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UIT-T

SECTOR DE NORMALIZACIÓN
DE LAS TELECOMUNICACIONES
DE LA UIT

X.581

(11/95)

REDES DE DATOS Y COMUNICACIÓN ENTRE SISTEMAS ABIERTOS DIRECTORIO

**TECNOLOGÍA DE LA INFORMACIÓN –
INTERCONEXIÓN DE SISTEMAS ABIERTOS –
EL DIRECTORIO: PROTOCOLO DE ACCESO
DE DIRECTORIO – FORMULARIO DE
ENUNCIADO DE CONFORMIDAD
DE IMPLEMENTACIÓN DE PROTOCOLO**

Recomendación UIT-T X.581

(Anteriormente «Recomendación del CCITT»)

PREFACIO

La UIT (Unión Internacional de Telecomunicaciones) es el organismo especializado de las Naciones Unidas en el campo de las telecomunicaciones. El UIT-T (Sector de Normalización de las Telecomunicaciones de la UIT) es un órgano permanente de la UIT. En el UIT-T, que es la entidad que establece normas mundiales (Recomendaciones) sobre las telecomunicaciones, participan unos 179 países miembros, 84 empresas de explotación de telecomunicaciones, 145 organizaciones científicas e industriales y 38 organizaciones internacionales.

Las Recomendaciones las aprueban los Miembros del UIT-T de acuerdo con el procedimiento establecido en la Resolución N.º 1 de la CMNT (Helsinki, 1993). Adicionalmente, la Conferencia Mundial de Normalización de las Telecomunicaciones (CMNT), que se celebra cada cuatro años, aprueba las Recomendaciones que para ello se le sometan y establece el programa de estudios para el periodo siguiente.

En ciertos sectores de la tecnología de la información que corresponden a la esfera de competencia del UIT-T, se preparan las normas necesarias en colaboración con la ISO y la CEI. El texto de la Recomendación UIT-T X.581 se aprobó el 21 de noviembre de 1995. Su texto se publica también, en forma idéntica, como Norma Internacional ISO/CEI 14608-1.

NOTA

En esta Recomendación, la expresión «Administración» se utiliza para designar, en forma abreviada, tanto una administración de telecomunicaciones como una empresa de explotación reconocida de telecomunicaciones.

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RECOMENDACIONES UIT-T DE LA SERIE X

REDES DE DATOS Y COMUNICACIÓN ENTRE SISTEMAS ABIERTOS

(Febrero de 1994)

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Resumen

Esta Recomendación | Norma Internacional contiene el formulario de enunciado de conformidad de implementación de protocolo (PICS) para el protocolo de acceso de directorio especificado en las Recomendaciones de la serie X.500 de 1988. El formulario PICS presenta en forma tabular los elementos obligatorios y facultativos del protocolo de acceso de directorio.

Introducción

Esta Recomendación | Norma Internacional junto con las otras de la misma serie, ha sido elaborada para facilitar la interconexión de sistemas de procesamiento de información para la prestación de servicios de directorio. El conjunto de todos estos sistemas, junto con la información de directorio que contienen, puede considerarse como un todo integrado, denominado el **directorio**. La información contenida en el directorio, denominada en forma colectiva base de información de directorio (DIB, *directory information base*), se utiliza por lo general para facilitar la comunicación entre, con, o sobre objetos tales como entidades de aplicación, personas, terminales y listas de distribución.

El directorio desempeña un papel importante en la interconexión de sistemas abiertos (OSI, *open systems interconnection*), cuyo propósito es permitir, con un mínimo de acuerdos técnicos fuera de las propias normas de interconexión, la interconexión de sistemas de procesamiento de información:

- de diferentes fabricantes;
- sometidos a gestiones diferentes;
- de diferentes grados de complejidad; y
- de diferente construcción.

Para evaluar la conformidad de una determinada implementación, es necesario disponer de una descripción de las capacidades y opciones utilizadas. Dicha descripción se denomina un enunciado de conformidad de implementación de protocolo (PICS, *protocol implementation conformance statement*).

Esta Recomendación | Norma Internacional especifica el formulario de PICS para el protocolo de acceso de directorio, que se define en las Recs. de la serie X.500 del CCITT (1988) | ISO/CEI 9594:1990.

