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The Directory - Abstract Service Definition

KTS- 1C(X511)

DSA, DAP/DSP

1	1994. 2. 7	

The Directory

Abstract Service Definitions

KIS-1C(X511)

ABSTRACT

This standard defines directory capabilities, directory models, a framework for the provision of authentication services, the service provided by the directory the behaviour of DSAs taking part in the Distributed Directory application, application service element and application contexts for DAP and DSP, selected attribute types, selected attribute sets and selected object classes.

This standard has been produced to facilitate the interconnection of information processing systems to directory services.

HISTORY

Version	Issue Date	Contents
1	1994. 2. 7	Established

Directory - Abstract SService Definition

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1) X.511 , ISO 9594-3 ,

0

0.1

(DIB)

0.2

- :
- :
- ;
- .

0.3

가

0.4

A

ASN. 1

1

1.1

1.2

1 -

2

X.200 - Open Systems Interconnection - Basic Reference Model.

X.208 - Specification of Abstract syntax Notation One(ASN.1)

X.500 - , ,

X.501 -

X.509 -

X.518 -

X.519 -

X.520 -

X.521 -

X.219 - Remote Operations - Model, Notation and Service Definition.

X.229 - Remote Operations - Protocol Specification.

X.407 - Abstract Service Definition Conventions.

3

3.1

X.500 :

- a) ;
- b) (DIB);
- c) () .

3.2

X.501 :

- a) ;
- b) .

3.3

x.501 .

- a) ;
- b) ;
- c) () ;
- d) ;
- e) / ;
- f) ;
- g) ;
- h) ;
- i) ;
- j) .

3.4

X.501 .

- a) ;
- b) ;
- c) ;
- d) .

3.5

X.501 .

- a) , ;
- b) ;
- c) () ;
- d) ;
- e) .

3.6

X.518 .

- a)
- b) .

3.7

- a) :
;
b) :
;
c) : .

4.

AVA (Attribute Value Assertion)
DIB (Directory Information Base)
DIT (Directory Information Tree)
DMD (Directory Management Domain)
DSA (Directory System Agent)
DUA (Directory User Agent)
RDN (Relative distinguished Name) .

5

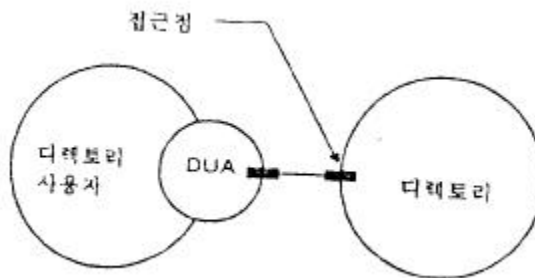
X.407

2 -

6

6.1 X.501
DUA

1/X.511



1/X.511

6.2

가

가 DUA

6.3 X.407

directory

OBJECT

PORTS {readPort [S],
searchPort [S],
modifyPort [S]}

::= id-ot-directory

: DIB

, DIB

, DIB

가

6.4 가 () DUA

dua

OBJECT

PORTS {readPort [C],
searchPort [C],
modifyPort [C]}

::= id-ot-dua

DUA 가

6.5 6.2 6.4

readPort

PORT

CONSUMER INVOKES {
Read, Compare, Abandon}

::= id-pt-search

searchPort

PORT

CONSUMER INVOKES {
List, Search}

::= id-pt-search

modifyPort

PORT

CONSUMER INVOKES {
AddEntry, RemoveEntry,
ModifyEntry, ModifyRDN}

::= id-pt-modify

6.6 readPort, SearchPort, modifyPort

9, 10,

11

6.6

X. 519

7

7.1

7.1.1

7.1.2

. 7.2

. 7.3 7.10

7.2

7.2.1 X. 501 :

- a) Attribute;
- b) AttributeType;
- c> AttributeValue;
- d) AttributeValueAssertion;
- e) DistinguishedName;
- f) Name;
- g) RelativeDistinguishedName.

7.2.2 X. 520 :

- a) PresentationAddress.

7.2.3 X. 509 :

- a) Certificate;
- b) SIGNED;
- c) CertificationPath.

7.2.4 X. 219 ;

- a) InvokeID.

7.2.5 X. 518 ;

- a) OperationProgress;
- b) ContinuationReference.

7.3

7.3.1 CommonArguments

가

```

CommonArguments ::= SET{
    [30] ServiceControls DEFAULT { },
    [29] SecurityParameters DEFAULT { },
    requestor [28] DistinguishedName
        OPTIONAL,
    [27] OperationProgress DEFAULT notStarted,
    aliasedRDNs [26] INTEGER OPTIONAL,
    EXTENSIONS [25] set of extension optional}
Extension ::= SET{
    identifier [0] INTEGER,
    critical [1] BOOLEAN DEFAULT FALSE,
    item [2] ANY DEFINED BY identifier}

```

7.3.2 7.3.2.1 7.3.2.4 .

7.3.2.1 ServiceControls 7.5 .

7.3.2.2 SecurityParameters 7.9 .

7.3.2.3 requestor DistinguishedName .

(7.10)

7.3.2.4 OperationProgress DSA가 가
X.518 .

7.3.2.5 aliasedRDNs 가
DSA
RDN (.
)

7.3.2.6 extensions

7.3.2.6.1 - 6.3.2.6.3 .

7.3.2.6.1 identifier .

7.3.2.6.2 critical 가

(, 가
).

unavailableCriticalExtension (ServiceError
partialOutcomeQualifier). 가

7.2.2.6.3 item 가

7.4

7.4.1 CommonResults 가

```
CommonResults ::= SET{
    [0] SecurityParameters OPTIONAL,
    performer [29] DistinguishedName
                                OPTIONAL,
    aliasDereferenced [28] BOOLEAN
                        DEFAULT FALSE}
```

7.4.2 7.4.2.1 7.4.2.3 .

7.4.2.1 SecurityParameters 7.9 .

7.4.2.2 PerformerDistinguishedName 가
(7.10) DSA .

7.4.2.3 aliasDereferenced
TRUE .

