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OPEN DOCUMENT ARCHITECTURE (ODA) AND INTERCHANGE FORMAT INTRODUCTION AND GENERAL PRINCIPLES

Reedition of CCITT Recommendation T.411 published in the Blue Book, Fascicle VII.6 (1988)

NOTES

1 CCITT Recommendation T.411 was published in Fascicle VII.6 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation T.411

OPEN DOCUMENT ARCHITECTURE (ODA) AND INTERCHANGE FORMAT INTRODUCTION AND GENERAL PRINCIPLES

CONTENTS

Introduction

Recommendation T.411 is one of the T.410 series of Recommendations which has been prepared by CCITT COM VIII/WP 2 for the interchange of documents in the context of document architecture transfer, and manipulation.

This series of Recommendations specifies a document architecture (known as the "Open Document Architecture" ODA) and an interchange format (known as the "Open document interchange format" ODIF).

The T.410 series of Recommendations consists of:

- Rec. T.411: Open document architecture (ODA) and interchange format – Introduction and general principles;
- Rec. T.412: Document structures;
- Rec. T.414: Document profile;
- Rec. T.415: Open document interchange format (ODIF);
- Rec. T.416: Character content architectures;
- Rec. T.417: Raster graphics content architectures;
- Rec. T.418: Geometric graphics content architectures.

Note – At present, there is no Recommendation T.413

Other Recommendations may be added to this series.

The T.410 series of Recommendations supersedes Recommendation T.73 (1984)

Development of the T.410 series has been in parallel with:

- ECMA-101: "Office document architecture";
- ISO 8613: "Information processing – Text and office systems – Office document architecture (ODA) and interchange format".

1 Scope

1.1 The purpose of the T.410 series of Recommendations is to facilitate the interchange of documents.

In the context of the T.410 series, documents are considered to be items such as memoranda, letters, invoices, forms and reports, which may include pictures and tabular material. The content elements used within the documents may include graphic characters, geometric graphics elements and raster graphics elements, all potentially within one document.

Note – The T.410 series is designed to allow for extensions, including typographical features, colour, spreadsheets and additional types of content such as sound.

1.2 The T.410 series applies to the interchange of documents by means of data communications.

The T.410 series provides for the interchange of documents for either or both of the following purposes:

- to allow presentation as intended by the originator;
- to allow processing such as editing and reformatting.

The composition of a document in interchange can take several forms:

- formatted form, allowing presentation of the document;
- processable form, allowing processing of the document;
- formatted processable form, allowing both presentation and processing.

The T.410 series also provides for the interchange of ODA information structures used for the processing of interchanged documents.

Furthermore, the T.410 series allows for the interchange of documents containing one or more different types of content, such as character text, images, graphics and sound.

1.3 This Recommendation:

- introduces the T.410 series as a whole;
- gives the references necessary for all the Recommendations pertaining to this series;
- defines terms used in the context of the T.410 series;
- presents the concepts of the document architecture;
- gives an overview of all the Recommendations in the T.410 series;
- describes the inter-dependencies of these Recommendations;
- defines conformance to the T.410 series;
- gives rules for defining document application profiles.

Annex A lists other Recommendations, standards and registers to which references are made, but that are not indispensable for the application of the T.410 series.

Annex B describes the relationships of the T.410 series with other Recommendations and standards.

Annex C describes the correspondence between Recommendation T.73 and the T.410 series of Recommendations.

Annex D establishes the Principles for the assignment of ASN.1 object identifier values in the T.410 series of Recommendations.

Annex E defines the use of MHS to interchange documents conforming to the T.410 series of Recommendations.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of the T.410 series of Recommendations. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Recommendation are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

The following references are applicable to the whole of the T.410 series of Recommendations.

- Rec. T.4 (1984): Standardization of group 3 facsimile apparatus for document transmission
- Rec. T.6 (1984): Facsimile coding schemes and coding control functions for group 4 facsimile apparatus
- Rec. T.50 (1984): International alphabet No. 5
- Rec. T.60 (1984): Terminal equipment for use in the teletex service
- Rec. T.101 (1984): International interworking for videotex services
- Rec. X.208 (1988): Specification of abstract syntax notation one (ASN.1)
- Rec. X.209 (1988): Specification of basic encoding rules for abstract syntax notation one (ASN.1)
- Rec. T.412 (1988): Open document architecture (ODA) and interchange format – Document structures
- Rec. T.414 (1988): Open document architecture (ODA) and interchange format – Document profile
- Rec. T.415 (1988): Open document architecture (ODA) and interchange format – Open document interchange format (ODIF)
- Rec. T.416 (1988): Open document architecture (ODA) and interchange format – Character content architectures
- Rec. T.417 (1988): Open document architecture (ODA) and interchange format – Raster graphics content architectures
- Rec. T.418 (1988): Open document architecture (ODA) and interchange format – Geometric graphics content architectures
- ISO 2022 (1986): Information processing – ISO 7-bit and 8-bit coded character sets – Code extension techniques

- ISO 6429 (1983): Information Processing – ISO 7-bit and 8-bit coded character sets – Additional control functions for character-imaging devices[1)]
- ISO 6937-1 (1983): Information processing – Coded character sets for text communication – Part 1: General introduction
- ISO 6937-2 (1983): Information Processing – Coded character sets for text communication – Part 2: Latin alphabetic and non-alphabetic graphic characters
- ISO 6937-3 (1983): Information processing – Coded character sets for text communication – Part 3: Control functions for page-image format[1)]
- ISO 8601: Data elements and interchange format – Information interchange – Representation of dates and times[2)]
- ISO 8632-1 (1987): Information processing systems – Computer graphics – Metafile for the storage and transfer of picture description information (CGM) – Part 1: Functional specification
- ISO 8632-3 (1987): Information processing systems – Computer graphics – Metafile for the storage and transfer of picture description information (CGM) – Part 3: Binary encoding
- ISO 9541-1: Information processing – Font and character information interchange – Part 1: introduction (2)
- ISO 9541-2: Information processing – Font and character information interchange – Part 2: Registration and naming procedures[2)]
- ISO 9541-5: Information processing – Font and character information interchange – Part 5: Font attributes and character model[2)]
- ISO 9541-6: Information processing – Font and character information interchange – Part 6: Font and character attribute subsets and applications[2)]

3 Definitions

For the purposes of the T.410 series of Recommendations, the following definitions apply:

3.1 active position

The point at which the action specified by the next character is to be effected.

3.2 aligned around

A tabulation alignment that positions the sequence of character images for a specified character string such that the position point of the character image of the first instance of a specified group of characters within that string is positioned at the tabulation stop.

3.3 aspect ratio

The ratio of the dimension of a pel array in the direction of the pel path to the dimension on the direction of the line progression.

3.4 assured reproduction area

The rectangular area that remains on the nominal page after deducting an agreed allowance for edge losses.

3.5 attribute

An element of a constituent of a document that has a name and a value and that expresses a characteristic of this constituent or a relationship with one or more constituents.

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1) Under revision.

2) To be published.

3.6 **available area**

The area determined by the document layout process into which the content portion is formatted by the content layout process.

3.7 **basic component**

A basic logical or layout object, or an object class from which basic logical or layout objects may be derived.

3.8 **basic layout object**

An object in the specific layout structure that has no subordinate.

3.9 **basic logical object**

An object in the specific logical structure that has no subordinate.

3.10 **basic measurement unit (BMU)**

A unit of linear measurement equal to 1/1200 of 25.4 mm.

Note – A locally defined scaling factor may be used to map the document to a particular imaging device.

3.11 **basic value**

An attribute value, a control function parameter value or the value of any other capability that is unconditionally allowed in document interchange in the context of a given document application profile.

3.12 **binding**

A pair comprising an identifier and a value, where the value may be of any type, may be specified by an expression, and is accessed through use of the binding identifier.

3.13 **block**

A type of basic layout component that corresponds to a rectangular area within a frame or a page.

3.14 **bottom edge**

The edge of the positioning area of a basic layout object that is in the direction of the line progression.

3.15 **bottom left corner**

The corner of a layout object that is least progressed in the horizontal direction and most progressed in the vertical direction of this layout object.

3.16 **bottom right corner**

The corner of a layout object that is most progressed both in the horizontal and vertical directions of this layout object.

3.17 **centred**

1) The result of a layout or imaging process that positions the sequence of character images for a line such that the distance from the line home position to the position point of the first character image is approximately equal to the distance from the escapement point of the last character image to the end edge of the positioning area.
2) A tabulation alignment that positions the sequence of character images for a specified character string such that the distance from the position point of the first character image to the tabulation stop is approximately equal to the distance from the tabulation stop to the escapement point of the last character image.

Note – The term "centred" is also used in the parameter "alignment" of the attribute "position" and in the attribute "block alignment".

3.18 **character**

A member of a set of elements used for the organization, control and representation of information.

3.19 **character base line**

A line across a character image, in the horizontal direction when the character image is in its intended viewing orientation.

3.20 **character image**

The human perceptible rendering of a character on a presentation medium.

3.21 **character orientation**

The direction of the character base line relative to the character path.

3.22 **character path**

The direction of progression of successive character images within a line box.

3.23 **character sequence**

A sequence of characters intended to be presented as one or more lines.

3.24 **characters spacing** (for constant spacing fonts only)

The distance between the position points of successive character images when the inter- character space equals zero.

3.25 **clipped array**

The actual pel array to be imaged as determined by taking account of all clipping parameters.

3.26 **complete generator set**

A constituent of a document consisting of a document root object class description and at least one level of subordinate object class descriptions which are used to control the creation and/or modification of the set of object descriptions representing a corresponding specific structure.

An object or an object class.

3.28 **composite component**

A composite logical or layout object, or an object class from which composite logical or layout objects may be derived.

