ICMP ActiveX Control for Microsoft® Windows™

1 ICMP Overview

1.1 Introduction

The Magneto Software ICMP (Internet Control Message Protocol) ActiveX control (skicmp.ocx) allows developers to integrate the ICMP protocol message sending capability into their 32-Bit or 64-Bit applications without making calls directly to a Dynamic Link Library (DLL).
ICMP supports packets containing error, control, and informational messages.
The Magneto Software ICMP custom control takes care of creating an ICMP handle and sending the ICMP message to the desired host. Reply sent from the host is decoded and necessary information is passed to the application.
All functionality normally associated with an ICMP library is taken care of by setting properties and by handling events. Properties can be changed at run time. Events occur to inform the application of errors and changes in the connection status and to deliver the incoming data.
Applications, which call a DLL directly are either notified of errors, connection changes and incoming data by an upcall posted by the library to the applications window or by making polling calls to the library at frequent intervals.
Some environments, such as Visual Basic, are not designed for either of these two methods. Using a custom control in an application frees the developer from handling upcalls or polling. Instead, events fired by the control deliver incoming data, errors and status changes directly to the application.

1.2 Usage

To change skicmp.ocx from ping mode to traceroute mode the only property needs to change – **optTraceRoute** right before using **ICMPSendEchoRequest.**
It is set to 0 for the ping requests, and set to non-zero for traceroute requests.
Ping mode is used to send ICMP echo requests to an IP address, and wait for ICMP echo responses. Ping reports on the number of responses received and the time interval between sending the request and receiving the response.
Traceroute works by sending ICMP echo requests to an
IP address, while incrementing the time-to-live (TTL) field in the IP header by one starting at 1, and analyzing ICMP errors that get returned. Each succeeding echo request should get one hop further into the network before the TTL field reaches 0 and an ICMP Time exceeded error is returned by the router attempting to forward it. Traceroute simply prints out an ordered list of the routers in the path that returned these error messages.

1.3 Property Summary

optCount
Number of echo requests to send.
Ping the specified host until stopped if set to 0
optDoNotFragment
Set don't fragment flag in packet
optInterval
Interval in seconds between two packets in Ping mode
optRecordRoute
Record route for count hops.
optResolve
Resolve addresses to hostnames
optSize
Send buffer size
optTimeout
Timeout in milliseconds to wait for each reply
optTimestamp
Timestamp for count hops
optTOS
Type Of Service
optTraceRoute
Mode (Ping or Traceroute)
optTraceRouteMaxHopsNumber
Maximum number of hops to search for target
optTTL
Time To Live

1.4 Event Summary

IcmpCompleted
Indicates that skicmp.ocx has stopped processing ICMP replies.
IcmpReplyReceived
ICMP echo reply is received (Ping or Traceroute).
PingCompleted
Indicates that skicmp.ocx has stopped processing Ping replies.
PingReplyReceived
Ping echo reply is received.
TraceRouteCompleted
Indicates that skicmp.ocx has stopped processing Traceroute replies.
TraceRouteReplyReceived
Traceroute echo reply is received.

1.5 Method Summary

AboutBox
Display a dialog box with SKICMP activeX control license and version information.
AddDestinationAddressEntry
Adds entry to the destination address list (DAL).
CountDestinationAddressEntries
Counts entries in DAL
DeleteDestinationAddressByIndex
Deletes entry from DAL by index
GetAnyActiveDestinationEntries

Enumerates through the DAL entries and trying to send an ICMP packets to the remote hosts specified in the DAL.
GetDestinationAddressByIndex
Returns the DAL entry information given the entry index.
GetNextActiveDestinationAddress
Returns the next DAL entry information given the previous entry index.
ICMPReset
Stop all ICMP messages (Ping and Traceroute).
ICMPSendEchoRequest
Send an ICMP Request
ImportDestinationAddressList
Imports DAL table from specified remote host. If the currently logged user
Is not logged in to the remote machine, this method will fail with error ERROR_ACCESS_VIOLATION
PingGetReply
Retrieves Ping echo reply.
PingReset
Stop Ping messages (Traceroute messages will not be affected).
ResetICMPSettings
Reset all ICMP settings back to default values.
TracerouteGetReply
Retrieves Traceroute echo reply.
TraceRouteReset
Stop Traceroute messages (Ping messages will not be affected).

