



Optimizing and maintaining client performance for Microsoft Dynamics CRM 2011 and Microsoft Dynamics CRM Online

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Abstract

Performance tuning and optimization is a continuous balancing act between design decisions and resource availability. This white paper provides tips, tricks, and guidance for optimizing and maintaining the performance of Microsoft Dynamics CRM clients connecting to Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online.

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Optimizing and maintaining client performance for Microsoft Dynamics CRM 2011 and Microsoft Dynamics CRM Online

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Performance tuning and optimization is a continuous balancing act between design decisions and resource availability. This white paper provides tips, tricks, and guidance for optimizing and maintaining the performance of Microsoft Dynamics CRM clients connecting to Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online.

Applies To

- Microsoft Dynamics CRM 2011
- Microsoft Dynamics CRM Online

In this White Paper

[Introduction](#)

[Overview of optimizing and maintaining Microsoft Dynamics CRM clients](#)

[General approach to optimization and maintenance](#)

[Factors affecting the performance of Microsoft Dynamics CRM clients](#)

[Configuring Microsoft Dynamics CRM clients for optimal performance](#)

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[Appendix A: Additional resources](#)

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[Appendix C: Microsoft Dynamics CRM web application recommendations for a rich experience with forms](#)

[Appendix D: Microsoft Dynamics CRM Online performance troubleshooting](#)

[Feedback](#)

This section introduces the purpose, scope, and applicability of the information provided in this paper.

Purpose

This white paper is designed to complement, rather than replace, existing support resources that are available for Microsoft Office Outlook and Microsoft Internet Explorer. To that end, contents

include techniques and best practices that are specific to optimizing and maintaining the performance of Microsoft Dynamics CRM clients interacting with a solution based on Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online, together with links to related resources for additional information as appropriate.

Scope

This paper focuses on **client-side** optimization and maintenance. For customers working with on-premises or hosted deployments of Microsoft Dynamics CRM 2011, be sure to consider server-side optimizations that can have a significant impact on the client-side performance. For information about server-side optimization and maintenance, see the white paper [Optimizing and maintaining a Microsoft Dynamics CRM 2011 server infrastructure](#).

Applicability

When considering the applicability of the information in this white paper to any specific solution based on Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online, note that the techniques and guidance provided in this white paper can yield varying results depending on a wide range of potential environmental factors, for example the level and complexity of the customizations applied to a Microsoft Dynamics CRM solution.

As a result, be sure to verify the functionality and performance impact associated with any specific optimization technique in a test environment prior to making any change in a production environment.

Important

For clients connected to a Microsoft Dynamics CRM solution that is integrated with other systems, be sure to verify optimization techniques in a test environment that approximates the complexity and integration that is present in the production environment.

Download

This paper can be downloaded from the Microsoft Download Center: [Optimizing and maintaining client performance for Microsoft Dynamics CRM 2011 and CRM Online](#).

Overview of optimizing and maintaining Microsoft Dynamics CRM clients

Access to and interaction with a business solution based on Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online is available by using the following Microsoft Dynamics CRM client offerings:

- The Microsoft Dynamics CRM Web client, which leverages Windows Internet Explorer as a browser to provide access to Microsoft Dynamics CRM functionality without requiring the installation of client software on a user's computer.
- Microsoft Dynamics CRM for Microsoft Office Outlook, which provides a Windows-based user experience that is highly integrated with Microsoft Office Outlook. Microsoft Dynamics CRM for Microsoft Office Outlook with Offline Access is a second configuration of the client that

provides users with the additional capability to synchronize Microsoft Dynamics CRM data for offline availability.



Note

Users can also connect to an implementation of Microsoft Dynamics CRM from an Internet-enabled mobile device, such as a cell phone, by using the Mobile Express client, which provides access via a lightweight version of the Microsoft Dynamics CRM Web client.

Successfully optimizing and maintaining the performance of Microsoft Dynamics CRM clients connecting to a business solution based on Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online requires:

Familiarity with:

- A general approach to optimization and maintenance
- Factors that can adversely affect the performance of Microsoft Dynamics CRM clients

A solid understanding of:

- Options available for configuring Microsoft Dynamics CRM Online clients to overcome potential performance issues
- Best practices for customizing Microsoft Dynamics CRM Online clients for optimal performance

The white paper is designed to address these topics, providing readers with the information necessary to optimize and maintain the performance of Microsoft Dynamics CRM Online clients.



Important

The performance of Microsoft Dynamics CRM Online clients can be assessed in a variety of ways. However, performance levels are often reflected by the amount of time it takes for the client to load and display pages and forms.

Load times are commonly categorized as either “cold” (on the first visit to a page during a session) or “warm” (on subsequent visits to the same page during the same session).

During a cold page load, a number of round trips between the client and the server are required to collect and display the appropriate information to the end user. On subsequent visits to the same page, the client requires many fewer round trips to display the page, as much of the required page information has been cached locally during the initial page visit.

General approach to optimization and maintenance

Performance tuning and optimization is a continuous balancing act between design decisions and resource availability. Consider taking the following high-level approach when optimizing and maintaining the clients that access a connected system such as Microsoft Dynamics CRM.



Note

Because Microsoft Dynamics CRM clients are CPU and memory intensive, the level of the hardware on which a client is running directly affects the performance of that client, with better hardware configurations yielding better performance results.



