

# [MS-OXPHISH]: Phishing Warning Protocol Specification

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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		Revised and edited technical content.
09/03/2008	1.02		Updated references.
12/03/2008	1.03		Updated IP notice.
02/04/2009	1.04		Revised and edited technical content.
03/04/2009	1.05		Revised and edited technical content.
04/10/2009	2.0		Updated applicable product releases.
07/15/2009	3.0	Major	Revised and edited for technical content.
11/04/2009	3.0.1	Editorial	Revised and edited the technical content.
02/10/2010	4.0.0	Major	Updated and revised the technical content.
05/05/2010	4.1.0	Minor	Updated the technical content.
08/04/2010	4.2	Minor	Clarified the meaning of the technical content.

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# 1 Introduction

This document specifies the Phishing Warning Protocol that is used by the client to identify and mark e-mail **messages** that are designed to trick recipients into divulging sensitive information (such as passwords and/or other personal information) to a non-trustworthy source.

## 1.1 Glossary

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

**big-endian**  
**GUID**  
**handle**  
**little-endian**  
**message**  
**Message object**  
**named property**  
**phishing**  
**phishing message**  
**property (1)**  
**property ID**  
**remote operation (ROP)**

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](mailto: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-OXCADATA] Microsoft Corporation, "[Data Structures](#)", April 2008.

[MS-OXCMSG] Microsoft Corporation, "[Message and Attachment Object Protocol Specification](#)", April 2008.

[MS-OXCPRPT] Microsoft Corporation, "[Property and Stream Object Protocol Specification](#)", April 2008.

[MS-OXCROPS] Microsoft Corporation, "[Remote Operations \(ROP\) List and Encoding Protocol Specification](#)", April 2008.

[MS-OXCSPAM] Microsoft Corporation, "[Spam Confidence Level Protocol Specification](#)", April 2008.

[MS-OXOMSG] Microsoft Corporation, "[E-Mail Object Protocol Specification](#)", April 2008.

[MS-OXOSFLD] Microsoft Corporation, "[Special Folders Protocol Specification](#)", April 2008.

[MS-OXPROPS] Microsoft Corporation, "[Exchange Server Protocols Master Property List](#)", April 2008.

[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>

### 1.2.2 Informative References

[MS-OXGLOS] Microsoft Corporation, "[Exchange Server Protocols Master Glossary](#)", April 2008.

## 1.3 Overview

This protocol enables the client to identify and mark e-mail messages that are likely to be **phishing**. When an e-mail message is delivered to a messaging client, the client examines the message **properties** to determine the likelihood of it being a **phishing message**. If the examination determines that the message is likely to be phishing, the client modifies a property on the message to mark it as suspicious. A messaging client's user interface can utilize this property value to identify a potential phishing message and display a warning to the end-user.

This protocol does not specify the algorithm that determines the likelihood of a message being a phishing message; it only specifies how the **Message object** is changed to indicate the result of the algorithm.

## 1.4 Relationship to Other Protocols

The Phishing Warning Protocol uses a property on the Message object as a means of identifying and marking messages that are likely to be phishing. Therefore, this specification relies on the following:

- An understanding of the Message object, as specified in [\[MS-OXOMSG\]](#).
- An understanding of getting and setting properties, as specified in [\[MS-OXCMSG\]](#).

## 1.5 Prerequisites/Preconditions

This specification assumes that the client has previously logged on to the server and has acquired a **handle** to the message for which it has to identify or designate phishing status.

## 1.6 Applicability Statement

A client can use this protocol to identify or mark messages that are likely to be phishing. This protocol does not specify the algorithm that determines the likelihood of a message that is a phishing message; it only specifies how the Message object is changed to indicate the result of such analysis.

## 1.7 Versioning and Capability Negotiation

None.

## 1.8 Vendor-Extensible Fields

None.

## 1.9 Standards Assignments

None.

## 2 Messages

### 2.1 Transport

Message properties are transported between client and server, as specified in [\[MS-OXCMSG\]](#). This protocol references commonly used data types, as specified in [\[MS-OXCDATA\]](#).

### 2.2 Message Syntax

Before sending requests to the server, the client MUST obtain a handle to the Message object used in property operations.