3.29 **composite layout object**

An object in the layout structure that has one or more subordinate objects.

3.30 **composite logical object**

An object in the logical structure that has one or more subordinate objects.

3.31 **constant spacing**

The characteristic of a font wherein the distance between the position point and the escapement point is the same for all character images.

3.32 **constituent**

A set of attributes that is one of the following types: a document profile, an object description, an object class description, a presentation style, a layout style or a content portion description.

3.33 **content**

The information conveyed by the document, other than the structural information, and that is intended for human perception.

3.34 **content architecture**

Rules for defining the internal structure and representation of the content of basic components in terms of a set of content elements, attributes and control functions, and guidelines for the presentation of the content.

3.35 **content architecture class**

The rules for defining the internal structure and representation of the content of basic components in one of a set of forms defined for each type of content element.

Note – Examples of content architecture classes are formatted form, processable form and formatted processable form in the case of character content elements.

3.36 **content architecture level**

An identified subset of the features pertaining to a content architecture class.

3.37 **content editing process**

The process that creates new content or modifies previous content.

3.38 **content element**

A basic element of the content of a document.

3.39 **content layout process**

The process that, interacting with the document layout process, consists of the formatting of content portions into available areas and the determination of the sizes of blocks in accordance with information contained in the presentation styles.

3.40 **content portion**

The result of partitioning the content of a document according to its logical and/or layout structure.

3.41 **content portion description**

A constituent of a document, representing a content portion that consists of content information and attributes to specify the properties of its content information.

3.42 **content type**

A category of content elements such as graphic characters, raster graphic elements and geometric graphic elements.

3.43 **control function**

An element of a character set that affects the recording, processing, transmission or interpretation of data, and that has a coded representation consisting of one or more bit combinations.

Note – Examples of control functions are Select Graphic Rendition (SGR) in character content architectures and Set Line Type in geometric graphics content architectures.

3.44 **current layout position**

The identification of a lowest level frame which is maintained during the layout process for each layout stream which occurs.

3.45 **data structure**

A set of data items and the relationship among them representing the whole or a part of a constituent.

Note – The data items constituting a data structure represent attributes of the document, the document profile, the component, the style or the content portion concerned.

3.46 **description**

A constituent that corresponds to a structural element.

3.47 **descriptor**

A data structure representing the document profile, an object class description, a layout style, a presentation style or an object description.

3.48 **document**

A structured amount of information intended for human perception, that can be interchanged as a unit between users and/or systems.

3.49 **document application profile**

The specification of a combination of features defined in the T.410 series, intended to form a subset to fulfil the requirements of an application.

3.50 **document architecture**

1) Rules for defining the structure of documents, in terms of a set of components and content portions, and the representation of documents in terms of constituents and attributes.
2) The structural information of a document consisting of the set of one or more of the following structures: specific logical structure, specific layout structure, generic logical structure and/or generic layout structure.

3.51 **document architecture class**

The rules for defining the structure and representation of documents in formatted form, processable form or formatted processable form.

3.52 **document architecture level**

An identified subset of the features pertaining to a document architecture class.

The part of a document that may include a generic logical and layout structure, specific logical and layout structure, layout and presentation styles but excludes the document profile.

3.54 **document class**

A set of logical object class descriptions, layout object class descriptions, generic content portion descriptions, styles and a document profile, that specifies a set of documents with common characteristics.

3.55 **document class description**

The specification of a document class.

3.56 **document layout process**

The process that creates a specific layout structure in accordance with the generic layout structure and information contained in the specific logical structure, the generic logical structure and the layout styles.

3.57 **document layout root**

The composite object of the specific layout structure at the highest level of the hierarchy.

3.58 **document logical root**

The composite object of the specific logical structure at the highest level of the hierarchy.

3.59 **document profile**

A set of attributes which specifies the characteristics of the document as a whole.

3.60 **document profile level**

An identified subset of the features pertaining to the document profile.

3.61 **editing process**

The stage of a document processing that consists of the content editing process and the logical structure editing process.

3.62 **end-aligned**

1) The result of a layout or imaging process that positions the sequence of character images for a line such that the escapement point of the last character image is positioned at the end edge of the positioning area.
2) A tabulation alignment that positions the sequence of character images for a specified character string such that the escapement point of the last character image is positioned at the tabulation stop.

3.63 **end edge**

The edge of the positioning area of a basic layout object that is in the direction of the character path.

3.64 **escapement point**

A reference point associated with a character image that is used for positioning of the next character image.

3.65 **external document class**

A document class referred to by the document profile of an interchanged document containing no generic structure.

3.66 **factor set**

One or more object class descriptions which are used to factorise the attributes of object descriptions representing a specific structure.

3.67 **filing**

The storage of a document according to some defined method in order to facilitate retrieval of the document.

3.68 **font**

A set of character images normally with a common design and size.

3.69 **font size**

The height of the character images in a font.

3.70 **formatted form**

A form of representation of a document that allows the presentation of the document as intended by the originator and that does not support editing and (re)formatting.

3.71 **formatted processable form**

A form of representation of the document that allows presentation of the document as intended by the originator and also supports editing and (re)formatting.

3.72 **formatting**

The carrying out of operations to determine the layout of a document.

3.73 **frame**

A type of composite layout component that corresponds to a rectangular area within a page or another frame.

3.74 **generic content portion**

A content portion associated with an object class.

3.75 **generic content portion description**

A content portion description associated with an object class description.

3.76 **generic-document**

A structured amount of information intended for the interchange of generic structures, and optionally associated styles and content portions, for use in the processing of interchanged documents.

3.77 **generic layout structure**

A set of layout object classes and associated generic content portions.

3.78 **geometric logical structure**

A set of logical object classes and associated generic content portions.

3.79 **geometric graphic element**

A graphic element used to describe an image by geometric graphical means.

Note – Geometric graphic elements include those describing primitive geometric shapes such as points, arcs, lines.

3.80 **graphic character**

A member of a set of graphic symbols used for the representation of information.

Note – Graphic characters include simple alphanumeric characters (for example, accented letters) and pictorial characters (for example, mosaics).

3.81 **graphic element**

A content element that is capable of having a visual representation.

Note – Three types of graphic elements are distinguished in the T.410 series of Recommendations: graphic characters, geometric graphics elements and raster graphics elements.

3.82 **hard line terminator**

A line terminator that is intended not to be removed in a re-formatting process.

3.83 **horizontal direction** (of a layout object)

The direction in a layout object relative to which content architectures may define attributes determined using the horizontal axis of the page.

3.84 **imaging order**

The order of precedence of layout objects for imaging in the layout object to which they are immediately subordinate.

3.85 **imaging process**

The process of producing a document on a presentation medium in human perceptible form, making use of the document profile, specific and generic layout structures, presentation styles and content portions.

3.86 **indentation**

The result of a layout or imaging process that causes the sequence of character images for a line to begin at a distance from the line home position in the direction of the character path.

3.87 **initial point**

1) The point associated with a basic layout object relative to which all line boxes imaged within that basic layout object are positioned (character content architectures Recommendation T.416).
2) The point associated with a basic layout object relative to which all pels imaged within that basic layout object are positioned (raster graphics content architectures Recommendation T.417).

3.88 **interchange**

The process of transferring a document from an originating system to a receiving system.

3.89 **interchange data element**

A data structure representing a constituent of a document.

3.90 **interchange format**

The rules for representing a document for the purpose of interchange.

3.91 **interchange format class**

A form of interchange format suitable to a specific application.

Note – In the T.410 series of Recommendations, the defined classes differ by the ordering of the interchange data elements or by the coding.

3.92 **inter-character space**

An additional amount of spacing that is included between adjacent character images.

3.93 **intersection**

The common area of two or more layout objects that overlap each other partially or fully on the presentation medium.

3.94 **item identifier**

A string of characters preceding the first line of characters in a content portion that is used to identify the subsequent text.

3.95 **justified**

The result of a layout or imaging process that varies the width of the space character and/or the inter-character space to produce a simultaneously start aligned and end-aligned presentation of the text.

3.96 **kern**

The part of a character which extends beyond its position point or escapement point.

3.97 **layout category**

The association of basic logical objects with lowest level frames such that the content of these basic logical objects is placed in the appropriate frames.

3.98 **layout object**

An element of the specific layout structure of a document, for example, page, block.

3.99 **layout object class**

An element of the generic layout structure from which a set of layout objects with common characteristics may be derived, for example, pages with common headers and footers.

3.100 **layout process**

The stage of a document processing that consists of the document layout process and the content layout process.

Note – This is also referred to as formatting.

3.101 **layout stream**

A set of basic logical objects pertaining to the same layout category.

3.102 **layout structure**

1) The result of dividing and subdividing the content of a document into increasingly smaller parts, on the basis of the presentation, for example, into pages, blocks.
2) All layout objects and associated content portions forming the layout hierarchy of a document.

3.103 **layout style**

A constituent of the document, referred to/from a logical component, that guides the creation of a specific layout structure.

3.104 **leading edge**

The edge of a frame or block that is orthogonal to the direction of the layout path and that is met first, from the outside of the frame or the block, in the opposite direction of the layout path.

3.105 **left hand edge**

The edge of a frame or block that is parallel to the direction of the layout path and that is met first, from the outside of the frame or the block, in the direction at an angle of 270° counterclockwise relative to the direction of the layout path.

3.106 **line box**

A rectangular area within which a sequence of character images are positioned.

3.107 **line home position**

The point within a line box that is used for positioning that line box.

3.108 **line progression**

1) The direction of progression of successive line boxes within a basic layout object (character content architectures Recommendation T.416).
2) The direction of progression of successive lines of pels within a basic layout object (raster graphics content architectures Recommendation T.417).