NORMA INTERNACIONAL

RECOMENDACIÓN UIT-T

**TECNOLOGÍA DE LA INFORMACIÓN – INTERCONEXIÓN DE SISTEMAS
ABIERTOS – EL DIRECTORIO: PROTOCOLO DE ACCESO DE DIRECTORIO –
FORMULARIO DE ENUNCIADO DE CONFORMIDAD
DE IMPLEMENTACIÓN DE PROTOCOLO**

1 Alcance

La presente Recomendación | Norma Internacional proporciona el formulario de enunciado de conformidad de implementación de protocolo (PICS) para el protocolo de acceso de directorio especificado en las Recs. de la serie X.500 del CCITT (1988) | ISO/CEI 9594:1990. Este formulario PICS se ajusta a los requisitos pertinentes y a las directrices aplicables indicadas en la Rec. UIT-T X.296 | ISO/CEI 9646-7. En esta Recomendación | Norma Internacional se dan detalles sobre la manera de utilizar este formulario.

El proveedor de una implementación que alega conformarse con las Recs. de la serie X.500 del CCITT | ISO/CEI 9594 tiene que rellenar un ejemplar del formulario PICS que figura en el Anexo A y proporcionar la información necesaria para identificar tanto al proveedor como a la implementación.

2 Referencias normativas

Las siguientes Recomendaciones | Normas Internacionales contienen disposiciones que, mediante su referencia en este texto, constituyen disposiciones de la presente Recomendación | Norma Internacional. Al efectuar esta publicación, estaban en vigor las ediciones indicadas. Todas las Recomendaciones y Normas son objeto de revisiones, por lo que se preconiza que los participantes en acuerdos basados en la presente Recomendación | Norma Internacional investiguen la posibilidad de aplicar las ediciones más recientes de las Recomendaciones y Normas citadas a continuación. Los miembros de la CEI y de la ISO mantienen registros de las Normas Internacionales actualmente vigentes. La Oficina de Normalización de las Telecomunicaciones de la UIT mantiene una lista de las Recomendaciones UIT-T actualmente válidas.

2.1 Recomendaciones | Normas Internacionales idénticas

- Recomendación UIT-T X.200 (1994) | ISO/CEI 7498-1:1994, *Tecnología de la información – Interconexión de sistemas abiertos – Modelo de referencia básico: El modelo básico.*
- Recomendación UIT-T X.247 (1994) | ISO/CEI 8650-2:1995, *Tecnología de la información – Interconexión de sistemas abiertos – Especificación de protocolo para el elemento de servicio de control de asociación: Formulario de declaración de conformidad de realización de protocolo.*
- Recomendación UIT-T X.249¹⁾ | ISO/CEI 9072-4:...¹⁾, *Tecnología de la información – Interconexión de sistemas abiertos – Elemento de servicio de operaciones a distancia – Formulario de declaración de conformidad de realización de protocolo.*

2.2 Pares de Recomendaciones | Normas Internacionales de contenido técnico equivalente

- Recomendación UIT-T X.290 (1995), *Metodología y marco de las pruebas de conformidad de interconexión de sistemas abiertos de las Recomendaciones sobre los protocolos para aplicaciones del UIT-T – Conceptos generales.*

ISO/CEI 9646-1:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*

¹⁾ Se publicará.

- Recomendación UIT-T X.296 (1995), *Metodología y marco de las pruebas de conformidad de interconexión de sistemas abiertos de las Recomendaciones sobre los protocolos para aplicaciones del UIT-T – Declaraciones de conformidad de implementación.*
ISO/CEI 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements.*
- Recomendación UIT-T X.500 del CCITT (1988), *La guía – Visión de conjunto de conceptos, modelos y servicios.*
ISO/CEI 9594-1:1990, *Information technology – Open Systems Interconnection – The Directory – Part 1: Overview of concepts, models and services.*
- Recomendación UIT-T X.501 del CCITT (1988), *La guía – Modelos.*
ISO/CEI 9594-2:1990, *Information technology – Open Systems Interconnection – The Directory – Part 2: Models.*
- Recomendación UIT-T X.509 del CCITT (1988), *La guía – Marco de autenticación.*
ISO/CEI 9594-8:1990, *Information technology – Open Systems Interconnection – The Directory – Part 8: Authentication framework.*
- Recomendación UIT-T X.511 del CCITT (1988), *La guía – Definición del servicio abstracto.*
ISO/CEI 9594-3:1990, *Information technology – Open Systems Interconnection – The Directory – Part 3: Abstract service definition.*
- Recomendación UIT-T X.518 del CCITT (1988), *La guía – Procedimientos para operación distribuida.*
ISO/CEI 9594-4:1990, *Information technology – Open Systems Interconnection – The Directory – Part 4: Procedures for distributed operation.*
- Recomendación UIT-T X.519 del CCITT (1988), *La guía – Especificaciones de protocolos.*
ISO/CEI 9594-5:1990, *Information technology – Open Systems Interconnection – The Directory – Part 5: Protocol specifications.*
- Recomendación UIT-T X.520 del CCITT (1988), *La guía – Tipos de atributo seleccionados.*
ISO/CEI 9594-6:1990, *Information technology – Open Systems Interconnection – The Directory – Part 6: Selected attribute types.*
- Recomendación UIT-T X.521 (1988), *La guía – Clases de objeto seleccionadas.*
ISO/CEI 9594-7:1990, *Information technology – Open Systems Interconnection – The Directory – Part 7: Selected object classes.*

3 Definiciones

A los efectos de la presente Recomendación | Norma Internacional, se aplican las siguientes definiciones.