1.6 Error codes

The following provides a complete listing of error codes returned by SKICMP ActiveX control.

IP_SUCCESS (0)	IP Success
IP_BUF_TOO_SMALL (11001)	IP Buffer Too Small
IP_DEST_NET_UNREACHABLE (11002)	IP Destination Net Unreachable
IP_DEST_HOST_UNREACHABLE (11003)	IP Destination Host Unreachable
IP_DEST_PROT_UNREACHABLE (11004)	IP Destination Protocol Unreachable
IP_DEST_PORT_UNREACHABLE (11005)	IP Destination Port Unreachable
IP_NO_RESOURCES (11006)	IP No Resources
IP_BAD_OPTION (11007)	IP Bad Option
IP_HW_ERROR (11008)	IP Hardware Error
IP_PACKET_TOO_BIG (11009)	IP Packet Too Big
IP_REQ_TIMED_OUT (11010)	IP Request Timed Out
IP_BAD_REQ (11011)	IP Bad Request
IP_BAD_ROUTE (11012)	IP Bad Route
IP_TTL_EXPIRED_TRANSIT (11013)	IP TimeToLive Expired Transit
IP_TTL_EXPIRED_REASSEM (11014)	IP TimeToLive Expired Reassembly
IP_TTL_EXPIRED_REASSEM (11015	IP Parameter Problem
IP_SOURCE_QUENCH (11016)	IP Source Quench
IP_OPTION_TOO_BIG (11017)	IP Option Too Big
IP_BAD_DESTINATION (11018)	IP Bad Destination

2 Properties

2.1 optAutoSave

Summary
Automatically save parameters on exit.
Description
This property specifies whether parameters should be saved on exit. By default this value will be set to 1. If this value is 0, skicmp.ocx will net save parameters on exit.
This property is of type short.
VB Example
SKICMP. optAutoSave = 0

2.2 optCount

Summary
Number of echo requests to send.
Description
This property specifies the number of times that you want to resend your requests if it times out. By default this value will be set to 4. If this value is 0, skicmp.ocx will ping the specified host until stopped.
This property is of type short.
VB Example

```
Dim Count As Integer
Count = 4
SKICMP.optCount = Count
```

2.3 optDoNotFragment

Summary
Set Don't Fragment flag in the IP header options to be sent.
Description
This property specifies the flags field contained in the IP header of the packet to be sent.
This property is of type short.
0=MayFragment, 1=Don’t Fragment
The default value for this property is 1, which means, don't fragment flag is set.
VB Example
ICMP.optDoNotFragment = 1

2.4 optInterval

Summary
Interval in seconds between two packets in Ping mode.
Description
By default this value will be set to 1.
Is applicable only in Ping mode
This property is of type long.
VB Example

```
Dim Interval As Integer
Interval = 3600    'send a packet every hour (3600 seconds)
ICMP.optInterval =Interval
```

2.5 optRecordRoute

Summary
Record route for count hops.
Description
By default this value will be set to 0.
This option has to be set to value between 0 and 9.
This property is of type short.
VB Example

```
Dim RecordRoute As Integer
RecordRoute = 9
ICMP.optRecordRoute = RecordRoute
```

2.6 optResolve

Summary
Resolve addresses to hostnames
Description
This property will enable an automatic lookup of the host name by IP address. This is to be able to supply the user with the host name. If the user does not need the name of the replying host, and wishes to decrease the network traffic this option has to be turn off. By default this value will be set to 0 (turned off).
This property is of type short.
VB Example

```
Dim Timestamp As Integer
Resolve = 1
ICMP.optResolve = Resolve
```

2.7 optSize

Summary
Send buffer size.
Description
This property specifies the send buffer size. By default this value will be set to 64.
This property is of type short.
VB Example

```
Dim Size As Integer
Count = 128
SKICMP.optSize = Size
```

2.8 optTimeout

Summary
Timeout value in milliseconds to wait for replies.
Description
This property specifies the timeout value in milliseconds that is used to wait for a reply when a request packet is sent. The application must set this value before the request is sent. By default this value is set to 2 second. (2000 milliseconds)
This property is of type long.
VB Example

```
Dim Time As Long
Time = 2000
SKICMP.optTimeout = Time
```

2.9 optTimestamp

Summary
Timestamp for count hops.
Description
By default this value will be set to 0.
This option has to be set to value between 0 and 4.
This property is of type short.
VB Example

```
Dim Timestamp As Integer
Timestamp = 2
ICMP.optTimestamp = Timestamp
```

2.10 optTOS

Summary

Type of service field in the IP header of the packet to be sent.

