**Task Scheduler**

Purpose

The Task Scheduler enables you to automatically perform routine tasks on a chosen computer. The Task Scheduler does this by monitoring whatever criteria you choose to initiate the tasks (referred to as triggers) and then executing the tasks when the criteria is met.

Where applicable

The Task Scheduler can be used to execute tasks such as starting an application, sending an email message, or showing a message box. Tasks can be scheduled to execute:

* When a specific system event occurs.
* At a specific time.
* At a specific time on a daily schedule.
* At a specific time on a weekly schedule.
* At a specific time on a monthly schedule.
* At a specific time on a monthly day-of-week schedule.
* When the computer enters an idle state.
* When the task is registered.
* When the system is booted.
* When a user logs on.
* When a Terminal Server session changes state.

### Run-time requirements

**1. Task Scheduler 1.0:**

* Windows Vista
* Windows XP
* Windows 2000 PRO
* Windows ME
* Windows 98
* Windows 2000 Server
* Windows 2003 Server
* Windows 2008 Server

**2. Task Scheduler 2.0:**

* Windows Vista
* Windows 2008 Server
* Windows 7
* Windows 8

**2.1 What's New in Task Scheduler**

The following changes summarize what is new in different versions of Task Scheduler.

Windows 8

The following Task Scheduler 2.0 changes are introduced in Windows 8:

* Powershell support: users can manage (create, delete, modify, explicitly start, stop etc.) Windows Task Scheduler tasks using the ScheduledTasks powershell module.
* Managed passwords: administrators can use the Active Directory managed password accounts as task principals. These tasks no longer require an enforced password reset policy.
* API changes: Introduced two new task settings with the [**ITaskSettings3**](http://msdn.microsoft.com/es-es/library/windows/desktop/hh832148(v=vs.85).aspx) interface.
  + [**MaintenanceSettings**](http://msdn.microsoft.com/es-es/library/windows/desktop/hh974642(v=vs.85).aspx): tasks using these settings are treated as a new type of scheduled tasks that are invoked during OS automatic maintenance time, according to the specified periodicity and deadline.
  + [**Volatile**](http://msdn.microsoft.com/es-es/library/windows/desktop/hh832150(v=vs.85).aspx): tasks that are set to be volatile are always disabled on an OS boot and must be explicitly re-enabled back when required. Volatile tasks are utilized by the failover clusters to ensure only one task instance is scheduled on a cluster at a time.
* The unified scheduling engine now supports the following features:
  + S4U Logon type, through the **[LogonType](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383013(v=vs.85).aspx)** element.
  + XPath query values for event triggers, through the **[ValueQueries](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383289(v=vs.85).aspx)** element.
  + Do not allow task hard terminate, through the **[AllowHardTerminate](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382594(v=vs.85).aspx)** element.
* Features deprecated in this release
  + Actions: **[sendEmail](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383095(v=vs.85).aspx)** and **[showMessage](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383104(v=vs.85).aspx)**.
  + AT.exe cmdline utility

Windows 7

The following Task Scheduler 2.0 changes are introduced in Windows 7:

* Using the unified scheduling engine provided by the underlying operating system.
* Ability to reject starting tasks in Remote Applications Integrated Locally (RAIL) sessions.
* Task security hardening (for tasks running as "NETWORK SERVICE" or "LOCAL SERVICE" only):
  + Ability to assign a process token security identifier (SID) type (for example, unrestricted or none) to a task.
  + Allow task developers to request the exact set of privileges that their task requires.
* API changes:
  + Task security hardening support: new task security hardening feature is introduced with new IPrincipal2 interface.
  + Introduced two new task settings with the new ITaskSettings2 interface.
    - DisallowStartOnRemoteAppSession: The new DisallowStartOnRemoteAppSession setting can reject a task start if triggered in [Remote Applications Integrated Locally (RAIL)](http://go.microsoft.com/fwlink/p/?linkid=168157) sessions.
    - UseUnifiedSchedulingEngine: Using the UseUnifiedSchedulingEngine setting provides a cohesive behavior for Windows Tasks and Services because it is being managed in a uniform manner by a common system-wide scheduling engine. Although using a unified engine is recommended, it does not support some of the Task Scheduler features. If the combination of properties will not allow running of the task under a unified engine, the registration of such will be rejected.
    - The task features that are not supported by the unified scheduling engine include:
      * Logon types:
        + [TASK\_LOGON\_INTERACTIVE\_TOKEN\_OR\_PASSWORD](http://go.microsoft.com/fwlink/p/?linkid=168159)
      * Multiple instance policy:
        + [**TASK\_INSTANCES\_STOP\_EXISTING**](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383040(v=vs.85).aspx)
      * Actions:
        + [Send email](http://go.microsoft.com/fwlink/p/?linkid=168161)
        + [Display message](http://go.microsoft.com/fwlink/p/?linkid=168164)
      * Settings:
        + [Task network settings](http://go.microsoft.com/fwlink/p/?linkid=168166)
        + [Do not allow task hard terminate](http://go.microsoft.com/fwlink/p/?linkid=168167)
      * Triggers:
        + [Trigger execution time limit](http://go.microsoft.com/fwlink/p/?linkid=168168)
        + [Repetition patterns for calendar triggers](http://go.microsoft.com/fwlink/p/?linkid=168169)
        + [XPath query values for event triggers](http://go.microsoft.com/fwlink/p/?linkid=168170)
        + [Monthly](http://go.microsoft.com/fwlink/p/?linkid=168171) and [Monthly day-of-week](http://go.microsoft.com/fwlink/p/?linkid=168173) trigger types

Windows Vista

The Task Scheduler 2.0 API should be used in developing applications that use the Task Scheduler service on Windows Vista. For more information, see [Task Scheduler Reference](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383608(v=vs.85).aspx) and [Using the Task Scheduler](http://msdn.microsoft.com/es-es/library/windows/desktop/aa384006(v=vs.85).aspx).

Windows 2000, Windows XP, and Windows Server 2003

The Task Scheduler 2.0 API is not available. Use Task Scheduler 1.0.

**2.2 About the Task Scheduler**

The Task Scheduler service allows you to perform automated tasks on a chosen computer. With this service, you can schedule any program to run at a convenient time for you or when a specific event occurs. The Task Scheduler monitors the time or event criteria that you choose and then executes the task when those criteria are met.

Where Task Scheduler is Installed

The Task Scheduler is automatically installed with several Microsoft operating systems.

Task Scheduler 1.0 is installed with the Windows Server 2003, Windows XP, and Windows 2000 operating systems.

Task Scheduler 2.0 is installed with Windows Vista and Windows Server 2008.

The Task Scheduler 2.0 API should be used in developing applications that use the Task Scheduler service on Windows Vista. For more information, see [Task Scheduler Reference](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383608(v=vs.85).aspx).

Task Scheduler is started each time the operating system is started. It can be run either through the Task Scheduler graphical user interface (GUI) or through the Task Scheduler API described in this SDK.

Information about Tasks

Tasks are the main component of the Task Scheduler. For information on what tasks are and what their components are, see the following topics:

* [Tasks](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382589(v=vs.85).aspx)
* [Task Actions](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383549(v=vs.85).aspx)
* [Task Triggers](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383619(v=vs.85).aspx)
* [Task Registration Information](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383569(v=vs.85).aspx)
* [Task Idle Conditions](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383561(v=vs.85).aspx)
* [Security Contexts for Tasks](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382140(v=vs.85).aspx)
* [Repeating A Task](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382116(v=vs.85).aspx)
* [Automatic Maintenance](http://msdn.microsoft.com/es-es/library/windows/desktop/jj835985(v=vs.85).aspx)

For more information and examples about how to use the Task Scheduler interfaces, scripting objects, and XML, see [Using the Task Scheduler](http://msdn.microsoft.com/es-es/library/windows/desktop/aa384006(v=vs.85).aspx).

**2.3 Using the Task Scheduler**

This section contains code examples that illustrate how the Task Scheduler API is used and XML examples that show how tasks are defined in the Task Scheduler schema. Most of these examples are stand-alone code that can be run independently, or pasted into a larger application and modified to the requirements of the application.

