INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.525
Corrigendum 2
(02/2001)

SERIES X: DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

Directory

Information technology – Open Systems Interconnection – The Directory: Replication

Technical Corrigendum 2

ITU-T Recommendation X.525 (1997) – Corrigendum 2

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INTERNATIONAL STANDARD ISO/IEC 9594-9
ITU-T RECOMMENDATION X.525

Information technology – Open Systems Interconnection – The Directory: Replication

TECHNICAL CORRIGENDUM 2

Source

Corrigendum 2 to ITU-T Recommendation X.525 (1997) was prepared by ITU-T Study Group 7 (2001-2004) and approved on 2 February 2001. An identical text is also published as Technical Corrigendum 2 to ISO/IEC 9594-9.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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TECHNICAL CORRIGENDUM 2

NOTE – This Technical Corrigendum covers the result of the ballot resolutions of Draft Technical Corrigenda 2, 3, and 4.

1) Defect reports covered by Draft Technical Corrigendum 2

(Covering resolutions to defect report 187, 208 and 243)

1.1) This corrects the defects reported in defect report 9594/187

In 7.2.1.1, add **root** *to the list of SDSE types.*

In 11.3.1.1, delete **root** *from the list of SDSE types.*

1.2) This corrects the defects reported in defect report 9594/208

Insert the following text into 7.2.2.3, at the end of both the second paragraph and the first sentence of the third paragraph (after "appropriate knowledge"*):*
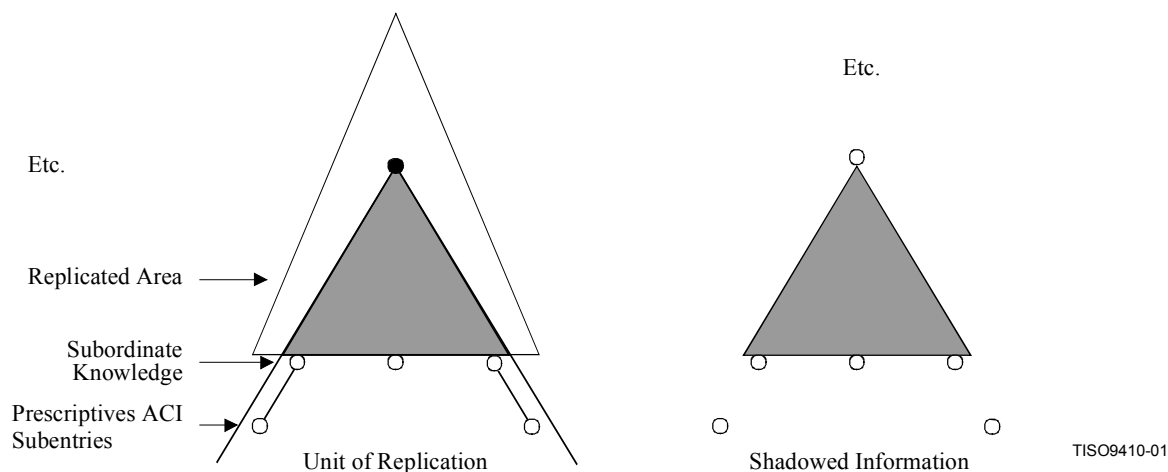
and access control information.

Insert a new third paragraph into 7.2.2.3 as follows:

If subordinate knowledge is supplied, and the supplying DSE (of type **subr)** is also of type **admPoint**, then the SDSE shall additionally be of type **admPoint** and the **administrativeRole** attribute shall be supplied. If such a DSE has any immediately subordinate subentries containing **PrescriptiveACI** relating to the administrative point, then they shall also be supplied as SDSEs in the shadowed information.

> NOTE – A DSE can be of type **subr** and **admPoint** in a superior DSA, when the naming context in the subordinate DSA is the start of a new administrative area.

Update Figure 3 as follows to show a subentry immediately below a subordinate reference. The subentry contains prescriptiveACI and is part of the shadowed information.

Etc.

Replicated Area

Subordinate Knowledge

Prescriptives ACI Subentries

Unit of Replication

Etc.