Description

This property specifies the TOS value to be placed in the IP header of the packet to be sent. Type of service provides an indication of the abstract parameters of the quality of service desired. These parameters are to be used to guide the selection of the actual service parameters when transmitting a datagram through a particular network. Several networks offer service precedence, which somehow treats high precedence traffic as more important than other traffic. The major choice is a three-way tradeoff between low-delay, high-reliability, and high throughput. This value is 8bit value and its syntax is given below.

Bits 0-2: Precedence.
Bit 3: 0 = Normal Delay, 1 = Low Delay.
Bit 4: 0 = Normal Throughput, 1 = High Throughput
Bit 5: 0 = Normal Reliability, 1 = High Reliability.
Bit 6-7: Reserved for future Use.
Precedence
111 – Network Control
110 – Internetwork Control
101 – CRITIC/ECP
100 – Flash Override
011 – Flash
010 – Immediate
001 – Priority
000 – Routine

0 is the default value for this property. If this property is used then it should be set in unsigned short as only LSB will be extracted and used. If more information is required please refer to RFC 791on IP protocol header format and its usage. Possible range of values for this property is between 0 and 63.

VB Example

SKICMP.optTOS = 0

With 0 as the default value every packet is set for Routine treatment with Normal Delay, Normal throughput, and Normal Reliability.

2.11 optTraceRoute

Summary
Mode (Ping or Traceroute)
Description
This property specifies the mode of the ICMP requests that will be issued after setting this option by calling ICMPSendEchoRequest().
This property value for Ping mode is 0, for Traceroute mode is 1.
Default value for this property is 0 (Ping mode).
VB Example
SKICMP.optTraceRoute = 0 Ping mode

2.12 optTraceroutePacketCount

Summary
Maximum number of packets per hop to search for target.
Description
By default this value will be set to 3.
To use skicmp.ocx in traceroute mode this option has to be set to value between 1 and 3.
This property should be initialized before calling the ICMPSendEchoRequest method.
This property is of type short.
VB Example
ICMP. optTraceroutePacketCount = 1

2.13 optTraceRouteMaxHopsNumber

Summary
Maximum number of hops to search for target.
Description
By default this value will be set to 30.
To use skicmp.ocx in traceroute mode this option has to be set to value between 0 and 255.
This property should be initialized before calling the ICMPSendEchoRequest method.
This property is of type short.
VB Example

```
MaxHops = 60
ICMP.optTraceRouteMaxHopsNumber = MaxHops
```

2.14 optTTL

Summary

Time to live field in the IP header to be sent.

Description

This property specifies the TTL value to be put in the IP header options. TTL is decremented at every hop and is used to have an upper bound on the time that a datagram can spend in the Internet before getting to the destination. If TTL becomes 0, the datagram is discarded. The time is measured in units of seconds, but since every module that processes a datagram must decrease the TTL by at least one even if it processes the datagram in less than a second, the TTL must be thought of only as an upper bound on the time a datagram may exist. Values used for this property are between 0 and 255 and it is of type short.

Default value for this property is 255.

VB Example

```
SKICMP.optTTL = 255
```

2.14 optUseIpProtocolVersion

Summary
Version of the Internet Protocol to be used
Description
This property specifies the version of the Internet Protocol to use.
Values used for this property are between -1 and 3 and it is of type short.
-1: Prefer using IPv6: if a target address resolves to IPv4 and IPv6 IP addresses, IPv6 will be used.
0: Prefer using IPv4: if a target address resolves to IPv4 and IPv6 IP addresses, IPv4 will be used.
1: Force using IPv6: use of IPv6 protocol is enforced.
2: Force using IPv4: use of IPv4 protocol is enforced.
Default value for this property is -1 - Prefer using IPv6.
VB Example
SKICMP. optUseIpProtocolVersion = 0

3 Events

3.1 IcmpCompleted

Summary
Indicates that skicmp.ocx has stopped processing ICMP replies.
Syntax
IcmpCompleted()
Description
skicmp.ocx allows for processing of multiple Ping and multiple Traceroute requests by the same program simultaneously. This event can have a high importance for the application presentation logic, like Start/Stop buttons and other.
Parameters
None.