Important

Regularly downloading and installing the latest hotfixes and update rollups is a key first step in efforts to enhance and maintain the performance of clients that are accessing a Microsoft Dynamics CRM implementation. For a listing of current resources, updates, and hotfixes available for Microsoft Dynamics CRM Online or Microsoft Dynamics CRM 2011, see the [Support for Dynamics CRM](#) page.

Optimizing Performance and Establishing a Baseline

After setting up a Microsoft Dynamics CRM solution, it is important to assess the overall performance of the clients that will be accessing the solution within the context of the unique business and environmental factors inherent in a specific scenario. The results of this analysis can serve as an initial baseline against which to measure the impact of efforts to optimize client performance for a specific environment.

After ensuring that the clients accessing the Microsoft Dynamics CRM solution are performing at optimal levels, be sure to capture a second set of results to serve as a baseline for future monitoring and of the optimized levels of performance.

Monitoring and Maintaining Performance

To maintain the optimal performance of Microsoft Dynamics CRM clients over time, it is important periodically to monitor performance levels by leveraging the functionality of the Windows Performance Monitor or the Windows Resource Monitor.

These system tools provide information about the use of hardware and software resources in real time, and results can be filtered to monitor specific processes or services. In addition, they can be used to start, stop, suspend, and resume processes and services, and to troubleshoot when an application does not respond as expected.



Note

For additional information about Performance Monitor, Resource Monitor, and general guidelines and best practices for monitoring performance, see the following resources:

- [Performance Monitoring Getting Started Guide.](#)
- [Resource Availability Troubleshooting Getting Started Guide.](#)
- [Windows Vista Performance and Reliability Monitoring Step-by-Step Guide](#)

For the latest information about Microsoft Dynamics CRM performance in general and to learn about the release of additional support resources, see the [Microsoft Dynamics CRM Team blog](#).

Factors affecting the performance of Microsoft Dynamics CRM clients

The performance Microsoft Dynamics CRM clients can be directly affected by a wide variety of factors, including:

- The hardware level of the computer running the client and the versions of software that are installed, as well as the configuration of selected Control Panel settings
- Any extraneous processes and applications running on the same computer
- The characteristics of the network over which client access occurs
- The level and complexity of customizations applied to the solution

In addition, Microsoft Dynamics CRM for Outlook performance can potentially be affected by:

- The number of Microsoft Dynamics CRM organizations that a single instance of Microsoft Dynamics CRM for Outlook is configured to access. By default, Microsoft Dynamics CRM for Outlook is configured to access and display information from a single “primary” Microsoft Dynamics CRM organization, but it can be configured to display information from one or more secondary organizations. However, increasing the number of organizations that a single instance of Microsoft Dynamics CRM for Outlook is configured to access also increases client memory requirements.
- The volume of data that is processed during:
 - Outlook synchronization
 - Offline synchronization (Microsoft Dynamics CRM for Outlook with Offline Access only)

Hardware and software requirements

Key factors in the overall performance of computers running Microsoft Dynamics CRM clients include the level of hardware, versions of software, and Power Settings configuration associated with a particular computer.

Hardware levels and software versions

The performance of a Microsoft Dynamics CRM client is directly affected by the hardware on which that client is running, with higher-level hardware configurations (especially the level of processor and amount of memory) typically yielding better performance. In addition, there are specific software requirements associated with running Microsoft Dynamics CRM clients. As a result, be sure to verify that computers running Microsoft Dynamics CRM clients meet the appropriate hardware and software requirements according to their usage.



Note

For a listing of the hardware and software requirements for running Microsoft Dynamics CRM clients, in the Implementation Guide, in the Planning Guide, see the following topics:

- [Microsoft Dynamics CRM for Outlook hardware requirements.](#)
- [Microsoft Dynamics CRM for Outlook software requirements.](#)

- [Microsoft Dynamics CRM Web client software requirements.](#)



Important

Later versions of Internet Explorer provide enhancements that improve page rendering. It is recommended that computers running Microsoft Dynamics CRM clients be installed with the latest version of Internet Explorer supported within a specific business environment. For an optimal experience with Microsoft Dynamics CRM Online, use Internet Explorer 9, if possible. Internet Explorer 9 includes JavaScript acceleration functionality to help improve client-side performance.

Power settings

In addition to hardware and software requirements, selected Control Panel settings can also affect performance. Windows provides a variety of power plans settings to help users manage their computers' power consumption and performance.

- **Balanced.** Offers full performance when you need it and saves power during periods of inactivity. This is the best power plan for most people.
- **Power saver.** Saves power by reducing system performance and screen brightness. This plan can help laptop users get the most from a single battery charge.
- **High performance.** Maximizes screen brightness and might increase the computer's performance in some circumstances. This plan uses a lot more energy and will reduce the amount of time that a laptop battery lasts between charges.



Note

High performance does not appear on the battery meter by default. To turn on High performance, in Control Panel, open the **Power Options** item, under **Select a power plan**, click **Show additional plans**, and then click **High performance**.

Microsoft Dynamics CRM performs best when a computer's power plan is set to "High Performance," which is the recommended setting to ensure the fastest performing computer for running Microsoft Dynamics CRM for Outlook and Microsoft Dynamics CRM for Outlook with Offline Access, and the Microsoft Dynamics CRM Web client.

