

[MS-XWDVSEC]: Web Distributed Authoring and Versioning (WebDAV) Protocol Security Descriptor Extensions

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Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1		Initial Availability.
04/25/2008	0.2		Revised and updated property names and other technical content.
06/27/2008	1.0		Initial Release.
08/06/2008	1.01		Updated references to reflect date of initial release.
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03/04/2009	1.04		Revised and edited technical content.
04/10/2009	2.0		Deprecated for Exchange 2010.
07/15/2009	3.0	Major	Changes made for template compliance.
11/04/2009	3.1.0	Minor	Updated the technical content.
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08/05/2011	3.6	No change	No changes to the meaning, language, or formatting of the technical content.
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1 Introduction

This document specifies an extension to the WebDAV protocol, as specified in [\[RFC2518\]](#). The extension uses the standard **HTTP** mechanism that is specified in [\[RFC2068\]](#) to define how to request and set **security descriptors** by using the **WebDAV** methods **PROPFIND** and **PROPPATCH**.

1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

access control entry (ACE)
access control list (ACL)
discretionary access control list (DACL)
flags
Hypertext Transfer Protocol (HTTP)
security identifier (SID)
XML

The following terms are defined in [\[MS-OXGLOS\]](#):

mailbox
permission
public folder
security descriptor
store
Web Distributed Authoring and Versioning Protocol (WebDAV)
WebDAV client
WebDAV server
XML namespace
XML schema definition (XSD)

The following terms are specific to this document:

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[MS-ADA1] Microsoft Corporation, "[Active Directory Schema Attributes A-L](#)".

[MS-ADA3] Microsoft Corporation, "[Active Directory Schema Attributes N-Z](#)".

[MS-ADTS] Microsoft Corporation, "[Active Directory Technical Specification](#)".

[MS-DTYP] Microsoft Corporation, "[Windows Data Types](#)".

- [MS-OXPROPS] Microsoft Corporation, "[Exchange Server Protocols Master Property List](#)".
- [MS-SAMR] Microsoft Corporation, "[Security Account Manager \(SAM\) Remote Protocol Specification \(Client-to-Server\)](#)".
- [MS-WSO] Microsoft Corporation, "[Windows System Overview](#)".
- [MS-XWDEXT] Microsoft Corporation, "[Web Distributed Authoring and Versioning \(WebDAV\) Core Extensions](#)".
- [RFC2068] Fielding, R., Gettys, J., Mogul, J., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2068, January 1997, <http://www.ietf.org/rfc/rfc2068.txt>
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>
- [RFC2518] Goland, Y., Whitehead, E., Faizi, A., et al., "HTTP Extensions for Distributed Authoring - WebDAV", RFC 2518, February 1999, <http://www.ietf.org/rfc/rfc2518.txt>
- [W3C-XMLNote] Layman, A., Jung, E., Maler, E., et al., "XML-Data", W3C Note, January 1998, <http://www.w3.org/TR/1998/NOTE-XML-data-0105>
- [XMLNS] Bray, T., Hollander, D., Layman, A., et al., Eds., "Namespaces in XML 1.0 (Third Edition)", W3C Recommendation, December 2009, <http://www.w3.org/TR/2009/REC-xml-names-20091208/>
- [XMLSCHEMA1/2] Thompson, H.S., Ed., Beech, D., Ed., Maloney, M., Ed., and Mendelsohn, N., Ed., "XML Schema Part 1: Structures Second Edition", W3C Recommendation, October 2004, <http://www.w3.org/TR/xmlschema-1/>
- [XMLSCHEMA2/2] Biron, P.V., Ed. and Malhotra, A., Ed., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, October 2004, <http://www.w3.org/TR/xmlschema-2>

1.2.2 Informative References

- [MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".
- [MS-OXGLOS] Microsoft Corporation, "[Exchange Server Protocols Master Glossary](#)".

1.3 Overview

In WebDAV[\[RFC2518\]](#), properties can be retrieved and set. A particular property that the server can implement is one that represents a security descriptor, as specified in [\[MS-DTYP\]](#), in **XML**. This property and its type are documented in this specification.

1.4 Relationship to Other Protocols

The descriptor (<http://schemas.microsoft.com/exchange/security/descriptor>) is a property based on WebDAV, as specified in [\[RFC2518\]](#) section 13.

This protocol uses the WebDAV extensions specified in [\[MS-XWDEXT\]](#) section 2.2.1.17 and [\[MS-XWDEXT\]](#) section 2.2.1.18.

1.5 Prerequisites/Preconditions

The server and client applications must implement the WebDAV protocol, as specified in [\[RFC2518\]](#), so that the security descriptor can be set on target items in a database.

1.6 Applicability Statement

This protocol is only useful when a client issuing a WebDAV command requires knowledge of or adjustment to access to an entity. For example, a client with sufficient permission could gate access to a particular entity to various security principals.

1.7 Versioning and Capability Negotiation

This security descriptor property exposes no new versioning capabilities beyond the base protocol of WebDAV and the security descriptor revision field, as specified in [\[MS-DTYP\]](#).

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

There is no standards assignment for this property other than the ones assigned for the base WebDAV protocol [\[RFC2518\]](#).

2 Messages

The security descriptor property adds to the set of WebDAV properties, as specified in [\[RFC2518\]](#) section 13.

2.1 Transport

Messages are transported by using HTTP, as specified in [\[RFC2518\]](#) and [\[RFC2068\]](#).