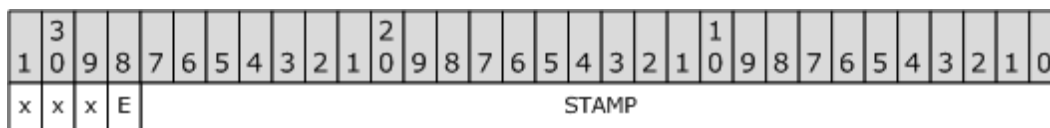
#### 2.2.1 Phishing Warning Protocol Properties

The following properties are specific to the Phishing Warning Protocol.

##### 2.2.1.1 PidNamePhishingStamp

Type: **PtypInteger32**

The value of this **named property** is a 32-bit field. The structure is specified as follows. For clarity, individual fields are presented in **big-endian** byte order, but the diagram does not reflect the actual byte ordering of the **PtypInteger32** value in the **remote operation (ROP)** buffer. The value of this **PtypInteger32** property is encoded in **little-endian** byte order in the ROP buffer.



**E: (ENABLED)** bitmask 0x10000000) If the value of this field is 1, the user has enabled functionality (such as hyperlinks, reply, and attachments) within the message. The default value for this field is zero (0), which indicates that the user has not enabled functionality.

**STAMP:** (bitmask 0xFFFFFFFF) This field is obtained from the fifth value of the [PidTagAdditionalRenEntryIds](#) property ([\[MS-OXPROPS\]](#) section 2.588, [\[MS-OXOSFLD\]](#) section 2.2.2).

**x:** Unused. These bits SHOULD be set to zero (0) by the client and ignored by the server.

The client SHOULD set this property if it is determined that the message is likely to be phishing. The client SHOULD use the value of this property to warn the user when a message is likely to be phishing.

## 3 Protocol Details

The role of the client is to determine whether a message is phishing and to update the [PidNamePhishingStamp](#) property (as specified in section [3.1.1.1](#)) to indicate the results of such analysis. The client then checks the value of the [PidNamePhishingStamp](#) property when the message is opened, and conveys a warning to the end user for any message that is likely to be phishing.

### 3.1 Client Details

#### 3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with the behavior described in this document.

##### 3.1.1.1 Setting the PidNamePhishingStamp Property

When the client determines that a message is phishing, it updates the value of the [PidNamePhishingStamp](#) property ([\[MS-OXPROPS\]](#) section 2.525) to indicate whether the message is likely to be phishing.

The [PidNamePhishingStamp](#) property value ([\[MS-OXPROPS\]](#) section 2.525) is calculated as follows:

A query for the fifth value in the [PidTagAdditionalRenEntryIds](#) property ([\[MS-OXPROPS\]](#) section 2.588, [\[MS-OXOSFLD\]](#) section 2.2.2) is performed. Let the queried value be called `QueriedValue_FromEntryID`.

The mask (0x0FFFFFFF) is then applied to `QueriedValue_FromEntryID`. That is, the bitwise operation (0x0FFFFFFF AND `QueriedValue_FromEntryID`) is performed to produce the **STAMP** field of [PidNamePhishingStamp](#) ([\[MS-OXPROPS\]](#) section 2.525).

If the user has not enabled functionality on the message, the value of the **ENABLED** field is zero (0) and the final property value is the same as the value of the **STAMP** field. If the user determines that the message is not a phishing message and indicates as such by interaction with the user interface, the final [PidNamePhishingStamp](#) property value ([\[MS-OXPROPS\]](#) section 2.525) with **ENABLED** field 1 is produced by applying the bitwise operation (**STAMP** OR 0x10000000).

##### 3.1.2 Timers

None.

##### 3.1.3 Initialization

Before matching the [PidNamePhishingStamp](#) on the message, the existence of the fifth value of [PidTagAdditionalRenEntryIds](#) MUST be ensured. If it is not present, the value MUST be created (as specified in [\[MS-OXCSPAM\]](#) section 3.1.4.1.2).

### 3.1.4 Higher-Layer Triggered Events

#### 3.1.4.1 Client Receives a New Message

When the client receives a new message, the client determines whether the message is likely to be phishing. If on delivery, the client determines that the message is likely to be phishing, the client sets the [PidNamePhishingStamp](#) property on the message (as specified in section [3.1.1.1](#)).