Extraneous processes and applications

All the processes and applications running on a client computer can adversely affect the performance of Microsoft Dynamics CRM clients.

Non-critical business processes and non-essential applications

For client computers with hardware at or near minimal-level requirements, consider turning off non-critical business processes, video streaming, and software such as games and music programs, to accelerate performance. Because this issue can have a greater impact on client computers configured for offline access, third-party add-ins for Microsoft Office Outlook can also be disabled to improve the performance of Microsoft Dynamics CRM for Outlook.

Security packages and virus scanning applications

Microsoft Dynamics CRM client performance can also be affected by desktop security software, including malware applications and antivirus programs, which can lock certain files and make them inaccessible to other applications. In addition, some of these software packages include a feature called ScriptScan, which scans all web pages for malicious script and is known to affect the performance of web-based applications such as Microsoft Dynamics CRM.

Most of these programs provide the ability to disable scanning on specific web sites, and if so, adding the URL of the Microsoft Dynamics CRM organization to a list of excluded sites can help to improve performance in these situations.

Important

To exclude sites from scanning in McAfee specifically, see the following KB articles:

- [ScriptScan improvement to whitelist URLs for trusted web sites \(Performance improvement for web-based applications that are script intensive\).](#)
- [Slow performance with McAfee antivirus.](#)

For additional detail about disabling scanning in other antivirus applications, see the documentation associated with the specific application.

Important

Each environment requires a thoughtful decision on what to include and exclude, and there is always a possibility that excluding files from scans can lead to unwanted consequences. Be sure to consider these options together with the well planned internal IT management policies established for a specific scenario.

Network characteristics

The primary characteristics of a network that affect the performance of Microsoft Dynamics CRM clients are **bandwidth** and **latency**.

- *Bandwidth* is the width or capacity of a specific communications channel.
- *Latency* is the time required for a signal to travel from one point on a network to another; latency is a fixed cost between two points.

One of the main causes of poor performance of Microsoft Dynamics CRM clients is the latency of the network over which the clients connect to the Microsoft Dynamics CRM solution. Lower latencies (measured in milliseconds) generally provide better levels of performance.

Note that even if the latency of a network connection is low, however, bandwidth can become a factor if there are a lot of resources sharing the network connection, for example to download files and send and receive email.

Networks with high bandwidth do not guarantee low latency. For example, a network path traversing a satellite link often has high latency, even though throughput is very high. It is not uncommon for a network round trip traversing a satellite link to have five or more seconds of latency. An application designed to send a request, wait for a reply, send another request, wait for

another reply, and so on, will wait at least five seconds for each packet exchange, regardless of the speed of the server.

 **Warning**

It is recommended to test the implications of client performance in any WAN environment with potential bandwidth or latency issues, which can vary greatly from performance in a LAN environment.

For example, users connecting to a standard configuration of Microsoft Dynamics CRM 2011 in a LAN environment (up to 10ms latency) can expect Account or Contact forms to load within 2 to 2.5 seconds, while users connecting to a similar configuration of Microsoft Dynamics CRM 2011 or Microsoft Dynamics CRM Online in a WAN environment (up to 150ms latency) can expect 3 to 3.5 second load times for the same forms. Note that Microsoft Dynamics CRM Online users always work over connections with characteristics that more closely resemble a WAN environment than a LAN environment.

Microsoft Dynamics CRM is designed to work best over networks with latency under 150 ms (milliseconds) and bandwidth greater than 50 kbps (kilobytes per second).

Level and complexity of customizations

When optimizing the performance of Microsoft Dynamics CRM clients, keep in mind that client performance is directly affected by the:

- Number of:
 - Columns and grids in use
 - Rows returned per page
 - Sub-grids used on a page
 - Controls on a form (Form Design)
 - Controls on the ribbon
 - Client-side events (OnLoad, OnSave, OnChange)
- Complexity and number of visualizations used in dashboards
- Use of Jscript and Plugins. Advanced Jscript can add a significant amount of time to, open, save, close and other events especially if calls are made to Microsoft Dynamics CRM or other system. Plug-ins can also affect performance when saving.

As a result, in environments with high latency and/or low bandwidth, it is recommended to limit use of these features and functionalities as much as possible without compromising business requirements. In addition, for any customization features that are required in your business environment be sure to limit the number of times that you publish customizations, as this process can also negatively impact client performance.

Configuring Microsoft Dynamics CRM clients for optimal performance

To help overcome latency and maximize bandwidth usage for the best performance of Microsoft Dynamics CRM clients, consider the following techniques.

Configuring Internet Explorer for optimal performance

There are several configuration techniques available for optimizing the performance of Windows Internet Explorer, which are detailed in the following sections.

Configuring client-side browser settings

Internet Explorer 7 and later versions are by default configured to automatically manage client-side browser settings, which can greatly affect user experience over slower connections.

To help optimize performance, however, it may at times be advisable to increase the amount of hard disk space that is reserved for temporary Internet files. This technique ensures that the cache has adequate space to take advantage of improved load times when making subsequent visits to the same page for the same files.