2.2 Message Syntax

This property is an XML representation of a security descriptor. The type of this property is specified by using **XSD** grammar, as specified in [\[XMLSCHEMA1/2\]](#).

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema xmlns:S="http://schemas.microsoft.com/security/"
  xmlns:D="urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/"
  attributeFormDefault="qualified"
  elementFormDefault="qualified"
  targetNamespace="http://schemas.microsoft.com/security/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema">

  <!-- Bool is defined to be either 1 or 0 -->
  <xs:simpleType name="bool">
    <xs:restriction base="xs:boolean">
      <xs:pattern value="0|1" />
    </xs:restriction>
  </xs:simpleType>

  <!-- Globally Unique Identifier [MS-DTYP]
  These MUST be enclosed by curly braces, e.g.
  '{41a1a32a-4d0f-41ab-ad0c-fb344ef368fd}' -->
  <xs:simpleType name="guid">
    <xs:restriction base="xs:string">
      <xs:pattern value="\{[0-9A-Fa-f]{8}-[0-9A-Fa-f]{4}-[0-9A-Fa-f]{4}-[0-9A-Fa-f]{4}-[0-9A-
Fa-f]{12}\}" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="type_string">
    <xs:restriction base="xs:string">
      <xs:enumeration value="user" />
      <xs:enumeration value="group" />
      <xs:enumeration value="domain" />
      <xs:enumeration value="alias" />
      <xs:enumeration value="well_known_group" />
      <xs:enumeration value="deleted_account" />
      <xs:enumeration value="invalid" />
      <xs:enumeration value="unknown" />
      <xs:enumeration value="computer" />
    </xs:restriction>
  </xs:simpleType>

  <xs:element name="display_name" type="xs:string" />
  <xs:element name="ad_object_guid" type="S:guid" />
  <xs:element name="type" type="S:type_string" />
  <xs:element name="nt4_compatible_name" type="xs:string" />

```



```

<xs:element name="string_sid" type="xs:string" />

<xs:complexType name="NT_Sid">
  <xs:sequence>
    <xs:element minOccurs="0" ref="S:string_sid" />
    <xs:element minOccurs="0" ref="S:nt4_compatible_name" />
    <xs:element minOccurs="0" ref="S:type" />
    <xs:element minOccurs="0" ref="S:ad_object_guid" />
    <xs:element minOccurs="0" ref="S:display_name" />
  </xs:sequence>
</xs:complexType>

<xs:complexType name="sid">
  <xs:sequence>
    <xs:element name="sid" type="S:NT_Sid" />
  </xs:sequence>
</xs:complexType>

<xs:element name="access_mask">
  <xs:simpleType>
    <xs:restriction base="xs:hexBinary">
      <xs:minLength value="1" />
      <xs:maxLength value="8" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<xs:complexType name="ace_T">
  <xs:sequence>
    <xs:element ref="S:access_mask" />
    <xs:element name="sid" type="S:NT_Sid" />
  </xs:sequence>
  <xs:attribute name="inherited" type="S:bool" />
</xs:complexType>

<xs:complexType name="inheritable_ace_T">
  <xs:complexContent mixed="false">
    <xs:extension base="S:ace_T">
      <xs:attribute name="no_propagate_inherit" type="S:bool" />
    </xs:extension>
  </xs:complexContent>
</xs:complexType>

<xs:complexType name="aces">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="access_allowed_ace"
type="S:ace_T" />
    <xs:element minOccurs="0" maxOccurs="unbounded" name="access_denied_ace" type="S:ace_T"
/>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="system_audit_ace" type="S:ace_T"
/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="inheritable_aces">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="access_allowed_ace"
type="S:inheritable_ace_T" />
  </xs:sequence>
</xs:complexType>

```

```

        <xs:element minOccurs="0" maxOccurs="unbounded" name="access_denied_ace"
type="S:inheritable_ace_T" />
        <xs:element minOccurs="0" maxOccurs="unbounded" name="system_audit_ace"
type="S:inheritable_ace_T" />
    </xs:sequence>
</xs:complexType>

<xs:element name="revision" type="xs:unsignedInt" />

<xs:complexType name="acl">
    <xs:all minOccurs="0">
        <xs:element ref="S:revision" />
        <xs:element name="effective_aces" type="S:aces" />
        <xs:element name="subcontainer_inheritable_aces" type="S:inheritable_aces" />
        <xs:element name="subitem_inheritable_aces" type="S:inheritable_aces" />
    </xs:all>
</xs:complexType>

<xs:element name="audit_always" type="S:acl" />
<xs:element name="audit_on_failure" type="S:acl" />
<xs:element name="audit_on_success" type="S:acl" />

<xs:element name="sacl">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="S:revision" />
            <xs:element ref="S:audit_always" />
            <xs:element ref="S:audit_on_failure" />
            <xs:element ref="S:audit_on_success" />
        </xs:sequence>
        <xs:attribute name="defaulted" type="S:bool" />
        <xs:attribute name="protected" type="S:bool" />
        <xs:attribute name="autoinherited" type="S:bool" />
    </xs:complexType>
</xs:element>

<xs:element name="dacl">
    <xs:complexType>
        <xs:complexContent mixed="false">
            <xs:extension base="S:acl">
                <xs:attribute name="defaulted" type="S:bool" />
                <xs:attribute name="protected" type="S:bool" />
                <xs:attribute name="autoinherited" type="S:bool" />
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
</xs:element>

