Contents

Foreword

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

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 14608-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.582.

ISO/IEC 14608 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — The Directory*:

— *Part 1: Directory Access Protocol — Protocol Implementation Conformance Statement (PICS) proforma*

— *Part 2: Directory System Protocol — Protocol Implementation Conformance Statement (PICS) proforma*

Annex A forms an integral part of this part of ISO/IEC 14608.

Introduction

This Recommendation | International Standard, together with the others in the set, has been produced to facilitate the interconnection of information processing systems to provide directory services. The set of all such systems, together with the directory information which they hold, can be viewed as an integrated whole, called the **Directory**. The information held by the Directory, collectively known as the Directory Information Base (DIB), is typically used to facilitate communication between, with or about objects such as application entities, people, terminals and distribution lists.

The Directory plays a significant role in Open Systems Interconnection, whose aim is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of information processing systems:

- from different manufacturers;

- under different managements;

- of different levels of complexity; and

- of different technologies.

To evaluate the conformance of a particular implementation, it is necessary to have a description of the capabilities and options which have been implemented. Such a description is called a Protocol Implementation Conformance Statement (PICS).

This Recommendation | International Standard includes the PICS proforma for the Directory System Protocol (DSP) as defined in the 1988 CCITT Rec. X.500-Series | ISO/IEC 9594:1990.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – THE DIRECTORY: DIRECTORY SYSTEM PROTOCOL – PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) PROFORMA

1 Scope

This Recommendation | International Standard provides the Protocol Implementation Conformance Statement (PICS) proforma for the Directory System Protocol (DSP) specified in the 1988 CCITT Rec. X.500-Series | ISO/IEC 9594:1990. This PICS proforma is in compliance with the relevant requirements, and in accordance with the relevant guidance given in ITU-T Rec. X.296 | ISO/IEC 9646-7. Detail of the use of this proforma is provided in this Recommendation | International Standard.

The supplier of an implementation which is claimed to conform to CCITT Rec. X.500-Series | ISO/IEC 9594 is required to complete a copy of the PICS proforma provided in Annex A, and is required to provide the information necessary to identify both the supplier and the implementation.

This PICS proforma applies to a cooperating Directory System Agent (DSA).

2 Normative references

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

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*

- ITU-T Recommendation X.247 (1994) | ISO/IEC 8650-2:1995, *Information technology – Open Systems Interconnection – Protocol specification for the Association Control Service Element: Protocol Implementation Conformation Statement (PICS) proforma.*

- ITU-T Recommendation X.249[1] | ISO/IEC 9072-4...[1], *Information technology – Open Systems Interconnection – Remote Operations: Protocol Implementation Conformance Statement (PICS) proforma.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation X.290 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – General concepts.*

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

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[1] To be published.

– ITU-T Recommendation X.296 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements.*

ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements.*

– CCITT Recommendation X.500 (1988), *The Directory – Overview of concepts, models and services*

ISO/IEC 9594-1:1990, *Information technology – Open Systems Interconnection – The Directory – Part 1: Overview of concepts, models and services.*

– CCITT Recommendation X.501 (1988), *The Directory – Models.*

ISO/IEC 9594-2:1990, *Information technology – Open Systems Interconnection – The Directory – Part 2: Models.*

– CCITT Recommendation X.509 (1988), *The Directory – Authentication framework.*

ISO/IEC 9594-8:1990, *Information technology – Open Systems Interconnection – The Directory – Part 8: Authentication framework.*

– CCITT Recommendation X.511 (1988), *The Directory – Abstract service definition.*

ISO/IEC 9594-3:1990, *Information technology – Open Systems Interconnection – The Directory – Part 3: Abstract service definition.*

– CCITT Recommendation X.518 (1988), *The Directory – Procedures for distributed operation.*

ISO/IEC 9594-4:1990, *Information technology – Open Systems Interconnection – The Directory –Part 4: Procedures for distributed operation.*

– CCITT Recommendation X.519 (1988), *The Directory – Protocol specifications.*

ISO/IEC 9594-5:1990, *Information technology – Open Systems Interconnection – The Directory – Part 5: Protocol specifications.*

– CCITT Recommendation X.520 (1988), *The Directory – Selected attribute types.*

ISO/IEC 9594-6:1990, *Information technology – Open Systems Interconnection – The Directory – Part 6: Selected attribute types.*

– CCITT Recommendation X.521 (1988), *The Directory – Selected object classes.*

ISO/IEC 9594-7:1990, *Information technology – Open Systems Interconnection – The Directory – Part 7: Selected object classes.*

3 Definitions

For the purposes of this Recommendation | International Standard, the following definitions apply.

