

[MS-XWDVSEC]: WebDAV Extensions for Security Protocol Specification

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1 Introduction

This document specifies an extension to the **WebDAV** protocol, as specified in [RFC2518], by using a standard **HTTP** mechanism specified in [RFC2068]. This extension specifies how to request and set the Exchange security descriptor by using the WebDAV methods **PROPFIND** and **PROPPATCH**.

1.1 Glossary

The following terms are defined in [MS-OXGLOS]:

access control entry (ACE)
access control list (ACL)
Hypertext Transfer Protocol (HTTP)
security identifier (SID)
property
store
XML

The following terms are specific to this document:

discretionary access control list (DACL): An **access control list (ACL)** that is controlled by the owner of an object and that specifies the access particular users or groups can have to that object.

entity: A resource that can be identified by a URL. Use of this term is consistent with that specified in [RFC2616] section 2.3.

security descriptor: The **SECURITY_DESCRIPTOR** structure that defines an entity's security. It specifies the security principal that owns the entity, the security principal(s) that can access the entity and what they can do with it, what level of audit logging has to be applied to the entity, and what type of restrictions apply to the use of the security descriptor. For more information, see [MS-DTYP] section 2.4.6.

property: A named value that is associated with an entity, as specified in [RFC2518] section 13.

Web Distributed Authoring and Versioning Protocol (WebDAV): The protocol specified in [RFC2518].

WebDAV client: A computer that uses the **WebDAV** protocol, as specified in [RFC2518], to retrieve data from the **WebDAV server**.

WebDAV server: A computer that supports the **WebDAV protocol**, as specified in [RFC2518], to and from which **WebDAV clients** can connect and retrieve data.

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

- [MS-ADA1] Microsoft Corporation, "Active Directory Schema Attributes A-L", July 2006, <http://go.microsoft.com/fwlink/?LinkId=112308>.
- [MS-ADA3] Microsoft Corporation, "Active Directory Schema Attributes N-Z", July 2006, <http://go.microsoft.com/fwlink/?LinkId=112148>.
- [MS-ADTS] Microsoft Corporation, "Active Directory Technical Specification", July 2006, <http://go.microsoft.com/fwlink/?LinkId=112149>.
- [MS-DTYP] Microsoft Corporation, "Windows Data Types", March 2007, <http://go.microsoft.com/fwlink/?LinkId=111558>.
- [MS-NSPI] Microsoft Corporation, "Name Service Provider Interface (NSPI) Protocol Specification", June 2008.
- [MS-OXGLOS] Microsoft Corporation, "Exchange Server Protocols Master Glossary", June 2008.
- [MS-SAMR] Microsoft Corporation, "Security Account Manager (SAM) Remote Protocol Specification (Client-to-Server)", <http://go.microsoft.com/fwlink/?LinkId=112150>.
- [MS-SECO] Microsoft Corporation, "Windows Security Overview", December 2006, <http://go.microsoft.com/fwlink/?LinkId=112307>.
- [RFC2068] Fielding, R., 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.ietf.org/rfc/rfc2119.txt>.
- [RFC2518] Goland Y., et al., "HTTP Extensions for Distributed Authoring – WEBDAV", RFC 2518, February 1999, <http://www.ietf.org/rfc/rfc2518.txt>.
- [RFC2616] Fielding, R., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, <http://www.ietf.org/rfc/rfc2616.txt>.
- [W3C-XSD1] World Wide Web Consortium, "XML Schema Part 1: Structures Second Edition", October 2004, <http://www.w3.org/TR/xmlschema-1/>.
- [W3C-XSD2] World Wide Web Consortium, "XML Schema Part 2: Datatypes Second Edition", October 2004, <http://www.w3.org/TR/xmlschema-2/>.

1.2.2 Informative References

None.

1.3 Protocol 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. Its value is that of a security descriptor that controls access to an entity.

1.5 Prerequisites/Preconditions

For this **property** to be exposed, a **WebDAV** method to retrieve or set is operated against an entity on which this property exists.

1.6 Applicability Statement

This **property** 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] section 2.4.6.

