchange of magnetically recorded Flexible Disk Cartridges is *given in Annex H of [ITU-T Rec. T.411 | ISO/IEC 8613-1].* This annex provides for recording each ODA document as a separate file as defined by ISO 9293.

> **NOTE -** Documents encoded in ODL may be stored such that each SGML ENTITY is recorded in a separate file, or in the case of an SDIF encoding, the file can be stored in a single file.

B.2 Interoperability with SGML applications

The recommended method for the exchange of documents between Standard Generalized Markup Language (ISO 8879, SGML) based systems and systems based on this ODA document application profile is by means of exchanging a document representation conforming to these agreements in an encoded form of the SGML language known as the Office Document Language (ODL). ODL is a standardized SGML application for representing documents conforming to the ODA base standard. Such a representation can be converted into the Office Document Interchange Format (ODIF) supported by this document application profile.

Annex C

References to other standards and registers

(Informative)

CCITT Recommendation T.400 : 1988, Introduction to Document Architecture, Transfer and Manipulation;

CCITT Recommendation T.503 : 1984, Document Application Profile for the Interchange of Group 4 Facsimile Documents;

ISO 8571 : 1988, Information processing systems - Open Systems Interconnection - File transfer, access and management;

ISO 9070 : 1990, Information processing - SGML support facilities - Registration procedures for public owner identifiers;

ISO/TR 9573 : 1988, Information processing - SGML technical report - Techniques for using SGML;

ISO 10021 : 1990, Information technology - Text communication - Message Oriented Text Interchange System;

ISP 11181-1 : 1992, Information Technology - International Standardized Profile FOD26 - Office Document Format: Enhanced Document Structure - Character, Raster Graphics and Geometric Graphics content architecture;

ISP 11182-1 : 1992, Information Technology - International Standardized Profile FOD36 - Office Document Format: Extended Document Structure - Character, Raster Graphics and Geometric Graphics content architecture;

Annex D

Supplementary information on attributes

(Informative)

Table D.1 - Content coding attributes

Attributes	Basic values	Permissible default values *	Non-basic values
Number-of-pels-per-line	any positive integer	None	None
Number-of-lines	any positive integer	None	None
Compression	compressed	any value	uncompressed
Number-of-pels-per-tile-line	512	any value	Any non-negative integer except 512
Number-of-lines-per-tile	512	any value	Any non-negative integer except 512
Tiling-offset **	(any non-negative integer < number-of-pels-per-tile-line, any non-negative integer < number-of-lines-per-tile)	None	None
Tile-types **	Rec. T.6 encoded, bitmap encoded, null background, null foreground, Rec. T.6 encoded -MSB	any value	None
Type-of-coding	T.6 encoding (untiled), bitmap (untiled), tiled encoded, T.4 1D encoding, T.4 2D encoding, T.6 encoding - MSB (untiled), T.4 1D encoding - MSB, T.4 2D encoding - MSB	T.6 encoding, T.6 encoding - MSB, tiled encoding	None

Tutorial Note - * These are permissible default values which may be specified in the document profile. If no values specified in the document profile, then the default values stipulated in the base standard are to be used.

Tutorial Note - ** Attribute only used if "type of coding" is 'tiled encoded'

Table D.2 - Presentation attributes

Attributes	Basic values	Permissible default values	Non-basic values
Pel-path	0, 90 deg	any value	180, 270 deg
Line-progression	270 deg	any value	90 deg
Pel-spacing	16, 12, 8, 6, 5, 4, 3, 2, 1 BMU	any value except 'null'	Any value except 'null' and 16, 12, 8, 6, 5, 4, 3, 2, 1 BMU
Spacing-ratio	1	any value	any value except 1
Clipping	Two Coordinate Pairs (any non-negative integer, any non-negative integer)	None	None

