



Team: Wide Area Application Services

MAPI Application Optimizer FAQ

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Cisco WAAS MAPI Application Optimizer FAQs

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Answers

Key Benefits and Features

What benefits does WAAS 4.1 provide to Microsoft Exchange email optimization?

Cisco WAAS provides a number of acceleration services for Exchange to help improve performance. This acceleration will provide:

- Reduced send and receive time for email messages and improved response time of interactive control operations.
- Faster downloads of Outlook Address Book (OAB) while significantly reducing BW consumption as this is usually a redundant transfer across the user population.
- Faster clean up of emails from the outbox. In cached mode, email messages will take a while before being cleaned from the Outbox. WAAS 4.1 optimize the send operation which will help in faster clean up of the Outbox.

How Cisco's implementation of Exchange email optimization different from other vendors?

Unlike other solutions that provide acceleration for Exchange, Cisco WAAS acceleration for Exchange was developed without relying on reverse engineering of protocols, and in conjunction with Microsoft to ensure complete correctness and compatibility with all major versions of Exchange.

This optimization is without any security holes such as keeping sessions open after users have logged out.

Cisco WAAS transparent architecture enables automatic integration into the existing Exchange deployment.

WAAS 4.1 optimizes native Outlook 2007 operations (if encryption is disabled on Exchange server) without negotiating down to Outlook 2003 functionalities.

What benefits does WAAS 4.1 provide over WAAS 4.0 for Microsoft Exchange email applications?

WAAS 4.0 provided basic transport optimization for all TCP applications including Microsoft Exchange. New with WAAS 4.1 is the MAPI Application Optimizer (AO) that provides application specific acceleration for Microsoft Exchange to overcome the inherent chattiness of the underlying MAPI protocol.

Was WAAS 4.1 Exchange optimization developed using reverse engineering?

No, WAAS 4.1 MAPI Application Optimizer provides Exchange optimization and was developed in conjunction with Microsoft. The MAPI protocol was licensed directly from Microsoft. This ensures a trusted, proven, reliable and vendor supported solution for optimization. In contrast, reverse engineering can easily break the protocol semantics and generates many application errors. Any further changes in the original application will break the protocol flow and result in unexpected application behavior. Some examples of the consequences of reverse engineering the MAPI protocol include:

- Inability to support newer version (for example native Outlook 2007 optimization)
- Missing some functionality of newer version (some tabs or buttons are automatically disable in Outlook 2007)
- Downgrading protocol handling of newer version (native Outlook 2007) to older version (Outlook 2003). All handshake and protocol handling might be downgraded to older version (2003), so even if the enterprise Exchange deployment were upgraded to Exchange 2007, the benefits of the newer version would be minimal.

Vendors who do reverse engineering of such proprietary protocol use customer to troubleshoot their issues. They will also need to catch up with any new development Microsoft will be doing to enhance functionality of Exchange application in future.

What are the benefits of the Cisco approach of developing WAAS 4.1 Exchange email optimization in cooperation with Microsoft?

Cisco follows a proactive development approach. Working in cooperation with Microsoft, Cisco licensed the software protocols for Exchange application. This ensures trusted, proven, reliable, and sustainable Microsoft supported solution for Exchange email optimization in WAAS 4.1.

Cisco has also worked with Microsoft to create validated designs that are jointly published with Microsoft and cover the full range of Cisco Application Delivery Products. These designs offer the best practices and significantly reduce the risk of deploying of WAN optimization to accelerate these applications. Cisco also has joint escalation support with Microsoft to ensure that cross vendor issues are appropriately and expeditiously addressed.

Specifically with Microsoft, Cisco has developed the optimized branch architecture where Cisco WAAS is used to optimize performance of centralized applications like Microsoft Exchange, SharePoint and File Services, while Windows Core services like Microsoft Active Directory and Print are integrated into branch WAAS devices using WAAS Virtual Blades for local hosting.

Performance

How WAAS 4.1 accelerate Microsoft Exchange Email application?

Cisco WAAS accelerates Microsoft Exchange email by applying application specific optimizations using the MAPI Application Optimizer (AO). This AO performs following functions:

Object Read Ahead: Standard objects, such as email, calendar items, or address books, that are being fetched from the server are acquired at an accelerated rate because Cisco WAAS MAPI AO pre-fetches the objects on behalf of the user. Pre-fetching helps minimize the 'send-and-wait' behavior between Exchange and Outlook.