Shadowed Information

TISO9410-01

Add supporting text to 7.2 in the paragraph after Figure 3. Insert the following sentences after the sentence "Subordinate knowledge may also be replicated":

Implicit in the subordinate knowledge is the access control information which governs access to the RDN of the subordinate knowledge. When the subordinate entry is an administrative point in another DSA, then part of this access control information may be held in **prescriptiveACI** subentries beneath the subordinate knowledge.

Add the following new point d) to 9.2.4.1:

      d)   if subordinate knowledge (not extended knowledge) is shadowed then any **prescriptiveACI** in subordinate subentries shall also be copied.

1.3)   This corrects the defects reported in defect report 9594/243

In 2.1, change all references ISO/IEC 9594-x:1997 *to* ISO/IEC 9594-x:1998.

In clause 6, change ITU-T Rec. X.518 | ISO/IEC 9594-5 *to* ITU-T Rec. X.519 | ISO/IEC 9594-5.

In 9.2 in the **UnitOfReplication** *type, change* **ContextType** *to* **CONTEXT.&id**.

In 11.1:

Change **CoordinateShadowUpdate** *to* **coordinateShadowUpdate**.

Remove the last right curly parenthesis in the **CoordinateShadowUpdateArgument**.

Replace the ASN.1 in Annex A with:

```
DirectoryShadowAbstractService
     {joint-iso-itu-t ds(5) module(1) directoryShadowAbstractService(15) 3}
DEFINITIONS   IMPLICIT TAGS   ::=
BEGIN


-- EXPORTS All --

-- The types and values defined in this module are exported for use in the other ASN.1 modules contained
-- within the Directory Specifications, and for the use of other applications which will use them to access
-- directory services. Other applications may use them for their own purposes, but this will not constrain
-- extensions and modifications needed to maintain or improve the directory service.

IMPORTS

-- from ITU-T Rec. X.501 | ISO/IEC 9594-2

     directoryAbstractService, directoryOperationalBindingTypes, informationFramework,
     disp, distributedOperations, dsaOperationalAttributeTypes, enhancedSecurity,
     opBindingManagement
          FROM UsefulDefinitions {joint-iso-itu-t ds(5) module(1) usefulDefinitions(0) 3}

     Attribute, AttributeType, CONTEXT, DistinguishedName, RelativeDistinguishedName,
     SubtreeSpecification
          FROM InformationFramework informationFramework

     OPERATIONAL-BINDING, OperationalBindingID
          FROM OperationalBindingManagement opBindingManagement

     DSEType, SupplierAndConsumers
          FROM DSAOperationalAttributeTypes dsaOperationalAttributeTypes

     OPTIONALLY-PROTECTED, OPTIONALLY-PROTECTED-SEQ
          FROM EnhancedSecurity enhancedSecurity

-- from ITU-T Rec. X.511 | ISO/IEC 9594-3

     CommonResultsSeq, ContextSelection, directoryBind, directoryUnbind, EntryModification,
     SecurityParameters
          FROM DirectoryAbstractService directoryAbstractService
```

-- from ITU-T Rec. X.518 | ISO/IEC 9594-4

    AccessPoint
        FROM DistributedOperations distributedOperations

-- from ITU-T Rec. X.519 | ISO/IEC 9594-5

    id-op-binding-shadow
        FROM DirectoryOperationalBindingTypes directoryOperationalBindingTypes

    id-errcode-shadowError, id-opcode-coordinateShadowUpdate, id-opcode-requestShadowUpdate,
    id-opcode-updateShadow, reliableShadowSupplierInitiatedAC,
    reliableShadowConsumerInitiatedAC,
    shadowConsumerInitiatedAC, shadowSupplierInitiatedAC
        FROM DirectoryInformationShadowProtocol disp

-- from ITU-T Rec. X.880 | ISO/IEC 13712-1

    ERROR, OPERATION
        FROM Remote-Operations-Information-Objects
            {joint-iso-itu-t remote-operations(4) informationObjects(5) version1(0) }   **;**