#### 3.1.4.2 End-User Opens a Message

When an end user opens a message, the client tries to retrieve the value of the [PidNamePhishingStamp](#) property (as specified in section [2.2.1](#)). If the property is present, its **STAMP** field is compared against the fifth value of the multi-valued property [PidTagAdditionalRenEntryIds](#). If this comparison does not result in a match, the [PidNamePhishingStamp](#) property SHOULD be ignored. If the comparison results in a match, the client considers the message to be a phishing message. If the value of the **ENABLED** field in the [PidNamePhishingStamp](#) property is 1, the user has enabled the functionality, and the client SHOULD display the message as a normal message. If the value of the **ENABLED** field in the [PidNamePhishingStamp](#) property is zero (0), the client SHOULD disable the functionality of the message. The functionality that the client chooses to disable (according to the value of the **ENABLED** field in the [PidNamePhishingStamp](#) property) is implementation-dependent.

The user has the option to enable all functionality within a message by interaction with the user interface. If the user enables functionality within a message, the value of the **ENABLED** field of the [PidNamePhishingStamp](#) property on that message (as specified in section [2.2.1](#)) is set to 1.

The functionality is also enabled when the [PidTagJunkPhishingEnableLinks](#) property (as specified in [\[MS-OXCSPAM\]](#)) is set to TRUE.

### 3.1.5 Message Processing Events and Sequencing Rules

None.

### 3.1.6 Timer Events

None.

### 3.1.7 Other Local Events

None.



## 4 Protocol Examples

### 4.1 Setting the PidNamePhishingStamp Property

When the client receives a new message, the client determines whether the message is likely to be phishing. If the client determines that the message is likely to be phishing, the client sets the [PidNamePhishingStamp](#) property ([MS-OXPROPS] section 2.525) on the message (as specified in section 3.1.1.1) on message delivery. The client calculates the [PidNamePhishingStamp](#) property value ([MS-OXPROPS] section 2.525) as described in the following example:

If the fifth value queried from [PidTagAdditionalRenEntryIds](#) ([MS-OXPROPS] section 2.588, [MS-OXOSFLD] section 2.2.2) is 0xAE241D99, the client begins calculating the [PidNamePhishingStamp](#) property ([MS-OXPROPS] section 2.525) by setting the **STAMP** field as follows: (0xAE241D99 AND 0xFFFFFFFF) = 0x0E241D99.

The value of the **ENABLED** field of the [PidNamePhishingStamp](#) property ([MS-OXPROPS] section 2.525) can be either zero (0), if the user has not enabled the functionality of the message, or 1, if the user has enabled the functionality of the message. If the value of the **ENABLED** field is zero (0), the final [PidNamePhishingStamp](#) property value ([MS-OXPROPS] section 2.525) is 0x0E241D99. If the value of the **ENABLED** field is 1, the final [PidNamePhishingStamp](#) property value ([MS-OXPROPS] section 2.525) is the result of the bitwise operation (0x0E241D99 OR 0x10000000) = 0x1E241D99.

### 4.2 Evaluating the PidNamePhishingStamp Property

For purposes of the examples in section 4.2, let the fifth value queried from [PidTagAdditionalRenEntryIds](#) be called **PhishingTagValue**.

#### 4.2.1 No PidNamePhishingStamp Property

If the [PidNamePhishingStamp](#) property (section 2.2.1.1) is absent from a message, the client will treat the message as non-phishing.

#### 4.2.2 PidNamePhishingStamp Property Mismatch

If the [PidNamePhishingStamp](#) property is present, the client will compare its **STAMP** field with the least significant 28 bits of **PhishingTagValue**. If the [PidNamePhishingStamp](#) property value is 0x0EAE2103 and **PhishingTagValue** is 0xAE241D99, the comparison does not result in a match. Therefore, the client ignores the [PidNamePhishingStamp](#) property, resulting in enabled message functionality and no added phishing-related user interface elements.

#### 4.2.3 PidTagJunkPhishingEnableLinks Property Set to True

If the [PidTagJunkPhishingEnableLinks](#) property is present and is set to **true**, the client will ignore the [PidNamePhishingStamp](#) property and will treat the message as non-phishing.

#### 4.2.4 Phishing Message Functionality Not Enabled By the User

If the [PidNamePhishingStamp](#) property is present, the client will compare its **STAMP** field with the least significant 28 bits of **PhishingTagValue**. If the [PidNamePhishingStamp](#) property value is 0x0E241D99, and **PhishingTagValue** is 0xAE241D99, the comparison results in a match, indicating that the message is likely to be phishing. If the value of the **ENABLED** field of the [PidNamePhishingStamp](#) property (as specified in section 2.2.1) is zero (0), the user has not enabled functionality within the message. Therefore, the client will disable functionality within the message,

display a warning to the user, and add phishing-related user interface elements that allow the user to enable message functionality.