Los siguientes términos definidos en la Rec. UIT-T X.290 | ISO/CEI 9646-1:

- a) enunciado de conformidad de realización;
- b) formulario de enunciado de conformidad de realización;
- c) enunciado de conformidad de realización de protocolo (PICS); y
- d) formulario PICS.

Términos adicionales:

- a) *DSA centralizado*: DSA que no tiene conocimiento de otros DSA.
- b) *DSA independiente*: DSA que no puede utilizar el protocolo de sistema de directorio, pero tiene conocimiento de otros DSA. Estos DSA utilizan únicamente el modo referimiento.
- c) *DSA cooperante*: DSA que tiene la capacidad de utilizar el protocolo de sistema de directorio.

4 Abreviaturas

A los efectos de la presente Recomendación | Norma Internacional, se utilizan las abreviaturas siguientes:

DAP	Protocolo de acceso de directorio (<i>directory access protocol</i>)
DSA	Agente de sistema de directorio (<i>directory system agent</i>)
DUA	Agente de usuario de directorio (<i>directory user agent</i>)
ICS	Enunciado de conformidad de implementación (<i>implementation conformance statement</i>)
PICS	Enunciado de conformidad de implementación de protocolo (<i>protocol implementation conformance statement</i>)

5 Conformidad

Un formulario PICS conforme será técnicamente equivalente al formulario PICS publicado por UIT-T | ISO/CEI y preservará la numeración y el orden de los ítems del formulario PICS del UIT-T | ISO/CEI.

Un formulario PICS conforme a esta Recomendación | Norma Internacional:

- a) describirá una implementación que se ajusta a las Recs. de la serie X.500 del CCITT | ISO/CEI 9594;
- b) será un formulario PICS conforme, que se ha rellenado de acuerdo con las instrucciones indicadas en la cláusula A.2;
- c) incluirá la información necesaria para identificar de manera única al suministrador y a la implementación.

Anexo A

Formulario de enunciado de conformidad de implementación de protocolo (PICS) para el protocolo de acceso de directorio²⁾

(Este anexo es parte integrante de esta Recomendación | Norma Internacional)

A.1 Identification of PICS proforma corrigenda

The supplier of the PICS proforma shall identify any corrigenda (i.e. Technical Corrigenda or equivalent) to the published proforma that have been applied. Suppliers of the proforma should modify the proforma, or attach relevant additional pages in order to apply the corrigenda, and then record the application of the corrigenda in the table below.

Item	ITU-T Rec. X.581 (1995) ISO/IEC 14608-1:1996
1	Corr:
2	Corr:
3	Corr:
4	Implementors' Guide version:

A.2 Instructions

A.2.1 Purpose and structure of the proforma

The purpose of this PICS proforma is to provide suppliers of implementations of CCITT Rec. X.500-Series | ISO/IEC 9594 with a consistent means of stating which capabilities have been implemented.

The proforma is in the form of a questionnaire and consists of a set of items. An item is provided for each capability for which an implementation choice is allowed. Items are also provided for major mandatory capabilities for which no implementation choice is allowed. Each item includes an item number, an item description, a status value specifying the support requirement, and room for a support answer to be provided by the supplier.

This subclause provides general information and instructions for completion of the proforma.

Subclause A.3 is for identification of the implementation.

Subclause A.4 contains the means of specifying, at a high level, the protocol and corrigenda that have been implemented.

Subclause A.5 contains the global statement of conformance.

Subclauses A.6 onwards contain tables in which the supplier specifies details of the implementation options chosen.

A.2.2 Symbols, terms and abbreviations

A.2.2.1 Introduction

Notations have been introduced in order to reduce the size of tables in the PICS proforma. These have allowed the use of multi-column layout where the columns are headed 'Status', and 'Support'. The definition of each are given below.

Additionally, the following definitions apply.

A.2.2.1.1 (PICS) item: A row in a PICS proforma table.

A.2.2.1.2 (PICS) question: The question to be answered in the intersection of a PICS item and either a support column (i.e. "Is this item supported in the context applying to this table and column") or supported values column (i.e. "What values are supported for this item in the context applying to this table and column") in a PICS proforma table.

A.2.2.1.3 status (value): An allowed entry in the status column for an item in a PICS proforma table.