<xs:element name="primary_group">
    <xs:complexType>
        <xs:complexContent mixed="false">
            <xs:extension base="S:sid">
                <xs:attribute name="defaulted" type="S:bool" />
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
</xs:element>

<xs:element name="owner">

```

```

<xs:complexType>
  <xs:complexContent mixed="false">
    <xs:extension base="S:sid">
      <xs:attribute name="defaulted" type="S:bool" />
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>

<xs:element name="security_descriptor">
  <xs:complexType>
    <xs:complexContent mixed="false">
      <xs:extension base="D:microsoft.security_descriptor">
        <xs:attribute name="from_mapi_tlh" type="S:bool" />
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
</xs:schema>

<!-- The base microsoft security descriptor -->
<xs:schema xmlns:S="http://schemas.microsoft.com/security/"
  xmlns:D="urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/"
  attributeFormDefault="qualified"
  elementFormDefault="qualified"
  targetNamespace="urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema">

  <xs:complexType name="microsoft.security_descriptor">
    <xs:all minOccurs="0">
      <xs:element ref="S:revision" />
      <xs:element ref="S:owner" />
      <xs:element ref="S:primary_group" />
      <xs:element ref="S:dacl" />
      <xs:element ref="S:sacl" />
    </xs:all>
  </xs:complexType>
</xs:schema>

<!-- The schema of the actual descriptor property
  This is the property that can be asked for via WebDAV -->

<xs:schema xmlns:S="http://schemas.microsoft.com/security/"
  xmlns:D="urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/"
  attributeFormDefault="qualified"
  elementFormDefault="qualified"
  targetNamespace=
    "http://schemas.microsoft.com/exchange/security/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema">