3.109 **lines spacing**

1) The distance between two adjacent reference lines within a basic layout object (character content architectures Recommendation T.416).
2) The distance between two adjacent lines of pels within a basic layout object (raster graphics content architectures Recommendation T.417).

3.110 **line terminator**

A control function or combination of control functions that indicates the end of a line or the end of a character sequence.

3.111 **logical object**

An element of the generic logical structure of a document which may have a meaning that is significant to the application or user, for example, chapter, section, paragraph.

3.112 **logical object class**

An element of the generic logical structure from which a set of logical objects with common characteristics may be derived, for example, composite logical objects representing sections with a common internal structure.

3.113 **logical structure**

1) The result of dividing and subdividing the content of a document into increasingly smaller parts, on the basis of the human-perceptible meaning of the content, for example, into chapters, sections, paragraphs.
2) All logical objects and associated content portions representing the logical hierarchy of a document.

3.114 **logical structure editing process**

The process that creates a new specific logical structure or modifies a previous specific logical structure and allocates or re-allocates content to basic logical objects.

3.115 **mandatory attribute**

An attribute which, when applicable to a constituent, must be specified explicitly in that constituent.

3.116 **nominal page**

A rectangular area which, as assumed by the sender of a document, has the ideal size of the presentation surface.

Note – Examples of ideal sizes are given in ISO 216.

3.117 **non-basic**

A qualifier for attribute values, control function parameter values and other capabilities that are only allowed in document interchange in the context of a given document application profile if their use is declared in the document profile.

3.118 **non-mandatory attribute**

An attribute which, when applicable to a constituent, need not be specified explicitly; if the attribute is not specified explicitly in a given constituent, the attribute does not apply.

3.119 **object**

An element of the specific layout structure or of the specific logical structure.

3.120 **object class**

An element of a generic structure from which objects with common characteristics may be derived.

3.121 **object class description**

A set of attributes that specify the properties of an object class including its relationships, if any, with other components.

3.122 **object description**

A set of attributes that specify the properties of an object including its relationships, if any, with other components.

3.123 **object type**

A property of every component that specifies which attributes are permitted in the description to which it applies and indicates the role of the component in the document architecture.

3.124 **orphan**

One or more lines of text that is associated with subsequent text but isolated from it by a page or column boundary.

3.125 **overhang**

The result of a layout or imaging process that positions the sequence of character images for a line to begin at a distance from the line home position in the direction opposite to the character path.

3.126 **page**

A layout component that corresponds to a rectangular area used for presenting the content of the document.

3.127 **page coordinate system**

An orthogonal co-ordinate system whose origin is the top left corner of the page; its horizontal axis and its vertical axis coincide with the top edge and the left edge of the page, respectively.

3.128 **page set**

A composite layout component that represents a collection of pages or further page sets.

3.129 **pairwise kerning**

The distance between two adjacent character images depending on the combination of the two characters together rather than separately.

3.130 **parallel annotation**

Two sequential character strings that are presented in parallel, wherein the second string is used to indicate the pronunciation or interpretation of the first string.

3.131 **partial generator set**

A collection consisting of hierarchically related object class descriptions which are used to guide the creation of hierarchically related corresponding object descriptions but does not fully specify all specific structures that may be created.

3.132 **pel array**

A two-dimensional array of pels used to represent a pictorial image.

3.133 **pel path**

The direction of progression of successive pels along a line within a basic layout object.

3.134 **pel spacing**

The distance between any two successive pels along a line within a basic layout object.

3.135 **picture element (pel)**

The smallest graphic element that can be independently addressed within a picture; (an alternative term for raster graphics element).

3.136 **positioning area**

The rectangular area within a basic layout object within which the position points and the escapement points of all character images are located.

3.137 **position point**

The point relative to which the character image is placed i.e. the character is imaged with the position point at the active position.

3.138 **presentation**

The operation of rendering a document in a form perceptible to a human being.

3.139 **presentation medium**

The carrier of information in a form perceptible to a human being.

3.140 **presentation style**

A constituent of the document, referred to from a basic logical or layout component, which guides the format and appearance of the document content.

3.141 **presentation surface**

A two-dimensional presentation medium (such as paper, film, video display screen) on which the formatted form of a document may be displayed for human viewing.

A form of representation of a document that allows editing and formatting.

3.142 **processable form**

A form of representation of a document that allows editing and formatting.

3.143 **processing**

The carrying out of operations on a document, including editing, reformatting, presentation, filing and retrieval.

3.144 **raster graphics element**

An alternative term for a picture element (pel).

3.145 **reformatting**

The carrying out of operations to determine the new layout of a previously formatted document.

3.146 **reference area**

A rectangular area within a basic layout object, with its side equal to the pel spacing and the line spacing, within which the main part of a pel is imaged.

3.147 **reference line**

A line through the line home position and parallel to the character path.

3.148 **reference point**

The point at the corner of the reference area situated in the opposite direction of both pel path and line progression and which is used for positioning a pel.

3.149 **region of interest**

A rectangular area within a virtual device coordinate space, with sides which are parallel to the axes of its coordinate system, surrounding those (parts of) geometric graphics elements that are intended to be imaged.

3.150 **resource document**

A generic-document containing one or more object class descriptions referred to by one or more object class descriptions of another document.

3.151 **retrieval**

The recovery of previously filed information.

3.152 **right hand edge**

The edge of a frame or block that is parallel to the direction of the layout path and that is met first, from the outside of the frame or the block, in the direction at an angle of 90° counterclockwise relative to the direction of the layout path.

3.153 **scaled measurement unit (SMU)**

A unit of linear measurement used for positioning and dimensioning layout objects and content elements on a presentation surface, its value being equal to the basic measurement unit (BMU) times the unit scaling.

3.154 **sequential layout order**

The sequential order in which layout objects are to be imaged when an imaging order is not specified.

3.155 **sequential logical order**

The sequential order in which logical objects are to be processed by the layout process.

3.156 **sequential order**

A convention for ordering the objects in a structure such that each object is succeeded by all of its immediate subordinates, before any other object with the same immediate superior, i.e. in order tree traversal.

3.157 **soft line terminator**

A line terminator that is allowed to be removed, relocated or replaced in a subsequent layout process.

3.158 **spacing ratio**

The ratio of line spacing to pel spacing.

3.159 **specific layout structure**

A set of layout objects and associated content portions.

3.160 **specific logical structure**

A set of logical objects and associated content portions.

3.161 **start-aligned**

1) The result of a layout or imaging process that positions the sequence of character images for a line such that the position point of the first character image of that sequence is positioned on the line home position or at the point specified by the first line indentation or overhang if any.
2) A tabulation alignment that positions the sequence of character images for a specified character string such that the position point of the first character image of that sequence is positioned at the tabulation stop.

3.162 **start edge**

The edge of the positioning area of a basic layout object that is in the direction opposite to the character path.

3.163 **structural element**

The structural elements of a document are the content portion, the object and the object class.

3.164 **tabulation alignment**

A layout or imaging process that causes the sequence of character images for a specified character string to be positioned according to a specified method, (start-aligned, end-aligned, centred or aligned-around) at a specified point (tabulation stop) along a reference line.

3.165 **tabulation stop**

A position along a reference line that is to be used for a specified method (start-aligned, end-aligned, centred or aligned-around) of tabulation alignment.

3.166 **text unit**

A data structure representing a content portion description.

3.167 **top edge**

The edge of the positioning area of a basic layout object that is in the direction opposite to the line progression.

3.168 **top left corner**

The corner of a layout object that is least progressed both in the horizontal and vertical directions of this layout object.

3.169 **top right corner**

The corner of a layout object that is most progressed in the horizontal direction and least progressed in the vertical direction of this layout object.

3.170 **trailing edge**

The edge of a frame or block that is orthogonal to the direction of the layout path and that is met first, from the outside of the frame or the block, in the direction of the layout path.

3.171 **unit scaling**

A scaling factor (an integer or a fraction) that is applied to the basic measurement unit (BMU) to derive a scaled measurement unit (SMU).

3.172 **variable spacing**

The characteristic of a font wherein the distance between the position point and the escapement point for different character images may be different.

3.173 **widow**

One or more lines of text associated with preceding text but isolated from it by a page or column boundary.

4 Conventions

The following conventions are used in the T.410 series of Recommendations:

4.1 Names of attributes

The names of attributes are referenced by giving the name of the attribute in double quotation marks preceded by the word attribute. For example:

"...expressed by the attribute "subordinates". This attribute..."

In some cases terms are used to describe concepts which have the same name as an attribute. In the case of reference to such concepts neither the word attribute nor quotes are used.

4.2 *Names of attribute values*

The names of attribute values are referenced by giving the name of the attribute value in single quotation marks. For example:

"...the second parameter allows a sender to select a recto or a verso presentation of the page by specifying w'rectow' or w'versow', respectively."

4.3 *Component and component description*

The term component may be used in conjunction with qualifying terms, including: basic, composite, page set, page, frame, block, logical and layout. For example:

a) "layout components containing block" means "layout objects containing blocks, or classes b)"frame component" means "an object of type frame, or a class from which objects of type frame may be derived".

The term component description may be qualified the same way.

4.4 *Introduction of terms*

Underlining is used for the purpose of highlighting the point at which the definition of a term occurs in the text.

These terms are also defined in Section 3.

5 General concept of ODA

5.1 *Purpose of ODA*

The purpose of the document architecture is to facilitate the interchange of documents, in a manner such that:

- different types of content, including text, image, graphic and sound, can coexist within a document;
- the intentions of a document originator with respect to editing, formatting and presentation can be communicated most effectively.

This Section uses a number of terms for which definitions are given in Section 3. However, for the purpose of the current Section, different though compatible definitions of the essential terms are given below.