To increase the disk space size for temporary Internet files

1. In Internet Explorer, on the **Tools** menu, click **Internet options**.
2. In the **Internet Options** dialog box, on the **General** tab, under **Browsing history**, and then click **Settings**.
3. In the **Temporary Internet Files and History Settings** dialog box, under **Check for newer versions of stored pages**, verify that **Automatically** is selected.
4. In the **Disk space to use** box, specify a value from 50 to 250 megabytes (the closer to 250 MB, the better) of disk space for temporary Internet files, and then click **OK**.
5. In the **Internet Options** dialog box, on the **General** tab, under **Browsing history**, verify that the **Delete browsing history on exit** check box is cleared to prevent deletion of temporary Internet files each time that the browser is closed.
6. On the **Advanced** tab, under **Settings**, scroll down to **Security** settings and verify that the **Do not save encrypted pages to disk** check box is cleared, and then click **OK**.



Note

After the client-side browser settings on a computer are modified, loading the Microsoft Dynamics CRM Web client for the first time (the “cold” load) may take several moments longer than usual. However, subsequent page loads (“warm” loads) will show improved performance as many of the Microsoft Dynamics CRM web pages will have been cached during the initial load.

Configuring simultaneous download sessions

In Windows Internet Explorer 7 and earlier versions, users are by default limited to two simultaneous downloads. In Windows Internet Explorer 8, however, the default limit is increased

to six, a change that reflects the faster connection speeds that are now typical for most users. Note that for dial-up connections, the limits from earlier versions still apply.

The Microsoft Dynamics CRM Online application synchronously requests data to and from the Microsoft Dynamics CRM Online data center, which in many cases can easily exhaust the available number of simultaneous downloads.

 **Important**

The following procedures require modification of the registry, which can create serious problems if the registry is modified incorrectly. As a result, be sure to follow these steps carefully and for added protection, back up the registry before making any changes.

Internet Explorer 7:

To increase the number of files that can be downloaded at one time to 10

1. Start Registry Editor, and then navigate to the following key:
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Internet Settings
2. On the **Edit** menu, point to **New**, click **DWORD Value**, and then add the following registry values:
 - **Value name:** MaxConnectionsPer1_0Server
 - **Value data:** 10
 - **Base:** Decimal
 - **Value Name:** MaxConnectionsPerServer
 - **Value data:** 10
 - **Base:** Decimal
3. Exit Registry Editor.

Internet Explorer 8 and later versions:

To configure the connection limit by modifying a registry key

1. Start Registry Editor, and then navigate to the following key:
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Internet Explorer\MAIN\FeatureControl\FEATURE_MAXCONNECTIONSPERSERVER
2. On the **Edit** menu, point to **New**, click **DWORD Value**, and then add the following registry value:
 - **Value name:** iexplore.exe
 - **Value data:** 10
 - **Base:** Decimal

 **Note**

Set this value to the connection limit that you want for HTTP 1.1 connections. By setting the value to 10, you increase the connection limit to 10.

3. Exit Registry Editor.

To configure the connection limit by using Group Policy

1. Click **Start**, click **Run**, type **gpedit.msc**, and then click **OK**.
2. In Local Group Policy Editor, under **Local Group Policy**, under **User Configuration**, navigate to:
Administrative Templates\Windows Components\Internet Explorer\Security Features\AJAX
3. Specify the appropriate values for the **Maximum number of connections per server (HTTP 1.0)** and **Maximum number of connections per server (HTTP 1.1)** settings, and then close Local Group Policy Editor.
4. Update policies or restart the computer to apply the modified configuration.

Configuring the Internet Explorer Zoom setting

The Zoom functionality in Internet Explorer lets you enlarge or reduce the view of a web page. Unlike changing font size, zoom enlarges or reduces everything on the page, including text and images. You can zoom from 10% to 1000%.

Note however that a Zoom setting of anything other than “100%” will result in an increase in page rendering time, and hence in slower performance from your Microsoft Dynamics CRM system.

To configure the Internet Explorer Zoom setting to 100%

Do one of the following:

- Press **Ctrl+0**, which is the keyboard short-cut for a 100% zoom level setting in most versions of Internet Explorer.
- In Internet Explorer 7, on the menu bar, click **Page**, point to **Zoom**, and then click 100%.
- In Internet Explorer 8 and later versions, on the menu bar, click **View**, point to **Zoom**, and then click 100%.

Configuring Microsoft Dynamics CRM for Outlook for optimal performance

There are several configuration techniques available for optimizing the performance of Microsoft Dynamics CRM for Outlook, which are detailed in the following sections.



Note

Over very high latency connections, often a Terminal Services/Citrix connection will improve performance. Note that Terminal Services/Citrix connections are only accessible via Microsoft Dynamics CRM for Outlook; Terminal Services does not support Microsoft Dynamics CRM for Outlook with Offline Access.

Optimizing the Outlook synchronization process

To optimize the performance of Microsoft Dynamics CRM for Outlook, configure the filters associated with the Outlook synchronization process to affect the fewest record types and to occur as infrequently as possible without compromising business requirements and to avoid creating duplicate records if key fields match.

To configure the filters associated with the Outlook synchronization process

1. In Outlook 2003 or Outlook 2007, on the **CRM** menu, click **Options**.
- OR -
In Outlook 2010, on the **File** tab, click **CRM**, click **Options**.
2. In the **Set Personal Options** dialog box, on the **Synchronization** tab, under **Synchronize Microsoft Dynamics CRM items with my default Outlook folders**, click **Outlook Filters**.
3. In the **Filter: Outlook** dialog box, on the **User Filters** tab, click the name of the filter that you want to edit, or on the Actions toolbar, click **New** to create a new filter, and then edit the filter as necessary.