  <xs:element name="descriptor">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="S:security_descriptor" />
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>

```

2.2.1 Namespaces

This specification defines and references various **XML namespaces** by using the mechanisms specified in [\[XMLNS\]](#). Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

Prefix	Namespace URI	Reference
S	http://schemas.microsoft.com/security/	
D	urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/	[W3C-XMLNote]
xs	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1/2]
(none)	http://schemas.microsoft.com/security/	

2.2.2 PidTagSecurityDescriptorAsXml

Canonical name: `PidTagSecurityDescriptorAsXml` ([\[MS-OXPROPS\]](#) section 2.1050)

Property name: 0x0E6A

Data type: `PtypString`, 0x001F

Area: Access Control Properties Property set

Alternate names: http://schemas.microsoft.com/exchange/security/descriptor

This property exposes in XML the entity's security attributes. These attributes specify who owns the entity, who can access it and what they can do with it, what level of audit logging can be applied to the object, and what kind of restrictions apply to the use of the security descriptor. This property is a limited XML version of SECURITY_DESCRIPTOR, as specified in [\[MS-DTYP\]](#).

One aspect of note in the handling of this property is that the XML security descriptor format does not have a way of transmitting the SECURITY_INFORMATION field needed to set the security descriptor. Instead, the SECURITY_INFORMATION field is derived from the presence/absence of fields in the XML description. So, to set only the **DACL** on an object, this property is set with only a DACL in it.

It is possible for a caller to get this descriptor on an entity when 1) the caller created the object, 2) the caller has administrator rights, 3) the object is in the caller's **mailbox**, and 4) the object is in a **public folder**.

It is possible for a caller to set this descriptor on an entity when 1) the caller created the object, 2) the caller has administrator rights, 3) the object is in the caller's mailbox, and 4) the object is in a public folder and the caller has owner **permissions** on that public folder.

The content of this property is specified by the **security_descriptor** element, as specified in section [2.2.3](#). The schema that specifies the possible values for this property is specified in section [2.2](#).

2.2.3 security_descriptor Element

Name: `security_descriptor`

Namespace: http://schemas.microsoft.com/security/

Type: `microsoft.security_descriptor` (section [2.2.4](#)).

Purpose: This is the type of descriptor specified in section [2.2.2](#).

Description: This type extends the `microsoft.security_descriptor` (section [2.2.4](#)), adding a **bool** attribute of `from_mapi_tlh`.

2.2.3.1 `from_mapi_tlh` Attribute

Name: `from_mapi_tlh`

Namespace: `http://schemas.microsoft.com/security/`

Type: `bool` (section [2.2.20](#)).

Purpose: Indicates that the entity for which this security descriptor applies is from a **store** that is accessible via MAPI-enabled clients.

Description: If this attribute is present, the value MUST be 1. Absence of this value implies that its value is 1. This attribute is only applicable when it is set by the server. The server MUST ignore this attribute if it is set by a client.

2.2.4 `microsoft.security_descriptor` Type

Name: `microsoft.security_descriptor`

Namespace: `urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/`

Purpose: This is the base security descriptor on which the server security descriptor is based.

2.2.5 `revision` Element

Name: `revision`

Namespace: `http://schemas.microsoft.com/security/`

Type: `unsignedInt`, as specified in [\[XMLSCHEMA2/2\]](#) section 3.3.22.

Purpose: The revision of the `microsoft.security_descriptor` type (section [2.2.4](#))

Description: If present, its value MUST be set to "1". The absence of this element implies that its value is "1".

2.2.6 `owner` Element

Name: `owner`

Namespace: `http://schemas.microsoft.com/security/`

Purpose: Contains the **SID** (section [2.2.16](#)) that specifies the owner of the entity to which the security descriptor is associated.

Description: This element can be present. This is the same semantics as specified for **Owner** in [\[MS-DTYP\]](#).

2.2.6.1 defaulted Attribute

Name: defaulted

Namespace: <http://schemas.microsoft.com/security/>

Type: bool (section [2.2.20](#)).

Purpose: Set when the owner (section [2.2.6](#)) was established by default means.

Description: This attribute MUST be present for the **owner** element (section [2.2.6](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag OD.

2.2.7 primary_group Element

Name: primary_group

Namespace: <http://schemas.microsoft.com/security/>

Purpose: Contains the SID (section [2.2.16](#)) that specifies the group of the entity to which the security descriptor is associated.

Description: This element MUST be present for the **owner** element (section [2.2.6](#)). This is the same semantics as specified for **Group** in [\[MS-DTYP\]](#).

2.2.7.1 defaulted Attribute

Name: defaulted

Namespace: <http://schemas.microsoft.com/security/>

Type: bool (section [2.2.20](#)).

Purpose: Set when the group (section [2.2.7](#)) was established by default means.

Description: This attribute MUST be present for the **primary_group** element (section [2.2.7](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag GD.

2.2.8 dacl Element

Name: dacl

Namespace: <http://schemas.microsoft.com/security/>

Purpose: The discretionary **ACL** (section [2.2.10](#)) contains **aces** (section [2.2.11](#)) that grant or deny access to principals or groups.

Description: This is the same semantics as specified for DACL in [\[MS-DTYP\]](#).

2.2.8.1 defaulted Attribute

Name: defaulted

Namespace: <http://schemas.microsoft.com/security/>

Type: bool (section [2.2.20](#)).

Purpose: Set when the DACL (section [2.2.8](#)) was established by default means.

Description: This attribute MUST be present for the **dacl** element (section [2.2.8](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag DD.

2.2.8.2 protected Attribute

Name: **protected**

Namespace: <http://schemas.microsoft.com/security/>

Type: **bool** (section [2.2.20](#)).

Purpose: Set when the DACL (section [2.2.8](#)) SHOULD be protected from inherit operations.

Description: This attribute MUST be present for the **dacl** element (section [2.2.8](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag PD.

2.2.8.3 autoinherited Attribute

Name: **autoinherited**

Namespace: <http://schemas.microsoft.com/security/>

Type: **bool** (section [2.2.20](#)).

Purpose: Set when the ACL (section [2.2.10](#)) was created through inheritance.

Description: This attribute MUST be present for the **dacl** element (section [2.2.8](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag DI.

2.2.9 sacl Element

Name: **sacl**

Namespace: <http://schemas.microsoft.com/security/>

Purpose: The system ACL (section [2.2.10](#)) contains auditing **aces** (section [2.2.11](#)).

Description: This is the same semantics as specified for system ACL<1> in [\[MS-DTYP\]](#).

2.2.9.1 revision Element

Name: **revision**

Namespace: <http://schemas.microsoft.com/security/>

Type: **unsignedInt** as specified in [\[XMLSCHEMA2/2\]](#) section 3.3.22.

Purpose: This attribute MUST be present for the **sacl** element (section [2.2.9](#)). Serves the same purpose as the **AclRevision** element specified in [\[MS-DTYP\]](#) and shares the same appropriate values.

2.2.9.2 audit_always Element

Name: **audit_always**

Namespace: <http://schemas.microsoft.com/security/>

Type: **acl** (section [2.2.10](#)).

Purpose: The set of **ACEs** to generate audit messages for access attempts.

Description: This is the same semantics as specified in [\[MS-DTYP\]](#), relating to FAILED_ACCESS_ACE_FLAG and SUCCESSFUL_ACCESS_ACE_FLAG.

2.2.9.3 audit_on_failure Element

Name: **audit_on_failure**

Namespace: <http://schemas.microsoft.com/security/>

Type: **acl** (section [2.2.10](#)).

Purpose: The set of ACEs to generate audit messages for failed access attempts.

Description: This is used in place of FAILED_ACCESS_ACE_FLAG, as specified in [\[MS-DTYP\]](#), and has the same semantic meaning.

2.2.9.4 audit_on_success Element

Name: **audit_on_success**

Namespace: <http://schemas.microsoft.com/security/>

Type: **acl** (section [2.2.10](#)).

Purpose: The set of ACEs to generate audit messages for successful access attempts.