#### 4.2.5 Phishing Message Functionality Enabled By the User

If the [PidNamePhishingStamp](#) property is present, the client will compare its **STAMP** field with the least significant 28 **bits** of **PhishingTagValue**. If the [PidNamePhishingStamp](#) property value is 0x1E241D99 and **PhishingTagValue** is 0xAE241D99, the comparison results in a match, which indicates that the message is likely to be phishing. Because the value of the **ENABLED** field of the [PidNamePhishingStamp](#) property is 1, the user has enabled functionality within the message. Therefore, the client will treat the message as non-phishing.

#### 4.3 Sample Properties on a Phishing Message

The following is a description of what a client does to stamp the message that has been identified as phishing and the responses that a server returns. The ROP input and responses are summarized in this section; for a complete explanation of how to set properties by using [RopSetProperties](#), see [\[MS-OXCPRPT\]](#) section 2.2.5.

Because the [PidNamePhishingStamp](#) property (section [2.2.1.1](#)) is a named property, the client asks the server to perform mapping from named properties to **property IDs**, by using [RopGetPropertyIDsFromNames](#), as specified in [\[MS-OXCROPS\]](#) section 2.2.8.1.

Property	Property Set GUID	Name or ID
<a href="#">PidNamePhishingStamp</a> (section <a href="#">2.2.1.1</a> )	{00020329-0000-0000-C000-000000000046}	http://schemas.microsoft.com/outlook/phishingstamp

The server returns the following property IDs in response to [RopGetPropertyIDsFromNames](#) ([\[MS-OXCROPS\]](#) section 2.2.8.1).

Property	Property ID
<a href="#">PidNamePhishingStamp</a> (section <a href="#">2.2.1.1</a> )	0x831F

After determining the value of the property, the client uses [RopSetProperties](#) ([\[MS-OXCPRPT\]](#) section 2.2.5) to transmit the data to the server.

Property	Property ID	Property Type	Value
<a href="#">PidNamePhishingStamp</a> (section <a href="#">2.2.1.1</a> )	0x831F	0x0003(PT_LONG)	0x0A73AE09

If the user enables the functionality of the phishing message, the property value is changed and the client uses [RopSetProperties](#) ([\[MS-OXCPRPT\]](#) section 2.2.5) to transmit the new value to the server.

Property	Property ID	Property Type	Value
<a href="#">PidNamePhishingStamp</a> (section <a href="#">2.2.1.1</a> )	0x831F	0x0003(PT_LONG)	0x1A73AE09

The client then uses [RopSaveChangesMessage](#) ([\[MS-OXCROPS\]](#) section 2.2.6.3) to commit the properties to the server.

## 5 Security

### 5.1 Security Considerations for Implementers

On delivery of the message, the presence of the [PidNamePhishingStamp](#) with a successful match of the **STAMP** field signals the client that the message has already been evaluated for phishing and does not have to be filtered again. Therefore, care has to be taken while setting the [PidNamePhishingStamp](#) property on the message and all precautions for evaluation of the fifth value of [PidTagAdditionalRenEntryIds](#) have to be followed (as specified in [\[MS-OXCMSG\]](#)).

### 5.2 Index of Security Parameters

None.

## 6 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products:

- Microsoft® Office Outlook® 2007
- Microsoft® Exchange Server 2007
- Microsoft® Outlook® 2010
- Microsoft® Exchange Server 2010

Exceptions, if any, are noted below. If a service pack number appears with the product version, behavior changed in that service pack. 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 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 product does not follow the prescription.

## 7 Change Tracking

This section identifies changes that were made to the [MS-OXPHISH] protocol document between the May 2010 and August 2010 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type "Editorially updated."

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact [protocol@microsoft.com](mailto:protocol@microsoft.com).

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
<a href="#">1.2.1 Normative References</a>	55751 Moved [MS-OXGLOS] from Normative References section to Informative References section.	N	Content update.
<a href="#">1.2.1 Normative References</a>	57624 Added [MS-OXPROPS] to list of references.	N	Content update.

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