Warning

You can also use the **Filter: Outlook** dialog box to specify the status of an existing Outlook filter as either **Active** or **Inactive**.

4. Click **OK** to save any changes and close the **Filter: Outlook** dialog box.
5. To define the frequency with which the Microsoft Dynamics CRM items in your Microsoft Dynamics CRM for Outlook folders are updated in the background, in the **Set Personal Options** dialog box, select the **Synchronize the CRM items in my Outlook folders every** check box, and then specify the number of minutes between each update.

Using this feature provides the user with the convenience of not having to remember to manually synchronize Microsoft Dynamics CRM with Outlook.

Warning

An organization must permit a user to change the **Synchronize the CRM items in my Outlook folders every** check box, and the administrator sets the minimum time allowed between synchronizations.

6. Click **OK** to save any changes and close the **Set Personal Options** dialog box.

Warning

For more information about Outlook synchronization, see the white paper [Outlook Synchronization in Microsoft Dynamics CRM](#)*

* Microsoft Dynamics CRM 4.0 version prior to update for Microsoft Dynamics CRM 2011

Tuning background polling activity

Microsoft Dynamics CRM for Outlook has background polling activities that communicate to the server and react to server-side changes regardless of client-side activity, and the level of background activity associated with regular polling can impact overall client performance.

Microsoft Dynamics CRM includes caches for features such as the Address Book, reminders, and views, and the default polling interval for MAPI caches is 15 minutes. To tune the polling intervals for various MAPI caches, you can modify one or more of a set of registry keys.

For additional information, including a list of the client-side registry keys that influence the level of background activity associated with Microsoft Dynamics CRM for Outlook, see Knowledge Base

Article 282157, [Slow performance when using the Microsoft Dynamics CRM 2011 Client for Outlook](#).

Optimizing Address Book performance

To optimize Address Book performance, configure the Address Book to match only against the contacts that are synchronized to Microsoft Dynamics CRM and to retrieve updates as infrequently as possible without compromising business requirements.

To set Address Book options for optimal performance

1. In Outlook 2003 or Outlook 2007, on the **CRM** menu, click **Options**.
- OR -
In Outlook 2010, on the **File** tab, click **CRM**, and then click **Options**.
2. In the **Set Personal Options** dialog box, on the **Address Book** tab, under **Select how email recipients are reconciled with Microsoft Dynamics CRM records**:
 - For **Contacts**, choose whether names and email addresses from the address book are compared to some or all of your Microsoft Dynamics CRM contacts.
 - i. **Match only against contacts synchronized to Microsoft Dynamics CRM** specifies to link email messages to the Microsoft Dynamics CRM contact records that you have chosen to synchronize and also match a name or email address in your address book. This option is selected by default.
 - ii. **Match all contacts in Microsoft Dynamics CRM** specifies to link email messages to any Microsoft Dynamics CRM contact record that also matches a name or email address in the address book.
 - For **Other** record types, choose whether you want to link email messages to other record types if the names and email addresses in the other record types match those in the address book; also choose the types of records.
 - i. **Do not match** specifies not to link email messages to other record types
 - ii. **Match only the items I own** specifies to link email messages to other records types. This option is selected by default.
 - iii. **Match all items in Microsoft Dynamics CRM** specifies to link email messages to all record types in Microsoft Dynamics CRM.
3. Under **Select how often the Outlook Address Book should be updated from Microsoft Dynamics CRM**, select the **Update the Outlook Address Book every** check box, and then in the box to the left of hours, type in the number of hours you want between each Address Book update.
4. Click **OK** to save the changes and close the **Set Personal Options** box dialog box.

Pinning commonly used views

With Microsoft Dynamics CRM for Outlook, users can open tabs to display multiple views of an entity. Users can also “pin” views so they always display when a user logs in to Outlook. Pinned views, which are stored in cache, respond more quickly than do standard views, so be sure that suggest that users “pin” the views with which they most commonly interact.

Important

Each pinned view consumes system resources (memory), so be sure to balance the use of pinned views against the broader requirements for system resources.

To pin a view in Microsoft Dynamics CRM for Outlook

1. In Outlook, click the tab to the right of the active tab, and then select the view to pin.
2. On the tab, click the push pin symbol (the symbol will turn vertically). The view is now pinned, so that the next time the user logs on, the pinned view will display rather than the default view.

Optimizing the offline synchronization process

To optimize the offline synchronization process on computers running Microsoft Dynamics CRM for Outlook with Offline Access, consider the following best practices.

- Assign all users roles with the minimum access levels and permissions required to perform a job function to help ensure optimized data synchronization to the offline client.
- Whenever possible, do not use:
 - **“Parent downloaded=true” clauses.** Use of this clause often results in the synchronization of unnecessary data, which can degrade the performance of the synchronization process.
 - **Sliding time windows.** These variables calculate results from a date range that shifts depending on the current date (such as, “last 60 days”), and their use can adversely affect performance; use variables that calculate results from a specific date forward.
- Implement local data filtering for each offline client to ensure that users have offline access only to the data required to perform their job functions. After implementing local data filtering, be sure to remain online and synchronize the data manually. The initial synchronization will be slower than subsequent synchronizations because Microsoft Dynamics CRM must remove records.