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

This **property** adds to the set of 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 [W3C-XSD1].

```
<?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: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:all>
</xs:complexType>

```



```

        <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: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 PidTagSecurityDescriptorAsXml

Canonical name: PidNameCalendarResources

Property set:

Property name: 0x0E6A

Data type: PtypString, 0x001F

Area: Common

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 SHOULD 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] section 2.4.6.

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.

Also, it is not possible to get this descriptor on an entity and set it back on the entity unless the caller also created the object. When the caller resets the security descriptor, the XML representation includes the owner, and the **store** (and NT) will not allow a normal user to set the owner of an object to anyone other than that user.

2.2.2 security_descriptor Element

Name: **security_descriptor**

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

Type: **microsoft.security_descriptor** (section 2.2.3)

Purpose: This is the type of descriptor specified in section 2.2.1.

Description: This type extends the **microsoft.security_descriptor** (section 2.2.3), adding a **bool** attribute of **from_mapi_tlh**.

2.2.2.1 from_mapi_tlh Attribute

Name: **from_mapi_tlh**

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

Type: **bool** (section 2.2.19)

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

Description: This value MAY be present. If present, it MUST be "1". Absence of this value implies that its value is "1".

2.2.3 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. It was designed to be analogous to the **SECURITY_DESCRIPTOR** structure ([MS-DTYP] section 2.4.6) and shares nearly all of the same field names.

2.2.4 revision Element

Name: **revision**
Namespace: http://schemas.microsoft.com/security/
Type: **unsignedInt**, as specified in [W3C-XSD2] section 3.3.22
Purpose: The revision of the **microsoft.security_descriptor** type (section 2.2.3).
Description: This field MAY be present. If present, its value MUST be set to "1". The absence of this element implies that its value is "1".

2.2.5 owner Element

Name: **owner**
Namespace: http://schemas.microsoft.com/security/
Purpose: Contains the **SID** (section 2.2.15) that specifies the owner of the entity to which the **security_descriptor** is associated.
Description: This element MAY be present. This is the same semantics as specified for **Owner** in [MS-DTYP] section 2.4.6.

2.2.5.1 defaulted Attribute

Name: **defaulted**
Namespace: http://schemas.microsoft.com/security/
Type: **bool** (section 2.2.19)
Purpose: Set when the owner (section 2.2.5) was established by default means.
Description: This attribute MUST be present for the **owner** element (section 2.2.5). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag OD.

2.2.6 primary_group Element

Name: **primary_group**
Namespace: http://schemas.microsoft.com/security/
Purpose: Contains the **SID** (section 2.2.15) 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 2.2.5). This is the same semantics as specified for **Group** in [MS-DTYP] section 2.4.6.

2.2.6.1 defaulted Attribute

Name: **defaulted**
Namespace: http://schemas.microsoft.com/security/
Type: **bool** (section 2.2.17)

Purpose: Set when the **primary_group** (section 2.2.6) was established by default means.

Description: This attribute MUST be present for the **primary_group** element (section 2.2.6). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag GD.

2.2.7 dacl Element

Name: **dacl**

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

Purpose: The discretionary **ACL** (section 2.2.9) contains **ACEs** (section 2.2.10) that grant or deny access to principals or groups.

Description: This is the same semantics as specified for **DACL** in [MS-DTYP] section 2.4.5.

2.2.7.1 defaulted Attribute

Name: **defaulted**

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

Type: **bool** (section 2.2.17)

Purpose: Set when the **DACL** (section 2.2.7) was established by default means.

