

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 of layout objects containing blocks";

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 "formatted 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 may 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.

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 and 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 and 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. Similarly 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 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 8613-5 (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.

Correspondence of attributes and values

W

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
"object type"	2.5.3.1	"object type"	T.412 5.3.1.1
'document'		'document layout root'	
'page set'		'page set'	
'page'		'page'	
'frame'		'frame'	
'block'		'block'	
"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"	2.5.3.10	"transparency"	T.412 5.4.3.2
'transparent'		'transparent'	

"content type"	2.5.4.1	"content type"	T.412 5.3.4.2
'character box element'		'formatted character content architecture'	
'photographic element'		'formatted raster graphics content architectures'	

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

Correspondence of attributes and values

w

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

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 n/a '6', '5' '4', '3', '2', '1', '0'	"pel transmission density" (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"	2.5.5.2	"type of coding"	T.412 5.9.2

'T.61', 'T.6'

'ISO 2022', 'T.6'

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

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	2.3.3	"specific layout	T.414 5.2.2

layout structure value=obj.id. "1"		structure" 'present'	
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

Correspondence of attributes and values

w

T.73 (1984)		T.410 Series	
Attribute/Value	Location	Attribute/Value	Location
Interchange format	4.4	"document architecture class"	T.414 5.3.3
'TIF.0'		(no value for TIF.0)	
'TIF.1'		'Formatted'	
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"	T.414 5.3.7.5
		'raster graphics coding attributes'	
"presentation attributes"		"character presentation features"	T.414 5.3.7.6
		"raster graphics presentation features"	
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.

The module for specifying the ODA body parts is described below:

```
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 ExternallyDefinedBodyPart --,
```

```
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)}}}
```

```
OaData ::= 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
```