To set offline synchronization options for optimal performance

- a. In Outlook 2003 or Outlook 2007, on the **CRM** menu, click **Offline Filters**.

- OR -

In Outlook 2010, on the **File** tab, click **CRM**, click **Go Offline**, and then click **Offline Filters**.

- b. In the **Filters: Offline** dialog box, on the **User Filters** tab, click the name of the filter that you want to edit, or on the Actions toolbar, click **New** to create a new filter, and then edit the filter as necessary.

Note

You can also use the **Filters: Offline** dialog box to specify the status of an existing Outlook filter as either **Active** or **Inactive**.

- c. Click **OK** to save any changes and close the **Filters: Offline** dialog box.
- Configure offline synchronization to run in the background periodically, for example every 15 minutes, to improve performance by helping to ensure that:

- The user's local database is regularly updated so that when the user actually wants to go offline, there's not as much data to copy down.
- If the user loses connection and the client goes into an offline mode, the data store is relatively current.

To schedule Offline Synchronization to run in the background

- i. In Outlook 2003 or Outlook 2007, on the **CRM** menu, click **Options**.
OR -
 - ii. In Outlook 2010, on the **File** tab, click **CRM**, and then click **Options**.
- In the **Set Personal Options** dialog box, on the **Local Data** tab, select the **Update local data every** check box, and then specify (in minutes) the duration of the interval between each synchronization attempt. The default (and minimum) value is 15 minutes.



Note

For more information about offline synchronization, see the following resources:

- [Offline and Online Synchronization in Microsoft Dynamics CRM*](#).
* Microsoft Dynamics CRM 4.0 version prior to update for Microsoft Dynamics CRM 2011
- [Hitting the Road with Microsoft Dynamics CRM for Outlook with Offline Access](#).
- [Synchronizing Information](#) (Microsoft Dynamics CRM Online-specific).

Customizing Microsoft Dynamics CRM for optimal client performance

When customizing Microsoft Dynamics CRM for optimal performance of the Microsoft Dynamics CRM clients, keep in mind the following best practices.

Best practices

- Use JScript judiciously. While a few lines of JScript can greatly enhance the user experience by automatically updating data as a form loads or as data changes, they can also cause a performance issue if a lot of JScript code is running on a form. When using JScript on forms, verify that code is optimized to ensure efficient form loads.



Note

To determine if JScript is affecting the performance of a form, remove the JScript and test how the form performs. Then, compare those results to the performance of the form with JScript included.

- Use iFrames judiciously. The greater the number of iFrames on a form, the greater the associated form load time will be. If an iFrame is not on the form's primary tab, use collapsed tabs and set the URL in the TabStateChange Jscript event for the tab on which the iFrame resides. This ensures that the iFrame loads only when a user clicks the tab, rather than loading each time a record is opened.

- Use sub-grids judiciously. Each sub-grid that is used in a form queries the Microsoft Dynamics CRM system in the background for a set of data to load into the grid. While the query executes in the background, each sub-grid control on a form adds more HTML to the page, resulting in longer load times. For sub-grids that are in use, consider having users collapse them, as data will not be retrieved until the user expands a sub-grid.

 **Important**

- Each sub-grid also includes a context-sensitive ribbon to provide users with access to the appropriate commands for that sub-grid. Although the ribbon only becomes visible when the grid is selected, the required xml (and therefore the processing) occurs as the form is loaded. As a result, even if a user never selects the sub-grid, there is a performance impact associated with each sub-grid on a form.
- Use role-based forms to limit the fields that display on a form to accommodate the specific requirements of users based on their assigned security role.
 - Adjust security roles to limit the functionality presented to users based upon their specific requirements for selected record types. This ensures that the user interfaces adapts to display only the elements required by specific users to work with data in the Microsoft Dynamics CRM solution.
 - Consider the complexity and number of visualizations used in the dashboards on a page. Dashboards capture a lot of data and are loaded separately in parallel connections to the rest of the page. As a result, limit the number of visualizations used in a dashboard as much as possible without compromising business goals.
 - Use columns and grids judiciously. Optimize views and sub-grids so that only the required columns and grids display by default.
 - Customize forms to display only the fields required for specific types of records.
 - Limit the number of rows that are returned per page while still meeting any related business requirements.
 - After users are sufficiently familiar with Microsoft Dynamics CRM, hide the Get Started pane to reduce any impact it might have on client performance.

 **Note**

The Get Started pane can be displayed or hidden by default on a per user basis or CRM Administrators can set this configuration for all system users.

To set Get Started panes to display or hide for a specific user

- a. In Outlook 2003 or Outlook 2007, on the **CRM** menu, click **Options**.
- OR -
In Outlook 2010, on the **File** tab, click **CRM**, and then click **Options**.
- b. In the **Set Personal Options** dialog box, on the **General** tab, under **Select the setting for Get Started Panes**, select or deselect the **Show Getting Started panes on all lists** check box accordingly
- c. Click **OK** to save any changes and close the **Set Personal Options** dialog box.