²⁾ Comunicado sobre derechos de autor del formulario de PICS – Los usuarios de esta Recomendación | Norma internacional pueden reproducir libremente el formulario de PICS de este anexo a fin de que pueda ser utilizado para los fines previstos, y pueden además publicar el PICS cumplimentado.

A.2.2.1.4 (support) answer: An allowed entry in the support or supported values columns for an item in a PICS, in answer to a PICS question.

A.2.2.2 Item numbering

Each line within the PICS proforma which requires implementation detail to be entered is given an item number in the first column. The item number column provides a means of uniquely referencing each possible answer within the PICS proforma. Such referencing is necessary for specifying conditional expressions, test suite parameters, and test suite selection expressions.

The means of referencing individual answers is to specify the following sequence:

- a) if, and only if, the reference is being made from another Specification, then start with an unambiguous identifier for the relevant ICS proforma specification, enclosed in parentheses – this identifier is stated in the PICS proforma specification and is updated whenever the PICS proforma is updated – it is recommended that this identifier be the relevant Specification number and year of publication, as is used in a Normative references clause, and this is the default for such identifiers;
- b) the number of the relevant table or, if the tables are not numbered, of the smallest subclause enclosing the relevant table;
- c) a solidus character, “/”;
- d) the item number of mnemonic reference to the item, to identify the row in which the answer appears;
- e) if, and only if, more than one question occurs in the row identified by the item number or mnemonic reference, then each possible answer is implicitly labelled a, b, c, etc., from left to right, and this letter is appended to the sequence, prefixed by a solidus character (“/”) if a mnemonic reference is used.

If mnemonic references are specified and each uniquely identify an item in the PICS proforma, then entries b) and c) in the above sequence may be omitted.

A.2.2.3 Status column

The ‘Status’ column indicates the level of support required for conformance to CCITT Rec. X.500-Series | ISO/IEC 9594. The values are as follows:

‘m’	The item is mandatory. The capability is required to be implemented.
‘o’	The item is optional. The capability may be implemented.
‘o.n’	The item is a mutually exclusive or selectable option among a set (where n is the number which identifies the group of optional items). The requirement for each numbered group is specified as part of the relevant tables.
‘c’	The item is conditional. The requirement on the capability depends on the selections of other optional or conditional items. The status (mandatory, optional, prohibited, or non-applicable) depends on the evaluation of a conditional expression which is specified as part of the relevant tables.
‘cn’	The item is conditional (where n is the number which identifies the condition which is applicable). The definitions for conditional statements are given as part of the relevant tables.
‘x’	The item is prohibited or excluded. There is a requirement not to use this capability in the given context.
‘n/a’	The item is not applicable. The capability is not applicable in the given context.

A.2.2.4 Support column

The ‘Support’ column shall be completed by the supplier or implementor to indicate the level of implementation of each capability. The proforma has been designed such that the only entries required in the ‘Support’ column are:

‘Y’	Yes, the capability is implemented in conformance with CCITT Rec. X.500-Series ISO/IEC 9594.
‘N’	No, the capability is not implemented.
‘—’	No answer is required – it is unnecessary to answer the question with a yes or a no because the question has a status value of non-applicable.

A.2.2.5 Definition of support

A capability is said to be supported if the implementation is able:

- to generate the corresponding operation parameters (either automatically or because the end user requires that capability explicitly);
- to interpret, handle and when required make available to the end user the corresponding error or result.

A protocol element is said to be supported for a sending implementation if the implementation is able to generate it under some circumstances (either automatically or because the end user requires relevant services explicitly).

A protocol element is said to be supported for a receiving implementation if it is correctly interpreted and handled and also, when appropriate, made available to the end user.

An object class is said to be supported if the implementation is able to construct entries of that object class. Support of an object class also requires support of the object identifier(s) of its superclass(es) of that object class.

An attribute type is said to be supported by a DUA implementation if the DUA supports those aspects of the attribute syntax which are pertinent to encoding, decoding or both of the attribute.

An attribute type is said to be supported by a DSA implementation if the DSA supports a subset or all aspects of the attribute syntax of the attribute and stores the attribute value(s) where appropriate.

A.2.2.6 Note column

This column indicates the following:

- | | |
|------|---|
| n | Refers to Note n. |
| d(n) | A default value n within () is defined in the Recommendation International Standard. When absent in the PDU, both sender and receiver shall interpret it as having the default value specified in the Recommendation International Standard. |

A.2.2.7 Abbreviations

- | | |
|-------|---|
| ACSE | Association Control Service Element |
| PDU | Protocol Data Unit |
| ROSE | Remote Operations Service Element |
| v1988 | The 1988 version of the Specification |
| X.511 | CCITT Recommendation X.511 and ISO/IEC 9594-3 |

A.2.3 Instructions for completion

The supplier shall complete all entries in the column marked 'Support'. In certain clauses of the PICS proforma further guidance for completion may be necessary. Such guidance shall supplement the guidance given in this clause and shall have a scope restricted to the clause in which it appears. In addition, other specifically identified information shall be provided by the implementor where requested. No changes shall be made to the proforma except the completion as required. Recognizing that the level of detail required may, in some instances, exceed the space available for responses, a number of responses specifically allow for the addition of appendices to the PICS.