The following table lists Task Scheduler 2.0 examples included in this section.

|  |  |
| --- | --- |
| **Example** | **Description** |
| [Starting an Executable at a Specific Time](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382152(v=vs.85).aspx) | Defines a task that starts Notepad at a specified time. |
| [Starting an Executable Daily](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382153(v=vs.85).aspx) | Defines a task that starts Notepad daily. |
| [Starting an Executable on System Boot](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382154(v=vs.85).aspx) | Defines a task that starts Notepad when the system is booted. |
| [Starting an Executable Weekly](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382155(v=vs.85).aspx) | Defines a task that starts Notepad on a weekly basis. |
| [Starting an Executable When a Task is Registered](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382524(v=vs.85).aspx) | Defines a task that starts Notepad when the task is registered. |
| [Starting an Executable When a User Logs On](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382527(v=vs.85).aspx) | Defines a task that starts Notepad when a user logs on. |
| [Enumerating Tasks and Displaying Task Information](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446880(v=vs.85).aspx) | Enumerates through all the tasks on the local computer and displays each task's state. |

The following table lists Task Scheduler 1.0 examples included in this section.

|  |  |
| --- | --- |
| **Example** | **Description** |
| [Creating a Task Using NewWorkItem Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446826(v=vs.85).aspx) | Creates a new task. |
| [Enumerating Tasks Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446881(v=vs.85).aspx) | Enumerates all the tasks on the local computer. |
| [Starting a Task Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382529(v=vs.85).aspx) | Starts a known task. |
| [Editing a Work Item using Property Pages](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446867(v=vs.85).aspx) | Displays the property pages of a task for editing. |
| [Retrieving Work Item Property Examples](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382124(v=vs.85).aspx) | A set of examples that show how to retrieve properties that apply to all types of work items. |
| [Setting Work Item Property Examples](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382147(v=vs.85).aspx) | A set of examples that show how to set properties that apply to all types of work items. |
| [Retrieving Task Property Examples](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382122(v=vs.85).aspx) | A set of examples that show how to retrieve properties unique to tasks. |
| [Setting Task Property Examples](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382146(v=vs.85).aspx) | A set of examples that show how to set properties unique to tasks. |
| [Retrieving a Task Page Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382121(v=vs.85).aspx) | Retrieves and displays the general task page of a known task. |
| [Creating a New Trigger](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446825(v=vs.85).aspx) | Creates a new trigger for a known task. |
| [Creating an Idle Trigger Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa446824(v=vs.85).aspx) | Creates an event-based idle trigger for a known task. |
| [Terminating a Task Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383621(v=vs.85).aspx) | Terminates a task while it is running. |
| [Retrieving Trigger Strings Example](http://msdn.microsoft.com/es-es/library/windows/desktop/aa382123(v=vs.85).aspx) | Retrieves the trigger string of all triggers associated with a known task. |

**2.4 Task Scheduler Reference**

This section describes the APIs, scripting objects, and XML schema that are provided by the Task Scheduler.

API topics include a description of the API, the declaration syntax of the API, remarks that describe special conditions for the API, and a requirements block that describes what platform, header files, and libraries are required.

Scripting object topics include a description of the object, the declaration syntax of the object, remarks that describe special conditions for the object, and a requirements block that describes what platform and type libraries are required.

XML schema topics include a description of the element, parent, child, and attribute information, and remarks that describe special conditions.

|  |  |
| --- | --- |
| **See** | **For information on** |
| [Task Scheduler Objects](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383607(v=vs.85).aspx) | Scripting objects and their methods and properties. |
| [Task Scheduler Interfaces](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383606(v=vs.85).aspx) | Interfaces and their methods and properties. |
| [Task Scheduler Structures and Unions](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383615(v=vs.85).aspx) | Structures and unions. |
| [Task Scheduler Enumerated Types](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383602(v=vs.85).aspx) | Constants defined by enumerators. |
| [Task Scheduler Schema](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383609(v=vs.85).aspx) | Elements, simple types, complex types, and attribute groups defined by the schema. |
| [Task Scheduler Error and Success Constants](http://msdn.microsoft.com/es-es/library/windows/desktop/aa383604(v=vs.85).aspx) | Error and success constants returned by Task Scheduler APIs. |
| [**Schtasks.exe**](http://msdn.microsoft.com/es-es/library/windows/desktop/bb736357(v=vs.85).aspx) | The Schtasks.exe command line tool that is used to create, delete, query, change, run, and end scheduled tasks on a local or remote computer. |

**Task Scheduler Interfaces (API)**

[**http://msdn.microsoft.com/en-us/library/aa383606(v=vs.85).aspx**](http://msdn.microsoft.com/en-us/library/aa383606(v=vs.85).aspx)