The following terms defined in ITU-T Rec. X.290 | ISO/IEC 9646-1:

a) Implementation conformance statement;

b) Implementation conformance statement proforma;

c) Protocol Implementation Conformation Statement (PICS); and

d) PICS proforma.

Additional terms

a) *Cooperating DSA:* A DSA that has the capability of using the Directory System Protocol.

b) *Security Level:* Security levels shall be declared for peer entity authentication, originator authentication and results authentication, respectively.

– For peer entity authentication, there are five security levels: "none", "simple without password", "simple with unprotected password", "simple with protected password" and "strong".

– For originator authentication, there are three security levels: "none", "simple with distinguished name" and "strong".

– For results authentication, there are two security levels: "none" and "strong".

4 Abbreviations

For the purposes of this Recommendation | International Standard, the following abbreviations apply:

DSA   Directory System Agent

DSP   Directory System Protocol

ICS   Implementation Conformance Statement

PICS   Protocol Implementation Conformance Statement

5 Conformance

A conforming PICS proforma shall be technically equivalent to the ITU-T | ISO/IEC published PICS proforma and shall preserve the numbering and ordering of the items in the ITU-T | ISO/IEC PICS proforma.

A PICS which conforms to this Recommendation | International Standard shall:

a) describe an implementation which conforms to CCITT Rec. X.500-Series | ISO/IEC 9594;

b) be a confirming PICS proforma, which has been completed in accordance with the instruction for completion given in A.2;

c) include the information necessary to uniquely identify both the supplier and the implementation.

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Annex A

**Protocol Implementation Conformance Statement (PICS) proforma
for the directory system protocol[2)]**

(This annex forms an integral part of this Recommendation I International Standard)

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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) I ISO/IEC 14608-2:1996
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 I 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.

[2)]   Copyright release for PICS proforma – Users of this Recommendation I International Standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

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

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 I 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 to CCITT Rec. X.500 series I ISO/IEC 9594.

'N' No, the capability is not implemented.

'–' No answer 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 DSA implementation may be an invoker and/or a consumer of a DSA operation unless "Chaining Mode" is supported, then the DSA implementation must be able to invoke and consume DSA operations.

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

   –   to generate the corresponding operation parameters (either automatically or because the invoker requires that capability explicitly);

   –   to interpret, handle and when required, make available to the invoker the corresponding error or result.

A protocol element is said to be supported for a sending implementation (i.e. the implementation invoking the subject operation) if the implementation is able to generate it under some circumstances (either automatically or because the invoker requires relevant services explicitly).

A protocol element is said to be supported for a receiving implementation (i.e. the implementation responding to the subject operation) if it is correctly interpreted and handled and also, when appropriate, made available to the invoker.

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 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 I International Standard. When absent in the PDU, both sender and receiver shall interpret it as having the default value specified in the Recommendation I International Standard.

A.2.2.7   Abbreviations

ACSE	Association Control Service Element
Init	Initiator
PDU	Protocol Data Unit
Res	Responder
ROSE	Remote Operations Service Element
v1988	The 1988 version of the Specification.
X.511	CCITT Recommendation X.511 and ISO/IEC 9594-3.
X.518	CCITT Recommendation X.518 and ISO/IEC 9594-4.

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 at least one of the following configurations:
- non-First-Level 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 and Amendments	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.