Table D.3 - Document profile attributes

Attribute	Class	Permissible values
Specific-layout-structure	m	present
Presentation-styles	nm	present
Document-characteristics	M	
Document-architecture-class	m	formatted
Document-application-profile	m	{– See clause 8 for a definition of the permitted values for this attribute. –}
Content-architecture-classes	m	{2 8 2 7 2}
Interchange-format-class	m	A
ODA-version	m	ITU-T Rec. T.410 series (1993) | ISO/IEC 8613 : 1994; version 2.00, 1992-05-01
Document-architecture-defaults	M	
Content-architecture-class	m	formatted processable raster graphics
Type-of-coding	m	T.6 encoding, tiled encoding, T.6 encoding - MSB
Page-dimensions	nm	See list in table 1, (Default value is 9240 x 12400 BMU)
Medium-types	nm	See list in table 1
Page-position	nm	any coordinate pair within page
Raster-gr-content-defaults	NM	
Compression	nm	compressed, uncompressed (compressed is normal default)
Pel-path	nm	0, 90, 180, 270 degrees (0 is normal default)
Line-progression	nm	90, 270 degrees (270 is normal default)
Pel-spacing	nm	16, 12, 8, 6 5, 4, 3, 2, 1 BMU, (Normal default is 4 BMU)
Spacing Ratio	nm	Any value
Number-of-pels-per-tile-line	nm	Any value (512 is normal default)
Number-of-lines-per-tile	nm	Any value (512 is normal default)
Tiling-offset	nm	Any value (0,0 is normal default)
Tiling-type	nm	Any value (Normal default is T.6 encoded)

Table D.3 - Document profile attributes (concluded)

Attribute	Class	Permissible values
Non-basic-doc-characteristics	NM	
Profile-character-sets	nm	See 6.7.3.1
Page-dimensions	nm	See table 1
Medium-types	nm	See table 1
Coding-attributes	NM	
Compression	nm	uncompressed
Number-of-pels-per-tile-line	nm	any value except 512
Number-of-lines-per-tile	nm	any value except 512
Raster-gr-presentation-features	NM	
Pel-path	nm	180, 270 degrees
Line-progression	nm	90 degrees
Pel-spacing	nm	Any value except 16, 12, 8, 6, 5, 4, 3, 2, or 1 BMU
Document-management-attributes *	M	
Document Reference	m	Any string of characters

The following notation is used in the class column of this table:

a) m mandatory attribute

b) nm non-mandatory attribute

c) d defaultable attribute

Capital letters (M, NM, and D) are used for groups of attributes.

Tutorial Note - * There are numerous other attributes (too many to list) that may optionally be used (nm).

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DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

[Docket No. 950120021–5021–01]

RIN 0693–AB12

Approval of Federal Information Processing Standards Publication 194, Open Document Architecture (ODA) Raster Document Application Profile (DAP)

AGENCY: National Institute of Standards and Technology (NIST), Commerce.

ACTION: Notice.

SUMMARY: The purpose of this notice is to announce that the Secretary of Commerce has approved a new standard, which will be published as FIPS Publication 194, Open Document Architecture (ODA) Raster Document Application Profile (DAP).

On January 28, 1994, notice was published in the **Federal Register** (59 FR 4032) that a Federal Information Processing Standard (FIPS) for Open Document Architecture Raster Document Application Profile was being proposed for Federal use.

NIST reviewed written comments submitted by interested parties and other available material. On the basis of this review, NIST recommended that the Secretary approve the standard as a Federal Information Processing Standard (FIPS), and prepared a detailed justification document for the Secretary's review in support of that recommendation.

The detailed justification document which was presented to the Secretary, and which includes an analysis of the written comments received, is part of the public record and is available for inspection and copying in the Department's Central Reference and Records Inspection Facility, Room 6020, Herbert C. Hoover Building, 14th Street between Pennsylvania and Constitution Avenues, NW., Washington, DC 20230.