Description: This attribute MUST be present for the **dacl** element (section 2.2.7). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag DD.

2.2.7.2 protected Attribute

Name: **protected**

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

Type: **bool** (section 2.2.17)

Purpose: Set when the **DACL** (section 2.2.7) should be protected from inherit operations.

Description: This attribute MUST be present for the **dacl** element (section 2.2.7). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag PD.

2.2.7.3 autoinherited Attribute

Name: **autoinherited**

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

Type: **bool** (section 2.2.17)

Purpose: Set when the **ACL** (section 2.2.7) was created through inheritance.

Description: This attribute MUST be present for the **dacl** element (section 2.2.7). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag DI.

2.2.8 sacl Element

Name: **sacl**
Namespace: <http://schemas.microsoft.com/security/>
Purpose: The system **ACL** (section 2.2.9) contains auditing **ACEs** (section 2.2.10).
Description: This is the same semantics as specified for system ACL in [MS-DTYP] section 2.4.5.

2.2.8.1 revision Element

Name: **revision**
Namespace: <http://schemas.microsoft.com/security/>
Type: **unsignedInt** as specified in [W3C-XSD2] section 3.3.22
Purpose: This attribute **MAY** be present for the **sacl** element (section 2.2.8). Serves the same purpose as the **AclRevision** element found in [MS-DTYP] section 2.4.5 and shares the same appropriate values.

2.2.8.2 audit_always Element

Name: **audit_always**
Namespace: <http://schemas.microsoft.com/security/>
Type: **acl** (section 2.2.9)
Purpose: The set of **ACEs** to generate audit messages for access attempts.
Description: This is the same semantic as specified in [MS-DTYP] section 2.4.4.1: AceFlags **FAILED_ACCESS_ACE_FLAG** and **SUCCESSFUL_ACCESS_ACE_FLAG**.

2.2.8.3 audit_on_failure Element

Name: **audit_on_failure**
Namespace: <http://schemas.microsoft.com/security/>
Type: **acl** (section 2.2.9)
Purpose: The set of **ACEs** to generate audit messages for failed access attempts.
Description: This is used in place of [MS-DTYP] section 2.4.4.1 AceFlag **FAILED_ACCESS_ACE_FLAG** and has the same semantic meaning.

2.2.8.4 audit_on_success Element

Name: **audit_on_success**
Namespace: <http://schemas.microsoft.com/security/>
Type: **acl** (section 2.2.9)
Purpose: The set of **ACEs** to generate audit messages for successful access attempts.
Description: This is used in place of [MS-DTYP] section 2.4.4.1 AceFlag **SUCCESSFUL_ACCESS_ACE_FLAG** and has the same semantic meaning.

2.2.8.5 defaulted Attribute

Name: **defaulted**
Namespace: <http://schemas.microsoft.com/security/>
Type: **bool** (section 2.2.17)

Purpose: Set when the system **ACL** (section 2.2.8) was established by default means.
Description: This attribute **MUST** be present for the **sacl** element (section 2.2.8). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag SD.

2.2.8.6 protected Attribute

Name: protected
Namespace: http://schemas.microsoft.com/security/
Type: **bool** (section 2.2.17)
Purpose: Set when the system **ACL** (section 2.2.8) should be protected from inherit operations.
Description: This attribute **MUST** be present for the **sacl** element (section 2.2.8). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag PS.

2.2.8.7 autoinherited Attribute

Name: autoinherited
Namespace: http://schemas.microsoft.com/security/
Type: **bool** (section 2.2.17)
Purpose: Set when the system **ACL** (section 2.2.8) was created by inheritance.
Description: This attribute **MUST** be present for the **sacl** element (section 2.2.8). This is the same semantics as specified in [MS-DTYP] section 2.4.6, relating to the Control bit flag SI.

2.2.9 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] section 2.4.5.

2.2.9.1 revision Element

Name: **revision**
Namespace: http://schemas.microsoft.com/security/
Type: **unsignedInt**, as specified in [W3C-XSD] section 3.3.22
Purpose: Indicates the version of the **ACL** Type (section 2.2.9).
Description: This element **MAY** exist. Serves the same purpose as the **AclRevision** element found in [MS-DTYP] section 2.4.5 and shares the same appropriate values.

2.2.9.2 effective_aces Element

Name: **effective_aces**