Async Write: Write operations for sending email and attachments are acknowledged locally by the WAAS MAPI AO. Local responses allow clients to more efficiently utilize WAN bandwidth.

Messages Decompression: Cisco WAAS can automatically defer native compression provided by the Exchange server and Outlook in favor of Cisco WAAS DRE and persistent LZ compression. Additionally, the Cisco WAAS AO can natively decode messages encoded by Exchange or Outlook to provide additional levels of compression. Full data coherency is preserved end-to-end.

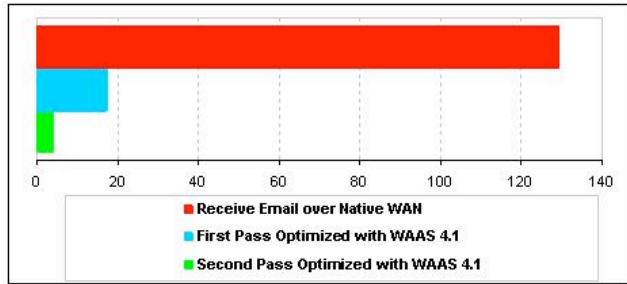
DRE hints: The Cisco WAAS MAPI AO provides hints to the DRE process based on payload resulting in better compression and improving the overall DRE efficiency.

Payload aggregation: The Cisco WAAS AO recognizes many small Exchange messages and can either batch them together for optimized delivery or dynamically adjust DRE and PLZ compression to improve the compression ratio on these messages.

What is the performance improvements observed after enabling Exchange email optimization with WAAS 4.1?

WAAS 4.1 Exchange email optimization provides performance improvements in both response time and bandwidth. As MAPI is a chatty protocol, the performance improvement varies with latency, bandwidth and type of email operations. It is generally observed that MAPI AO performance improvements increase with the increase of latency. A typical use case of downloading an email attachment of 5 MB size over a T1 link with latency of 250 msec is depicted in the following charts.

Time to receive an email with 5 MB attachments over T1 bandwidth with 250 ms latency:



What version of Outlook is supported with WAAS 4.1 email optimization?

Cisco WAAS acceleration for Exchange was developed in conjunction with Microsoft to ensure full compatibility with all major versions, including Outlook 2000, 2003, and 2007 and the corresponding versions of Exchange. Because older version of Outlook (5.5) encode messages differently, Outlook 5.5 connections are optimized by the standard transport optimization (DRE/LZ/TFO) of Cisco WAAS.

Configuration

What minimum configuration is required to enable Microsoft Exchange optimization in WAAS 4.1?

There is no additional configuration required to enable Microsoft Exchange optimization in WAAS 4.1. With Enterprise license, Exchange email optimization will be enabled automatically. MAPI Application Optimizer (AO) and EPM (EndPoint Mapper) application accelerator will be enabled by default to apply application specific optimization for Exchange. Additionally, the system will have a default application policy named Email-and-Messaging of type EPM, with a UUID of MAPI and an Accelerate setting of MAPI. This policy is defined by default. WAAS 4.1 provide full transparency both from configuration and network perspective.

Why must the EPM Accelerator be enabled to get optimization for Exchange applications?

The EPM (End-Point-Mapper) accelerator is enabled by default in WAAS 4.1. Microsoft Exchange traffic is negotiated using MS Port Mapper (port 135) and generating dynamic ports. The WAAS EPM adapter is a Layer-7 classification mechanism, inspecting MS-RPC traffic to identify specific applications, apply relevant optimizations policies, and monitor their traffic statistics. The EPM adapter helps to classify, optimize and monitor Microsoft Exchange traffic in Cisco WAAS 4.1.

Do I need to have MAPI and EPM Application Optimizers enabled on both sides?

Yes, WAAS 4.1 Exchange email optimization requires a dual sided architecture. By default, both MAPI and EPM Application Optimizers will be enabled on both server side and client side WAEs. For Exchange application optimization with WAAS 4.1, both side should have MAPI and EPM AOs enabled with the same acceleration policy for Exchange traffic.

How to verify if Microsoft Exchange optimization is enabled automatically in WAAS 4.1?