- Interchange is the process of providing a document to a receiving person or device, by means of data communication or by exchange of storage media.
- Editing is the carrying out of operations associated with creation and amendment of the structure and/or the content of a document.
- Formatting is the carrying out of operations to determine the layout of a document, i.e. the appearance of its content on a presentation medium.
- Presentation is the operation of rendering the content of a document in a form perceptible to a human being. Typical presentation media are paper and video screens.

The document architecture provides for the representation of documents in three forms:

- Formatted form, that allows documents to be presented as intended by the originator;
- Processable form, that allows documents to be edited and formatted;
- Formatted processable form, that allows documents to be presented as well as edited and reformatted;

Alternative terms commonly used are "final form" and "image form" for "formated form", and "revisable form" for "processable form". Each of these forms allows the originator to express intentions regarding the structuring and/or formatting of the interchanged document.

5.2 *Overall concept of ODA*

The concept of ODA is based on:

- the existence of a layout view and a logical view of the document: the view from the physical viewpoint (for example, a collection of pages) and the view in the sense of its abstract components (for example, an assembly of sentences);
- the existence of a specific structure and a generic structure; the specific "document" structure is the one that the user may read; the generic structure is the template that guides the creation of the document and that could be re-used for its amendment;
- the existence of document classes: a document class is the set of generic features that are common to a category of documents (for example, Sales Report Form).

5.2.1 *Logical structure and layout structure*

The key concept in the document architecture is that of structure. Document structure is the division and repeated subdivision of the content of a document into increasingly smaller parts. The parts are called objects. The structure has the form of a tree.

The document architecture permits two structures to be applied to a document: a logical structure and a layout structure. Any one or both structures y be applied to a given document.

In the logical structure, the document is divided and subdivided on the basis of the meaning. Examples of logical objects are chapters, sections, figures and paragraphs.

In the layout structure, the document is divided and subdivided on the basis of the layout. Examples of layout objects are pages and blocks.

An example of the logical view of a document called "report" is shown in Figure 1/T.411.

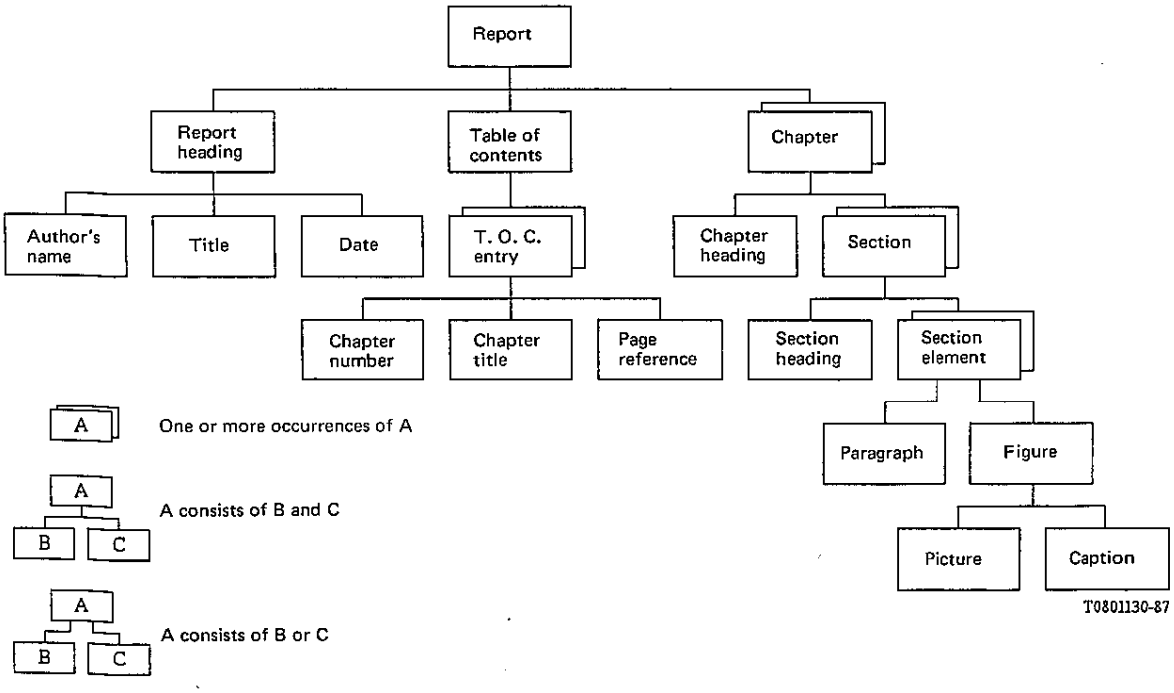

FIGURE 1/T.411

Example of a logical view of a document

The logical structure and the layout structure provide alternative but complementary views of the same document. For example, a book can be regarded as consisting of chapters containing figures and paragraphs, or alternatively, as consisting of pages that contain text blocks and/or graphic blocks.

An object that is not subdivided into smaller objects is called a basic object. All other objects are called composite objects.

The following types of layout objects are defined in the document architecture:

- block: a basic layout object corresponding to a rectangular area on the presentation medium containing a portion of the document content;
- frame: a composite layout object corresponding to a rectangular area on the presentation medium and containing either one or more frames or one or more blocks;
- page: a basic or composite layout object corresponding to a rectangular area of the presentation medium and, if it is a composite object, containing either one or more frames or one or more blocks;
- page set: a set of one or more page sets and/or pages;
- document layout root: the highest level object in the hierarchy of the specific layout structure.

For logical objects, no classification other than "basic logical object", "composite logical object" and "document logical root" is defined in the document architecture. Logical object categories such as "chapter", "section" and "paragraph" are application-dependent and can be defined using the "object class" mechanism (see § 5.2.5).

5.2.2 *Content portions*

The basic elements of the content of a document are called content elements. For content consisting of character text, the content elements are characters. In the case of images or graphics, the content elements are Picture elements (also called pels) or geometric graphics elements (lines, arcs, polygons, etc.).

When a document has both logical structure and layout structure, each content element belongs, in general, to exactly one basic logical object and to exactly one basic layout object. A set of related content elements that belong to one basic logical object (if the document has any logical structure) and one basic layout object (if the document has any layout structure) is called a content portion.

It follows from this description that:

- a basic logical object has associated with it one or more content portions;
- a basic layout object has associated with it one or more content portions;
- any logical or layout object (basic or composite) has associated with it an integral number of content portions;
- there is, in general, no one-to-one correspondence between logical objects and layout objects.

The last point is illustrated by Figure 2/T.411.

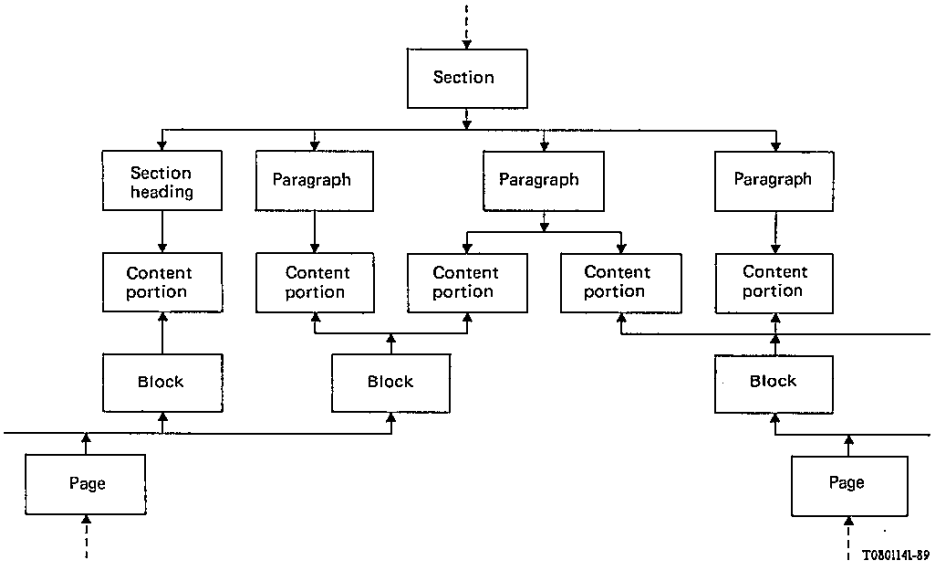

FIGURE 2/T.411

Possible correspondence between logical and layout objects

5.2.3 *Content architectures*

A content portion associated with a basic logical object or a basic layout object may have a more detailed internal structure. The rules governing such an internal structure depend on the type of content and are called a content architecture. The content of a basic logical object or a basic layout object is structured according to only one content architecture.

Recommendations T.416, T.417 and T.418 contain definitions of content architectures for characters, raster graphics and geometric graphics.

5.2.4 *Attributes*

An attribute is a property of a document, or of a document constituent (i.e. a logical object, a layout object, a logical object class, a layout object class, a style or a content portion). It expresses a characteristic of the document or document component concerned, or a relationship with one or more documents or document components.

The set of attributes associated with a document as a whole is called document profile. It represents reference information about the document and may repeat information in the document content, for example the title and the name of the author.

The set of attributes that applies to a logical object or a layout object depends on the type of the object: different sets of attributes are defined for basic logical objects, composite logical objects, document logical root, blocks, frames, pages, page sets and document layout root. These are called document architecture attributes. Document architecture attributes are independent of the type of content of the objects to which they apply.

Examples of document architecture attributes are:

- the attribute "object identifier" (all objects);
- the attribute "subordinates" (composite objects);
- layout directives such as the attribute "indivisibility", the attribute "offset", the attribute "separation" (different sets of attributes for basic and composite logical objects);
- the attribute "position" (blocks and frames);
- the attribute "dimensions" (blocks, frames and pages).