Description: This is used in place of SUCCESSFUL_ACCESS_ACE_FLAG, as specified in [\[MS-DTYP\]](#), and has the same semantic meaning.

2.2.9.5 defaulted Attribute

Name: **defaulted**

Namespace: <http://schemas.microsoft.com/security/>

Type: **bool** (section [2.2.20](#)).

Purpose: Set when the system ACL (section [2.2.10](#)) was established by default means.

Description: This attribute MUST be present for the **sacl** element (section [2.2.9](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag SD.

2.2.9.6 protected Attribute

Name: **protected**

Namespace: <http://schemas.microsoft.com/security/>

Type: **bool** (section [2.2.20](#)).

Purpose: Set when the system ACL (section [2.2.10](#)) should be protected from inherit operations.

Description: This attribute MUST be present for the **sacl** element (section [2.2.9](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag PS.

2.2.9.7 autoinherited Attribute

Name: autoinherited

Namespace: <http://schemas.microsoft.com/security/>

Type: bool (section [2.2.20](#)).

Purpose: Set when the system ACL (section [2.2.10](#)) was created by inheritance.

Description: This attribute MUST be present for the **sacl** element (section [2.2.9](#)). This is the same semantics as specified in [\[MS-DTYP\]](#), relating to the Control bit flag SI.

2.2.10 acl Type

Name: acl

Namespace: <http://schemas.microsoft.com/security/>

Purpose: Access control list

Description: Contains a list of ACEs. This is analogous to ACL, as specified in [\[MS-DTYP\]](#).

2.2.10.1 revision Element

Name: revision

Namespace: <http://schemas.microsoft.com/security/>

Type: unsignedInt, as specified in [\[XMLSCHEMA2/2\]](#) section 3.3.22.

Purpose: Indicates the version of the **acl** Type (section [2.2.10](#)).

Description: This element MUST exist. Serves the same purpose as the **AclRevision** element specified in [\[MS-DTYP\]](#) and shares the same appropriate values.

2.2.10.2 effective_aces Element

Name: effective_aces

Namespace: <http://schemas.microsoft.com/security/>

Type: aces (section [2.2.11](#)).

Purpose: Contains a list of ACEs that affect the entity.

Description: This element can exist if the ACL contains one or more ACEs.

2.2.10.3 subcontainer_inheritable_aces Element

Name: subcontainer_inheritable_aces

Namespace: <http://schemas.microsoft.com/security/>

Type: inheritable_aces (section [2.2.12](#)).

Purpose: Contains a list of ACEs such that child objects that are containers, such as folders, inherit these ACEs as effective ACEs (section [2.2.10.2](#)).

Description: This element can exist if the ACL contains one or more ACEs. Semantically the same as having each ACE within here having the CONTAINER_INHERIT_ACE flag set on the **AceFlags** as specified in [\[MS-DTYP\]](#).

2.2.10.4 subitem_inheritable_aces Element

Name: subitem_inheritable_aces

Namespace: http://schemas.microsoft.com/security/

Type: inheritable_aces (section [2.2.12](#)).

Purpose: Contains a list of ACEs such that non-container child objects, such as attachments, inherit these ACEs as effective ACEs (section [2.2.10.2](#)).

Description: This element can exist if the ACL contains one or more ACEs. Semantically the same as having each ACE within here having the OBJECT_INHERIT_ACE flag set on **AceFlags**, as specified in [\[MS-DTYP\]](#).

2.2.11 aces Type

Name: aces

Namespace: http://schemas.microsoft.com/security/

Purpose: Contains a list of non-inheritable ACEs (section [2.2.11.1](#) through [2.2.11.3](#)).

Description: All the ACEs in this type are semantically the same as having the flag ACE_INHERITED_OBJECT_TYPE_PRESENT not set, as specified in [\[MS-DTYP\]](#).

2.2.11.1 access_allowed_ace Element

Name: access_allowed_ace

Namespace: http://schemas.microsoft.com/security/

Type: ace_T (section [2.2.13](#)).

Purpose: Allows access to an entity for a specific trustee identified by a SID (section [2.2.16](#)).

Description: This ACE is only allowed on DACLs (section [2.2.8](#)). This element can exist if a trustee is allowed access to an entity. This ACE follows the same semantics as **ACCESS_ALLOWED_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.11.2 access_denied_ace Element

Name: access_denied_ace

Namespace: http://schemas.microsoft.com/security/

Type: ace_T (section [2.2.13](#)).

Purpose: Denies access to an entity for a specific trustee identified by a SID (section [2.2.16](#)).

Description: This ACE is allowed only on DACLs (section [2.2.8](#)). This element can exist if a trustee is denied access to an entity. This ACE follows the same semantics as **ACCESS_DENIED_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.11.3 system_audit_ace Element

Name: system_audit_ace

Namespace: http://schemas.microsoft.com/security/

Type: ace_T (section [2.2.13](#)).

Purpose: System-audit ACE.

Description: This ACE is only allowed on system ACLs (section [2.2.10](#)). This element can exist if a trustee is monitored for attempts to access a specific object. This ACE follows the same semantics as **SYSTEM_AUDIT_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.12 inheritable_aces Type

Name: inheritable_aces

Namespace: http://schemas.microsoft.com/security/

Purpose: Contains a list of inheritable ACEs.

Description: How these ACEs are inherited is declared by the usage of this type in either **subitem_inheritable_aces** (section [2.2.10.4](#)) or **subcontainer_inheritable_aces** (section [2.2.10.3](#)).

2.2.12.1 access_allowed_ace Element

Name: access_allowed_ace

Namespace: http://schemas.microsoft.com/security/

Type: inheritable_ace_T (section [2.2.14](#)).

Purpose: Allows access to an entity for a specific trustee identified by a SID (section [2.2.16](#)).

Description: This element can exist if a trustee is allowed access to an entity. This ACE is only allowed on DACLs (section [2.2.8](#)). This ACE follows the same semantics as **ACCESS_ALLOWED_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.12.2 access_denied_ace Element

Name: access_denied_ace

Namespace: http://schemas.microsoft.com/security/

Type: inheritable_ace_T (section [2.2.14](#)).

Purpose: Denies access to an entity for a specific trustee identified by a SID (section [2.2.16](#)).

Description: This element can exist if a trustee is denied access to an entity. This ACE is only allowed on DACLs (section [2.2.8](#)). This ACE follows the same semantics as **ACCESS_DENIED_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.12.3 system_audit_ace Element

Name: system_audit_ace

Namespace: <http://schemas.microsoft.com/security/>

Type: `inheritable_ace_T` (section [2.2.14](#)).

Purpose: System-audit ACE.

Description: This element can exist if a trustee is monitored for attempts to access a specific object. This ACE is only allowed on system ACLs (section [2.2.10](#)). This ACE follows the same semantics as `SYSTEM_AUDIT_ACE`, as specified in [\[MS-DTYP\]](#).

2.2.13 ace_T Type

Name: `ace_T`

Namespace: <http://schemas.microsoft.com/security/>

Purpose: The base type for ACEs.

Description: The type for access control entries found in ACEs (section [2.2.11](#)).

2.2.13.1 access_mask Element

Name: `access_mask`

Namespace: <http://schemas.microsoft.com/security/>

Type: `access_mask` (section [2.2.15](#)).

Purpose: Encodes the rights to an entity for a security principal.

Description: This element MUST exist on all ACEs. The actual **flags** for encoding these rights are specified in section [2.2.15](#).

2.2.13.2 sid Element

Name: `sid`

Namespace: <http://schemas.microsoft.com/security/>

Type: `NT_Sid` (section [2.2.17](#)).

Purpose: Identifies a security principal.

Description: This element MUST exist on all ACEs. Semantically the same as SID, as specified in [\[MS-DTYP\]](#).

2.2.13.3 inherited Attribute

Name: `inherited`

Namespace: <http://schemas.microsoft.com/security/>

Type: `bool` (section [2.2.20](#)).

Purpose: Indicates that the ACE was inherited.

Description: This attribute MUST exist. Semantically the same as the **AceFlags INHERITED_ACE**, as specified in [\[MS-DTYP\]](#).

2.2.14 inheritable_ace_T Type

Name: inheritable_ace_T

Namespace: <http://schemas.microsoft.com/security/>

Purpose: The base type for all inheritable ACEs (section [2.2.12](#)).

Description: ACEs of this type are the equivalent of having the specific **AceFlags** **CONTAINER_INHERIT_ACE** or **OBJECT_INHERIT_ACE** set as specified in [\[MS-DTYP\]](#).

The **inheritable_ace_T** type extends the base **ace_T** type, as specified in section [2.2.13](#).

2.2.14.1 no_propagate_inherit Attribute

Name: no_propagate_inherit