A.3 Identification of the implementation

A.3.1 Date of statement

1	Date of statement? (yy-mm-dd)
---	-------------------------------

A.3.2 Identification of the implementation and/or system

Item	Question	Response
1	Implementation Name	
2	Version Number	
3	Machine Name	
4	Machine Version Number	
5	Operating System Name	
6	Operating System Version Number	
7	Special Configuration (Note)	
8	Other Information	
NOTE – Enter one or more of the following configurations: – DUA for connection to centralized DSAs; – DUA for connection to either standalone or cooperating DSAs; – Centralized DSA; – Standalone DSA; – Cooperating DSA; – First-level DSA.		

A.3.3 Identification of the system supplier and/or test laboratory client

Item	Question	Response
1	Organization Name	
2	Contact Name(s)	
3	Address	
4	Telephone Number	
5	Fax Number	
6	Telex Number	
7	E-Mail Address	
8	Other Information	

A.4 Protocol identification**A.4.1 CCITT Rec. X.500-Series | ISO/IEC 9594 protocol specifications and amendments implemented**

Item	Identification of Protocol Specification	Support
–	CCITT Rec. X.500-Series (1988) ISO/IEC 9594:1990	
1	Amd:	
2	Amd:	
3	Amd:	
4	Amd:	
5	Amd:	

A.4.2 CCITT Rec. X.500-Series | ISO/IEC 9594 technical corrigenda implemented

Item	CCITT Rec. X.500-Series (1988) ISO/IEC 9594:1990	Support
1	Corr:	
2	Corr:	
3	Corr:	
4	Corr:	
5	Corr:	
6	Implementors' Guide version:	

A.5 Global statement of conformance

Are all mandatory features implemented? (yes or no)
NOTE – If a positive response is not given to this box, then the implementation does not conform to CCITT Rec. X.500-Series ISO/IEC 9594.

A.5.1 DSA implementation and/or system

Answer if the implementation is a DSA.

Item	Question	Status	Support	Notes
1	Are all mandatory general capabilities for the DSA implemented?	m		
2	Are minimum knowledge requirements (X.518) implemented?	c		1
3	Are all mandatory First-level DSA requirements (X.518) implemented?	c		2
4	Is Cross Reference implemented?	o		
5	Is NSSR (non-specific subordinate reference) implemented?	o		
6	Supported Security Level(s)	None, simple, strong		
7	Is asynchronous (ROSE class 2) mode of operation supported?	m		
8	Is the alias mechanism implemented?	o		
NOTES 1 This item is mandatory unless the special configuration in A.3.2/7 is a centralized DSA. 2 This item is mandatory if the special configuration in A.3.2/7 indicates the DSA acting as a First-level DSA.				

A.5.2 DUA implementation and/or system

Answer if the implementation is a DUA.

Item	Question	Status	Support	Notes
1	Are all mandatory general capabilities for the DUA implemented?	m		
2	Supported Security Level(s)	None, simple, strong		
3	Is asynchronous (ROSE class 2) mode of operation supported?	o		

A.6 Capabilities and options

This part of the PICS proforma identifies the supported application context, the PDUs and operations. Finally, the operation arguments and PDU parameters are identified.

A.6.1 Supported application context

The only application context supported by this PICS proforma is Directory Access application context.

A.6.2 Operations

Item	Operation	Status (DUA)	Status (DSA)	Support	Notes	References
1	Directory Bind	m	m			A.6.3.1
2	Directory Unbind	m	m			A.6.3.2
3	Read	o	m		1, 2	A.6.3.3
4	Compare	o	m		1	A.6.3.4
5	Abandon	o	m		3	A.6.3.5
6	List	o	m		1, 2	A.6.3.6
7	Search	o	m		1, 2	A.6.3.7
8	AddEntry	o	m		1	A.6.3.8
9	RemoveEntry	o	m		1	A.6.3.9
10	ModifyEntry	o	m		1	A.6.3.10
11	ModifyRDN	o	m		1	A.6.3.11
NOTES 1 This Note applies to the DUA implementation only. If the supported security level in A.5.2/2 indicates 'strong', then conformance requires support of the signed form of the arguments for the operation. 2 This Note applies to the DSA implementation only. If the supported security level in A.5.1/6 indicates 'strong', then conformance requires support for the signed form of the results for the operation. 3 The Abandon operation can only be supported if the asynchronous mode (ROSE class 2) of operation is supported in A.5.1/7 or A.5.2/3.						