Item	Question	Status	Support
1	Are all mandatory general capabilities implemented?	m	
2	Are minimum knowledge requirements (X.518) implemented?	m	
3	Are all mandatory First-level DSA requirements (X.518) implemented?	c.1	
4	Is Cross Reference type implemented?	o	
5	Is NSSR (non-specific subordinate reference) implemented?	o	
6.1.1	Is security level "none" for peer entity authentication supported?	o.2	
6.1.2	Is security level "simple without password" for peer entity authentication supported?	o.2	
6.1.3	Is security level "simple with unprotected password" for peer entity authentication supported?	o.2	
6.1.4	Is security level "simple with protected password" for peer entity authentication supported?	o.2	
6.1.5	Is security level "strong" for peer entity authentication supported?	o.2	
6.2.1	Is security level "none" for originator authentication supported?	o.3	
6.2.2	Is security level "simple with distinguished name" for originator authentication supported?	o.3	
6.2.3	Is security level "strong" for originator authentication supported?	o.3	
6.3.1	Is security level "none" for results authentication supported?	o.4	
6.3.2	Is security level "strong" for results authentication supported?	o.4	
7	Is "DSA Referral Mode" supported?	m	
8	Is "Chaining Mode" supported?	o	
9	Is the alias mechanism implemented?	o	
c.1 This item is mandatory if the special configuration in item A.3.2/7 is a First-level DSA.			
o.2 At least one of security levels for peer entity authentication shall be supported.			
o.3 At least one of security levels for originator authentication shall be supported.			
o.4 At least one of security levels for results authentication shall be supported.			

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, and supported object classes and attributed types are identified.

A.6.1 Supported application context

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

A.6.2 Operations

Item	Operation	Status	Support	Notes	References
1	DSABind	m			A.6.3.1
2	DSAUnbind	m			A.6.3.2
3	ChainedRead	m			A.6.3.3
4	ChainedCompare	m			A.6.3.4
5	ChainedAbandon	m			A.6.3.5
6	ChainedList	m			A.6.3.6
7	ChainedSearch	m			A.6.3.7
8	ChainedAddEntry	m			A.6.3.8
9	ChainedRemoveEntry	m			A.6.3.9
10	ChainedModifyEntry	m			A.6.3.10
11	ChainedModifyRDN	m			A.6.3.11

A.6.3 Protocol elements

A.6.3.1 DSABind Protocol Elements

A.6.3.1.1 DSABind Arguments

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	DirectoryBindArg	m		m			(X.518) 13.1
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 security level for peer entity authentication is "simple without password" (A.5/6.1.2), "simple with unprotected password" (A.5/6.1.3), "simple with protected password" (A.5/6.1.4) or "strong" (A.5/6.1.5) then m else n/a.

c2: if the security level for peer entity authentication is "simple without password" (A.5/6.1.2), "simple with unprotected password" (A.5/6.1.3), or "simple with protected password" (A.5/6.1.4) then m else n/a.

c3: if the security level for peer entity authentication is "strong" (A.5/6.1.5) then m else n/a.

A.6.3.1.2 DSABind Result

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	DirectoryBindResult	m		m			(X.518) 13.1
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 security level for originator authentication is "simple with distinguished name" (A.5/6.2.2) or "strong" (A.5/6.2.3) then m else n/a.

c2: if the security level for originator authentication is "simple with distinguished name" (A.5/6.2.2) then m else n/a.

c3: if the security level for originator authentication is "strong" (A.5/6.2.3) then m else n/a.

A.6.3.1.3 DSABindError

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	DirectoryBindError	m		m			(X.518) 13.1
2	versions	m		m		d(v1988)	
3	ServiceError	m		m			
4	SecurityError	m		m			

A.6.3.2 DSAUnbind Elements

DSAUnbind has no arguments (refer to 13.2 of CCITT Rec. X.518 I ISO/IEC 9594-4).

A.6.3.3 ChainedRead Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	ReadArgument	m		m			(X.511) 9.1
3	object	m		m			
4	selection	m		m			A.6.3.16
5	CommonArguments	m		m			A.6.3.13
6	ChainingResults	m		m			A.6.3.22
7	ReadResult	m		m			
8	entry	m		m			A.6.3.17
9	CommonResults	m		m			A.6.3.14

A.6.3.4 ChainedCompare Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	CompareArgument	m		m			(X.511) 9.2
3	object	m		m			
4	purported	m		m			
5	CommonArguments	m		m			A.6.3.13
6	ChainingResults	m		m			A.6.3.22
7	CompareResult	m		m			(X.511) 9.2
8	DistinguishedName	m		m			
9	matched	m		m			
10	fromEntry	m		m		d(true)	
11	CommonResults	m		m			A.6.3.14

A.6.3.5 ChainedAbandon Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	Chaining Arguments	m		m			A.6.3.21 (X.518) 14
2	AbandonArgument	m		m			(X.511) 9.3
3	invokedId	m		m			
4	ChainingResults	m		m			A.6.3.22
5	AbandonResult	m		m			