Namespace: <http://schemas.microsoft.com/security/>

Type: **bool** (section [2.2.20](#)).

Purpose: Declares that an inherited ACE is not inheritable.

Description: This attribute **MUST** exist. This is semantically the same as **NO_PROPAGATE_INHERIT_ACE** as specified in [\[MS-DTYP\]](#) for the **AceFlags** **CONTAINER_INHERIT_ACE** and **OBJECT_INHERIT_ACE**.

2.2.15 access_mask Element

Name: access_mask

Namespace: <http://schemas.microsoft.com/security/>

Type: **hexBinary** [\[XMLSCHEMA2/2\]](#) section 3.2.15, but limited to between one and eight digits.

Purpose: 32-bit set of flags that are used to encode the user rights to an object. An access mask is used both to encode the rights to an object assigned to a principal and to encode the requested access when opening an object.

Description: This element **MUST** exist for all ACEs. A bit set to 1 specifies that the allowed or denied right is granted. The unused lower bits **MUST** be ignored. The lower 16 bits are as follows.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				V	DOI	WOP	WA	RA		E	WP	RP	AM	WB	RB

Value	Description
RB	Read Body
WB	Write Body
AM	Append Message

Value	Description
RP	Read property
WP	Write property
E	Execute
RA	Read Attributes
WA	Write Attributes
WOP	Write Own property
DOI	Delete Own Item
V	View Item

2.2.16 sid Type

Name: sid

Namespace: http://schemas.microsoft.com/security/

Purpose: Contains the security identifier (SID) that uniquely identifies a security principal.

Description: This specific type simply wraps an **NT_Sid** (section [2.2.17](#)) with a **sid** element.

2.2.17 NT_Sid Type

Name: NT_Sid

Namespace: http://schemas.microsoft.com/security/

Purpose: Contains a security identifier (SID).

Description: It is important to understand more about the XML representation of NT security identifiers. Note that it can be seen that a number of different pieces of information about the security identity are available.

If you retrieve from the **WebDAV server** the XML representation, all the following elements will appear in the representation of the **NT_Sid** (as long as they are available):

string_sid (see section [2.2.17.1](#))

nt4_compatible_name (see section [2.2.17.2](#))

type (see section [2.2.17.3](#))

ad_object_guid (see section [2.2.17.4](#))

display_name (see section [2.2.17.5](#))

In some cases, less information is returned. For example, if the SID cannot be looked up, you would see only the string SID. For some built-in NT accounts, you will only get the **string_sid**, **nt4_compatible_name**, and **type** elements.

If the **WebDAV client** sets the XML representation, it does not have to give all the elements, providing that one of the following elements is sufficient:

string_sid (see section [2.2.17.1](#))

nt4_compatible_name (see section [2.2.17.2](#))

ad_object_guid (see section [2.2.17.4](#))

display_name (see section [2.2.17.5](#))

The WebDAV server will only use one of the elements that the WebDAV client gives it to determine the SID. The WebDAV server SHOULD use the element that is easiest to compute and least prone to ambiguity. The order based on ease of computation is 1) **string_sid**, 2) **nt4_compatible_name**, 3) **ad_object_guid**, and 4) **display_name**. As a last resort, the client can use **display_name**, but because of the ambiguity problems, this would probably not be a good choice.

2.2.17.1 string_sid Element

Name: **string_sid**

Namespace: <http://schemas.microsoft.com/security/>

Type: **string** [[XMLSCHEMA2/2](#)] section 3.2.1.

Purpose: Identifies a security principal.

Description: This element can exist for any SID (section [2.2.16](#)). This is the string representation of the SID as specified in [[MS-DTYP](#)].

2.2.17.2 nt4_compatible_name Element

Name: **nt4_compatible_name**

Namespace: <http://schemas.microsoft.com/security/>

Type: **string** [[XMLSCHEMA2/2](#)] section 3.2.1.

Purpose: Identifies a security principal.

Description: This element can exist for any SID (section [2.2.16](#)). Contains a security principal as either a fully qualified account name (domain_name/user_name) or a user principal name (user_name@domain_name) as specified in [[MS-WSO](#)].

2.2.17.3 type Element

Name: **type**

Namespace: <http://schemas.microsoft.com/security/>

Type: **type_string** (section [2.2.18](#)).

Purpose: Value that specifies the type of SID.

Description: This element can exist for any SID (section [2.2.16](#)). The enumeration of values is specified in section [2.2.18](#).

2.2.17.4 ad_object_guid Element

Name: ad_object_guid

Namespace: http://schemas.microsoft.com/security/

Type: guid (section [2.2.19](#)).

Purpose: Identifies a security principal.

Description: This element can exist for any SID (section [2.2.16](#)). The value of this is a string representation of the **objectGuid** property specified in [\[MS-ADA3\]](#) section 2.43. This property is included so clients that allow users to pick an entry from the directory service [\[MS-ADTS\]](#) can specify the entry by giving the **objectGuid** property.

2.2.17.5 display_name Element

Name: display_name

Namespace: http://schemas.microsoft.com/security/

Type: string [\[XMLSCHEMA2/2\]](#) section 3.2.1.

Purpose: Identifies a security principal.

Description: This element can exist for any SID (section [2.2.16](#)). The value of this is a display name that clients can display in the UI. It comes from the **PidTagDisplayName** property, as specified in [\[MS-OXPROPS\]](#) section 2.734. It can also be read from the directory service as displayName [\[MS-ADA1\]](#). The downside of identifying a security principal by using this element is that it is not unique.

2.2.18 type_string Type

Name: type_string

Namespace: http://schemas.microsoft.com/security/

Purpose: Specifies the possible type of **NT_Sid** (section [2.2.17](#)).

Description: Can be one of the following values:

Value	Meaning
user	A user SID.
group	A group SID.
domain	A domain SID.
alias	An alias SID.
well_known_group	A SID for a well-known group.
deleted_account	A SID for a deleted account.
invalid	A SID that is not valid.
unknown	A SID of unknown type.

Value	Meaning
computer	A SID for a computer.

These values are semantically the same as those found in the enumeration **SID_NAME_USE**, as specified in [\[MS-SAMR\]](#).

2.2.19 guid Type

Name: guid

Namespace: <http://schemas.microsoft.com/security/>

Purpose: Globally unique identifier.

Description: Used to identify a security principal. Semantically the same as [\[MS-DTYP\]](#).

2.2.20 bool Type

Name: bool

Namespace: <http://schemas.microsoft.com/security/>

Type: Boolean [\[XMLSCHEMA2/2\]](#).

Purpose: To indicate a **Boolean** state.

Description: This has the same meaning as specified in [\[XMLSCHEMA2/2\]](#), but is constrained to the values of 0 (zero) and 1.

3 Protocol Details

3.1 Common Details

The **descriptor** property that is retrieved from the server can contain more information than what is required of the client to set it. Section [2.2.2](#) specifies that the client does not need to set the entire security descriptor to modify the DACL (section [2.2.8](#)). Additionally, the **descriptor** property can contain multiple security principal identifiers for the NT_Sid type (section [2.2.17](#)). The server **MUST** generate all available security principal identifiers when the property is sent to the client. Clients can generate all the security identifiers but the server **MUST** use the most precise identifier that is received from the client, as specified in section [2.2.17](#). It is recommended that the client generate the most precise security principal identifier, as specified in section [2.2.17](#), to avoid ambiguous identifiers.

3.1.1 Abstract Data Model

None.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Higher-Layer Triggered Events

No additional higher-layer triggered events exist beyond those in [\[RFC2518\]](#), and the behavior of any existing higher-layer triggered events is unchanged by this extension.

3.1.5 Message Processing Events and Sequencing Rules

The sequence rules are those that are found for any property, as specified in [\[RFC2518\]](#) section 13.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

4 Protocol Examples

This section gives examples of how to retrieve and set this property.

4.1 Retrieving the Property

This security descriptor can be retrieved via a standard WebDAV **PROPFIND** request by asking for the property:

`http://schemas.microsoft.com/exchange/security/descriptor`

For example, the property **descriptor** might look as follows:

```
<d:descriptor xmlns:d="http://schemas.microsoft.com/exchange/security/">
  <S:security_descriptor xmlns:S="http://schemas.microsoft.com/security/"
  xmlns:D="urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/" D:dt="microsoft.security_descriptor"
  S:from_mapi_tlh="1">
    <S:revision>1</S:revision>
    <S:owner S:defaulted="0">
      <S:sid>
        <S:string_sid>S-1-5-21-2082262111-2968666075-236047801-1111</S:string_sid>
        <S:type>user</S:type>
        <S:nt4_compatible_name>ELZCHU-DOM\bob</S:nt4_compatible_name>
        <S:ad_object_guid>{138bfc4d-48e0-4d29-9de6-643ecb7314f1}</S:ad_object_guid>
        <S:display_name>bob</S:display_name>
      </S:sid>
    </S:owner>
    <S:primary_group S:defaulted="0">
      <S:sid>
        <S:string_sid>S-1-5-21-2082262111-2968666075-236047801-513</S:string_sid>
        <S:type>group</S:type>
        <S:nt4_compatible_name>ELZCHU-DOM\Domain Users</S:nt4_compatible_name>
        <S:ad_object_guid>{f2a02601-c596-4fd2-9543-d770ba31d9e5}</S:ad_object_guid>
      </S:sid>
    </S:primary_group>
    <S:dacl S:defaulted="1" S:protected="0" S:autoinherited="1">
      <S:revision>2</S:revision>
      <S:effective_aces>
        <S:access_allowed_ace S:inherited="1">
          <S:access_mask>1f0fbf</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-5-21-2082262111-2968666075-236047801-500</S:string_sid>
            <S:type>user</S:type>
            <S:nt4_compatible_name>ELZCHU-DOM\Administrator</S:nt4_compatible_name>
            <S:ad_object_guid>{41a1a32a-4d0f-41ab-ad0c-fb344ef368fd}</S:ad_object_guid>
            <S:display_name>Administrator</S:display_name>
          </S:sid>
        </S:access_allowed_ace>
        <S:access_allowed_ace S:inherited="1">
          <S:access_mask>1f0fbf</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-5-7</S:string_sid>
            <S:type>well_known_group</S:type>
            <S:nt4_compatible_name>NT AUTHORITY\ANONYMOUS
            LOGON</S:nt4_compatible_name>
            <S:ad_object_guid>{ff158509-ee41-4c44-98c1-affd7edf6a83}</S:ad_object_guid>
          </S:sid>
        </S:access_allowed_ace>
      </S:effective_aces>
    </S:dacl>
  </S:security_descriptor>
</d:descriptor>
```