With Enterprise license, by default both MAPI and EPM Application Optimizers will be automatically enabled. To verify these AOs are enabled using the CLI, telnet to the device and enter:

```

WAE# show accelerator mapi

Accelerator    Licensed    Config State  Operational State
-----
mapi           Yes        Enabled       Running

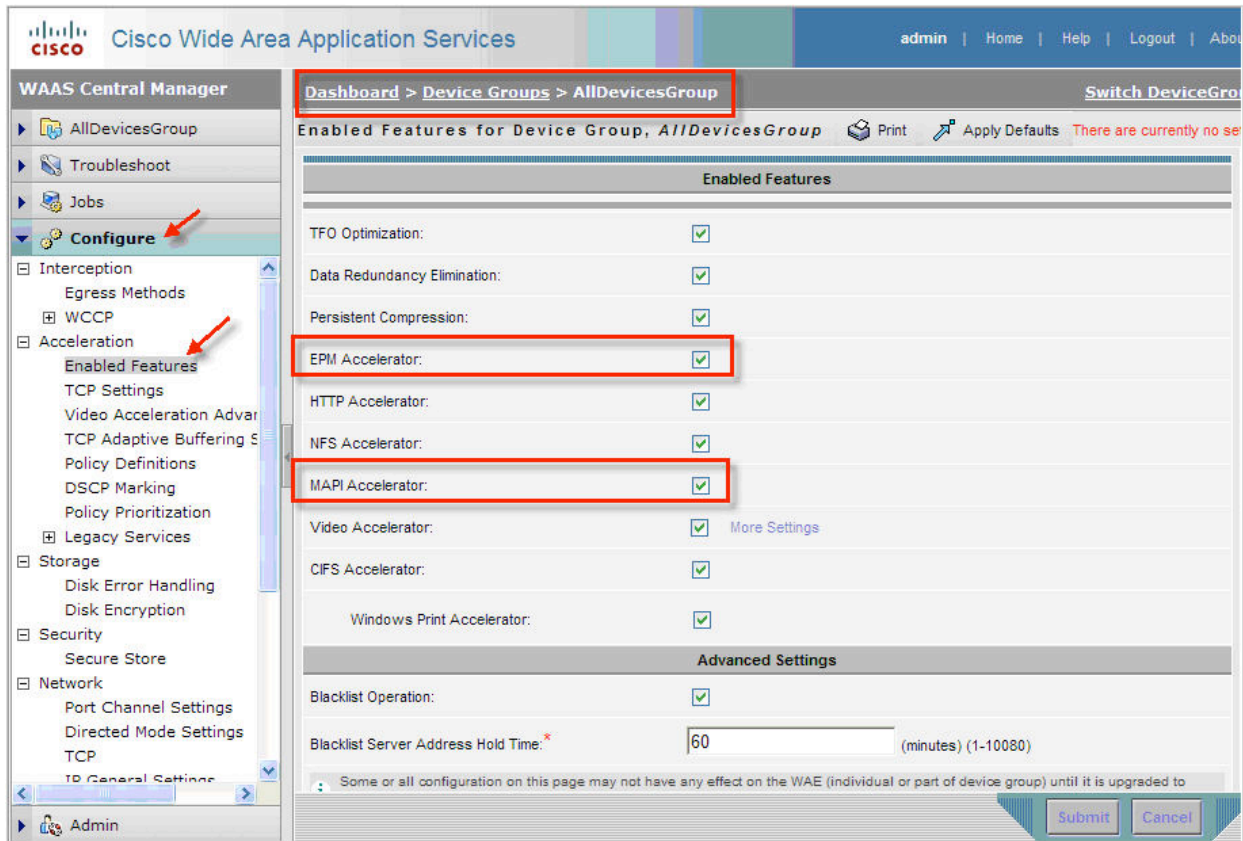
MAPI:
  Accelerator Config Item      Mode      Value
  -----
  Read optimization            User      enabled
  Write optimization            User      enabled

  Policy Engine Config Item      Value
  -----
  State                           Registered
  Default Action                   Use Policy
  Connection Limit                  0
  Effective Limit                   0
  Keepalive timeout                 5.0 seconds

WAE# show license
License Name    Status      Activation Date Activated By
-----
Transport       not active
Enterprise       active      07/17/2008    CMS
Video           not active
WAE#
    
```

The Config State should be Enabled and the Operation State should be Running. An Operational State of "Shutdown" with a Config State of "Enabled" points to an issue with licensing. The WAE# show license command displays license information for Cisco WAAS. Acquire and add the Enterprise license if it is not active already.