A.6.3.6 ChainedList Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	ListArgument	m		m			(X.511) 10.1
3	object	m		m			
4	CommonArguments	m		m			A.6.3.13
5	ChainingResults	m		m			
6	ListResult	m		m			
7	listInfo	m		m			
8	DistinguishedName	m		m			
9	subordinates	m		m			
10	RelativeDistinguishedName	m		m			
11	aliasEntry	m		m		d(false)	
12	fromEntry	m		m		d(true)	
13	partialOutcomeQualifier	m		m			
14	limitProblem	m		m			
15	unexplored	m		m			A.6.3.20
16	unavailableCriticalExtensions	m		m		d(false)	
17	CommonResults	m		m			A.6.3.14
18	uncorrelatedListInfo	m		m			A.6.3.6/6

A.6.3.7 ChainedSearch Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.8 (X.518) 14
2	SearchArgument	m		m			(X.511) 10.2
3	baseObject	m		m			
4	subset	m		m		d(0)	
5	filter	m		m		d(and{})	A.6.3.18
6	searchAliases	m		m		d(true)	
7	selection	m		m		d({})	A.6.3.16
8	CommonArguments	m		m			A.6.3.13
9	ChainingResults	m		m			A.6.3.22
10	SearchResult	m		m			(X.511) 10.2
11	searchInfo	m		m			
12	DistinguishedName	m		m			
13	entries	m		m			A.6.3.17
14	partialOutcomQualifier	m		m			
15	limitProblem	m		m			
16	unexplored	m		m			A.6.3.20
17	unavailableCriticalExtensions	m		m			
18	CommonResults	m		m			A.6.3.14
19	uncorrelatedSearchInfo	m		m			A.6.3.7/10

A.6.3.8 ChainedAddEntry Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.22 (X.518) 14
2	AddEntryArgument	m		m			(X.511) 11.1
3	object	m		m			
4	entry	m		m			A.6.3.17
5	CommonArguments	m		m			A.6.3.13
6	ChainingResults	m		m			A.6.3.22
7	AddEntryResult	m		m			(X.511) 11.1

A.6.3.9 ChainedRemoveEntry Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	RemoveEntryArgument	m		m			(X.511) 11.2
3	object	m		m			
4	CommonArguments	m		m			A.6.3.13
5	ChainingResults	m		m			A.6.3.22
6	RemoveEntryResult	m		m			

A.6.3.10 ChainedModifyEntry Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	ModifyEntryArgument	m		m			(X.511) 11.3
3	object	m		m			
4	changes	m		m			
5	addAttribute	m		m			
6	removeAttribute	m		m			
7	addValues	m		m			
8	removeValues	m		m			
9	CommonArguments	m		m			A.6.3.13
10	ChainingResults	m		m			A.6.3.22
11	ModifyEntryResult	m		m			(X.511) 11.3

A.6.3.11 ChainedModifyRDN Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ChainingArguments	m		m			A.6.3.21 (X.518) 14
2	ModifyRDNArgument	m		m			(X.511) 11.4
3	object	m		m			
4	newRDN	m		m			
5	deleteOldRDN	m		m		d(false)	
6	CommonArguments	m		m			A.6.3.13
7	ChainingResults	m		m			A.6.3.22
8	ModifyRDNResult	m		m			(X.511) 11.4

A.6.3.12 Errors and Parameters

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	Abandoned	m		m			(X.511) 12.2
2	AbandonFailed	m		m			(X.511) 12.3
3	problem	m		m			
4	operation	m		m			
5	AttributeError	m		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	m		m			(X.511) 12.5
12	problem	m		m			
13	matched	m		m			
14	DSAReferral	m		m			(X.518) 15.2
15	continuationReference	m		m			A.6.3.20
16	contextPrefix	m		m			
17	SecurityError	m		m			(X.511) 12.7
18	problem	m		m			
19	ServiceError	m		m			(X.511) 12.8
20	problem	m		m			
21	UpdateError	m		m			(X.511) 12.9
22	problem	m		m			

A.6.3.13 CommonArguments Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ServiceControls	m		m		d({})	A.6.3.15
2	SecurityParameters	c1		c2		d({})	A.6.3.25
3	requestor	o		o			
4	OperationProgress	m		m		d(notStarted)	
5	nameResolutionPhase	m		m			
6	nextRDNToBeResolved	m		m			
7	aliasedRDNs	m		m			
8	criticalExtensions	o		m			

c1: if the implementation supports strong initiator authentication (A.5/6.3.2) then "m",
if the implementation supports secondary chaining (A.5/8) then "m" to forward from an incoming DSP request into the outgoing DSP request else "n/a".

c2: if the implementation supports strong initiator authentication then "m" else "n/a".