7.5

7.5.1 ServiceControls

```
ServiceControls ::= SET{
    Options[0] BIT STRING {
        preferChaining(0)
        chainingProhibited (1)
        localScope (2),
        dontUseCopy (3),
        dontDereferenceAliases(4)}
    DEFAULT {},
    priority [1] INTEGER {
        low (0),
        medium (1),
        high (2)} DEFAULT medium,
    timeLimit [2] INTEGER OPTIONAL,
    sizeLimit [3] INTEGER OPTIONAL,
    scopeOfReferral [4] INTEGER {
```

dml(0)

country(1)}

OPTIONAL }

7.5.2 7.5.2.1 7.5.2.5 .

7.5.2.1 options , 가

;

a) preferChaining

b) ChainingProhibited ,

c) localScope

가 DEA DMD

d) dontUseCopy (X.518) 가

e) dontDereferenceAliases

- , ,

가 가 :

, ()

7.5.2.2 priority(,)
가 , “ ”

7.5.2.3 timeLimit 가
가 List Search 가

가 List Search ,

DSA가

7.5.2.4 sizeLimit List search
가 List search

7.5.2.5 scopeOfReferral ISA가
dml , country DSA

List search ReferralError unexplored

7.5.3 priority,timeLimit sizeLimit
;

7.6

7.6.1 EntryInformationSelection 가

```
EntryInformationSelection ::= SET {
    attributeTypes
    CHOICE {
        AliAttributes [0] NULL,
        select [1] SET OF Attribute Type
        -- empty set implies no attributes
        -- are requested --
        DEFAULT allAttributes NULL,
    InfoTypes [2] INTEGER {
        attributeTypesOnly (0)
        attributeTypesAndValues (0) }
        DEFAULT attributeTypesAndValues }
```

7.6.2 7.6.2.1 7.6.2.2

7.6.2.1 attributeTypes

a) select 가
가
, noSuchAttribute AttributeError
b) allAttributes 가
가
, (insufficientAccessRights) SecurityError

7.6.2.2 infoTypes ()가
attributeTypes (7.6.2.1)가
가

7.7

```
EntryInformation
EntryInformation ::= SEQUENCE {
    DistinguishedName.
    fromEntry BOOLEAN DEFAULT TRUE,
    SET OF CHOICE {
        AttributeType,
        Attribute} OPTIONAL }
```

7.7.2 DistinguishedName .

7.7.3 fromEntry 가 (TRUE),
(FALSE) .

7.7.4 , AttributeTypes Attributes가
, .

7.8

7.8.1 Filter .
, TRUE 가

- TRUE, FALSE, .
Filter ::= CHOICE {
 item [0] FilterItem
 and [1] SET OF Filter,
 or [2] SET OF Filter,
 not [3] Filter }
FilterItem ::= CHOICE {
 equality [0] AttributeValueAssertion,
 substrings [1] SEQUENCE {
 type AttributeType,
 string SEQUENCE OF CHOICE {
 Initial [0] AttributeValue,
 any [1] AttributeValue,
 final [2] AttributeValue}},
 greaterOrEqual [2] AttributeValueAssertion,
 lessOrEqual [3] AttributeValueAssertion,
 present [4] AttributeType,
 approximateMatch [5] AttributeValueAssertion }

7.8.2 Filter FilterItem(7.8.3) and,or not
Filter . Filter , FilterItem
, Filter Filter

a) item , FilterItem TRUE TRUE .
b) and , Filter가 FALSE가 TRUE .
- Filter가 and TRUE .
c) or , Filter가 TRUE가 FALSE .
- Filter가 or FALSE .
d) not , Filter가 TRUE

7.8.3 FilterItem .

TRUE, FALSE, .

ProtectionRequest ::= INTEGER {
non (0),
signed (1)}

7.9.2 7.9.2.1 7.9.2.5 .

7.9.2.1 CertifitationPath

. ,
가
가

가 가 가

7.9.2.2 name DUA
가 , DSA .

7.9.2.3 time 가 ,
가 .

7.9.2.4 random .
가 , .

7.9.2.5 target ProtectionRequest
가 가
가 none (가) signed (,
)
,

7.10

7.10.1 OPTIONALLY-SIGNED

OPTIONALLY-SIGNED MACR ::= BEGIN
TYPE NOTATION ::= type (Type)
VALUE NOTATION ::= value (VALUE
CHOICE {Type, SIGNED Type })
END

7.10.2 SIGNED X. 509

8.1

8.1.1 DirectoryBind

```

DirectoryBind ::= ABSTRACT-BIND
    TO {readPort, searchPort, modifyPort}
    BIND
    ARGUMENT DirectoryBindArgument
    RESULT DirectoryBindResult
    BIND-ERROR DirectoryBindError

DirectoryBindArgument ::= SET {
    credentials [0] Credentials OPTIONAL,
    versions [1] Versions DEFAULT
        v1988}

Credentials ::= CHOICE {
    simple [0] SimpleCredentials,
    strong [1] StrongCredentials,
    externalProcedure [2] EXTERNAL }

SimpleCredentials ::= SEQUENCE {
    name [0] DistinguishedName,
    validity [1] SET {
        time1 [0] UTCTime OPTIONAL,
        time2 [2] UTCTime OPTIONAL,
        random1 [2] BIT STRING OPTIONAL,
        random2 [3] BIT STRING OPTIONAL } OPTIONAL,
    -- in most instances the argument for
    -- time and random are relevant in
    -- dialogues employing protected password
    -- mechanisms and derive their meaning
    -- as per bilateral agreements

Password [2] OCTET STRING OPTIONAL }
    -- the value could be an unprotected
    -- password or Protected1 or Protected2
    -- as specified in Recommendation X.509.

StrongCredentials ::= SET {
    certification-path[0] CertificationPath
        OPTIONAL,
    bind-token [1] Token }

Token ::= SIGNED SEQUENCE {
    algorithm [0] AlgorithmIdentifier,
    name [1] DistinguishedName,
    time [2] UTCTime
    random [3] BIT STRING }

Versions ::= BIT STRING {v1988(0)}

```

```

DirectoryBindResult ::= DirectoryBindArgument
DirectoryBindError ::= SET {
    versions [0] Versions DEFAULT v1988,
    CHOICE {
        serviceError [1] ServiceProblem
        securityError [1] SecurityProblem
    }
}

```

8.1.2 8.1.2.1 8.1.2.2 .