In addition to the document architecture attributes, a set of presentation attributes applies to basic logical and basic layout objects. The set of presentation attributes that applies to a given basic object depends on the content architecture governing the content of this object: a different set of presentation attributes is defined for each content architecture.

Examples of presentation attributes are:

- the attribute "line spacing" (character content architectures);
- the attribute "clipping" (raster graphics content architectures);
- the attribute "line rendition" (geometric graphics content architectures).

Presentation attributes may be collected into presentation styles, to which references may be made from both logical and layout objects.

The attributes that apply to a content portion include a content portion identifier and a set of coding attributes, the composition of which depends on the coding method used for the content, for example, the attribute "number of pels per line" for facsimile-coded raster graphics images.

5.2.5 *Relations between logical structure and layout structure*

The logical structure and the layout structure are, in principle, independent of each other. The logical structure of a document is determined by the author and embedded in the document during the editing process. The layout structure is usually determined by a formatting process. The formatting process may be controlled by attributes called layout directives associated with the logical structure.

Examples of layout directives are:

- the requirement that a chapter starts on a new page;
- the requirement that the title of a section and the first two lines of its first paragraph are presented on the same page;
- the amount of indentation for a list of items.

Layout directives may be collected into layout styles each of which may be referred to by one or more logical objects.

5.2.6 *Specified and generic structures*

In a document, the logical objects and/or the layout objects can often be classified into groups of similar objects. Therefore the concept of object class is introduced.

The similarity may be related to logical features such as chapter, section or paragraph hierarchy, to layout features such as size or style, or to content such as page headers and footers. Even an entire document may be a member of a group of similar documents, a letter, a memorandum or a report.

An object class or a document class is a specification of the set of properties that are common to its members. Such a specification consists of a set of rules to determine the values of the attributes that specify the common properties. These rules can be used to control the consistency among the objects or documents making up the class, and to facilitate the creation of additional objects or documents within the class.

The set of logical object classes and layout object classes associated with a document, and their relationships, are called generic logical structure and generic layout structure.

The structures that are particular to a given document are named specific logical structure and specific layout structure.

A document class is described by a generic logical structure and a generic layout structure. The generic logical structure represents the set of all potential specific logical structures, and the generic layout structure represents the set of all potential specific layout structures that are applicable to the document class concerned.

The generic logical structure can be used as a set of rules from which specific logical objects and structures are derived during the editing process. The generic layout structure can be used as a set of rules from which specific layout objects and structures are derived during the formatting process.

An example of generic layout structure is depicted by Figure 3/T.411 which shows a page layout with frames for a header, a footer and two columns of body text.

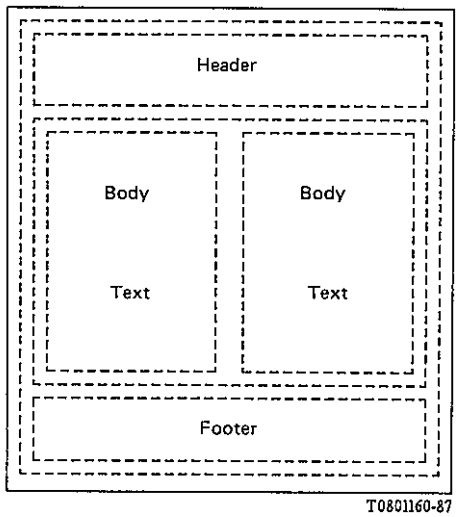

FIGURE 3/T.411

Example of a page layout

5.2.7 *Document profile*

The document profile consists of a set of attributes associated with a document as a whole. In addition to reference information such as title, date and author's name, which facilitates storage and retrieval of the document, the document profile contains a summary of the document architecture features that are used in the document, in order that a recipient can easily determine which capabilities are required for processing or imaging the document. The attributes representing the latter type of information are called document characteristics and include:

- a specification of the form (formatted, processable or formatted processable) of the document;
- specifications of the content architectures used in the document;
- specifications of the character sets, character fonts, character styles, character orientations and types of emphasis used in the document.

The document profile may be interchanged alone.

5.2.8 *Generic-document*

A generic-document consisting of a document profile end generic structures can be used to assist in the processing of interchanged documents. A generic-document may be interchanged.

5.3 *Document processing model*

5.3.1 *Relationships of ODA to document processing*

The T.410 series of Recommendations is concerned with the definition of a document architecture which permits processing of interchanged documents. A model of document processing is provided as a basis for determining the scope of the processes described by the T.410 series.

A basic model of document processing is summarized in this Section (see Figure 4/T.411). This model is not intended to represent an actual implementation, nor to restrict in any way the processing that may be applied to an interchanged document.

Conceptually, a document is viewed as progressing through three phases of processing as shown in Figure 4/T.411. The order of the processes is not intended to imply that they are performed sequentially in an actual implementation.

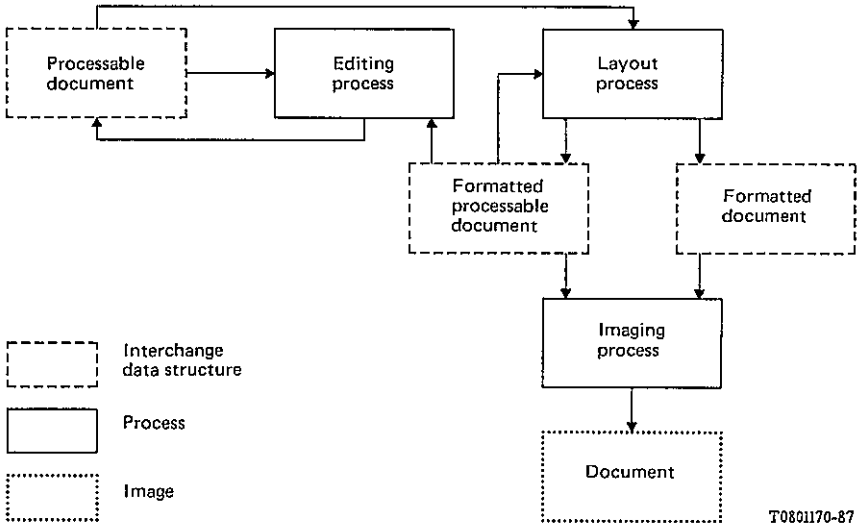

FIGURE 4/T.411

Basic document processing model

5.3.2 *Editing process*

The document editing process is concerned with creating a new document or modifying a previous one. The document architecture provides data structures for representing the document resulting from this process and for representing control information which influences this process.

While document creation and modification may differ in the functions performed and procedures followed, they are considered to be equivalent in the view of this model because the result of both is the same: a new document.

Upon completion of editing, the resulting document can be interchanged. Such a document is said to be interchanged in "processable" form; it is suitable for input to either the editing or layout process.

5.3.3 *Layout process*

The document layout process is concerned with defining a page-oriented organization (i.e. a layout) for the document content. This process can operate in two ways.

The layout process can generate a document which is not intended to be modified; it is suitable only for input to the imaging process. Such a document is said to be in "formatted" form.

This process can also generate a "formatted processable" form document which can be processed further if desired; it is suitable for input to any of the imaging, layout or editing processes.

The document architecture provides data structures for representing both forms of formatted documents and for representing control information which influences the layout process.

5.3.4 *Imaging process*

The document imaging process is concerned with presenting an image of the document in a form perceptible to a human, for example, on a paper or on a screen. A document interchanged in accordance with the T.410 series of Recommendations may contain information relating to the imaging process which allows it to be imaged as required by the originator of the document. However, the imaging process is not defined by the T.410 series and is regarded as a locally defined process that depends on the presentation device used.

Other forms of document processing may be possible; these are not specifically addressed by the document architecture.

6 Overview of Recommendations in the T.410 series

The T.410 series consists of Recommendations T.411, T.412, T.414, T.415, T.416, T.417 and T.418. At present, there is no Recommendation T.413.

6.1 *Recommendation T.411 – Introduction and general principles*

Recommendation T.411 provides information about the T.410 series as a whole by way of an introductory description of the document architecture, an overview of each of the Recommendations and a description of their interdependencies. References necessary for all Recommendations in the Series are given, and terms used throughout all Recommendations in the series are defined. Conformance to the T.410 series is specified and rules for defining document application profiles are given.

6.2 *Recommendation T.412 – Document structures*

Recommendation T.412 defines document architecture concepts which can be applied to the description of representations of documents. The purpose is to permit a common understanding of the structure of a document. The term "document architecture" is used to mean a set of rules by which a document can be produced or interpreted.

Recommendation T.412 describes the architectural concepts and defines the document structures and attributes. It specifies the interface between the document architecture and the content architectures, and defines the document architecture classes. A description of the document processing model is provided.

In addition, examples of document structures based on the T.410 series, and a suggested notation for representing them are included.

6.3 *Recommendation T.414 – Document profile*

Recommendation T.414 defines the document profile that provides information concerning the handling of the document. This is accomplished by means of attributes (for example, title, author(s)), a few of which apply to the representation of the document profile itself. Some relate to the processing of the document (for example, filing/retrieval, other applications). Other attributes provide a means for a user to specify user-specific information (for example, organization, status). Some of the information given in the document profile could duplicate that in the body of the document.

The document profile may be interchanged alone, that is without the remainder of the document constituents.

Note – Information contained in the profile is intended for a recipient (person) and/or device (for example, keywords). Some attribute values may have been supplied automatically (for example, size).

6.4 *Recommendation T.415 – Open document interchange format (ODIF)*

Recommendation T.415 defines the format of the data stream used to interchange documents structured in accordance with the T.410 series.