A.6.3 Protocol elements

A.6.3.1 DirectoryBind Protocol Elements

A.6.3.1.1 DirectoryBind Arguments

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	Directory BindArg	m	m			(X.511) 8.1
2	credentials	c1	c1			
3	simple	c2	c2			
4	name	m	m			
5	validity	o	o			
6	password	o	o			
7	strong	c3	c3			
8	externalProcedure	o	o			
9	versions	m	m		d(v1988)	
c1: if the supported security level in A.5.2/2 is either 'simple' or 'strong' then m else o. c2: if the supported security level in A.5.2/2 is 'simple' then m else o. c3: if the supported security level (for a DSA in A.5.1/6 and for a DUA in A.5.2/2) is 'strong' then m else o.						

A.6.3.1.2 DirectoryBind Result

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	Directory BindResult	m	m			(X.511) 8.1
2	credentials	c1	c1			
3	simple	c2	c2			
4	name	m	m			
5	validity	o	o			
6	password	o	o			
7	strong	c3	c3			
8	externalProcedure	o	o			
9	versions	m	m		d(v1988)	
c1: if the supported security level (for a DSA in A.5.1/6 and for a DUA in A.5.2/2) is either 'simple' or 'strong' then m else o. c2: if the supported security level (for a DSA in A.5.1/6 and for a DUA in A.5.2/2) is 'simple' then m else o. c3: if the supported security level (for a DSA in A.5.1/6 and for a DUA in A.5.2/2) is 'strong' then m else o.						

A.6.3.1.3 DirectoryBindError

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	Directory BindError	m	m			(X.511) 8.1
2	versions	m	m		d(v1988)	
3	ServiceProblem	m	m			
4	SecurityProblem	m	m			

A.6.3.2 DirectoryUnbind Elements

DirectoryUnbind has no arguments (see 8.2/X.511).

A.6.3.3 Read Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ReadArgument	m	m			(X.511) 9.1
2	object	m	m			
3	selection	m	m			A.6.3.16
4	CommonArguments	o	m			A.6.3.13
5	ReadResult	m	m			
6	entry	m	m			A.6.3.17
7	CommonResults	m	m			A.6.3.14

A.6.3.4 Compare Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	CompareArgument	m	m			(X.511) 9.2
2	object	m	m			
3	purported	m	m			
4	CommonArguments	o	m			A.6.3.13
5	CompareResult	m	m			(X.511) 9.2
6	DistinguishedName	m	m			
7	matched	m	m			
8	fromEntry	m	m		d(true)	
9	CommonResults	m	m			A.6.3.14

A.6.3.5 Abandon Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	AbandonArgument	m	m			(X.511) 9.3
2	invoked	m	m			
3	AbandonResult	m	m			

A.6.3.6 List Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ListArgument	m	m			(X.511) 10.1
2	object	m	m			
3	CommonArguments	o	m			A.6.3.13
4	ListResult	m	m			
5	listInfo	m	m			
6	DistinguishedName	o	m			
7	subordinates	m	m			
8	RDN	m	m			
9	aliasEntry	m	m		d(false)	
10	fromEntry	m	m		d(true)	
11	partialOutcomeQualifier	o	m			
12	limitProblem	o	o			
13	unexplored	o	c1			A.6.3.20
14	unavailableCriticalExt	m	m			
15	CommonResults	m	m			A.6.3.14
16	uncorrelatedListInfo	o	c2			A.6.3.6/4

c1: if A.3.2/7 indicates that the DSA is a cooperating DSA then m else o.

c2: if the supported security level in A.5.1/6 is 'strong' then m else o.

A.6.3.7 Search Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	SearchArgument	m	m			(X.511) 10.2
2	baseObject	m	m			
3	subset	m	m		d(0)	
4	filter	o	m		d(and{ })	A.6.3.8
5	searchAliases	m	m		d(true)	
6	selection	o	m		d({ })	A.6.3.16
7	CommonArguments	o	m			A.6.3.13
8	SearchResult	m	m			(X.511) 10.2
9	searchInfo	m	m			
10	DistinguishedName	o	m			
11	entries	m	m			A.6.3.17
12	PartialOutcomQuaf	o	m			A.6.3.6/11
13	CommonResults	m	m			A.6.3.14
14	uncorrelatedSearchInfo	o	c1			A.6.3.7/8
c1: if the supported security level in A.5.1/6 is 'strong' then m else o.						