8.1.2.1 DirectoryBindArgument Credentials 가
 simple, strong(X.509)
 externalProcedure .

8.1.2.1.1 SimpleCredentials (()
 . X.509 15
 SimpleCredential , () /
 , 가
 가 가

8.1.2.1.2 StrongCredential ,
 (X.509) 가

algorithm
 ;
 name . time .
 가

8.1.2.1.3 externalProcedure

8.1.2.2 DirectoryBindArgument Versions DUA가
 v1988(0) .

8.1.2.3
 :
 a) DirectoryBindArgument
 ;
 b) DirectoryBindArgument 가 (, Versions)

8.1.3 가 가 . 8.1.3.1 8.1.3.2

8.1.3.1 DirectoryBindResult Credentials 가 DSA

. () DSA DUA
가 (, CHOICE) .

8.1.3.2 DirectoryBindResult Versions DUA가
DSA .

8.1.4 가 8.1.4.1 8.1.4.2 가 .

8.1.4.1 DirectoryBindError Versions DSA
.

8.1.4.2 securityError serviceError ;
- SecurityError inappropriateAuthentication
invalidCredentials
- serviceError unavailable.

8.2

8.2.1 DirectoryUnbind .
DirectoryUnbind ::= ABSTRACT-UNBIND .
FROM {readPort, searchPort, modifyPort }

8.2.2 DirectoryUnbind .

9

가 : , 9.1 9.2 Read
Compare . 9.3 Abandon .

9.1

9.1.1 Read .

()
가 .
Read ::= ABSTRACT-OPERATION
ARGUMENT ReadArgument
RESULT ReadResult
ERRORS {
AttributeError, NameError,
ServiceError, Referral, Abandoned,
SecurityError }
ReadArgument ::= OPTIONALLY-SIGNED SET {
object [0] Name,
selection [1] Selection F¹³ EntryInformationSelection
DEFAULT {}
COMPONENTS OF CommonArguments }
ReadResult ::= OPTIONALLY-SIGNED SET {
entry [0] EntryInformation,

COMPONENTS OF CommonResults }

9.1.2 9.1.2.1 - 9.1.2.3 .

9.1.2.1 object 가 .
()

9.1.2.2 selection 가 . (7.6)

9.1.2.3 CommonArguments (7.3) .
sizeLimit .

9.1.3 가 . 9.1.3.1 7.4

9.1.3.1 entry (7,7)

9.1.4 가 . selection
, noSuchAttribute AttributeError가
가 12 .

9.2

9.2.1 Compare ()
() (7.10)
).

```
Compare ::= ABSTRACT-OPERATION
  ARGUMENT CompareArgument
  RESULT CompareResult
  ERRORS {
    AttributeError, NameError,
    ServiceError, Referral, Abandoned,
    SecurityError }
CompareArgument ::= OPTIONALLY-SIGNED
  SET {
    object [0] Name,
    purported [1] AttributeValueAssertion,
    COMPONENTS OF CommonArguments }
CompareResult ::= OPTIONALLY-SIGNED
  SET {
    DistinguishedName OPTIONAL,
    matched [0] BOOLEAN,
    from Entry [1] BOOLEAN DEFAULT TRUE,
    COMPONENTS OF CommonResults }
```

9.2.2 9.2.2.1 - 9,2,2.3 .

9.2.2.1 object . Name
가 ()

9.2.2.2 purported

9.2.2.3 CommonArguments(7.3)
sizeLimit

9.2.3 (, 가) 가
9.2.3.1, 9.2.3.2 7.4

9.2.3.1
DistinguishedName

9.2.3.2 matched
가 TRUE FALSE

9.2.3.3 fromEntry가 TRUE 가 , FALSE 가

9.2.4 가 가
12

9.3

9.3.1 가

Abandon ::= ABSTRACT-OPERATION
ARGUMENT AbandonArgument
RESULT AbandonResult
Errors {AbandonFailed}
AbandonArgument ::= SEQUENCE {
InvokeID [0] InvokeID}
AbandonResult ::= NULL

9.3.2 InvokeID . InvokeID
InvokeID

9.3.3 가 가
Abandoned

9.3.4 AbandonFailed 가 12.3

9.3.5 Read, Compare, List Search

9.3.6 DSA . DSA가 DSA
 DSA . DSA가
 AbandonFailed 가 .

10

10.1 10.2 List Search 가 가 .

10.1

10.1.1. List

() (7.10).

List ::= ABSTRACT-OPERATION
 ARGUMENT ListArgument
 Result ListResult
 ERRORS {
 NameError
 ServiceError, Referral, Abandoned,
 SecurityError }
 ListArgument ::= OPTIONALLY-SIGNED SET {
 object [0] Name,
 COMPONENTS OF CommonArguments }
 ListResult ::= OPTIONALLY-SIGNED
 CHOICE {
 listInfo SET {
 DistinguishedName OPTIONAL,
 subordinates SET OF SEQUENCE {
 RelativeDistinguishedName,
 aliasEntry [0] BOOLEAN DEFAULT FALSE
 fromEntry [1] BOOLEAN DEFAULT TRUE},
 partialOutcomeQualifier [2]
 PartialOutcomeQualifier OPTIONAL
 COMPONENTS OF CommonResults },
 uncorrelatedListInfo [0] SET OF
 ListResult }
 PartialOutcomeQualifier ::= SET{
 limitProblem [0] LimitProblem
 OPTIONAL,
 unexplored [1] SET OF
 ContinuationReference OPTIONAL,
 unavailableCriticalExtensions [2] BOOLEAN DEFAULT FALSE }
 LimitProblem ::= INTEGER {

timeLimitExceeded (0),
sizeLimitExceeded (1),
administrativeLimitExceeded (2) }

10.1.2 10.1.2.1 7.3 .

10.1.2.1 object 가 (가)
. Name 가 (.
) .

10.1.3 가 .

10.1.3.1 10.1.3.4 7.4 .

10.1.3.1 DistinguishedName .

10.1.3.2 subordinates 가 .