The ODIF data stream is described in terms of a set of data structures, called "interchange data element", which represent the constituents (document profile, object descriptions, object class descriptions, presentation styles, layout styles and content portion descriptions) of a document. The formats of the interchanged data element according to ODIF are defined using the Abstract Syntax Notation One (ASN.1) specified in CCITT Recommendation X.208.

6.5 *Recommendation T.416 – Character content architectures*

Recommendation T.416 applies to documents that are structured according to the architecture defined in T.412 and that include character content, consisting of a combination of graphic characters, control functions and space characters.

For this type of content architecture it defines those aspects of positioning and imaging that are applicable to the presentation of character content. It also defines specific character content architecture classes in terms of their structure, attributes, character repertoires, control functions and coding.

6.6 *Recommendation T.417 – Raster graphics content architectures*

Recommendation T.417 applies to documents that are structured according to the architecture defined in T.412 and that include raster graphics content, consisting of a descriptive representation of pictorial information provided by an array of picture elements (pels), encoded according to facsimile or bitmap encoding.

For this type of content architecture, it defines those aspects of positioning and imaging that are applicable to the presentation of raster graphics content. It also defines each class of raster graphics content architecture in terms of its structure, presentation attributes, content layout process, control functions and coding attributes.

6.7 *Recommendation T.418 – Geometric graphics content architectures*

Recommendation T.418 applies to documents that are structured according to the architecture defined in T.412 and that include geometric graphics content, consisting of a descriptive representation of picture description information as an ordered set of elements such as lines, arcs, polygons, attributes for these drawing elements, elements that structure the content portion, etc., using the Computer Graphic Metafile (CGM) and its binary encoding defined in ISO 8632-1 and ISO 8631-3, respectively.

For this type of content architecture, it defines those aspects of positioning and imaging that are applicable to the presentation of geometric graphics content. It also defines the geometric graphics content architecture class in term of its structure, presentation attributes, the relevant CGM parameters, the content layout process, control functions and coding attributes.

7 Inter-dependencies of the Recommendations

If there is a requirement to interchange documents or generic-documents, it is necessary to use Recommendations T.411, T.412, T.414 and T.415 together:

- Rec. T.411: Introduction and general principles;
- Rec. T.412: Document structures;
- Rec. T.414: Document profile;
- Rec. T.415: Open document interchange format (ODIF).

Should there be a requirement to interchange just the document profile, then only Recommendations T.411, T.414 and T.415 are necessary.

Additionally, it will be necessary to use one or more of the remaining Recommendations, depending on the particular type of content to be interchanged, for example:

- Rec. T.416: Character content architectures.

8 Conformance

The conformance to the T.410 series of Recommendations is defined in terms of conformance of a data stream that represents a document, a generic-document or a document profile. For the definition of conformance it is necessary to distinguish two cases:

- the document profile attribute "document application profile" is the identifier of a document application profile;
- no value is specified for the document profile attribute "document application profile",

A document application profile can only be specified if it is identified by an ASN.1 object identifier. This includes document application profiles defined in International Standards or CCITT Recommendations, or registered by registration authorities (see Annexes B, C and D of Recommendation X.208).

When the attribute "document application profile" is present in the document profile of a given document or generic-document, the data stream representing this document or generic-document is in conformance with the T.410 series of Recommendations if it conforms to the specified document application profile,

In the absence of the specification of a document application profile, the data stream representing the document or the generic-document must be assumed to conform to Recommendations T.411, T.412, T.414, T.415, T.416, T.417 and T.418. This means that the document or generic-document may contain:

a) any of the document architecture classes defined in Recommendation T.412, any attribute and attribute value permitted for that class;

b) any content architecture class which is defined in Recommendations T.416, T.417 and T.418 that defines such classes and any presentation attribute, control function, coding attribute and graphic element permitted for that class;

c) any document profile attribute defined in Recommendation T.414;

d) anyone of the interchange format classes as defined in Recommendation T.415;

e) no content architecture classes other than those defined in Recommendations T.416, T.417 or T.418;

f) only graphic character sets specified by other CCITT Recommendations or International Standards;

g) only geometric graphic elements specified by ISO 8632-1 and parameter values of these elements defined in ISO 8632-1 and ISO 8632-3 for these elements.

9 Document application profile

A document application profile is the specification of a combination of features that are defined in various Recommendations of the T.410 series. It is identified by a unique ASN.1 object identifier obtained in accordance with the rules in Recommendation X.208.

In order to define a valid combination, the features must be selected according to the rules given in 9.2:

- Features pertaining to a document architecture class are selected to form a document architecture level.
- Features of a content architecture class are selected to form a content architecture level.
- Features of the document profile are selected to constitute a document profile level.
- An interchange format class is selected.

A document application profile must include:

- one or more document architecture levels;
- one or more content architecture levels;
- a document profile level;
- an interchange format class.

The document architecture features can be broken down into:

- three classes:
  - formatted document architecture (FDA),
  - processable document architecture (PDA),
  - formatted processable document architecture (FPDA);
- for each class its:
  - constituents;
- for each constituent its:
  - attributes;
- for each attribute its:
  - classification (mandatory, non-mandatory, defaultable);
  - permissible values divided into basic, non-basic values;
  - default value, if the attribute is defaultable.

The content architecture features depend primarily on the type of content. For each type of content, various content architecture classes exist (for example, for character content architectures the classes are: character formatted, character processable, and character formatted processable);

- for each content architecture class are defined its:
  - presentation attributes,
  - coding attributes,
  - control functions;
- for each presentation attribute, coding attribute and control function parameter its:
  - permissible values divided into basic, non-basic values;
  - default value.

The features of the document profile are its:

- attributes;
- and for each attribute its:

- classification (mandatory, non-mandatory),
- permissible values.

The interchange formats that are permitted by Recommendation T.415 are:

- the open document interchange format (ODIF) divided into:
  - class A,
  - class B.

9.1 *General principles for defining a document application profile*

A document application profile can only place constraints on the previously listed features, it cannot extend them.

A document application profile shall not allow the use of attributes for purposes beyond those defined in the T.410 series of Recommendations. That is, a document application profile shall not modify in any way the semantics of the attributes defined in the T.410 series.

9.2 *Rules for defining a document application profile*

The rules for defining a document application profile consist of rules for defining document architecture levels, content architecture levels, a document profile level an for selecting an interchange format class.

9.2.1 *Rules for defining a document architecture level*

Recommendation T.412 specifies the three document architecture classes that may be used in defining document architecture levels. These are formatted document architecture class, processable document architecture class and formatted processable document architecture class.

For each of these classes, Recommendation T.412 defines which document structures may be used in documents that pertain to that class. These structures are classified as mandatory or optional. Each class also specifies which objects and object classes are applicable to these structures and, again, objects are classified as mandatory or optional. The class also defines which attributes are applicable to those objects and object classes and the body of Recommendation T.412 defines all permissible values and a standard default value for each defaultable attribute.

A document architecture level defines restrictions concerning which structures, objects and object classes, attributes and attribute values are allowed to be contained in documents or generic- documents that pertain to that level.

Note – The term "superclass" is sometimes applied to the set of document classes or object classes whose hierarchy of subordinate object classes and associated attributes and attribute values is restricted by a document application profile.

For each document architecture class, only one document architecture level can be specified. For example, a document application profile cannot make use of two different document architecture levels pertaining to the processable document architecture class (PDA).

The rules for defining a document architecture level are given below.

a) The document architecture level must pertain to a particular document architecture class, that is, the level must make use of only those document structures, objects and object classes that pertain to the specified document architecture class.

b) The document architecture level must specify which document structures pertain to that level. Structures pertaining to the corresponding document architecture class that are mandatory must be specified as mandatory in the document architecture level. Structures specified as optional in the document architecture class may be specified as optional or mandatory in the document architecture level.

   Note – If a factor set or a partial generator set is used, then the document architecture level should, in general, specify this as optional.

c) When a document application profile allows the interchange of more than one document architecture class (for example, formatted, processable and formatted processable), the document architecture levels must be consistent. For example, the generic logical structure used in the document architecture level of processable form must be identical to that used in the document architecture level of formatted processable form.

d) The document architecture level must specify which objects and object classes pertain to that level. Objects and object classes that are mandatory for a particular structure must be specified as mandatory in

the document architecture level. Objects and object classes that are specified as optional may be specified as optional or mandatory in the document architecture level.

e) The document architecture level must specify any restrictions that are applicable to the document structures that belong to the level. For example, the number of hierarchical levels allowed in a particular structure may be restricted or the specific structures allowed may be required to pertain to certain defined document classes.

f) The document architecture level must specify, in the case of formatted document architecture class, whether the pages are to be composite, basic.

g) The document architecture level must specify, in the case of formatted or processable document architecture classes, whether only one content portion or multiple content portions can be associated with basic objects.

h) For each object or object class used, the document architecture level must specify which attributes are applicable. These must include the appropriate minimum set of attributes pertaining to each object type as defined in Recommendation T.412.

i) For each permitted attribute, the document architecture level must specify the basic, default and non-basic (if any) values that are applicable. These values must be taken from the range of permissible values specified in the attribute definitions in Recommendation T.412.

Note – It is recommended that the default value used for defaultable attributes is that specified in the corresponding document architecture class.

j) The document architecture level may classify attributes that are designated as being defaultable or non-mandatory in Recommendation T.412 as being mandatory for that level. The classification of mandatory attributes must not be changed.

k) The document architecture level must specify which attributes may be included in the attribute "default value lists" and must specify the object types for which a default value list can be specified. Recommendation T.412 gives a definition of the use of this attribute.

9.2.2 *Rules for defining a content architecture level*

Each Recommendation in the T.410 series that caters for particular content types defines one or more than one content architecture class that corresponds to that content type. The number of content architecture classes defined depend upon the particular content type.