A.6.3.8 AddEntry Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	AddEntryArgument	m	m			(X.511) 11.1
2	object	m	m			
3	entry	m	m			A.6.3.17
4	CommonArguments	o	m			A.6.3.13
5	AddEntryResult	m	m			(X.511) 11.1

A.6.3.9 RemoveEntry Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	RemoveEntryArgument	m	m			(X.511) 11.2
2	object	m	m			
3	CommonArguments	o	m			A.6.3.13
4	RemoveEntryResult	m	m			

A.6.3.10 ModifyEntry Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ModifyEntryArgument	m	m			(X.511) 11.3
2	object	m	m			
3	changes	m	m			
4	addAttribute	m	m			
5	removeAttribute	m	m			
6	addValues	m	m			
7	removeValues	m	m			
8	CommonArguments	o	m			A.6.3.13
9	ModifyEntryResult	m	m			(X.511) 11.3

A.6.3.11 ModifyRDN Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ModifyRDNArgument	m	m			(X.511) 11.4
2	object	m	m			
3	newRDN	m	m			
4	deleteOldRDN	m	m		d(false)	
5	CommonArguments	o	m			A.6.3.13
6	ModifyRDNResult	m	m			(X.511) 11.4

A.6.3.12 Errors and Parameters

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	Abandoned	c1	m			(X.511) 12.2
2	AbandonFailed	c1	m			(X.511) 12.3
3	problem	m	m			
4	operation	m	m			
5	AttributeError	c2	m			(X.511) 12.4
6	object	m	m			
7	problems	m	m			
8	problem	m	m			
9	type	m	m			
10	value	m	m			
11	NameError	c3	m			(X.511) 12.5
12	problem	m	m			
13	matched	m	m			
14	Referral	c3	m			(X.511) 12.6
15	candidate	m	m			A.6.3.20
16	SecurityError	c3	m			(X.511) 12.7
17	problem	m	m			
18	ServiceError	c3	m			(X.511) 12.8
19	problem	m	m			
20	UpdateError	c4	m			(X.511) 12.9
21	problem	m	m			
c1: if the Abandon operation is implemented (see A.6.2/5) then m else o. c2: if at least one of the following operations is implemented (see A.6.2, items 3, 4, 7, 8 or 10): Read/Compare/ Search/AddEntry/ModifyEntry then m else o. c3: if at least one of the following operations is implemented (see A.6.2, items 3, 4, 7, 8, 10 or 11): Read/Compare/ List/Search/AddEntry/ModifyEntry/ModifyRDN then m else o. c4: if at least one of the following operations is implemented (see A.6.2, items 8, 10 or 11): AddEntry/RemoveEntry/ModifyEntry/ModifyRDN then m else o.						

A.6.3.13 CommonArguments Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ServiceControls	o	m		d({})	A.6.3.15
2	SecurityParameters	o	c1		d({})	
3	certification-path	o	m			
4	name	o	m			
5	time	o	m			
6	random	o	m			
7	target	o	o			
8	requestor	o	m			
9	OperationProgress	o	m		d(notStarted)	
10	nameResolutionPhase	o	m		d(notStarted)	
11	nextRDNTToBeResolved	o	m			
12	aliasedRDNs	o	m			
13	extensions	o	m			
c1: if the supported security level in A.5.1/6 is 'strong' then m else o.						

A.6.3.14 CommonResults Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	SecurityParameters	c1	c1			
2	certification-path	o	o			
3	name	o	o			
4	time	m	m			
5	random	m	m			
6	target	n/a	n/a	–		
7	performer	m	m			
8	aliasDereferenced	m	m		d(false)	
c1: if the supported security level (for a DSA in A.5.1/6 and for a DUA in A.5.2/2) is 'strong' then m else o.						

A.6.3.15 Service Controls

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	ServiceControls	o	m			(X.511) 7.5
2	options	o	m		d({})	
3	priority	o	m			
4	timeLimit	o	m			
5	sizeLimit	o	m			
6	scopeOfReferral	o	c1			
c1: if A.3.2/7 indicates that the DSA is a cooperating DSA then m else o.						

A.6.3.16 Entry Information Selection

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	EntryInformationSelection	o	m			(X.511) 7.6
2	attributeTypes	o	m			
3	allAttributes	o	m			
4	select	o	m			
5	infoTypes	o	m		d(1)	

A.6.3.17 Entry Information

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	EntryInformation	m	m			(X.511) 7.7
2	DistinguishedName	m	m			
3	fromEntry	m	m		d(True)	
4	<attributeset>	m	m		Note	
5	Attribute Type	m	m			
6	Attribute	m	m			
NOTE – The <attributeset> denotes the SET OF CHOICE ASN.1 construction.						