3.2 IcmpReplyReceived

Summary
ICMP echo reply is received (Ping or Traceroute).
Syntax
IcmpReplyReceived(BSTR *strRemoteAddress*, BSTR *strMessage*, short *nStatus*)
Description
The IcmpReplyReceived event occurs whenever a reply to an echo request is received.
Parameters
strRemoteAddress is the name of the remote host that was queried,
strMessage is the string message representing the result of the operation and
nStatus is the return status of each individual reply. See section 1.6 Error Codes the complete list of supported error codes.

3.3 PingCompleted

Summary
Indicates that skicmp.ocx has stopped processing Ping replies.
Syntax
PingCompleted()
Description
skicmp.ocx allows for processing of multiple Ping and multiple Traceroute requests by the same program simultaneously. This event can have a high importance for the application presentation logic, like Start/Stop buttons and other.
Parameters
None.

3.4 PingReplyReceived

Summary

Ping echo reply is received.

Syntax

PingReplyReceived(BSTR *strRemoteAddress*, long *lStatus*, BSTR *strReplyingAddress*, BSTR *strResolvedReplyingAddress*, short *nDataSize*, long *lRoundTripTime*, short *nTTL*, BSTR *strCountHopsInfo*)

Description

The PingReplyReceived event occurs whenever a Ping reply to a Ping request is received.

Parameters

strRemoteAddress is the name of the remote host that was queried,
lStatus is the return status of each individual reply. See section 1.6 Error Codes the complete list of supported error codes,
strReplyingAddress is the name of the replying remote host,
strResolvedReplyingAddress is the resolved name of the replying remote host; this argument may have a *value* if optResolve is set to 1.
nDataSize is the Ping reply packet size,
lRoundTripTime is the round trip time in milliseconds,
nTTL is the Ping reply packet TTL value,
strCountHopsInfo is the route info, this argument may have route info if optRecordRoute or optTimestamp is greater then 0.

3.4 TraceRouteCompleted

Summary
Indicates that skicmp.ocx has stopped processing Traceroute replies.
Syntax
TraceRouteCompleted()
Description
skicmp.ocx allows for processing of multiple Ping and multiple Traceroute requests by the same program simultaneously. This event can have a high importance for the application presentation logic, like Start/Stop buttons and other.
Parameters
None.

3.5 TraceRouteReplyReceived

Summary

Traceroute echo reply is received.

Syntax

TracerouteReplyReceived(BSTR *strRemoteAddress*, long *lStatus*, BSTR *strReplyingAddress*,
BSTR *strResolvedReplyingAddress*, short *nDataSize*, long *lRoundTripTime*,
short *nTtl*, short *nHop*, short *nPacket*)

Description

The TracerouteReplyReceived event occurs whenever a Traceroute reply to a Traceroute request is received.

Parameters

strRemoteAddress is the name of the remote host that was queried,
lStatus is the return status of each individual reply. See section 1.6 Error Codes the complete list of supported error codes,
strReplyingAddress is the name of the replying remote host,
strResolvedReplyingAddress is the resolved name of the replying remote host; this argument may have a *value* if optResolve is set to 1.
nDataSize is the Ping reply packet size,
lRoundTripTime is the round trip time in milliseconds,
nTTL is the Ping reply packet TTL value,
nHop is the hop index, starting from 0,
nPacket is the packet index, starting from 1.

4 Methods

4.1 AboutBox

Summary
Display a dialog box with SKICMP activeX control license and version information.
Syntax
void AboutBox();
Description
This method could be used to display version license information or to register skicmp.ocx control.
Parameters
None.