This FIPS contains two sections: (1) An announcement section, which provides information concerning the applicability, implementation, and maintenance of the standard; and (2) a specifications section, which deals with the technical requirements of the standard. Only the announcement section of the standard is provided in this notice.

EFFECTIVE DATE: This standard become effective September 1, 1995.

ADDRESSES: Interested parties may purchase copies of this standard, including the technical specifications section, from the National Technical Information Service (NTIS). Specific ordering information from NTIS for this standard is set out in the Where to Obtain Copies Section of the announcement section of the standard.

FOR FURTHER INFORMATION CONTACT: Mr. Frankie Spielman, (301) 975–3257, Computer Systems Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899.

EXECUTIVE ORDER 12866: This FIPS notice has been determined to be "not significant" for purposes of E.O. 12866.

Dated: March 7, 1995.

Samuel Kramer,

Associate Director.

Federal Information Processing Standards Publication 194

(Date)

Announcing the Standard for Open Document Architecture (ODA) Raster Document Application Profile (DAP)

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology after approval by the Secretary of Commerce pursuant to Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100–235.

1. Name of Standard. Open Document Architecture (ODA) Raster Document Application Profile (DAP), (FIPS PUB 194).

2. Category of Standard. Software Standard, Graphics.

3. Explanation. This Federal Information Processing Standard adopts the International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) 12064–1 International Standard Profile (ISP) FOD112, Open Document Format: Image Applications—Simple Document Structure—Raster Graphics content architecture, Part 1: Document Application Profile (DAP). This FIPS PUB defines three levels of conformance, the complete specification is in section 10.

ISO/IEC 12064–1 specifies the use of a subset of the ODA standard and, in this FIPS PUB, is referred to as the ODA Raster DAP. The ODA standard is defined in a joint ISO/IEC and International Telecommunications Union Telecommunication Standardization Sector (ITU–T) document ISO/IEC 8613–ITU–T Recommendation T.410 Series, Open Document Architecture (ODA) and Interchange Format.

The ODA standard supports the interchange of compound documents containing up to three types of contents: character (text), raster graphics, and geometric graphics. Developed by international standards organizations, the ODA standard specifies rules for describing the logical and layout structures of documents as well as rules for specifying character, raster graphics, and geometric graphics content of documents, thus providing for the interchange of complex documents. The ODA standard was developed primarily by the ISO/IEC Joint Technical Committee (JTC1) and ITU–T, formerly the Consultative Committee on International and Telegraph (CCITT).

A DAP is a functional subset of the ODA standard and facilitates the interchange of documents among different document systems by specifying the constraints on document structure and content according to the rules of the ODA Standard. The ODA Raster DAP specifies an interchange format suitable for the transfer of formatted structured documents between systems designed for raster graphics applications. The documents supported by this standard are based on a paradigm of an electronic engineering drawing, illustration, or other electronic image. Within an ODA document, only raster graphics content is allowed and supported by this FIPS.

The ODA Raster DAP was initially developed by an ad-hoc Continuous Acquisition and Life-Cycle Support (CALS) Tiling Task Group. CALS, formerly known as the Computer-aided Acquisition and Logistic Support, is a Department of Defense (DoD) initiative. The ODA Raster DAP was further developed by vendors and users of computer networks/systems participating in the Open Systems Environment Implementors' Workshop (OIW), and finally harmonized with the International organizations participating in the Profile Alignment Group for ODA (PAGODA). Finally, it was submitted to ISO/IEC JTC1/Special Group on Functional Standards (SGFS) for processing as part 1 of the ISP.

4. Approving Authority. Secretary of Commerce.

5. Maintenance Agency. U.S. Department of Commerce, National Institute of Standards and Technology (Computer Systems Laboratory).

6. Cross Index.

a. ISO/IEC 8613:1994—ITU–T 410 Recommendation Series (1993), Information Processing—Text and Office Systems Open Document Architecture (ODA) and Interchange Format Standard.

b. NIST Special Publication 500–224, Stable Implementation Agreements for Open Systems Interconnection Protocols, Version 8, Edition 1, December 1994.