A.6.3.18 Filter Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	item	o	m			A.6.3.19
2	and	o	m			
3	or	o	m			
4	not	o	m			

A.6.3.19 Filter item Elements

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	equality	o	m			
2	substrings	o	m			
3	type	o	m			
4	strings	o	m			
5	initial	o	m			
6	any	o	m			
7	final	o	m			
7	greaterOrEqual	o	m			
9	lessOrEqual	o	m			
10	present	o	m			
11	approximateMatch	o	m			

A.6.3.20 Continuation reference

Item	Protocol Element	Status (DUA)	Status (DSA)	Support	Notes	References
1	targetObject	o	m			
2	aliasedRDNs	o	m			
3	OperationProgress	o	m			
4	nameResolutionPhase	o	m			
5	nextRDNTToBeResolved	o	m			
6	rdnsResolved	o	m			
7	AccessPoint	o	m			
8	Name	o	m			
9	PresentationAddress	o	m			
10	pSelector	o	m			
11	sSelector	o	m			
12	tSelector	o	m			
13	nSelector	o	m			

A.6.4 Directory schema**A.6.4.1 Supported object classes****A.6.4.1.1 Standard object classes**

The supplier of the DSA implementation shall indicate, in the table below, the selected object classes defined in CCITT Rec. X.521 | ISO/IEC 9594-7 for which conformance is claimed. The supplier of the DUA implementation need not complete the following table:

Item	Object class	Status	Support
1	top	m	
2	alias	m	
3	country	o	
4	locality	o	
5	organization	o	
6	organizationalUnit	o	
7	person	o	
8	organizationalPerson	o	
9	organizationalRole	o	
10	groupOfName	o	
11	residentialPerson	o	
12	applicationProcess	o	
13	applicationEntity	o	
14	dSA	m	
15	device	o	
16	strongAuthenticationUser	o	
17	certificationAuthority	o	

A.6.4.1.2 Other Supported object classes

The supplier of the DSA implementation is required to list any other object classes provided for which conformance is claimed in the following table:

Item	Supported object classes
1	
2	
3	
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A.6.4.2 Supported Attribute Types

A.6.4.2.1 Standard Attribute Types

The supplier of the implementation shall indicate, in the following table, the selected attribute types defined in CCITT Rec. X.520 | ISO/IEC 9594-6 for which conformance is claimed:

Item	Attribute Type	Status	Support	Upper bound	Notes
0	objectClass	c1			
1	aliasedObjectName	o			
2	knowledgeInformation	o			
3	commonName	o		64	
4	surname	o		64	
5	serialNumber	o		64	
6	countryName	o			size = 2
7	localityName	o		128	
8	stateOrProvinceName	o		128	
9	streetAddress	o		128	
10	organizationName	o		64	
11	organizationalUnitName	o		64	
12	title	o		64	
13	description	o		1024	
14	searchGuide	o			
15	businessCategory	o		128	
16	postalAddress	o		6 (lines) × 30 (chs)	
17	postalCode	o		40	
18	postOfficeBox	o		40	
19	physicalDeliveryOfficeNa	o		128	
20	telephoneNumber	o		32	
21	telexNumber	o		14, 4, 8	
22	teletexTerminalIdentifier	o		24	
23	facsimileTelephoneNumber	o		32	
24	X.121Address	o		15	
25	internationalISDNNumber	o		16	
26	registeredAddress	o		6 (lines) × 30 (chs)	
27	destinationIndicator	o		128	
28	preferredDeliveryMethod	o			
29	presentationAddress	o			
30	supportedApplicationCont	o			
31	member	o			
32	owner	o			
33	roleOccupant	o			
34	seeAlso	o			
35	userPassword	o		128	
36	userCertificate	o			
37	cACertificate	o			
38	authorityRevocationList	o			
39	certificateRevocationList	o			
40	crossCertificatePair	o			
c1: if the implementation is a DSA then m else o.					

A.6.4.2.2 Other Supported Attribute Types

The supplier of the implementation shall list any other attribute types provided for which conformance is claimed in the following table:

Item	Attribute Types
1	
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A.6.5 Other information

The following table can be used to provide any other relevant information:

Item	Other information

A.7 Multi-layer dependencies**A.7.1 Upper layers**

Not applicable.

A.7.2 Underlying layers

The Directory Access Protocol is defined in the Directory Access Application Context that implies the modifications shown in the following tables to the referenced elements within the appropriate PICS proforma.

A.7.2.1 ROSE

ROSE PICS references	DUA	DSA
A.6.2, item 2	n/a	n/a
A.6.3, item 2	n/a	n/a
A.6.14, item 2	n/a	n/a
A.6.15, item 2	n/a	n/a

A.7.2.2 ACSE

ACSE PICS references	DUA	DSA
A.7, item 1	m	m
A.7, item 2	n/a	n/a
A.8, item 1	m	n/a
A.8, item 2	n/a	m