To verify the status using the Central Manager GUI, navigate:
 Dashboard → Device/Device Group → Configure → Acceleration → Enabled Features
 Please make sure both EPM Accelerator and MAPI Accelerator are enabled.



What changes in the policy definition are required if my Exchange deployment does not use dynamic ports?

If your Outlook administrator has configured Outlook in a nonstandard way to use a static port, you must create a new basic application policy that accelerates MAPI traffic with a classifier that matches the static port that was configured for Outlook. The instructions to create new Application policy and apply proper optimization to it are explained in the [WAAS Configuration Guide](#).

What changes required in Outlook client and Exchange server for WAAS 4.1 optimization?

Cisco WAAS Email optimization will typically integrate transparently with your existing Exchange deployment requiring no changes either to the client side or Exchange server side. However, if the client is Outlook 2007 and encryption is enabled, it must to be disabled on the client side for acceleration to be successful.

How does WAAS 4.1 Email optimization work with Outlook 2007 encrypted mode?

Outlook 2007 uses encrypted mode by default. If encryption is enabled in the Outlook 2007 client, it must to be disabled. WAAS 4.1 can then optimize native Outlook 2007 operations with the MAPI Application Optimizer.

How can encryption be disabled in the Outlook client?

Encryption can be disabled in following ways in Outlook clients:

Outlook 2000: Control Panel → Mail → Services tab → Microsoft Exchange Server → Properties

Outlook 2003: Outlook / Tools / E-mail Accounts.../Change → More Settings → Security

Outlook 2007: Outlook / Tools / Account Settings... / E-Mail tab / Change....

Is it possible to disable encryption from the Active directory Group Policy instead of disabling from each client?

Yes, the steps to disable encryption from the Active directory Group Policy configuration are described below. This example script is meant for illustrative purposes only. Please consult your Microsoft server team before making any changes.

Download the [2007 Office system Administrative templates](#) and then edit outlk12.adm.

1. Open "Active Directory Users and Computers".
2. Right click on the domain controller and select "Properties".
3. Click on the "Group Policy".
4. Select the GPO (Group Policy Objects) that you want to edit and click "Edit". We recommend you to use the Group Policy Management Console to edit GPOs. Download [Group Policy Management Console with Service Pack 1 here](#).
5. Find "Administrative Templates" under "User configuration" and right click on it.
6. Select "Add/Remove Templates" and click on "Add".
7. Find outlk12.adm (Note: Please find the location of Office 2007 policy templates ...ADMEN-US)
8. Find "User configuration" → "Administrative Templates" → "Microsoft Office Outlook 2007" → "Tools | Account Settings" → "Exchange".
9. Find "Enable RPC encryption" in the right pane. Enable it or disable it as required.
10. Upon completion, run "gpupdate /force" to force client to apply the GPO.

Troubleshooting

How can I troubleshoot if Microsoft Exchange optimization is not working properly?

If Exchange email optimization is not working properly, you can troubleshoot MS Exchange optimization as following:

1. Make sure MAPI AO is enabled. Check output of:

```

WAE# show accelerator mapi

Accelerator      Licensed      Config State  Operational State
-----
mapi             Yes           Enabled        Running

MAPI:
  Accelerator Config Item      Mode      Value
  -----
  Read optimization            User      enabled
  Write optimization           User      enabled

  Policy Engine Config Item      Value
  -----
  State                          Registered
  Default Action                  Use Policy
  Connection Limit                0
  Effective Limit                 0
  Keepalive timeout              5.0 seconds

WAAS-EDGE# show license
License Name      Status      Activation Date  Activated By
-----
Transport        not active
Enterprise        active      08/22/2008      admin
Video            not active
WAE#
    
```

Here operation state should be Running Normally. The operational status of "shutdown" and config state of "Enabled" points to an issue with licensing. The show license command displays license information for Cisco WAAS. Add the Enterprise license if it is not active already.