4.2 AddDestinationAddressEntry

Summary
Adds an entry to the destination address list (DAL).
Syntax
long AddDestinationAddressEntry(BSTR *bstrDestinationAddress*)
Description
It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed, otherwise it will be set to the error code.
Parameters
bstrDestinationAddress is the name of the remote host to be added to the DAL.

4.3 CountDestinationAddressEntries

Summary
Counts all entries in the destination address list (DAL).
Syntax
short CountDestinationAddressEntries (BSTR *bstrDestinationAddress*)
Description
It returns a number of entries in the DAL.
If calls fails it returns 0.
Parameters
None.

4.4 DeleteDestinationAddressEntry

Summary
Deletes an entry from the destination address list (DAL) given the entry name.
Syntax
void DeleteDestinationAddressEntry(BSTR *bstrDestinationAddress*)
Parameters
bstrDestinationAddress is the name of the remote host to be deleted from the DAL.

4.5 GetAnyActiveDestinationAddress

Summary

Enumerates through the destination address list (DAL) entries while querying them with ICMP echo requests.

Syntax

long GetAnyActiveDestinationAddress(BSTR* *pbstrDestinationAddress*, short* *pnIndex*)

Description

It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed and an active host found, otherwise it will be set to the error code.

If successful, *pbstrDestinationAddress* contains an active host name; *pnIndex* contains an index of this host name in the DAL.

Parameters

bstrDestinationAddress is a first active host name from the DAL,

pnIndex is an index of this host (starting from 0).

4.6 GetDestinationAddressByIndex

Summary
Returns the DAL entry information given the entry index.
Syntax
long GetDestinationAddressByIndex(short *nIndex*, BSTR* *pbstrDestinationAddress*)
Description
It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed and an active host found, otherwise it will be set to the error code.
If successful, *pbstrDestinationAddress* contains host name from DAL that corresponds to *nIndex*.
Parameters
nIndex is an ordinal index from the destination address list
bstrDestinationAddress is a host name from destination address list located at *nIndex*.

4.7 GetNextActiveDestinationAddress

Summary

Returns the next DAL entry information given the previous entry index.

Syntax

long GetNextActiveDestinationAddress(short *nPrevIndex*, BSTR* *pbstrDestinationAddress*, short* *pnIndex*)

Description

If nPrevIndex set to –1, *pbstrDestinationAddress will be assigned to* the first active entry found in DAL (similar to method GetAnyActiveDestinationAddress).

It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed and an active host found, otherwise it will be set to the error code.

If successful, *pbstrDestinationAddress* contains the first active host name from DAL, *pnIndex* contains an index of this host in the DAL. If *pnIndex* is set to –1 there are no active entries available.

4.8 ICMPReset

Summary
Terminate pinging
Syntax
void ICMPReset (void)
Description
The ICMPReset method terminates the ping process.
Parameters
None.

4.9 ICMPSendEchoRequest

Summary
Send an ICMP request.
Syntax
long ICMPSendEchoRequest (BSTR *bstrDestinationAddress*)
Description
The ICMPSendEchoRequest method sends an ICMP request to the host.
Before calling this method all other properties should be properly initialized.
It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed, otherwise it will be set to the error code from section 1.6 Error Codes.
It takes one parameter, bstrDestinationAddress, the name of the host you want to send request to.
Parameters
bstrDestinationAddress is the name of the remote host to query.

4.10 ImportDestinationAddressList

Summary

Imports DAL table from specified remote host. If the currently logged user
Is not logged in to the remote machine, this method will fail with error.

Syntax

long ImportDestinationAddressList(BSTR *bstrMachineName*, short *nOverwrite*)

Description

Imports DAL table from specified remote host. If the currently logged user
Is not logged in to the remote machine, this method will fail with error ERROR_ACCESS_VIOLATION. If *nOverwrite* set to 1 local DAL will be overwritten, otherwise imported entries will be added to it. Using this method local DAL list can be synchronized if necessary with some remote central DAL. The DAL list is stored in registry under *HKEY_LOCAL_MACHINE\SOFTWARE\MagnetoSoft\SKICMP\Destination Address List*.

Parameters

bstrMachineName is a remote machine name to import from.
nOverwrite is a flag to overwrite local DAL. If *nOverwrite* set to 1 local DAL will be overwritten, otherwise imported entries will be added to it.