Each content architecture class definition consists of the specification of the following:

- a set of presentation attributes,
- a set of content elements,
- a set of control functions,
- the type(s) of coding used,
- a set of coding attributes.

For each presentation attribute and coding attribute, the content architecture class definition specifies the permissible values and a recommended default value. Similarily the content architecture class definition specifies the permissible values and a recommended default value for the control function parameters (where applicable).

Each content architecture class definition also specifies the basic component types that the content architecture class can be used in.

A content architecture level defines restrictions concerning which presentation attributes, control functions and coding attributes, and their values, are allowed to be used in association with content pertaining to that level. The content architecture level may also define restrictions concerning the content elements and types of coding that may be used.

For each content architecture class, that is defined for a particular type of content, only one content architecture level can be specified. For example, a document application profile cannot make use of two different content architecture levels pertaining to the formatted character content architecture class (CF).

The rules for defining a content architecture level are given below.

a) The content architecture level must pertain to a particular content architecture class, that is, the presentation attributes, content elements, control functions, types of coding and coding attributes specified by the content architecture must be taken from those specified in the corresponding content architecture class.

b) When a document application profile allows the interchange of more than one content architecture class pertaining to the same content type (for example, formatted, processable and formatted processable for character content architecture classes), the levels must be consistent. For example the features used in the content architecture level of formatted form must be, when applicable, identical to those used in the content architecture level of formatted processable form.

c) Subject to the above restrictions, there is no further restriction on which presentation attributes, content elements, control functions, type of coding and coding attributes can be specified in a content architecture level.

d) The content architecture level must specify, for each permitted presentation attribute, control function and coding attribute, the basic, default and non-basic (if any) values that are applicable. These values must be taken from the range of permissible values specified in the corresponding content architecture class.

Note – It is recommended that the default value used is that specified in the content architecture class.

e) The content architecture level must specify which set or sets of content elements are applicable. These must be taken from the permissible sets specified in the corresponding content architecture class. If appropriate, a default set of content elements may be specified. In addition, a distinction may be made between basic and non-basic content elements. The type or types of coding allowable must also be specified.

Note – There may be mandatory content elements (for example, BEGIN METAFILE or END METAFILE in the case of geometric graphics content type) that are to be present in every set of content elements specified by a content architecture level.

The T.410 series of Recommendations allows the interchange of documents containing content architecture levels pertaining to content architecture classes that are not defined in this series. It does not define how such content architecture levels should be specified except that the interface between the content architecture and the document architecture should be defined as specified in Recommendation T.412. The only restriction imposed on the use of content architecture levels defined outside of the T.410 series is that they are not allowed to be used if no document application profile identifier is indicated in the document profile (see 8).

9.2.3 *Rules for defining a document profile level*

Recommendation T.414 defines all attributes that may be specified for use in a document profile. The rules for specifying how document profile attributes may be used in a document profile level are given below.

a) The document profile level may specify any document profile attribute defined in Recommendation T.414. It must not specify attributes not defined in Recommendation T.414.

b) The document profile level must specify the minimum set of document profile attributes defined in Recommendation T.414, Annex B.

c) The document profile level may specify any document profile attribute as being mandatory or non-mandatory for that level.

d) The document profile level must specify attribute values taken from the range of permissible values defined in Recommendation T.414.

e) The document profile level may specify additional restriction on the use of certain attributes and limit the values applicable to these attributes.

f) The document profile level shall not modify the semantics of the absence of attributes from those semantics specified in Recommendation T.414.

9.2.4 *Rules for selecting the interchange format class*

Recommendation T.415 defines the valid interchange format classes that can be used for interchanging a document or a generic-document. It also defines the restrictions on the use of these interchange format classes. Only one interchange format class may be specified in a document application profile. No other restriction may be specified concerning the use of an interchange format class in a document application profile.

ANNEX A

(to Recommendation T.411)

(Informative)

Reference to other Recommendations, standards and registers

Reference to the following Recommendations, standards and registers is made for information. It is not required for the application of the T.410 series of Recommendations.

- Rec. T.61 (1984): Character repertoire and coded character sets for the international Teletex service
- Rec. T.73 (1984): Document interchange protocol for the Telematic services
- Rec. T.400 (1988): Introduction to document architecture, transfer and manipulation
- Rec. T.431 (1988): Document transfer and manipulation (DTAM) – Services and protocols – Introduction and general principles
- Rec. T.432 (1988): Document transfer and manipulation (DTAM) – Services and protocols – Service definition
- Rec. T.433 (1988): Document transfer and manipulation (DTAM) – Services and protocols – Protocol specification
- Rec. T.441 (1988) : Document transfer and manipulation (DTAM) – Operational structure
- Rec. T.501 (1988): Document application profile MM for the interchange of formatted mixed mode documents
- Rec. T.502 (1988) Document application profile PM1 for the interchange of processable form documents
- Rec. T.503 (1988): Document application profile for the interchange of Group 4 facsimile documents
- Rec. T.504 (1988): Document application profile for videotex interworking
- Rec. T.521 (1988): Communication application profile BT0 for document bulk transfer based on the session service (according to the rules defined in T.62 bis)
- Rec. T.522 (1988): Communication application profile BT1 for document bulk transfer
- Rec. T.523 (1988): Communication application profile DM1 for videotex interworking
- Rec. T.541 (1988): Operational application profile for videotex interworking
- Rec. T.561 (1988): Terminal characteristics for mixed mode of operation MM
- Rec. T.562 (1988): Terminal characteristics for Teletex processable mode PM1
- Rec. T.563 (1988): Terminal characteristics for Group 4 facsimile apparatus
- Rec. T.564 (1988): Gateway characteristics of videotex interworking
- Rec. X.200 (1984): Reference model of open systems interconnection for CCITT applications
- Rec. X.210 (1984): Open systems interconnection (OSI) layer service definition conventions
- Recommendation X.215 (1984): Session service definition for open systems interconnection in CCITT applications
- Recommendation X.216 (1984): Presentation service definition for open systems interconnection for CCITT applications
- ISO 216 (1975): Writing paper and certain classes of printed matter trimmed sizes – A and B series
- ISO 2375 (1985): Data Processing – Procedure for registration of escape sequences
- ISO 7350 (1984): Text Communication – Registration of graphic character subrepertoires
- ISO 8613-1 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 1: Introduction and general principles

- ISO 8613-2 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 2: Document structures
- ISO 8613-4 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 4: Document profile
- ISO 8613-5 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 5: Office document interchange format
- ISO 8613-6 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 6: Character content architectures
- ISO 8613-7 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 7: Raster graphics content architectures
- ISO 8613-8 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format – Part 8: Geometric graphics content architectures
- ISO International register of character sets to be used with escape sequences
- ISO International register of graphic character subrepertoires
- ECMA – 101 (1985): Office document architecture
- ANSI X3.151 (1987): Bond papers and index bristols – Basic sheet sizes and standard stock sizes
- JIS P 0138 (1961): Trimmed sizes of paper

ANNEX B

(to Recommendation T.411)

(Informative)

Relationships with other Recommendations and standards

B.1 The T.410 series of Recommendations has been developed in parallel with ISO 8613 (1988): Information processing – Text and office systems – Office document architecture (ODA) and interchange format.

Except for references (Recommendations make reference to other Recommendations rather than to their equivalent ISO Standards), mandated stylistic differences and provisions of ISO 8613 that are outside the scope of the T.410 series of Recommendations, the texts in the T.410 series are identical to the texts in correspondingly numbered parts of ISO 8613.

B.2 Provision has been made in the T.410 series of Recommendations for compatibility with Recommendation T.73 (1984): Document transfer protocol for the telematic services, by providing for a specific document interchange format class B, and by the provision of a number of structures and attributes primarily intended for use in document interchange format class B. These structures and attributes are identified and cross-referenced to the appropriate Recommendations of the T.410 series in Annex C.

Whenever interchange format class B is used, with the appropriate document structures and attributes, documents may be exchanged with application contexts conforming to Recommendation T.73 (1984).

Both the Recommendations T.73 (1984) and the T.410 series of Recommendations application contexts will need to define the interchange by use of identical document application profiles.

B.3 The T.410 series of Recommendations has been developed in parallel with ECMA-101, Office Document Architecture (1985). The text in the T.410 series is identical to the second edition of ECMA-101 (to be published) except for mandatory stylistic changes and provisions of ECMA-101 that are outside the scope of these CCITT Recommendations.

ANNEX C

(to Recommendation T.411)

(Informative)

Correspondence between Recommendation T.73 (1984)
and Recommendations in the T.410 series

CCITT Recommendation T.73 (1984) is replaced by Recommendations in the T.410 series.

This Annex describes the relationships between Recommendation T.73 (1984) and Recommendations in the T.410 series.

C.1 *Data stream format*

In Recommendation T.73 (1984) only one interchange data stream is specified, which corresponds to the interchange format class B in Recommendation T.415.

C.2 *Presentation capabilities descriptor*

The "presentation capabilities descriptor" specified in Recommendation T.73 (1984) corresponds to the "document characteristics" in Recommendation T.433.

C.3 *Attributes*

Several attributes and attribute values have different names in Recommendation T.73 (1984) and Recommendations in the T.410 series.

Table C-1/T.411 lists all attributes of Recommendation T.73 (1984) along with their locations, together with the corresponding names and locations in Recommendations in the T.410 series.