10.1.3.2.1 RelativeDistinguishedName .

10.1.3.2.2 formEntry 가 (TRUE)
(FALSE) .

10.1.3.2.3 aliasEntry 가 (TRUE),
가 (FALSE) .

10.1.3.3 PartialOutcomeQualifier 10.1.3.3.1 10.1.3.3.3
. 가 .

10.1.3.3.1 LimitProblem , 가
. 가 .

10.1.3.3.2 unexplored DIT
DUA가 List .

continuationReferences () , OperationProgress ,

ContinuationReferences .

10.1.3.3.3 unavailableCriticalExtensions
가 .

10.1.3.4 DUA가 signed uncorrelatedListInfo
가 , DSA가 , DUA가

10.1.4 가 . 가
12 .

10.2

10.2.1 Search DIT

$$(7.10) \quad).$$

```

Search ::= ABSTRACT-OPERATION
    ARGUMENT SearchArgument
    RESULT SearchResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, Abandoned,
        SecurityError }

SearchArgument ::= OPTIONALLY-SIGNED
SET {
    baseObject [0] Name
    subset [1] INTEGER {
        baseObject (0),
        oneLevel (1),
        wholeSubtree(2)} DEFAULT baseObject,
    filter [2] Filter DEFAULT and {}
    searchAliases [3] BOOLEAN DEFAULT TRUE,
    selection [4] EntryInformationSelection DEFAULT {}
    COMPONENTS OF CommonArguments }

SearchResult ::= OPTIONALLY-SIGNED
CHOICE {
    searchinfo SET {
        DistinguishedName OPTIONAL,
        entries [0] SET OF EntryInformation,
        partialOutcomeQualifier
            [2]PartialOutcomeQualifier OPTIONAL,

```

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```
COMPONENTS OF CommonResults },
uncorrelatedSearchInfo [0] SET OF
    SearchResult }
```

10.2.2 10.2.2.1 - 10.2.2.3 10.2.2.5 7.3

10.2.2.1 baseObject

)

10.2.2.2 subset ;

a) baseobject ;

b) (oneLevel);

c) (wholeSubtree).

10.2.2.3 filter

(7.8)

10.2.2.4 dontDereferenceAliasesServiceControl

searchAliases

searchAliases 가 TRUE , FALSE

searchaliases 가 TRUE ,

10.2.2.5 selection 가 가 (7.6).

10.2.3 , 가

- , () Search 가

Read , Read

AttributeError

10.2.3.1 - 10.2.3.4 7.3

10.2.3.1 DistinguishedName ,

10.2.3.2 entries (0)

(7.5).

10.2.3.3 PartialOutcomeQualifier 10.1.3.4 List

10.2.3.4 uncorrelatedSearchInfo 10.1.3.4 uncorrelatedListInfo

10.2.4 가 . 가

12 .

11

가 가 . AddEntry, RemoveEntry, ModifyEntry

ModifyRDN . 11.1 11.4 .

1 -

2 - AddEntry, RemoveEntry, ModifyRDN

DIB
affectsMultipleDSA 가 . X.518 . , UpdateError

11.1 가

11.1.1 AddEntry DIT () 가
(7.10)

```
Addentry ::= ABSTRACT-OPERATION
  ARGUMENT AddEntryArgument
  RESULT AddEntryResult
  ERRORS {
    AttributeError, NameError,
    ServiceError, Referral, SecurityError,
    UpdateError }
AddEntryArgument ::= OPTIONALLY-SIGNED
SET {
  object [0] DistinguishedName,
  entry [1] SET OF Attribute,
  COMPONENTS OF CommonArguments }
AddEntryResult ::= NULL
```

11.1.2 11.1.2.1 - 11.1.2.3 .

11.1.2.1 object 가
() RDN
.

11.1.2.2 entry , RDN ,
가
가 , aliasedObjectName
가 .

11.1.2.3 CommonArguments(7.3)
dontDereferenceAlias sizeLimit ,
.

11.1.3 가 가 .

11.1.4 가 가
12 .

11.2

11.2.1 RemoveEntry DIT ()
(7.10)

RemoveEntry ::= ABSTRACT-OPERATION
 ARGUMENT RemoveEntryArgument
 RESULT RemoveEntryResult
 ERRORS {
 NameError,
 ServiceError, Referral, SecurityError,
 UpdateError }
 RemoveEntryArgument ::= OPTIONALLY-SIGNED SET {
 object [0] DistinguishedName,
 COMPONENTS OF CommonArguments }
 RemoveEntryResult ::= NULL

11.2.2 11.2.2.1 11.2.2.2 .

11.2.2.1 object .

11.2.2.2 CommonArguments (7.3)
 dontDereferenceAlias sizeLimit .

11.2.3 가 가 .

11.2.4 가 가
 12 .

11.3

11.3.1 ModifyEntry

a) 가;
 b) ;
 t) 가;
 dl ;
 e) ;
 f) .
 (7.10).

ModifyEntry ::= ABSTRACT-OPERATION
 ARGUMENT ModifyEntryArgument
 RESULT ModifyEntryResult
 ERRORS {
 AttributeError, NameError,
 ServiceError, Referral, SecurityError,
 UpdateError }
 ModifyEntryArgument ::= OPTIONALLY-SIGNED SET {
 object [0] DistinguishedName,

```

changes      [1]      SEQUENCE OF EntryModification,
COMONETS OF CommonArguments }
ModifyEntryResult ::= NULL
EntryModification ::= CHOICE {
    addAttribute      [0]      Attribute,
    removeAttribute   [1]      AttributeType,
    addValues          [2]      Attribute,
    removeValues       [3]      Attribute }

```

11.3.2 11.3.2.1 11.3.2.2 .

11.3.2.1 object .

11.3.2.2 changes .

AttributeError가 , 가
가 EntryModification 가 ;

a) addAttribute : 가 ,
가 AttributeError가 .

b) removeAttribute : ()
AttributeError가 .

- RDN .

c) addValues : 가
AttributeError가 . 가 .

- RDN
ModifyEntry addvalues removeValues .

11.3.2.3 CommonArguments(7.3)
dontDereferenceAlias sizeLimit ,

11.3.3 가 가 .

11.3.4 가 가
12 .

11.4 RDN

11.4.1 RDN DIT ()
 (7.10)