-- bind and unbind operations --

dSAShadowBind   **OPERATION ::= directoryBind**

dSAShadowUnbind   **OPERATION ::= directoryUnbind**

-- shadow operational binding --

shadowOperationalBinding OPERATIONAL-BINDING ::= {
    AGREEMENT   **ShadowingAgreementInfo**
    APPLICATION CONTEXTS {
        { shadowSupplierInitiatedAC
            APPLIES TO   **{ All-operations-supplier-initiated } } |**
        { shadowConsumerInitiatedAC
            APPLIES TO   **{ All-operations-consumer-initiated } } |**
        { reliableShadowSupplierInitiatedAC
            APPLIES TO   **{ All-operations-supplier-initiated } } |**
        { reliableShadowConsumerInitiatedAC
            APPLIES TO   **{ All-operations-consumer-initiated } } }**
    ASYMMETRIC
        ROLE-A   **{**   *-- shadow supplier role*
            ESTABLISHMENT-INITIATOR   **TRUE**
            ESTABLISHMENT-PARAMETER   **NULL**
            MODIFICATION-INITIATOR   **TRUE**
            TERMINATION-INITIATOR   **TRUE }**
        ROLE-B   **{**   *-- shadow consumer role*
            ESTABLISHMENT-INITIATOR   **TRUE**
            ESTABLISHMENT-PARAMETER   **NULL**
            MODIFICATION-INITIATOR   **TRUE**
            MODIFICATION-PARAMETER   **ModificationParameter**
            TERMINATION-INITIATOR   **TRUE }**
    ID   **id-op-binding-shadow }**

-- types --

ModificationParameter   **::= SEQUENCE {**
    secondaryShadows   **SET OF SupplierAndConsumers }**