```

        </S:sid>
    </S:access_allowed_ace>
    <S:access_allowed_ace S:inherited="1">
        <S:access_mask>1f0fbf</S:access_mask>
        <S:sid>
            <S:string_sid>S-1-1-0</S:string_sid>
            <S:type>well_known_group</S:type>
            <S:nt4_compatible_name>\Everyone</S:nt4_compatible_name>
            <S:ad_object_guid>{aa5d6b3e-3546-4f9e-8530-
59ad567c6dd8}</S:ad_object_guid>
        </S:sid>
    </S:access_allowed_ace>
</S:effective_aces>
</S:dacl>
</S:security_descriptor>
</d:descriptor>

```

4.2 Setting the Property

To set a security descriptor by using the **PROPPATCH** method, the WebDAV request XML can look like this:

```

<?xml version='1.0'?>
<d:descriptor xmlns:d='http://schemas.microsoft.com/exchange/security/'>
  <S:security_descriptor xmlns:data='urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/'
data:dt='microsoft.security_descriptor'>
    <S:dacl xmlns:S='http://schemas.microsoft.com/security/' S:defaulted="0" S:protected="0"
S:autoinherited="0">
      <S:effective_aces>
        <S:access_allowed_ace>
          <S:access_mask>1f0fbf</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-5-21-2082262111-2968666075-236047801-500</S:string_sid>
          </S:sid>
        </S:access_allowed_ace>
        <S:access_allowed_ace>
          <S:access_mask>1f0fbf</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-5-7</S:string_sid>
          </S:sid>
        </S:access_allowed_ace>
        <S:access_allowed_ace>
          <S:access_mask>1208a9</S:access_mask>
          <S:sid>
            <S:ad_object_guid>{9F4AC28A-2FD0-475E-9736-A9AF92E6612F}</S:ad_object_guid>
          </S:sid>
        </S:access_allowed_ace>
        <S:access_allowed_ace>
          <S:access_mask>1200a9</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-1-0</S:string_sid>
          </S:sid>
        </S:access_allowed_ace>
        <S:access_denied_ace>
          <S:access_mask>d0f16</S:access_mask>
          <S:sid>

```

```
    <S:string_sid>S-1-1-0</S:string_sid>
  </S:sid>
</S:access_denied_ace>
</S:effective_aces>
<S:subcontainer_inheritable_aces>
  <S:access_allowed_ace>
    <S:access_mask>1208a9</S:access_mask>
    <S:sid>
      <S:ad_object_guid>{9F4AC28A-2FD0-475E-9736-A9AF92E6612F}</S:ad_object_guid>
    </S:sid>
  </S:access_allowed_ace>
</S:subcontainer_inheritable_aces>
<S:subitem_inheritable_aces>
  <S:access_allowed_ace>
    <S:access_mask>1208a9</S:access_mask>
    <S:sid>
      <S:ad_object_guid>{9F4AC28A-2FD0-475E-9736-A9AF92E6612F}</S:ad_object_guid>
    </S:sid>
  </S:access_allowed_ace>
</S:subitem_inheritable_aces>
</S:dacl>
</S:security_descriptor>
</d:descriptor>
```

5 Security

5.1 Security Considerations for Implementers

This extension has no security considerations beyond those described in [\[RFC2518\]](#) section 17, [\[RFC2068\]](#) section 15, and [\[MS-DTYP\]](#).

5.2 Index of Security Parameters

None.

6 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft® Exchange Server 2003
- Microsoft® Exchange Server 2007

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 2.2.9:](#) The **sacl** element is not settable in Exchange 2003 and Exchange 2007, but it can appear on items that were upgraded from earlier systems.

7 Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

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