```

ModifyRDN ::= ABSTRACT-OPERATION
  ARGUMENT ModifyRDNArgument
  RESULT ModifyRDNResult
  ERRORS {
    NameError,
    ServiceError, Referral, SecurityError,
    UpdateError }
ModifyRDNArgument ::= OPTIONALLY-SIGNED SET {
  object [0] DistinguishedName,
  newRDN [1] RelativeDistinguishedName,
  deleteOldRDN [2] BOOLEAN DEFAULT FALSE,
  COMPONENTS OF CommonArguments }
ModifyRDNResult ::= NULL
  
```

11.4.2 11.1.2.1 11.4.2.5 .

11.4.2.1 object .

(X.518)

11.4.2.2 newRDN RDN .

11.4.2.3 RDN (RDN -)
 가 . 가 가 .

11.4.2.4 deleteOldRDN 가 RDN RDN
 가 (RDN 가
) RDN
 가 .

11.4.2.5 CommonArguments (7.3)
 dontDereferenceAlias sizeLimit ,

11.4.3 가 가 .

11.4.4 가 가
 12 .

11.4.5 .

12

12.1

12.1.1 가

1 - 가 , DSA

2 -

12.1.2 가

가

- a) NameError
- b) UpdateError
- c) AttributeError
- d) SecurityError
- e) ServiceError

12.1.3 :

a) AbandonFailed : 가

b) Abandoned :
tooLate Abandonfailed가

c) Referral : “ ” 가 , DUA가
가

12.2

12.2.1 DUA가 invokeID Abandon

Abandoned ::= ABSTRACT-ERROR- - “ ” 가

12.2.2

12.3

12.3.1 AbandonFailed

Abandonfailed ::= ABSTRACT-ERROR

```

PARAMETER SET {
    problem      [0] AbandonProblem,
    operation     [1] InvokeID }
AbandonProblem ::= INTEGER
                noSuchOperation (1),
                tooLate (2),
                cannotAbandon (3 ) }
12.3.2          가
.
12.3.2.1      12.3.2.2

```

```

12.3.2.1      problem
a) noSuchOperation : 가 ( 가
b) tooLate: 가 ;
c) cannotAbandon: 가 ( ,
) 가

```

```

12.3.2.2      operation( )

```

12.4

12.4.1 AttributeError .

```

AttributeError ::= ABSTRACT-ERROR
PARAMETER SET {
    object [0] Name,
    - 25 -
    problems [1] SET OF SEQUENCE {
        problem [0] AttributeProblem,
        type [1] AttributeType,
        value [2] AttributeValue
        OPTIONAL }}

```

```

AttributeProblem ::= INTEGER {
    noSuchAttributeOrValue (1),
    InvalidAttributeSyntax (2),
    undefiendAttributeType (3),
    InappropriateMatching (4),
    constrainViolation (5),
    attributeOrValueAlreadyExists (6) }

```

12.4.2 12.4.2.1 12.4.2.2 .

12.4.2.1 object 가

12.4.2.2 problems . problem
type , value

- :
 - a) noSuchAttributeOrValue :
가 ;
 - b) invalidAttributeSyntax :
;
 - c) undefinedAttributeType :
Add, Remove, Modify ModifyRDN ;
 - d) inappropriateMatching :
 - e) ConstraintViolation :

X.501 (,
);
f) attributeOrValueAlreadyExists : 가
,

12.5

12.5.1 NameError

NameError ::= ABSTRACT-ERROR
 PARAMETER SET {
 problem [0] NameProblem,
 matched [0] Name }
 NameProblem ::= INTEGER {
 noSuchObject (1),
 aliasProblem (2),
 invalidAttributeSyntax (3),
 aliasDereferencingProblem (4) }

12.5.2

12.5.2.1 12.5.2.2

- 12.5.2.1 problem 가 :
- a) noSuchObject : ;
 - b) aliasProblem : 가
- ;
- c) invalidAttributeSyntax : AVA
- ;
- d) aliasDereferencingProblem :

12.5.2.2 matched DIT ()
,

- / 가 ,
(invalidattributeSyntax)NameError

12.6

12.6.1

```
Reeral ::= ABSTRACT-ERROR -- not literally an "error"
PARAMETER SET {
  candidate [0] ContinuationReference }
```

12.6.2

ContinuationReference

(X.518).

12.7

12.7.1 SecurityError

```
SecurityError ::= ABSTRACT-ERROR
PARAMETER SET {
  problem [0] Securityproblem }
Securityproblem ::= INTEGER {
  InappropriateAuthentication (1),
  InvalidCredentials (2),
  InsufficientAccessRights (3),
  InvalidSignature (4),
  protectionRequired (5),
  noInformation (6) }
```

12.7.2

가 , problem .

가 .

a) inappropriateAuthentication :

;

b) invalidCredentials : ;

c) insufficientAccessRights : 가 ;

d) invalidSignature : ;

e) protectionRequired : 가 가

f) noInformation : 가

12.8

12.8.1 ServiceError

```
ServiceError ::= ABSTRACT-ERROR
PARAMETER SET {
  problem [0] ServiceProblem },
ServiceProblem ::= Integer {
  busy (1),
  unavailable (2),
  unwillingToPerform (3),
```

chainingRequired (4),
 unableToProceed (5),
 invalidReference (6),
 timeLimitExceeded (7),
 administrativeLimitExceeded (8),
 loopDetected (9),
 unavailableCriticalExtension (10),
 outOfScope (11),
 ditError (12) }

12.8.2 가 , problem .

- ;
- a) busy :
- ;
- b) unavailable : 가 ;
- c) unwillingToPerform :
- ;
- d) ChainingRequired : 가 chainingProhibited ;
- e) unableToProceed : DSA ;
- f) invalidReference : DSA가 (OperationProgress) DUA ;
- g) timeLimitExceeded : 가 ;
- h) administrativeLimitExceeded : 가 ;
- i) loopDetected : 가 ;
- j) unavailableCriticalExtension : 가 ;
- k) outOfScope : ;
- l) ditError : DIT 가 .

12.9

12.9.1 UpdateError DIB 가,

Updateerror ::= ABSTRACT-ERROR
 PARAMETER SET {
 problem [0] UpdateProblem }
 UpdateProblem ::= INTEGER {
 namingViolation (1),
 objectClassViolation (2),
 notAllowedOnNonLeaf (3),
 notAllowedOnRDN (4),

```

entryAlreadyExists (5),
affectsMultipleDSAs (6),
objectClassModificationProhibited (7) }

```

12.9.2 problem 가 problem .