AgreementID   **::= OperationalBindingID**

ShadowingAgreementInfo   **::= SEQUENCE {**
    shadowSubject   **UnitOfReplication,**
    updateMode   **UpdateMode DEFAULT supplierInitiated : onChange : TRUE,**
    master   **AccessPoint OPTIONAL,**
    secondaryShadows   **[2]**   **BOOLEAN DEFAULT FALSE }**

```
UnitOfReplication           ::= SEQUENCE {
    area                        AreaSpecification,
    attributes                  AttributeSelection,
    knowledge                   Knowledge OPTIONAL,
    subordinates                BOOLEAN DEFAULT FALSE,
    contextSelection            ContextSelection OPTIONAL,
    supplyContexts              [0]   CHOICE {
        allContexts                     NULL,
        selectedContexts                SET SIZE (1..MAX) OF CONTEXT.&id } OPTIONAL }

AreaSpecification           ::= SEQUENCE  {
    contextPrefix           DistinguishedName,
    replicationArea         SubtreeSpecification }

Knowledge                   ::= SEQUENCE  {
    knowledgeType               ENUMERATED {
                                    master      (0),
                                    shadow      (1),
                                    both        (2) },
    extendedKnowledge           BOOLEAN DEFAULT FALSE }

AttributeSelection          ::= SET OF ClassAttributeSelection

ClassAttributeSelection     ::= SEQUENCE {
    class                       OBJECT IDENTIFIER OPTIONAL,
    classAttributes             ClassAttributes DEFAULT allAttributes : NULL }

ClassAttributes             ::= CHOICE {
    allAttributes           NULL,
    include                 [0]   AttributeTypes,
    exclude                 [1]   AttributeTypes }

AttributeTypes              ::= SET OF AttributeType

UpdateMode                  ::= CHOICE {
    supplierInitiated       [0]   SupplierUpdateMode,
    consumerInitiated       [1]   ConsumerUpdateMode }

SupplierUpdateMode          ::= CHOICE {
    onChange                BOOLEAN,
    scheduled               SchedulingParameters }

ConsumerUpdateMode          ::= SchedulingParameters

SchedulingParameters        ::= SEQUENCE {
    periodic                PeriodicStrategy OPTIONAL,  -- must be present if othertimes is set to FALSE --
    othertimes              BOOLEAN DEFAULT FALSE }

PeriodicStrategy            ::= SEQUENCE {
    beginTime               Time OPTIONAL,
    windowSize              INTEGER,
    updateInterval          INTEGER }

Time  ::= GeneralizedTime
    -- as per 41.3 b) and c) of ITU-T Rec. X.680 | ISO/IEC 8824-1

-- shadow operations, arguments, and results --

All-operations-consumer-initiated  OPERATION ::= {
        requestShadowUpdate | updateShadow }

All-operations-supplier-initiated  OPERATION ::= {
        coordinateShadowUpdate | updateShadow }

coordinateShadowUpdate  OPERATION ::= {
    ARGUMENT        CoordinateShadowUpdateArgument
    RESULT          CoordinateShadowUpdateResult
    ERRORS          { shadowError }
    CODE            id-opcode-coordinateShadowUpdate }
```

```
CoordinateShadowUpdateArgument ::= OPTIONALLY-PROTECTED { [0] SEQUENCE {
    agreementID         AgreementID,
    lastUpdate          Time OPTIONAL,
    updateStrategy      CHOICE {
        standard            ENUMERATED {
            noChanges           (0),
            incremental         (1),
            total               (2) },
        other               EXTERNAL },
    securityParameters  SecurityParameters OPTIONAL } }

CoordinateShadowUpdateResult ::= CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }

requestShadowUpdate   OPERATION ::= {
    ARGUMENT            RequestShadowUpdateArgument
    RESULT              RequestShadowUpdateResult
    ERRORS              { shadowError }
    CODE                id-opcode-requestShadowUpdate }

RequestShadowUpdateArgument ::= OPTIONALLY-PROTECTED { [0] SEQUENCE {
    agreementID         AgreementID,
    lastUpdate          Time OPTIONAL,
    requestedStrategy   CHOICE {
        standard    ENUMERATED {
            incremental     (1),
            total           (2) },
        other       EXTERNAL },
    securityParameters  SecurityParameters OPTIONAL } }

RequestShadowUpdateResult ::= CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }

updateShadow  OPERATION ::= {
    ARGUMENT            UpdateShadowArgument
    RESULT              UpdateShadowResult
    ERRORS              { shadowError }
    CODE                id-opcode-updateShadow }

UpdateShadowArgument ::=  OPTIONALLY-PROTECTED { [0] SEQUENCE {
    agreementID         AgreementID,
    updateTime          Time,
    updateWindow        UpdateWindow OPTIONAL,
    updatedInfo         RefreshInformation,
    securityParameters  SecurityParameters OPTIONAL } }

UpdateShadowResult ::= CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }

UpdateWindow ::= SEQUENCE {
    start   Time,
    stop    Time }

RefreshInformation ::= CHOICE {
    noRefresh               NULL,
    total           [0]     TotalRefresh,
    incremental     [1]     IncrementalRefresh,
    otherStrategy           EXTERNAL }
```

```
TotalRefresh ::= SEQUENCE {
    sDSE          SDSEContent OPTIONAL,
    subtree       SET SIZE (1..MAX) OF Subtree OPTIONAL }

SDSEContent ::= SEQUENCE {
    sDSEType          SDSEType,
    subComplete   [0] BOOLEAN DEFAULT FALSE,
    attComplete   [1] BOOLEAN OPTIONAL,
    attributes        SET OF Attribute,
    attValIncomplete  SET OF AttributeType DEFAULT {} }

SDSEType                ::= DSEType

Subtree                ::= SEQUENCE {
    rdn                RelativeDistinguishedName,
    COMPONENTS OF      TotalRefresh }

IncrementalRefresh     ::= SEQUENCE OF IncrementalStepRefresh

IncrementalStepRefresh ::= SEQUENCE {
    sDSEChanges        CHOICE {
        add            [0]  SDSEContent,
        remove              NULL,
        modify         [1]  ContentChange } OPTIONAL,
    subordinateUpdates SEQUENCE SIZE (1..MAX) OF SubordinateChanges OPTIONAL }

ContentChange          ::= SEQUENCE {
    rename             CHOICE {
        newRDN         RelativeDistinguishedName,
        newDN          DistinguishedName } OPTIONAL,
    attributeChanges  CHOICE {
        replace        [0]       SET SIZE (1..MAX) OF Attribute,
        changes        [1]       SEQUENCE SIZE (1..MAX) OF EntryModification } OPTIONAL,
    sDSEType                     SDSEType,
    subComplete    [2]           BOOLEAN DEFAULT FALSE,
    attComplete    [3]           BOOLEAN OPTIONAL,
    attValIncomplete   SET OF AttributeType DEFAULT {} }

SubordinateChanges     ::= SEQUENCE {
    subordinate        RelativeDistinguishedName,
    changes            IncrementalStepRefresh }

-- errors and parameters --

shadowError  ERROR ::= {
    PARAMETER       OPTIONALLY-PROTECTED-SEQ { SEQUENCE {
        problem             ShadowProblem,
        lastUpdate          Time OPTIONAL,
        updateWindow        UpdateWindow OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } }
    CODE        id-errcode-shadowError }

ShadowProblem ::= INTEGER {
    invalidAgreementID        (1),
    inactiveAgreement         (2),
    invalidInformationReceived (3),
    unsupportedStrategy       (4),
    missedPrevious            (5),
    fullUpdateRequired        (6),
    unwillingToPerform        (7),
    unsuitableTiming          (8),
    updateAlreadyReceived     (9),
    invalidSequencing         (10),
    insufficientResources     (11) }

END  -- DirectoryShadowAbstractService
```