A.6.3.14 CommonResults Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	SecurityParameters	c1		c1			A.6.3.25
2	performer	o		o			
3	aliasDereferenced	m		m			

c1: if implementation supports strong results authentication (A.5/6.3.2) then "m" else "n/a".

A.6.3.15 Service Controls

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	options	m		m		d({})	(X.511) 7.5
2	priority	m		m		d(medium)	
3	timeLimit	m		m			
4	sizeLimit	m		m			
5	scopeOfReferral	m		m			

A.6.3.16 Entry Information Selection

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	attributeTypes	m		m			(X.511) 7.6
2	allAttributes	m		m			
3	select	m		m			
4	infoTypes	m		m			

A.6.3.17 Entry Information

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

A.6.3.18 Filter Elements

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

A.6.3.19 Filter item Elements

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

A.6.3.20 Continuation reference

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	targetObject	m		m			
2	aliasedRDNs	m		m			
3	OperationProgress	m		m			
4	nameResolutionPhase	m		m			
5	nextRDNToBeResolved	m		m			
6	rdnsResolved	m		m			
7	referenceType	m		m			
8	accessPoints (SET OF)	m		m			
9	AccessPoint	m		m			A.6.3.26
10	entryOnly	m		m			

A.6.3.21 Chaining Argument Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	originator	m		m			
2	targetObject	m		m			
3	operationProgress	m		m			
4	nameResolutionPhase	m		m			
5	nextRDNToBeResolved	m		m			
6	traceInformation	m		m			A.6.3.24
7	aliasDereferenced	m		m			
8	aliasedRDNs	m		m			
9	entryOnly	m		m			
10	returnCrossReferences	c1		o			
11	referenceType	m		m			
12	info	o		o			
13	timeLimit	o		o			
14	SecurityParameters	c2		c2			

c1: if the implementation supports secondary chaining (A.5/8) then "m" to forward from an incoming DSP request into the outgoing DSP request else "n/a".

c2: if the implementation supports strong initiator authentication then "m" else "n/a".

A.6.3.22 Chaining Result Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	info	o		o			
2	crossReferences	c1		o			A.6.3.23
3	SecurityParameters	c2		c2			A.6.3.21/14

c1: if the implementation supports secondary chaining (A.5/8) then "m" to forward from an incoming DSP request into the outgoing DSP request else "n/a".

c2: if implementation supports strong result authentication (A.5/6.3.2) then "m" else "n/a".

A.6.3.23 Cross Reference Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	contextPrefix	m		m			
2	accessPoints (SET OF)	m		m			
3	AccessPoint	m		m			A.6.3.26

A.6.3.24 Trace Information Elements

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	Reference
1	TraceItem	m		m			
2	dSA	m		m			
3	targetObject	m		m			
4	operationProgress	m		m			
5	nameResolutionPhase	m		m			
6	nextRDNToBeResolved	m		m			

A.6.3.25 Security Parameters

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	certification-path	m		m			
2	name	m		m			
3	time	o		o			
4	random	o		o			
5	target	c1		c1			

c1: if A.6.3.25 appears in tables in A.6.3.13 and A.6.3.21 then "m" else "–".

A.6.3.26 Access Point

Item	Protocol Element	Status (Init)	Support (Init)	Status (Res)	Support (Res)	Notes	References
1	ae-title	m		m			
2	address	m		m			
3	pSelector	m		m			
4	sSelector	m		m			
5	tSelector	m		m			
6	nSelector	m		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 implementation shall indicate, in the following table, the selected object classes defined in CCITT Rec. X.521 | ISO/IEC 9594-7 for which conformance is claimed.

Item	Object class	Status	Support
1	top	m	
2	alias	m	
3	country	o	
4	locality	o	
5	organization	o	
6	organizationUnit	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	