Recommendation X.525 | ISO/IEC 9594-9

Technical Corrigendum 2 to the 3rd edition

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

Defect reports covered by Draft Technical Corrigendum 2
(Covering resolutions to defect report 187, 208 and 243)

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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

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"):
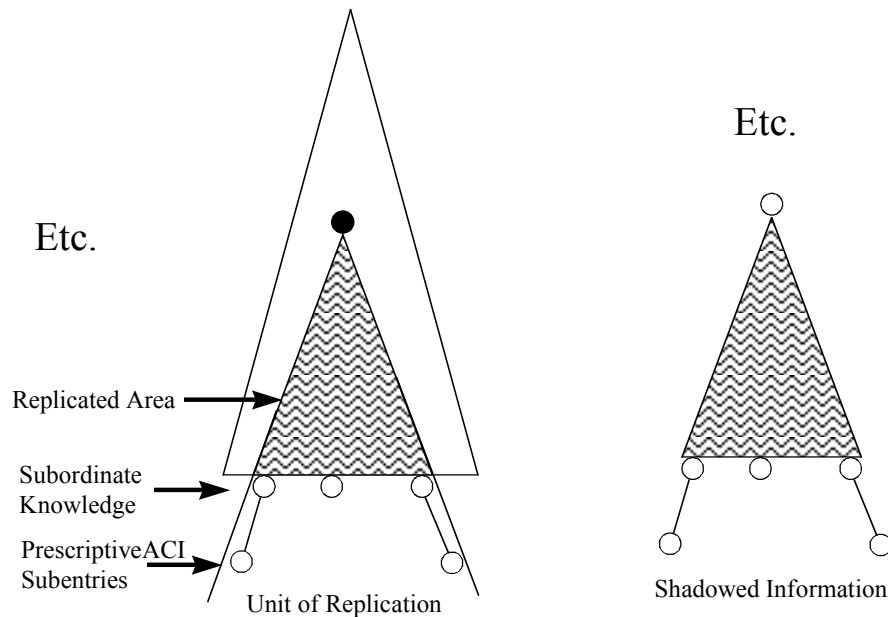"and access control information."

Insert a new third paragraph into 7.2.2.3:
"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 to show a subentry immediately below a subordinate reference. The subentry contains prescriptiveACI and is part of the shadowed information.

Additions to Figure 3, Section 7.2, X.525

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

"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 a new point d) to 9.2.4.1:

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

This corrects the defects reported in defect report 9594/243.
In to 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) 4}
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) 4}

      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

```
        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,
    windowSizeINTEGER,
    updateInterval  INTEGER }

Time ::= GeneralizedTime
```

-- as per 34.2 b) and c) of CCITT Rec. X.208 and ISO/IEC 8824

-- 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 {**
            greementID   **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*

Defect reports covered by Draft Technical Corrigendum 3

(Covering resolutions to defect report 245)

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This corrects the defects reported in defect report 9594/245.

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

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

Change **CommonResults** to **CommonResultSeq** in the import from **DirectoryAbstractService**.

In **CoordinateShadowUpdateResult**, **RequestShadowUpdateResult**, **UpdateShadowResult** and **shadowError** and associated text, change **CommonResults** to **CommonResultsSeq.**

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

Defect reports covered by Draft Technical Corrigendum 4

(Covering resolutions to defect reports 228 and 242)
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 {
                greementID          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)

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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.