Namespace: http://schemas.microsoft.com/security/
Type: **aces** (section 2.2.10)
Purpose: This element **MAY** exist. Contains a list of **ACEs** that affect the entity of which **descriptor** (section 2.2.1) is a property.

2.2.9.3 subcontainer_inheritable_aces Element

Name: **subcontainer_inheritable_aces**
Namespace: <http://schemas.microsoft.com/security/>
Type: **inheritable_aces** (section 2.2.11)
Purpose: Contains a list of **ACEs** such that child objects that are containers, such as folders, inherit these ACEs as effective ACEs (section 2.2.9.2).
Description: This element MAY exist. Semantically the same as having each ACE within here having the CONTAINER_INHERIT_ACE flag set on the **AceFlags** as defined in [MS-DTYP] section 2.4.4.1.

2.2.9.4 subitem_inheritable_aces Element

Name: **subitem_inheritable_aces**
Namespace: <http://schemas.microsoft.com/security/>
Type: **inheritable_aces** (section 2.2.11)
Purpose: Contains a list of **ACEs** such that non-container child objects, such as attachments, inherit these ACEs as effective ACEs (section 2.2.9.2).
Description: This element MAY exist. Semantically the same as having each ace within here having the OBJECT_INHERIT_ACE flag set on them as specified in [MS-DTYP] section 2.4.4.1.

2.2.10 aces Type

Name: **aces**
Namespace: <http://schemas.microsoft.com/security/>
Purpose: Contains a list of non-inheritable **ACES** (section 2.2.10.1 through 2.2.10.6)
Description: All the ACEs in this type are semantically the same as having the flag ACE_INHERITED_OBJECT_TYPE not set as specified in [MS-DTYP] section 2.4.4.2.

2.2.10.1 access_allowed_ace Element

Name: **access_allowed_ace**
Namespace: <http://schemas.microsoft.com/security/>
Type: **ace_T** (section 2.2.12)
Purpose: Allows access to an entity for a specific trustee identified by a **SID** (section 2.2.17).
Description: This **ACE** is only allowed on **DACLs** (section 2.2.7). This element MAY exist. This ACE follows the same semantics as **ACCESS_ALLOWED_ACE**, as specified in [MS-DTYP] section 2.4.4.2.

2.2.10.2 access_denied_ace Element

Name: **access_denied_ace**
Namespace: <http://schemas.microsoft.com/security/>
Type: **ace_T** (section 2.2.12)
Purpose: Denies access to an entity for a specific trustee identified by a **SID** (section 2.2.17).

Description: This **ACE** is allowed only on **DACLs** (section 2.2.7). This element **MAY** exist. This ACE follows the same semantics as **ACCESS_DENIED_ACE**, as specified in [MS-DTYP] section 2.4.4.4.

2.2.10.3 **system_audit_ace** Element

Name: **system_audit_ace**
Namespace: <http://schemas.microsoft.com/security/>
Type: **ace_T** (section 2.2.12)
Purpose: System-audit ace.
Description: This **ACE** is only allowed on system **ACLs** (section 2.2.8). This element **MAY** exist. This ACE follows the same semantics as **SYSTEM_AUDIT_ACE**, as specified in [MS-DTYP] section 2.4.4.9.

2.2.11 **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 2.2.9.4) or **subcontainer_inheritable_aces** (section 2.2.9.3).

2.2.11.1 **access_allowed_ace** Element

Name: **access_allowed_ace**
Namespace: <http://schemas.microsoft.com/security/>
Type: **inheritable_ace_T** (section 2.2.15)
Purpose: Allows access to an entity for a specific trustee identified by a **SID** (section 2.2.17).
Description: This element **MAY** exist. This **ACE** is only allowed on **DACLs** (section 2.2.7). This ACE follows the same semantics as **ACCESS_ALLOWED_ACE**, as specified in [MS-DTYP] section 2.4.4.2.

2.2.11.2 **access_denied_ace** Element

Name: **access_denied_ace**
Namespace: <http://schemas.microsoft.com/security/>
Type: **inheritable_ace_T** (section 2.2.13)
Purpose: Denies access to an entity for a specific trustee identified by a **SID** (section 2.2.17).
Description: This element **MAY** exist. This **ACE** is only allowed on **DACLs** (section 2.2.7). This ACE follows the same semantics as **ACCESS_DENIED_ACE**, as specified in [MS-DTYP] section 2.4.4.4.

2.2.11.3 **system_audit_ace** Element

Name: **system_audit_ace**

Namespace: <http://schemas.microsoft.com/security/>
Type: **inheritable_ace_T** (section 2.2.15)
Purpose: System-audit ace.
Description: This element MAY exist. This **ACE** is only allowed on system **ACLs** (section 2.2.8). This ACE follows the same semantics as **SYSTEM_AUDIT_ACE**, as specified in [MS-DTYP] section 2.4.4.9.