```

a) namingViolation :                      가                      X501
DIT                      ,                      가
                    RDN                      ;
b) objectclassViolation :
                    X.501                      ;
c) notAllowedOnNonLeaf :                      DIT                      ;
d) notAllowedOnRDN :                      RDN                      (RDN
);
e) entryAlreadyExists :                      가
;
f) affectsMultipleDSAs :                      DSA
;
g) objectClassModificationProhibited :
.
- UpdateError    AddEntry, RemoveEntry, ModifyEntry, ModifyRDN
,
AttributeError    .

```

A

ASN. 1

```

ASN.1                      DirectoryAbstractService
ASN.1                      ,                      .
DirectoryAbstractService {joint-ISO-CCITTds(5)modules(1) directoryAbstractService(2)
DEFINITIONS                      ::=
BEGIN
EXPORTS
    directory, readPort, searchPort, modifyPort,
        DirectoryBind, DirectoryBindArgument,
        DirectoryUnbind,
        Read, ReadArgument, ReadResult
        Abandon, AbandonArgument, AbandonResult,
        Compare, CompareArgument, CompareResult,
        List, ListArgument, ListResult,
        Search, SearchArgument, SearchResult,
        AddEntry, AddEntryArgument, AddEntryResult,
        RemoveEntry, RemoveEntryArgument, RemoveEntryResult,

```

```

ModifyEntry, ModifyEntryArgument, ModifyEntryResult,
ModifyRdn, ModifyRDNArgument, ModifyRDNResult,
Abandoned, Abandonfailed, AttributeError, NameError,
Referral, SecurityError, ServiceError, UpdateError,
SecurityParameters ;

IMPORTS
    informationFramework, authenticationFramework,
    distributedOperations, directoryObjectIdentifiers
        FROM UsefulDefinitions {joint-iso-ccitt ds(5) Modules(1)
                                usefulDefinitions(0) }

OBJECT, PORT, ABSTRACT-BIND, ABSTRACT-UNBIND,
    From AbstractServiceNotation {joint-iso-ccitt mhs-motis(6)
                                asdc(2) modules(0) notation(1) }
Attribute, AttributeType, AttributeValue, AttributeValueAssertion,
DistinguishedName, Name, RelativedistinguishedName
    FROM InformationFramework InformationFramework
id-ot-directory, id-ot-dua, id-pt-read, id-pt-0search, id-pt-modify
    FROM DirectoryObjectIdentifiers directoryObjectIdentifiers
ContinuationReference, OperationProgress
    FROM DistributedOperations distributedOperations
Certificate, CertificationPath, SIGNED,
PROTECTED, AlgorithmIdentifier
    FROM AuthenticationFramework authenticationFramework
InvokeID,
    FROM Remote-Operations-Notation {joint-iso-ccitt
                                remoteOperations(4) notation(0) };

-- macro for representing optional signing --
OPTIONALLY-SIGNED MACRO ::=
BEGIN
    TYPE NOTATION ::= type (Type)
    VALUE NOTATION ::= value (VALUE CHOICE {Type, SIGNED Type} )
-- objects and ports --
directory
    OBJECT
        PORTS {readPort [S],
                searchPort [S],
                modifyPort [s] }
    ::= id-ot-directory
dua
    OBJECT
        PORTS {readPort [C],
                searchPort [C],
                modifyPort [C] }
    ::= id-ot-dua
readPort
    PORT

```

```

        CONSUMER INVOKES {
            Read, Compare, Abandon }
 ::= id-pt-read
searchPort
    PORT
        CONSUMER INVOKES {
            List, Search }
 ::= id-pt-search
readPort
    PORT
        CONSUMER INVOKES {
            Addentry, RemoveEntry, }
            ModifyEntry, ModifyRDN }
 ::= id-pt-modify
-- bind and unbind --
DirectoryBind ::= ABSTRACT-BIND
    TO {readPort, searchPort, modifyPort}
    BIND
    ARGUMENT    DirectoryBindArgument
    RESULT      DirectoryBindResult
    BIND-ERROR  DirectoryBindError
DirectoryBindArgument ::= SET {
    credentials [0] Credentials OPTIONAL,
    versions    [1] Versions DEFAULT v1988}
Credentials ::= CHOICE {
    simple [0] SimpleCredentials,
    strong [1] StrongCredentials,
    externalProcedure [2] External }
SimpleCredentials ::= SEQUENCE {
    name [0] DistinguishedName,
    validity [1] SET {
        time1 [0] UTCTime OPTIONAL,
        time2 [1] UTCTime OPTIONAL,
        random1 [2] BIT STRING OPTIONAL,
        random2 [3] BIT STRING OPTIONAL }
        OPTIONAL,
        password [2] OCTET STRING OPTIONAL }
StrongCredentials ::= SET {
    certification-path [0] CertificationPath OPTIONAL,
    bind-token [1] Token }
Token ::= SIGNED SEQUENCE {
    algorithm [0] AlgorithmIdentifier
    name [1] DistinguishedName,
    time [2] UTCTime,
    random [3] BIT STRING }
Versions ::= BIT STRING (v1988(0))

```

```

DirectoryBindResult ::= DirectoryBindArgument
DirectoryBindError ::= SET {
    versions [0] Versions DEFAULT v1988,
    CHOICE {
        serviceError [1] ServiceProblem,
        securityError [2] SecurityProblem }}
DirectoryUnbind ::= ABSTRACT-UNBIND
    FROM {readPort, searchPort, modifyPort }
-- operations, arguments, and results --
Read ::= ABSTRACT-OPERATION
    ARGUMENT ReadArgument
    RESULT ReadResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, Abandoned,
        SecurityError }
ReadArgument ::= OPTIONALLY-SIGNED SET {
    object [0] Name,
    selection [1] EntryInformationSelection
        DEFAULT {},
    COMPONENTS OF CommonArguments }