2. Make sure both EPM and MAPI are properly configured

```

WAE# show running-config | include mapi
  map adaptor EPM mapi
    name Email-and-Messaging All action optimize full accelerate mapi
WAE# show running-config | include EndPortMapper
classifier MS-EndPortMapper
map other classifier MS-EndPortMapper action optimize DRE no compression none accelerate MS-port-mapper
    
```

3. Check output of Show stat connection optimized MAPI. If MAPI AO is optimizing connection, you will see connection with Accelerator M,T,D,L (at client side WAE) and connection with T,D,L,M (at server side WAE). If these accelerator are optimizing that means connections are being handled by MAPI, if not then in that case connection is not optimized by MAPI AO.

```

WAE#show statistics connection optimized mapi
D:DRE,L:LZ,T:TCP Optimization,
C:CIFS,E:EPM,G:GENERIC,H:HTTP,M:MAPI,N:NFS,S:SSL,V:VIDEO,
ConnID Local IP:Port Remote IP:Port PeerID Accelerator
83750 10.10.30.100:4322 10.10.10.100:1154 0:14:5e:83:55:a3 M,T,D,L

WAE# show policy-engine application dynamic
Dynamic Match Freelist Information:
Allocated: 32768 In Use: 1 Max In Use: 10 Allocations: 4957

Dynamic Match Type/Count Information:
None 0
Clean-Up 0
Host->Host 0
Host->Local 0
Local->Host 0
Local->Any 0
Any->Host 1
Any->Local 0
Any->Any 0
Individual Dynamic Match Information:
Number: 1 Type: Any->Host (6) User Id: EPM (3)
Src: ANY:ANY Dst: 10.56.44.245:1248 Identifies the server
(each server will have a different entry)
Map Name: uuida4f1db00-ca47-1067-b31f-00dd010662da MAPI UUID
Flags: TIME_LMT REPLACE FLOW_CNT
Seconds: 1200 Remaining: - NA - DM Index: 32766 Dynamic rule is removed "Seconds" seconds
after the last TCP connection disconnects
Hits: 1 Flows: 2 Cookie: 0x00000000 Flows indicates current number of TCP connections
to the server
    
```

4. Check the number of accelerated connection by WAE.

```

WAE#show statistics accelerator mapi
    
```

MAPI AO does not support encrypted traffic for versions of Outlook less than Outlook 2000 or greater than Outlook 2007. These connections will not be handled by the MAPI AO.

Upgrade/Downgrade

What will happen to my existing EPM settings if I upgrade from WAAS 4.0.x to WAAS 4.1?

When you upgrade from pre-WAAS 4.1 release to WAAS 4.1, EPM will be enabled by default. Any existing customized policy for MS-Exchange must be removed. MS-Exchange will be classified by the EPM accelerator. Existing policies using the EPM adaptor with MAPI UUID would be changed to use MAPI as an accelerator upon upgrade to WAAS 4.1.

What will happen to MAPI AO configuration if I downgrade from WAAS 4.1 to WAAS 4.0.x?

MAPI as an Application Optimizer would be removed from the policy after downgrading from WAAS 4.1.x to WAAS 4.0.x. Exchange Email application traffic will be optimized by the standard transport optimization of Cisco WAAS 4.0. All statistics related to MAPI Application Optimizer will be removed from the Central Manager database during the database downgrade.

Mixed-Mode deployments

Are older version Outlook clients (Exchange 5.5) optimized by WAAS 4.1?

Outlook 5.5 uses an older message protocol and encodes messages differently and this older protocol has been retired by Microsoft. Outlook 5.5 connections will be optimized by the standard transport level (DRE/LZ/TFO) optimization of Cisco WAAS.

What will happen to Exchange optimization if the WAE in the datacenter uses WAAS 4.0 and the WAE in the branch uses WAAS 4.1?

WAAS 4.1 Exchange optimization requires a dual sided architecture. There must be a MAPI accelerator service running on both datacenter and branch WAEs to optimize Exchange with MAPI acceleration. In the case of a mixed mode deployment, The MAPI Application Optimizer would not be used and Exchange email will optimize by the standard transport optimization of WAAS 4.0.

Failure Scenarios

Does WAAS 4.1 email optimization supports WAE in inline in-series clusters?

When WAEs are clustered using inline in-series connections, each and every exchange connection should optimize by the same pair of server side and client side WAEs. If any connection spill-over occurs to other WAEs in the serial cluster, the Outlook client will receive an error and the connection terminated. This will be transparent to the affected users as the Outlook client will resend the connection request and the connection will then be optimized. In older version of Outlook (5.5), a pop-up may appear announcing that the connection to the Exchange server was lost.