C. ANSI/AIIM MS53–1993, Standard Recommended Practice—File Format for Storage and Exchange of Images—Bi-Level Image File Format.

7. Related Documents. Related ISO and ITU documents are listed in the normative reference section of the ODA Raster DAP. Other related documents are:

a. FIPS PUB 149, Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 3 Facsimile Apparatus.

b. FIPS PUB 150, Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus.

c. NISTIR 5108, Raster Graphics: A Tutorial and Implementation Guide.

8. Objectives. The FIPS for ODA Raster DAP permits Federal departments and agencies to exercise more effective control over the production, management, and use of Government's raster graphics applications. The primary objectives of this standard are:

—To promote interchange of structured documents containing raster graphics images between image processing systems of different manufacturers,

—To facilitate the use of advanced technology by the Federal Government,

—To contribute to the economic and efficient use of image and document processing system resources, and

—To avoid the proliferation of vendor-unique solutions.

9. Applicability. The ODA Raster DAP is available for use by Federal Government agencies when acquiring and developing ODA raster graphics applications. This FIPS applies to systems processing, generating, and receiving raster graphics images utilizing the ODA standard in a structured document environment. It specifies the structure and parameters for describing and interchanging bi-level untiled compressed images as well as tiled raster images. Each system acquired or developed by Federal agencies to support the ODA Raster DAP shall include appropriate system-to-DAP and DAP-to-system translators, such that incoming data streams are interpreted correctly and that outgoing data streams are generated correctly. These translators may be acquired separately from the acquisition of the application system when it is in the best interest of the Federal agency to do so. Use of the standard is independent of the communications used to transfer documents produced by these applications; that is, this standard may be used within the existing framework of communication protocols. There are three levels of applicability defined to satisfy different implementation requirements.

10. Specifications. This FIPS adopts the provisions of ISO/IEC 12064–1 by defining three levels of implementation support. All levels must conform to the document and raster layout specifications of [ITU–T Rec. T.410 series—ISO/IEC 8613] and ISO/IEC ISP 12064–1 that are essential for raster graphics applications. The specifications for ODA data streams are also defined in [ITU–T Rec. T.410 series—ISO/IEC 8613] and ISO/IEC ISP 12064–1 and apply to all levels defined in this FIPS. The levels are: ANSI/AIIM MS–53 (Untiled), Intermediated ODA Raster DAP, and Full ODA Raster DAP.

10.1. ANSI/AIIM MS–53 (Untiled). This level of implementation supports ANSI/AIIM MS–53–1993, Standard Recommended Practice—File Format for Storage and Exchange of Images—Bi-Level Image File Format: Part 1. Files written in conformance with any of the pre-defined file formats described in the ANSI/AIIM MS–53 standard can be imported into an ODA implementation. Each of six file formats can be implemented without either technical knowledge or understanding of the ODA format. This implementation does not support tiled raster images but does support both ITU–T Recommendation T.6 (Group 4) and ITU–T Recommendation T.4 (Group 3) compression algorithms.

10.2. Intermediate ODA Raster DAP. This level of implementation supports raster graphics images in either the untiled or tiled format. The following restrictions apply to this level of implementation.

a. The ITU–T Recommendation T.4 (Group 3) one-dimensional and two-dimensional compression algorithms are not supported.

b. If the image is tiled, the tile size must be restricted to 512 X 512 pels.

c. The uncompressed escape option defined in FIPS PUB 150 (ITU–T Recommendation T.6) will not be used.

d. The bit ordering will be restricted to only the most significant bit (MSB) to least significant bit (LSB), the "down" bit order.

e. Only the "Document-reference" attribute within the Document Profile Document Management attributes is supported.

10.3. Full ODA Raster DAP. This level of implementation supports raster graphics images in either the untiled or tiled format. It fully supports all aspects of the ODA Raster DAP.