ReadResult ::=          OPTIONALLY-SIGNED SET {
    entry [0] EntryInformation,
    COMPONENTS OF CommonResults }
Compare ::= ABSTRACT-OPERATION
    ARGUMENT CompareArgument
    RESULT CompareResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, Abandoned,
        SecurityError }
CompareArgument ::= OPTIONALLY-SIGNED SET {
    object [0] Name,
    purported [1] AttributeValueAssertion,
    COMPONENTS OF CommonArguments }
CompareResult ::= OPTIONALLY-SIGNED SET {
    DistinguishedName OPTIONAL,
    matched [0] BOOLEAN,
    formEntry [1] BOOLEAN DEFAULT TRUE,
    COMPONENTS OF CommonResults }
Abandon ::= ABSTRACT-OPERATION
    ARGUMENT AbandonArgument
    RESULT AbandonResult
    ERRORS {AbandonFailed}
AbandonArgument ::= SEQUENCE {

```

```

    InvokeID [0] InvokeID }
AbandonResult ::= NULL
List ::= ABSTRACT-OPERATION
    ARGUMENT ListArgument
    Result ListResult
    Errors {
        AttributeError, NameError,
        ServiceError, Referral, Abandoned,
        SecurityError }
ListArgument ::= OPTIONALLY-SIGNED SET {
    object [0] Name,
    COMPONENTS OF CommonArguments }
ListResult ::= OPTIONALLY-SIGNED CHOICE {
    listInfo SET {
        DistinguishedName OPTIONAL
        subordinates [1] SET OF SEQUENCE {
            RelativeDistinguishedName,
            aliasEntry [0] BOOLEAN DEFAULT FALSE,
            fromEntry [1] BOOLEAN DEFAULT TRUE },
            partialOutcomeQualifier [2] PartialOutcomeQualifier
                OPTIONAL,

            COMPONENTS OF CommonResults },
        uncorrelatedListInfo [0] SET OF
            ListResult }
PartialOutcomeQualifier ::= SET {
    limitProblem [0] LimitProblem OPTIONAL,
    unexplored [1] SET OF
        ContinuationReference OPTIONAL,
    unavailableCriticalExtensions [2] BOOLEAN DEFAULT FALSE }
LimitProblem ::= INTEGER {
    timeLimitExceeded (0),
    sizeLimitExceeded (1),
    administrativeLimitExceeded (2) }
Search ::= ABSTRACT-OPERATION
    ARGUMENT SearchArgument
    RESULT SearchResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, Abandoned,
        SecurityError }
SearchArgument ::= OPTIONALLY-SIGNED SET {
    baseObject [0] NAME,
    subset [1] INTEGER {
        baseObject (0),
        oneLevel (1),
        wholeSubtree (2) } DEFAULT baseObject,

```



```

    filter      [2] Filter DEFAULT and {}
    searchAliases [3] BOOLEAN DEFAULT TRUE,
    selection    [4] EntryInformationselection DEFAULT {}
    COMPONENTS OF CommonArguments }

SearchResult ::= OPTIONALLY-SIGNED
    CHOICE {
    searchInfo SET {
    DistinguishedName OPTIONAL,
    entries [0] SET OF EntryInformation,
    partialOutcomeQualifier
        [2] partialOutcomeQualifier OPTIONAL,
    COMPONENTS OF CommonResults },
    uncorrelateSearchInfo [0] SET OF
        SearchResult }

AddEntry ::= ABSTRACT-OPERATION
    ARGUMENT AddEntryArgument
    RESULT AddEntryResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, SecurityError
        UpdateError }

AddEntryArgument ::= OPTIONALLY-SIGNED SET {
    object [0] DistinguishedName,
    entry [1] SET OF Attribute,
    COMPONENTS OF CommonArguments }

AddEntryResult ::= NULL

RemoveEntry ::= ABSTRACT-OPERATION
    ARGUMENT RemoveEntryArgument
    RESULT RemoveEntryResult
    ERRORS {
        NameError,
        ServiceError, Referral, SecurityError,
        UpdateError }

RemoveEntryArgument ::= OPTIONALLY-SIGNED SET {
    object [0] DistinguishedName,
    COMPONENTS OF CommonArguments }

RemoveEntryResult ::= NULL

ModifyEntry ::= ABSTRACT-OPERATION
    ARGUMENT ModifyEntryArgument
    RESULT ModifyEntryResult
    ERRORS {
        AttributeError, NameError,
        ServiceError, Referral, SecurityError,
        UpdateError }

ModifyEntryResult ::= OPTIONALLY-SIGNED SET {
    object [0] DistinguishedName,

```

```

changes [1] SEQUENCE OF EntryModification,
COMPONENTS OF CommonArguments }
ModifyEntryResult ::= NULL
EntryModification ::= CHOICE {
    addAttribute [0] Attribute,
    removeAttribute [1] AttributeType,
    addValues [2] Attribute,
    removeValues [3] Attribute}
ModifyRDN ::= ABSTRACT-OPERATION
    ARGUMENT ModifyRDNArgument
    RESULT ModifyRDNResult
    ERRORS {
        NameError,
        ServiceError, Referral, SecurityErrors,
        UpdateError }
ModifyRDNArgument ::= OPTIONALLY-SIGNED SET {
    object [0] DistinguishedName,
    newRDN [1] RelativeDistinguishedName,
    deleteoldRDN [2] BOOLEAN DEFAULT FALSE,
    COMPONENTS OF CommonArguments }
ModifyRDNResult ::= NULL
-- errors and parameters --
Abandoned ::=ABSTRACT-ERROR -- not literally an "error"
AbandonFailed ::= ABSTRACT-ERROR
    PARAMETER SET {
        problem [0] AbandonProblem,
        operation [1] InvokeID}
AbandonProblem ::= INTEGER {
    noSuchOperation (1),
    tooLate (2),
    cannotAbandon (3) }
AttributeError ::= ABSTRACT-ERROR
    PARAMETER SET {
        object [0] Name,
        problems [1] SET OF SEQUENCE [
            problem [0] AttributeProblem,
            type [1] AttributeType,
            value [2] AttributeValue OPTIONAL ]]
AttributeProblem ::=
    INTEGER {
        noSuchAttributeOrValue (1),
        invalidAttributeSyntax (2),
        undefinedAttributeType (3),
        inappropriateMatching (4),
        constraintViolation (5),
        attributeOrValueAlreadyExists (6) }

```