To set Get Started panes to display or hide for all users

- a. In Outlook 2003, Outlook 2007, or Outlook 2010, on the Navigation Pane, click **Settings**, click **System**, click **Administration**, and then click **System Settings**.
- b. In the **System Settings** dialog box, on the **General** tab, under **Select the display option for Get Started Panes**, select or deselect the **Show Getting Started panes on all lists for all users** check box accordingly.
- c. Click **OK** to save any changes and close the **System Settings** dialog box.

Troubleshooting considerations

If your Microsoft Dynamics CRM environment includes customizations and your users are experiencing general slowness, try having users reproduce the issue in a Microsoft Dynamics CRM Online test environment that is not customized. This will help determine whether or not the issue is potentially related to customizations in the Production environment. Also consider disabling customizations (for example OnLoad events) in the Production environment to help narrow down the potential issue.

In situations when subgrids are contributing to lengthy form load times, it may be helpful to collapse the subgrid sections as a test to see if performance improves. It is possible to collapse sections by default on the load of the form and then expand the form shortly after.

Appendix A: Additional resources

Technical resources

For more information about optimizing and maintaining Microsoft Dynamics CRM 2011, see the following technical resources.



Note

For the latest information about Microsoft Dynamics CRM performance in general and to learn about the release of additional support resources, see the [Microsoft Dynamics CRM Team blog](#).

Implementation and Installation

- Microsoft Dynamics CRM 2011 Implementation Guide
 - [Download](#)
 - [View online](#)
- [Microsoft Dynamics CRM for Outlook Installing Guide for use with Microsoft Dynamics CRM Online](#)
- [Microsoft Dynamics CRM 2011 Readme](#)

Server-Side Optimization and Maintenance

- [Optimizing and Maintaining the Performance of a Microsoft Dynamics CRM 2011 Server Infrastructure](#)

- [Performance Toolkit for Microsoft Dynamics CRM 2011](#)
- [Bandwidth testing using Microsoft Dynamics CRM Performance Toolkit](#)
- [Improving Microsoft Dynamics CRM Performance and Securing Data with Microsoft SQL Server 2008 R2](#)
- [SAMPLE - Performance and Scalability Assessment of Customer Implementation](#)
- [Microsoft Dynamics CRM 2011 performance counters](#)

“Nuts and Bolts”

- [Outlook Synchronization in Microsoft Dynamics CRM*](#)
* Microsoft Dynamics CRM 4.0 version prior to update for Microsoft Dynamics CRM 2011
- [Offline and Online Synchronization in Microsoft Dynamics CRM*](#)
* Microsoft Dynamics CRM 4.0 version prior to update for Microsoft Dynamics CRM 2011

Development

- [Microsoft Dynamics CRM 2011 Software Development Kit](#)
- [Microsoft Dynamics CRM Developers Center](#)

Microsoft Services

Microsoft Services is the consulting and enterprise support division of Microsoft. Their mission is to help businesses around the world get a maximized return on their investment in Microsoft products and technologies. This means not only helping with deploying and optimizing IT, but also helping businesses move forward with IT initiatives that deliver the most business value.

Between Enterprise Services and Customer Support Services, Microsoft Services has a global team of more than 9,720 professionals who work with more than 60,000 partners across 88 countries. As a result, Microsoft Services can extend its services to take on even the largest projects, helping a large number of customers worldwide get the most out of existing IT assets, saving them money, and delivering real business results.

Microsoft Services supports customers through a variety of services:

- Strategy
 - Enterprise Strategy Portfolio
 - Enterprise Strategy Foundation
- Support
 - Premier Support
 - Microsoft Services Partner Advantage
 - Contact Microsoft Services
- Consulting
 - Business Intelligence
 - CRM Solutions

- Datacenter Services
- Dynamic Workplace
- Next Generation Applications
- Optimized Desktop
- Platform Modernization



Note

For more information about Microsoft Services, see the [Microsoft Services](#) web site.

Appendix B: Accessibility for Microsoft Dynamics CRM

Administrators and users who have administrative responsibilities typically use the Settings area of the Microsoft Dynamics CRM web application to manage Microsoft Dynamics CRM. A mouse and keyboard are the typical devices that administrators use to interact with the application.

Users who don't use a mouse can use a keyboard to navigate the user interface and complete actions. The ability to use the keyboard in this way is a result of support for keyboard interactions that a browser provides.

For more information, see the following Microsoft Dynamics CRM web application accessibility topics:

- [Use Keyboard Shortcuts](#)
- [Accessibility for People with Disabilities](#)

Administrators and users who have administrative responsibilities for on-premises deployments of Microsoft Dynamics CRM 2011 also use Microsoft Dynamics CRM Deployment Manager, a Microsoft Management Console (MMC) application, to manage on-premises deployments of Microsoft Dynamics CRM Server 2011.

For more information, see the following Microsoft Management Console (MMC) accessibility topics:

- [Navigation in MMC Using the Keyboard and Mouse](#)
- [MMC Keyboard Shortcuts](#)

Accessibility Features in Browsers

Browser	Documentation
Internet Explorer	Microsoft Accessibility Language Support and Accessibility Features
Mozilla Firefox	Accessibility features in Firefox
Apple Safari	Safari
Google Chrome	Accessibility Technical Documentation

**Note**

For additional information, see the [Microsoft Accessibility Resource Center](#)

Appendix C: Microsoft Dynamics CRM web application recommendations for a rich experience with forms

While the Microsoft Dynamics CRM web application is designed to work on a variety of system configurations, ensuring a rich experience with forms in Microsoft Dynamics CRM requires a special consideration.