Does WAAS 4.1 support asymmetric routing scenarios?

Yes. WAAS 4.1 will accelerate Microsoft Exchange applications in asymmetric routing scenarios as long as each client-server connection is redirected to same pair of peer WAEs.

Miscellaneous

Does SSL application optimizer accelerate encrypted MAPI traffic?

Microsoft uses native encryption for MAPI Exchange communication with Outlook Client. The WAAS SSL application optimizer does not accelerate encrypted MAPI traffic. This service does not use MAPI protocol and hence Exchange 2007 Web service is not handled by MAPI application optimizer.

However, with Microsoft Exchange Server 2003 and 2007, Microsoft provides an Outlook Anywhere feature that lets Microsoft Office Outlook 2007 and Outlook 2003 clients connect to their Exchange servers over the Internet using the RPC over HTTP Windows networking component. This is referred to as MAPI over HTTPS and this can be optimized using WAAS SSL application optimizer.

For details on how to configure Microsoft Office Outlook 2007 and Outlook 2003 clients for Outlook Anywhere refer to Microsoft documentation:

<http://technet.microsoft.com/en-us/library/aa996922.aspx>

Specifically, for what is the read ahead (object pre-fetch) function in the MAPI Application Optimizer used?

The object pre-fetch feature will greatly accelerate read mail operation. The Read Ahead function will pre-fetch the data (generally attachments) from the Exchange server eliminating much of the chattiness of a read operation. Because the object is available before it is requested, email and attachments open very fast and the end user experiences significant improvement in response time.

Does WAAS 4.1 read ahead feature for the MAPI Application Optimizer overload Exchange server in the datacenter?

No, the read ahead feature will not overload the Exchange server. As we developed WAAS email optimization in conjunction with Microsoft, the MAPI Application Optimizer follows the standard flow control mechanism of Microsoft and obeys the Exchange overload handling condition. Read ahead will be executed by the server side WAE only when no other client requests are waiting to be executed. It always gives higher priority to client generated requests (fetching emails, etc.). Also, only one active read ahead per connection will be allowed. WAAS email optimization does not keep connections open after a clients has logged out from server. This will maintain security, data integrity and reduce significant load on the Exchange server.

Does WAAS accelerate Outlook Web Access (OWA)?

Yes, Cisco WAAS accelerates Outlook Web Access using standard optimizations (DRE, TFO, and LZ) and the new HTTP Application Optimizer. If Outlook Web Access is used over SSL with an HTTPS url, WAAS 4.1.1 will optimize that connection with TFO only. These connections are not handled by MAPI AO because OWA uses the WebDav protocol instead of MAPI. For information on the architecture of OWA, please refer to [TechNet](#).

Does WAAS 4.1 accelerate both cached mode and non-cached mode traffic?

Yes, the MAPI Application Optimizer accelerates both cached mode and non-cached mode traffic. Some competitive vendors recommend using non-cached mode during testing to show more optimization with their product. However, Cisco WAAS optimizes both cached mode and non-cached mode traffic with similar results. Starting from MS Exchange 2003, by default, cached mode has been used for private folder and non-cached mode used for public folder. [Microsoft has recommended](#) "cached mode" deployment of Exchange/Outlook since the release of Microsoft Exchange 2003.

Does WAAS 4.1 overcome the "Morning Rush" scenario with cached mode traffic?

Yes, WAAS 4.1 email optimization overcomes the "Morning Rush" scenario with cached mode traffic. In cached mode, clients maintain a local copy of messages stored on the server. Changes are synchronized on startup, and periodically thereafter. WAAS 4.1 email optimization minimizes messages and attachments sent over the WAN by caching and compression, providing local acknowledgement, and improving response time with read ahead. All these improvements collectively avoid the "Morning Rush" condition.

Does WAAS 4.1 accelerate Exchange 2007 Web service?

Yes, WAAS 4.1 accelerates Exchange 2007 Web service using HTTP specific acceleration. This service doesn't use MAPI protocol and hence Exchange 2007 Web service is not handled by the MAPI Application Optimizer.

What kinds of charts and reports can be generated by the Central Manager for MAPI email optimization?

Following is a list of charts available in the WAAS 4.1 Central Manager. More information about each chart can be found in [WAAS Configuration Guide](#) on Cisco.com.

Charts can be added under MAPI acceleration report. A number of charts are available as shown in figure below.