2.2.12 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 2.2.10).

2.2.12.1 access_mask Element

Name: **access_mask**
Namespace: <http://schemas.microsoft.com/security/>
Type: **access_mask** (section 2.2.14)
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 2.2.14.

2.2.12.2 sid Element

Name: **sid**
Namespace: <http://schemas.microsoft.com/security/>
Type: **sid** (section 2.2.15)
Purpose: Identifies a security principal.
Description: This element MUST exist on all **ACEs**. Semantically the same as **SID** as specified in section 2.4.4 [MS-DTYP].

2.2.12.3 inherited Attribute

Name: **inherited**
Namespace: <http://schemas.microsoft.com/security/>
Type: **bool** (section 2.2.19)
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] section 2.4.4.1.

2.2.13 inheritable_ace_T Type

Name: **inheritable_ace_T**
Namespace: <http://schemas.microsoft.com/security/>
Purpose: The base type for all inheritable **ACEs** (section 2.2.11)

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] section 2.4.4.1.

2.2.13.1 no_propagate_inherit Attribute

Name: **no_propagate_inherit**
 Namespace: <http://schemas.microsoft.com/security/>
 Type: **bool** (section 2.2.17)
 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 found in section 2.4.4.1 [MS-DTYP] for the **AceFlags CONTAINER_INHERIT_ACE** and **OBJECT_INHERIT_ACE**.

2.2.14 access_mask Element

Name: **access_mask**
 Namespace: <http://schemas.microsoft.com/security/>
 Type: **hexBinary** [W3C-XSD2] 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. Clients **MUST** use the same definition of the top 16 bits that Windows does in [MS-DTYP] section 2.4.3. 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
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

2.2.15 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 2.2.18) with a "<sid>" element.

2.2.16 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 2.2.18.1)
<nt4_compatible_name>	(see section 2.2.18.2)
<type>	(see section 2.2.18.3)
<ad_object_guid>	(see section 2.2.18.4)
<display_name>	(see section 2.2.18.5)

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**.

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 2.2.18.1)
<nt4_compatible_name>	(see section 2.2.18.2)
<ad_object_guid>	(see section 2.2.18.4)
<display_name>	(see section 2.2.18.5)

The WebDAV server will only use one of the elements the WebDAV client gives it to determine the SID. It SHOULD pick the cheapest element to work from. The notion of cost of determining which SID the client means is according to the order of the previous list – so use **string_sid** if it is known, else **nt4_compatible_name**, and so on. As a last resort the client MAY use **display_name**, but because of the ambiguity problems, this would probably not be a good choice.

2.2.16.1 **string_sid** Element

Name: **string_sid**
Namespace: <http://schemas.microsoft.com/security/>
Type: **string** [W3C-XSD2] section 3.2.1.
Purpose: Identifies a security principal.
Description: This element MAY exist for any **SID** (section 2.2.15). This is the string representation of the SID as specified in section 2.4.2 [MS-DTYP].

2.2.16.2 **nt4_compatible_name** Element

Name: **nt4_compatible_name**
Namespace: <http://schemas.microsoft.com/security/>
Type: **string** [W3C-XSD2] section 3.2.1
Purpose: Identifies a security principal.
Description: This element MAY exist for any **SID** (section 2.2.15). 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-SECO] section 2.2.

2.2.16.3 **type** Element

Name: **type**
Namespace: <http://schemas.microsoft.com/security/>
Type: **type_string** (section 2.2.17)
Purpose: Value that specifies the type of **SID**.
Description: This element MAY exist for any **SID** (section 2.2.15). The enumeration of values is specified in section 2.2.19.

2.2.16.4 **ad_object_guid** Element

Name: **ad_object_guid**
Namespace: <http://schemas.microsoft.com/security/>
Type: **guid** (section 2.2.18)
Purpose: Identifies a security principal.
Description: This element MAY exist for any **SID** (section 2.2.15). 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-OLABK] can specify the entry by giving the **objectGuid** property.

2.2.16.5 **display_name** Element

Name: **display_name**
Namespace: <http://schemas.microsoft.com/security/>
Type: **string** [W3C-XSD2] section 3.2.1