2) Defect reports covered by Draft Technical Corrigendum 3

(Covering resolutions to defect report 245)

2.1) This corrects the defects reported in defect report 9594/245

In 9.2, **UnitOfReplication**, *change the* **supplyContexts** *component to:*

```
supplyContexts          [0]  CHOICE {
    allContexts                 NULL,
    selectedContexts            SET OF CONTEXT.&id } OPTIONAL
```

In clause 11.1, **CoordinateShadowUpdateResult**, *clause 11.2,* **RequestShadowUpdateResult**, *clause 11.3,* **UpdateShadowResult**, *clause 12,* **shadowError** *and associated text, change* **CommonResults** *to* **CommonResultsSeq**.

(Changes to Annex A are subsumed by resolution to defect report 243.)

3) Defect reports covered by Draft Technical Corrigendum 4

(Covering resolutions to defect reports 228 and 242)

3.1) This corrects the defects reported in defect report 9594/228

Delete any occurrence of:

```
                                    ,
    DIRQOP.&…-QOP{@dirqop}
```

In 11.1, change **CoordinateShadowUpdateResult** *to:*

```
CoordinateShadowUpdateResult ::= CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }
```

In 11.2, change **RequestShadowUpdateResult** *to:*

```
RequestShadowUpdateResult  ::=  CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }
```

In 11.3, change **UpdateShadowResult** *to:*

```
UpdateShadowResult ::= CHOICE {
    null                NULL,
    information         OPTIONALLY-PROTECTED { [0] SEQUENCE {
        agreementID         AgreementID,
        lastUpdate          Time OPTIONAL,
        COMPONENTS OF       CommonResultsSeq } } }
```

In clause 12 in the **shadowError** *construct, change* **OPTIONALLY-PROTECTED** *to* **OPTIONALLY-PROTECTED-SEQ**.

(Changes to Annex A are subsumed by resolution to Defect Report 243.)

3.2) This corrects the defects reported in defect report 9594/242

Add size limit **SIZE (1..MAX)** *to all optional* **SET OF** *and* **SEQUENCE OF** *constructs*.

SERIES OF ITU-T RECOMMENDATIONS

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Series D   General tariff principles

Series E   Overall network operation, telephone service, service operation and human factors

Series F   Non-telephone telecommunication services

Series G   Transmission systems and media, digital systems and networks

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Series J   Cable networks and transmission of television, sound programme and other multimedia signals

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Series L   Construction, installation and protection of cables and other elements of outside plant

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