4.11 PingGetReply

Summary

Retrieves Ping echo reply.

Syntax

PingReplyReceived(VARIANT* *pvarRemoteAddress*, VARIANT* *pvarStatus*, VARIANT* pvarReplyingAddress, VARIANT* *pvarResolvedReplyingAddress*, VARIANT* *pvarDataSize*, VARIANT* *pvarRoundTripTime*, VARIANT* *pvarTTL*, VARIANT* *pvarCountHopsInfo*)

Description

Retrieves Ping reply when ICMPSendRequest is called.

Note that this method should be used only when SkICMP control is used as a COM server, not an ActiveX control, for instance, when SkICMP is instantiated from ASP page or Windows Scripting Host.

When SkICMP is used as regular ActiveX control, notification event PingReplyReceived should be used instead.

Parameters

pvarRemoteAddress is the name of the remote host that was queried,

pvarStatus is the return status of each individual reply. See section 1.6 Error Codes the complete list of supported error codes,

pvarReplyingAddress is the name of the replying remote host,

pvarResolvedReplyingAddress is the resolved name of the replying remote host; this argument may have a *value* if optResolve is set to 1.

pvarDataSize is the Ping reply packet size,

pvarRoundTripTime is the round trip time in milliseconds,

pvarTTL is the Ping reply packet TTL value,

pvarCountHopsInfo is the route info, this argument may have route info if optRecordRoute or optTimestamp is greater then 0.

Return value

Return value indicates current state.

Possible values:

997 (ERROR_IO_PENDING), control is still processing Ping request.

234 (ERROR_MORE_DATA), Ping reply is retrieved.

259 (ERROR_NO_MORE_ITEMS), there is no more data to retrieve.

4.12 PingReset

Summary
Stop Ping messages (Traceroute messages will not be affected).
Syntax
void PingReset (void)
Description
The PingReset method terminates any pending Ping requests.
Parameters
None.

4.13 ResetICMPSettings

Summary
Reset all ICMP settings back to default values.
Syntax
void ResetICMPSettings(void)
Description
All ICMP related settings will be reset to defaults.
The destination address list will remain intact.
Parameters
None.

4.14 TracerouteGetReply

Summary

Retrieves Traceroute echo reply.

Syntax

TracerouteReplyReceived(VARIANT* *pvarRemoteAddress*, VARIANT* *pvarStatus*, VARIANT* pvarReplyingAddress, VARIANT* *pvarResolvedReplyingAddress*, VARIANT* *pvarDataSize*, VARIANT* *pvarRoundTripTime*, VARIANT* *pvarTTL*, *VARIANT* pvarHop, VARIANT* pvarPacket*)

Description

Retrieves Traceroute reply when ICMPSendRequest is called.

Note that this method should be used only when SkICMP control is used as a COM server, not an ActiveX control, for instance, when SkICMP is instantiated from ASP page or Windows Scripting Host.

When SkICMP is used as regular ActiveX control, notification event TracerouteReplyReceived should be used instead.

Parameters

pvarRemoteAddress is the name of the remote host that was queried,

pvarStatus is the return status of each individual reply. See section 1.6 Error Codes the complete list of supported error codes,

pvarReplyingAddress is the name of the replying remote host,

pvarResolvedReplyingAddress is the resolved name of the replying remote host; this argument may have a *value* if optResolve is set to 1.

pvarDataSize is the Ping reply packet size,

pvarRoundTripTime is the round trip time in milliseconds,

pvarTTL is the Ping reply packet TTL value,

pvarHop is the hop index, starting from 0,

pvarPacket is the packet index, starting from 1.

Return value

Return value indicates current state.

Possible values:

997 (ERROR_IO_PENDING), control is still processing Traceroute request.

234 (ERROR_MORE_DATA), Traceroute reply is retrieved.

259 (ERROR_NO_MORE_ITETMS), there is no more data to retrieve.

4.15 TraceRouteReset

Summary
Stop Traceroute messages (Ping messages will not be affected).
Syntax
void TraceRouteReset (void)
Description
The TraceRouteReset method terminates any pending Traceroute requests.
Parameters
None.