10.4. Miscellaneous requirements. A bitmap image or tile represents the "information" in a document by one bits and the "background" by zero bits. This FIPS requires that the encoding programs exporting document images for interchange must produce the image with a pel line dimension which is a multiple of eight pels.

10.5. Conformance requirements. All implementations, regardless of implementation level, claiming conformance to this FIPS must adhere to the specific requirements defined in the "Conformance" clause of the ODA Raster DAP and to the general rules below.

Conformance Rules for Data Streams. A conforming data stream shall be syntactically, semantically, and structurally correct as defined in this standard.

Conformance Rules for Generators. A generator which claims conformance to this standard shall create only conforming data streams which correctly represent the raster graphics image which was input to the generator.

Conformance Rules for Receivers. A receiver which claims conformance to this standard shall be capable of reading and correctly processing any conforming data stream without halting or aborting such that it produces the correct results.

11. Implementation. The implementation of this standard involves three areas of consideration: acquisition of raster graphics implementations, interpretations of the standard, and validation of ODA Raster DAP implementations.

11.1. Acquisition of Raster Graphics Applications. This standard becomes effective September 1, 1995. For a period of twelve (12) months after the effective date, agencies are permitted to acquire alternative software that provides equivalent functionality to the ODA Raster DAP. Agencies are encouraged to use this standard for solicitation proposals for new raster processing systems to be acquired after the effective date. This standard is mandatory for use in all solicitation proposals for new ODA raster application products acquired twelve (12) months after the effective date.

11.2. Interpretation of the Standard. NIST provides for the resolution of

questions regarding FIPS for ODA Raster DAP specifications and requirements, and issues official interpretations as needed. Procedures for interpretations are specified in FIPS PUB 29–3. All questions about the interpretation of FIPS for ODA Raster DAP should be addressed to: Computer Systems Laboratory, Attn: Raster Graphics Interpretation, National Institute of Standards and Technology, Gaithersburg, MD 20899.

11.3. Validation of ODA Raster DAP Implementations. Implementations of FIPS ODA Raster DAP shall be validated in accordance with NIST Computer Systems Laboratory (CSL) validation procedures for FIPS ODA Raster DAP. The goal of the NIST ODA Raster DAP Validation Test Service is to maximize the probability of successful interchange between conforming systems.

Validation testing provides a way of determining the degree to which an implementation conforms to a standard. The testing of ODA Raster DAP implementations to determine the degree to which they conform to the standard may be required by Government agencies in accordance with Federal Information Resources Management Regulation (FIRMR) 201–20.303, 201–20.304, 201–39.1002, and the associated Federal ADP and Telecommunications Standard Index.

The agency is advised to refer to the NIST publication Validated Products List for information about the validation status of products.

Information concerning the NIST Raster Graphics Validation Test Service and validation procedures can be obtained by contacting the: National Institute of Standards and Technology, Computer Systems Laboratory, ATTN: Raster Graphics Test Service, Building 225, Room A266, Gaithersburg, MD 20899, (301) 975–3257.

12. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to FIPS. The head of such agency may redelegate such authority only to a senior official designated pursuant to section 3506(b) of Title 44, U.S. Code. Waivers shall be granted only when:

a. Compliance with a standard would adversely affect the accomplishment of the mission of an operator of a Federal computer system, or

b. Cause a major adverse financial impact on the operator which is not offset by governmentwide savings.

Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement-sensitive or classified portions clearly identified, shall be sent to: National Institute of Standards and Technology; Attn: FIPS Waiver Decisions, Technology Building, Room B–154; Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published in the **Federal Register**.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the Commerce Business Daily as a part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after that notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Sec. 552(b), shall be part of the procurement documentation and retained by the agency.

13. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. When ordering, refer to Federal Information Processing Standards Publication 194 (FIPSPUB194), and title. Specify microfiche, if desired. Payment may be made by check, money order, or NTIS deposit account.

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