```

NameError ::= ABSTRACT-ERROR
    PARAMETER SET {
        problem [0] NameProblem,
        matched [1] Name }
NameProblem ::= INTEGER {
    noSuchObject (1),
    aliasProblem (2),
    invalidAttributeSyntax (3),
    aliasDereferencingProblem (4)}
Referral ::= ABSTRACT-ERROR -- not literally an "error"
    PARAMETER SET {
        candidate [0] ContinuationReference }
SecurityError ::= ABSTRACT-ERROR
    parameter set {
        problem [0] SecurityProblem }
SecurityProblem ::= INTEGER {
    inappropriateAuthentication (1),
    invalidCredential (2),
    insufficientAccessRights (3),
    invalidSignature (4),
    protectionRequired (5),
    noInformation (6) }
ServiceError ::= ABSTRACT-ERROR
    PARAMETER SET {
        problem [0] ServiceProblem }
ServiceProblem ::= INTEGER {
    busy (1),
    unavailable (2),
    unwillingToPerform (3),
    chainingRequired (4),
    unableToProceed (5),
    invalidReference (6),
    timeLimitExceeded (7),
    administrativeLimitExceeded (8),
    loopDetected (9),
    unavailableCriticalExtension (10),
    outOfScope (11),
    ditError (12) }
UpdateError ::= ABSTRACT-ERROR
    PARAMETER SET {
        problem [0] UpdateProblem }
UpdateProblem ::= INTEGER {
    namingViolation (1),
    objectClassViolation (2),
    notAllowedOnNonLeaf (3),
    notAllowedOnRDN (4),

```

```

        entryAlreadyExists (5),
        affectsMultipleDSAs (6),
        objectClassModificationProhibited (7) }
-- common arguments/results --
CommonArguments ::= SET {
    [30] ServiceControls DEFAULT {}
    [29] SecurityParameters DEFAULT {}
    requestor [28] DistinguishedName OPTIONAL,
    [27] OperationProgress DEFAULT notStarted,
    aliasedRDNs [26] INTEGER OPTIONAL,
    extensions [25] SET OF Extension OPTIONAL }
Extension ::= SET {
    identifier [0] INTEGER,
    critical [1] BOOLEAN DEFAULT FALSE,
    item [2] ANY DEFINED BY identifier }
CommonResults ::= SET {
    [30] SecurityParameters OPTIONAL,
    performer [29] DistinguishedName OPTIONAL,
    aliasDereferenced [28] BOOLEAN DEFAULT FALSE }
-- Common data types --
ServiceControls ::= SET {
    options [0] BIT STRING {
        preferChaining (0),
        chainingProhibited (1),
        localScope (2),
        dontUseCopy (3),
        dontDereferenceAliases (4)}
        DEFAULT {}
    priority [1] INTEGER {
        low (0),
        medium (1),
        high (2) } DEFAULT medium,
    timeLimit [2] INTEGER OPTIONAL,
    sizeLimit [3] INTEGER OPTIONAL,
    scopeOfReferral [4] INTEGER {
        dml(0),
        country (1) }
        OPTIONAL }
EntryInformationSelection ::= SET {
    attributeTypes
        CHOICE {
        allAttributes [0] NULL,
        select [1] SET OF AttributeType
        -- empty set implies no attributes
        -- are requested --}
        DEFAULT allAttributes NULL,

```

```

infoTypes [2] INTEGER {
    attributeTypesOnly (0),
    attributeTypeAndValues (1) } DEFAULT
    attributeTypesandValues }
EntryInformation ::= SEQUENCE {
    DistinguishedName,
    fromEntry BOOLEAN DEFAULT TRUE,
    SET OF CHOICE {
        AttributeType,
        Attribute } OPTIONAL }
Filter ::= CHOICE {
    item [0] FilterItem,
    and [1] SET OF Filter,
    or [2] SET OF Filter,
    not [3] Filter }
FilterItem ::= CHOICE {
    equality [0] AttributeValueAssertion,
    substrings [1] SEQUENCE {
        type AttributeType,
        strings SEQUENCE OF CHOICE {
            initial [0] AttributeValue,
            any [1] AttributeValue,
            final [2] AttributeValue }},
    greaterOrEqual [2] AttributeValueAssertion,
    lessOrEqual [3] AttributeValueAssertion,
    present [4] AttributeType,
    approximateMatch [5] AttributeValueAssertion }
SecurityParameters ::= SET {
    certification-Path [0] CertificationPath OPTIONAL,
    name [1] DistinguishedName OPTIONAL,
    time [2] UTCTime OPTIONAL,
    random [3] BIT STRING OPTIONAL,
    target [4] ProtectionRequest OPTIONAL }
ProtectionRequest ::= INTEGER {
    none (0),
    signed (1) }

```

B

ASN.1 "DirectoryObjectIdentifiers"

ASN.1

DirectoryObjectIdentifiers {joint-ISO-CCITT ds(5) modules (1)

directoryObjectIdentifiers (9) }

DEFINITIONS ::=

begin

exports

id-ot-directory, id-ot-dua, id-pt-read, id-pt-search, id-pt-modify;

IMPORTS

id-ot, id-pt

FROM UsefulDefinitions {joint-iso-ccitt ds(5) modules(1),
usefulDefinitions(0)};

-- Objects --

id-ot-directory OBJECT IDENTIFIER ::= {id-ot 1}

id-ot-dua OBJECT IDENTIFIER ::= {id-ot 2}

-- Port Types --

id-pt-read OBJECT IDENTIFIER ::= {id-pt 1}

id-pt-search OBJECT IDENTIFIER ::= {id-pt 2}

id-pt-modify OBJECT IDENTIFIER ::= {id-pt 3}

END

KTS-1C(X518)

5. -

The Directory - Procedures for Distributed Operation