TABLE C-1/T.411

Correspondence of attributes and values

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
"object type" 'document' 'page set' 'page' 'frame' 'block'	2.5.3.1	"object type" 'document layout root' 'page set' 'page' 'frame' 'block'	T.412 5.3.1.1
"object identifier"	2.5.3.2	"object identifier" or "object class identifier"	T.412 5.3.1.2 T.412 5.3.1.3
"reference to corresponding generic object"	2.5.3.3	"object class"	T.412 5.3.3.1
"reference to subordinate objects"	2.5.3.4	"subordinates"	T.412 5.3.3.2
"reference to content portions"	2.5.3.5	"content portions"	T.412 5.3.3.3
"user-readable comments"	2.5.3.6	"user-readable comments"	T.412 5.3.5.1
"default value list"	2.5.3.7	"default value list"	T.412 5.3.5.5
"position"	2.5.3.8	"position"	T.412 5.4.1.1
"dimensions"	2.5.3.9	"dimensions"	T.412 5.4.1.2
"claiming"	2.5.3.10	DELETED	
"transparent" 'transparent'	2.5.3.10	"transparency" 'transparent'	T.412 5.4.3.2
"content type" 'character box element' 'photographic element'	2.5.4.1	"content type" 'formatted character content architecture' 'formatted raster graphics content architectures'	T.412 5.3.4.2

Conventions: - names of attributes in double quotation marks
- names of attribute values in single quotation marks

TABLE C-1/T.411 *(cont.)*

Correspondence of attributes and values

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
Presentation attributes for character box elements		Presentation attributes for character content architectures	
"character path" '0', '90', '180', '270'	2.5.4.2.1	"character path" '0', '90', '180', '270'	T.416 7.1.4
"line progression" '90', '270'	2.2.4.2.1	"line progression" '90', '270'	T.416 7.1.14
"character box orientation" '0', '90', '180', '270'	2.5.4.2.1	"character orientation" '0', '90', '180', '270'	T.416 7.1.3
"character box size"	2.5.4.2.2	DELETED	
"character base line offset"	2.5.4.2.2	DELETED	
"character spacing"	2.5.4.2.2	"character spacing"	T.416 7.1.5
"line spacing"	2.5.4.2.2	"line spacing"	T.416 7.1.15
"alignment" 'left aligned' 'right aligned' 'centered' 'justified'	2.5.4.2.3	"alignment" 'start-aligned' 'end-aligned' 'centred' 'justified'	T.416 7.1.1
"line layout"	2.5.4.2.3	"line layout table"	T.416 7.1.13
"initial offset"	2.5.4.2.3	"initial offset"	T.416 7.2.2
"graphic rendition"	2.5.4.2.4	"graphic rendition"	T.416 7.1.10

Conventions: - names of attributes in double quotation marks
- names of attribute values in single quotation marks

TABLE C-1/T.411 *(cont.)*

Correspondence of attributes and values

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
Presentation attributes for photographic elements		Presentation attributes for raster graphics content architectures	
"pel path" '0', '90', '180', '270'	2.5.4.3.1	"pel path" '0', '90', '180', '270'	T.417 6.1.3
"line progression" '90', '270'	2.5.4.3.1	"line progression" '90', '270'	T.417 6.1.2
"pel transmission density" '180', '200', '240 , '300', '400', '600', '1200' (pels per 25.4 mm)	2.5.4.3.2	"pel transmission density" n/a '6', '5' '4', '3', '2', '1', '0' (BMU per pel spacing)	T.417 6.2.2
"initial offset"	2.5.4.3.3	"initial offset"	T.417 6.2.1
Attributes of content portions		Content portion attributes	
"content portion identifier"	2.5.5.1	"content identifier layout"	T.412 5.9.1
"type of coding" 'T.61', 'T.6'	2.5.5.2	"type of coding" 'ISO 2022', 'T.6'	T.412 5.9.2

Conventions: - names of attributes in double quotation marks
- names of attribute values in single quotation marks

TABLE C-1/T.411 *(cont.)*

Correspondence of attributes and values

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
Coding attributes for photographic elements		Coding attributes for raster graphics content architectures	
"number of pels per line"	2.5.5.3	"number of pels per line"	T.417 7.2.3
"number of discarded pels"	2.5.5.3	"number of discarded pels"	T.417 7.2.4
"number of lines"	2.5.5.3	"number of lines"	T.417 7.2.2
"compression"	2.5.5.3	"compression"	T.417 7.2.1
"alternative graphic representation"	2.5.5.4	"alternative representation"	T.412 5.9.3.2
Document profile attributes		Document profile attributes	
reference to generic layout structure value=obj.id. "0"	2.3.3	"generic layout structure" 'partial'	T.414 5.2.1
reference to specific layout structure value=obj.id. "1"	2.3.3	"specific layout structure" 'present'	T.414 5.2.2
presentation capabilities	2.3.3	document characteristics	T.414 5.3
other document profile attributes	2.3.3	document management attributes	T.414 5.4
basic terminal characteristics 'Teletex' 'Group 4 Facsimile' 'Mixed Mode'	4.4	"document application profile" (no value for Teletex) 'Group 4 Facsimile' 'Mixed Mode'	T.414 5.3.1

Conventions: - names of attributes in double quotation marks
- names of attribute values in single quotation marks

TABLE C-1/T.411 *(end)*

Correspondence of attributes and values

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
Interchange format 'TIF.0' 'TIF.1'	4.4	"document architecture class" (no value for TIF.0) 'Formatted'	T.414 5.3.3
Non-basic terminal capabilities	4.4	Non-basic document characteristics	T.414 5.3.7
"graphic character sets"		DELETED	
"control character sets"		DELETED	
"page dimensions"		"page dimensions"	T.414 5.3.7.4.1
"coding attributes"		"coding attributes" 'raster graphics coding attributes'	T.414 5.3.7.5
"presentation attributes"		"character presentation features" "raster graphics presentation features"	T.414 5.3.7.6
Non-basic structural capabilities	4.4	Non-basic structure characteristics	T.414 5.3.8
"number of objects per page"		"number of objects per page"	T.414 5.3.8.1

Conventions: - names of attributes in double quotation marks
- names of attribute values in single quotation marks

ANNEX D

(to Recommendation T.411)

(Informative)

Principles for the assignment of ASN.1 object identifier values

Values of ASN.1 object identifiers are assigned in various Recommendations in the T.410 series. The assignment of these values is based on the following principles:

a) the value of the first component is 2, representing "joint-iso-ccitt";

b) the value of the second component is 8, designating the area of joint ISO-CCITT work "document architecture";

c) the value of the third component is 0, 1, 2 or 3, identifying one of the following categories of object identifier values assigned within this area of work:

   0 – object identifier value to be used as a part of an ASN.1 external data type;

   1 – object identifier value to be used as a part of an ASN.1 module identifier;

   2 – object identifier value for the identification of a content architecture class;

   3 – object identifier value for the identification of a type of coding;

d) the meaning of the fourth component and that of the fifth component, if any, depends on the value of the third component as follows:

   – if the value of the third component is 0, the fourth component identifies a particular external data type; values of the fourth component are assigned in Recommendation T.415; in this case, there is no fifth component;

   – if the third component is 1, 2 or 3, the fourth component identifies the Recommendation in the T.410 series in which the value of the fifth component is assigned:

     5 – T.415,

     6 – T.416,

     7 – T.417,

     8 – T.418.

ANNEX E

(to Recommendation T.411)
(Normative)

Use of MHS to interchange documents conforming to the T.410 series of Recommendations

E.1 *ODA identification in the P1 protocol of MHS*

Documents shall be identified by a set of ASN.1 object identifiers as externally-defined encoded-information-types. One member shall always be the ASN.1 object identifier for ODA, the other members shall be one or more ASN.1 object identifiers for the document application profiles to which the message body parts conform.

ODA document	{2 8 0 0}
Document Application Profile	{2 8 . . }
... ...	{2 8 . . }
... ...	{. . . .}
... ...	{. . . .}

Note 1 - Documents conforming to ODA shall not be converted.

E.2 *ODA identification in the P2 protocol of MHS*

Documents conforming to ODA shall be identified as ODA extended body parts. Each extended body part shall contain parameter information about the applicable document application profile and the document architecture class.

Note - ODA body parts can be mixed with non-ODA body parts in a P2 body.

```
IPMSExtendedBodyPartTypeOda  {joint-iso-ccitt(2) oda(8) modules(1) part(0)
extended-body-part-type-oda(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- Prologue

EXPORTS
     oda-body-part
     OdaBodyPartParameters
     OdaData

IMPORTS

     Interchange-Data-Element
     FROM Interchange-Data-Elements {2 8 1 5 5}
     EXTENDED-BODY-PART-TYPE
     FROM IPMSInformationsObjects {joint-iso-ccitt(2)
          mhs-motis(6) ipms(1) modules(0)
          information-objects(2)};

oda-body-part EXTENDED-BODY-PART-TYPE
     PARAMETERS              OdaBodyPartParameters
     DATA                    OdaData
     ::= id-et-oda

AbstractSyntax               ::= CHOICE {
     OdaBodyPartParameters
          -- shall appear in the parameter element of an
          -- IPM ExtenallyDefinedBodyPart --,

OdaData
          -- shall appear in the data element of an
          -- IPM ExternallyDefinedBodyPart --}

OdaBodyPartParameters                ::= SET {
     document-application-profile    [0]     OBJECT IDENTIFIER
          -- This object identifier value shall also be used in the
          -- MTS ExternalEncodedInformationType
          -- in addition to the id-et-oda object identifier
     document-architecture-class     [1]     INTEGER {
                                             formatted (0)
                                             processable (1)
                                             formatted processable (2)}}

OdaData                              ::= SEQUENCE OF Interchange-Data-Element

id-et-oda OBJECT identifier          ::= { 2 8 1 0 1 }
     -- Identifies the AbstractSyntax using the ASN.1 basic encoding rules
     -- This object identifier value shall also be used in the
     -- MTS ExternalEncodedInformationType

End  -- of IPMSExtendedBodyPartTypeOda
```

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