

# ***Tuning Windows Parameters to Improve Stability in HP Output Server 3.5***

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This technical note describes how to improve the job submission rate and stability of HP Output Server 3.5 when installed on Windows operating systems.

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NOTE: HP recommends tuning a few Windows-specific parameters as described in the sections below before deploying HP Output Server 3.5 in your production environment. This tuning helps achieve greater stability and reliability for HP Output Server 3.5.

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## **Problem**

When HP Output Server 3.5 is installed on a machine running the Windows operating system, different kinds of errors may occur when jobs are submitted to a large number of destinations from multiple clients. These errors affect the job submission rate and also lower the stability of the server. The overall performance of HP Output Server 3.5 suffers.

The errors might differ across scenarios. Examples of various scenarios and errors are described below:

**Table 1-1. Scenarios and Errors that may Occur on the Windows Operating System when HP Output Server 3.5 is Installed**

<b>Scenario</b>	<b>Configuration</b>	<b>Operating system</b>	<b>Servers</b>	<b>Clients</b>	<b>Destination</b>	<b>Results</b>	<b>Errors</b>
1	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 150 DSM	14 (remote)	4500 ps and 4500 pcl	272 jobs per minute, 494247 jobs delivered, 776 job failures	"[error 000b41d6] Exception caught while waiting for transformer to finish (Agent exited with error status 2304)"

Problem

**Table 1-1. Scenarios and Errors that may Occur on the Windows Operating System when HP Output Server 3.5 is Installed**

Scenario	Configuration	Operating system	Servers	Clients	Destination	Results	Errors
2	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 150 DSM	14 (remote)	4500 ps and 4500 pcl	272 jobs per minute, 60k jobs delivered, 82 job failures	"INCLIB error delivering notice" "Event Manager error-- error in DCE environment" "Job interrupted with transient errors, sending back with checkpoint (only for ps/pcl printer)"
3	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 75 DSM	4 (remote)	2250 ps	74 jobs per minute, 195227 jobs processed by DSM server, 0 job failures	"Job interrupted with transient errors, sending back with checkpoint (only for ps/pcl printer)" "Error when opening and reading document"
4	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 75 DSM	1 (remote)	2250 ps	62 jobs per minute, 0 job failures	0 errors

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Scenario	Configuration	Operating system	Servers	Clients	Destination	Results	Errors
5	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 150 DSM	7 (remote)	10000 ps	1004 jobs per minute, 9374 jobs received by DSM server, 9292 jobs successful 82 job failures	Thread 3814056: [debug 00090068] INCLIB error delivering notice  Thread 3814056 [error 0012403C] Event Manager error -- Error in DCE environment

## Solution

The performance of the servers can be improved by tuning certain parameters. `WorkerThreads` need to be introduced. `WorkerThreads` exist in a pool and perform all the work associated with request processing. By default, they are set to '0'. For them to operate efficiently, the registry needs to be modified.

To modify the registry, perform the following steps:

1. Click **Start**, and then select **Run**.  
The **Run** dialog box appears.
2. Enter **regedit**.  
The **Registry Editor** window appears.
3. Browse to the following path:  
HKLM\System\CurrentControlSet\Control\Session  
Manager\Executive\ (REG\_DWORD).
4. Double-click **AdditionalCriticalWorkerThreads** from the list in the description field of the window.  
The **Edit DWORD Value** dialog box appears.
5. Select any one of the **Base** options as required.
6. Enter **Value data** according to your selected **Base** option.  
For example, if you want to enter 10k as the value, do the following:  
For **Hexadecimal**, enter 186a0 .  
For **Decimal**, enter 100000 .  
  
For more information on how to decide the optimal number of `WorkerThreads` for the **Value data** field, refer to "Deciding the optimal number of `WorkerThreads`" on page 4.
7. Click **OK**.
8. Double-click **AdditionalDelayedWorkerThreads** in the list in the description field of the window.  
The **Edit DWORD Value** dialog box appears.
9. In the **Edit DWORD Value** dialog box, repeat steps 5 through 7.
10. Reboot the system.  
The registry modifications take effect.

### Deciding the optimal number of WorkerThreads

Once the `WorkerThreads` are set, the system is tuned and the desired results are achieved. For example, for the given setup, the following result is achieved:

**Table 1-2. Scenario on Windows Operating System after `WorkerThreads` are introduced**

Scenario	Configuration	Operating System	Servers	Clients	Destination	Results	Errors
6	Hardware: HP DL560 model 5GB RAM Four-2.2 GHz Xeon processors	Windows 2003 Enterprise Edition	10 DLM 16 JQM 150 DSM	7 (remote)	10000 ps	289 jobs per minute, 546139 jobs delivered, 0 failed jobs	0 errors

### Registry modifications made

Increased the number of the following threads:

`AdditionalDelayedWorkerThreads`

`AdditionalCriticalWorkerThreads`

The problem of errors and job failures is resolved. The use of threads makes submitting jobs easier and helps in concurrent processing. By tuning `WorkerThreads`, job failures are reduced and HP Output Server stability improves.

## Deciding the optimal number of WorkerThreads

To decide the optimal number of `WorkerThreads`, take the following factors into account:

- Determine the number of processors in your system. Allocate one thread per CPU to fully utilize the available resources.
- Determine whether the HP Output Server client request session or SQL extensions are to be used. Using either of these extensions involves database access, which can block a thread. Depending on the level of database activity, increase the number of threads.
- Decide an optimal trade-off between the average response time and the thread switching overhead. Note that if only one thread per CPU is allocated, requests are processed sequentially. This is the optimal setting for the minimal overall CPU load because the switching overhead is the least. However, this means that clients are being queued, so single requests might have to wait for other requests to be completed first.

## Conclusion

In general, if jobs fail and the job submissions rate is slow, then tuning the `WorkerThread` parameters in the registry helps improve stability.