Microsoft Dynamics CRM supports both read-optimized forms, which are designed to minimize page load times to present users with information as efficiently as possible, as well as rich form editing, whereby a user can customize out of the box forms or create new forms to accommodate specific business scenarios.

To ensure the best experience with forms in Microsoft Dynamics CRM, end users should have systems configured with:

- **RAM:** 2 GB or more
- **Operating System:** Windows 7
- **Browser:** Internet Explorer 9 or later
- **Power Settings:** Balanced+

In addition, while read-optimized form functionality in Microsoft Dynamics CRM is designed to accommodate hardware configurations with slower processors, ensuring a rich experience for users who regularly edit Microsoft Dynamics CRM forms requires a more powerful processor. Processor requirements for read-optimized forms and for rich form editing is shown in the following table:

Recommendation	Read-Optimized Forms	Rich Form Editing
Recommended	Core Duo, 1.4+ GHz	Core i3, 1.6+ GHz
Minimum	Pentium D	Core Duo, 1.4+ GHz
Not Recommended	< Pentium/Celeron; Atom	Pentium/Celeron; Atom

Appendix D: Microsoft Dynamics CRM Online performance troubleshooting

The sections below provide information and guidance on troubleshooting performance issues in Microsoft Dynamics CRM Online. As you begin any troubleshooting effort, be sure to gather as much information as possible about the details of the performance issues that the user or users are experiencing. These things may lead you to identify the source of an issue and will also help you provide as much detail as possible to our support team in the event you need additional help from Microsoft.

Troubleshooting considerations

The following sections call out specific considerations to keep in mind when troubleshooting the performance of Microsoft Dynamics CRM Online.

General considerations

- What operating system is in use?
- What is the total amount of memory on the computer?
- Does the issue repro in the CRM web client, Microsoft Dynamics CRM Online for Outlook, or both (it will be important to verify this)?
 - If the issue reproduces in the Microsoft Dynamics CRM Online web client, troubleshoot there first as there are other layers of Microsoft Dynamics CRM for Outlook that could inhibit your ability to determine the root cause.
- For issues with Microsoft Dynamics CRM for Outlook, what version of Office is in use?
- If the issue is occurring in Microsoft Dynamics CRM for Outlook, what Update Rollup is currently on the user's computer (this can be verified by getting the version of the crmaddin.dll...located in the Microsoft Dynamics CRM\Client\bin directory or by clicking the **Microsoft Dynamics CRM** button in Microsoft Dynamics CRM for Outlook)?

Considerations about issue magnitude

- How many users are experiencing the issue?
- Can the issue be consistently reproduced, or does it happen sporadically?
- Does the performance issue happen only in certain areas of the Microsoft Dynamics CRM Online application? If so, what area(s)?
- If the issue is happening sporadically, does it seem to be occurring during a certain time of the day, or when a certain process is running?

Performance considerations

- What type of internet connection does the user(s) have?
- Do multiple users experience this issue during the same period of time, or does it appear to be a one-off performance issue?

- What country is the user experiencing the issue accessing CRM from?

Network issues

A first step in identifying the source of a performance issue is to determine whether or not network factors (mainly bandwidth or latency) seem to be part of the problem. Low bandwidth and high latency will negatively impact the end-user experience in Microsoft Dynamics CRM Online, so be sure to get a baseline reading of WAN performance at the initiation of the troubleshooting process.

The Microsoft Dynamics CRM Product Group has developed a Microsoft Dynamics CRM Online Network Performance tool to gather client network configuration data. The tool provides insight into the network conditions under which Microsoft Dynamics CRM client is operating.

To run the Microsoft Dynamics CRM Online Network Performance tool

1. Log in to your Microsoft Dynamics CRM Online organization.
2. Navigate to the appropriate relative path for your organization:
`https://<orgname>.crm.dynamics.com/tools/diagnostics/diag.aspx`
3. Click the **Run** button for **All Tests**.



Important

Microsoft Dynamics CRM is designed to work best over networks with latency under 150 milliseconds.

Optimization tools

There are also tools available to assist with efforts to optimize the performance of Microsoft Dynamics CRM clients.

Fiddler

Run a Fiddler trace to determine the duration of each part of the page load process. By reviewing the timeline in Fiddler, you should be able to identify which process or processes are taking the longest.

To capture data for Microsoft Dynamics CRM Online

1. In Fiddler, on the **Tools** menu, click **Fiddler Options**.
2. In the **Fiddler Options** dialog box, on the **HTTPS** tab, verify that the **Capture HTTPS CONNECTs** check box is selected, select the **Decrypt HTTPS traffic** check box, and then click **OK**.

For more information on Fiddler, refer to the bog posting [Using Fiddler HTTP Debugger for CRM Troubleshooting and Performance Tuning](#).

SQL tools

For situations in which more advanced SQL tracing is needed to determine long running queries and/or blocking, you will need to engage the Microsoft support team. All previously mentioned levels of troubleshooting should be completed prior to taking this step.

Feedback

We appreciate hearing from you. To send your feedback, click the link below and type your comments in the message body.



Note

The subject-line information is used to route your feedback. If you remove or modify the subject line, we may be unable to process your feedback.

[Send feedback](#)

Conclusion