Purpose: Identifies a security principal.

Description: This element MAY exist for any **SID** (section 2.2.15). 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-NSPI]. It can also be read from the directory service as **displayName** [MS-ADA1] section 2.175. The downside of identifying a security principal by using this element is that it MAY not be unique.

2.2.17 type_string Type

Name: **type_string**
Namespace: <http://schemas.microsoft.com/security/>
Purpose: Specifies the possible type of **NT_SID** (section 2.2.18).
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.
computer	A SID for a computer.

These values are semantically the same as those found in the enumeration **SID_NAME_USE**, as defined in [MS-SAMR] section 2.2.2.6.

2.2.18 guid Type

Name: **guid**
Namespace: <http://schemas.microsoft.com/security/>
Purpose: Globally unique identifier.
Description: Used to identify various things. Semantically the same as [MS-DTYP] section 2.3.2.1.

2.2.19 bool Type

Name: **bool**
Namespace: <http://schemas.microsoft.com/security/>
Type: **boolean** [W3C-XSD2]
Purpose: To indicate a **Boolean** state.
Description: This has the same meaning as specified in [W3C-XSD2] section 3.2.2, but is constrained to just the values of 0 (zero) and 1 .

3 Protocol Details

3.1 Client/Server Details

No additional detailed interaction between client and server beyond that specified in [RFC2518] applies.

It is important to note that the **descriptor property** (section 2.2.1) does define access control access to the targeted entity. It is possible for the client to set this property in such a way as to deny or grant access to the targeted entity, so care has to be taken to ensure that the access set is what is desired.

Also, it bears reiterating that the **descriptor property** that is retrieved from the server MAY be more complete than what is required of the client to set it. In section 2.2.1 it is mentioned that the client does not need to set the entire security descriptor in order to just modify the **DAACL** (section 2.2.7). Another way that the property might differ is in the **SID** (section 2.2.16) values. The server tries to generate all versions of the identifiers of the security principal, but the client MAY only generate one of them. It is recommended that the client generate the most precise one as specified in section 2.2.16 in order to be as accurate as possible.

3.1.1 Abstract Data Model

No additional data is required beyond that specified in [RFC2518].

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 client sends a **WebDAV** command that retrieves or sets the value of this **property**. 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 MAY 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** MAY 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>lf0fbf</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:access_allowed_ace S:inherited="1">
        <S:access_mask>lf0fbf</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>

```

To set a security descriptor using the **WebDAV PROPPATCH**, the property MAY 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>lf0fbf</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>lf0fbf</S:access_mask>
          <S:sid>
            <S:string_sid>S-1-5-7</S:string_sid>
          </S:sid>
      </S:effective_aces>
    </S:dacl>
  </S:security_descriptor>
</d:descriptor>

```

```

    </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 **property** has no security considerations beyond those specified in [RFC2518] section 17, [RFC2616] section 15, and [MS-DTYP] section 4.

5.2 Index of Security Parameters

None.

6 Appendix A: Office/Exchange Behavior

The information in this specification is applicable to the following versions of Office/Exchange:

- Office 2003 with Service Pack 3 applied
- Exchange 2003 with Service Pack 2 applied
- Office 2007 with Service Pack 1 applied
- Exchange 2007 with Service Pack 1 applied

Exceptions, if any, are noted below. Unless otherwise specified, any statement of optional behavior in this specification prescribed using the terms SHOULD or SHOULD NOT implies Office/Exchange behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies Office/Exchange does not follow the prescription.

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