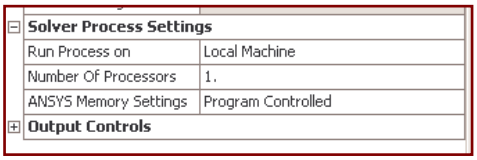
Date April 2, 2006 Memo Number STI:06/01B
Subject **Sheldon's ANSYS Tips and Tricks: Using the Workbench Remote Solution Manager**
Keywords Workbench Simulation, Remote Solution Manager

1. Introduction:

Workbench (WB) Simulation has the ability to allow the user to solve multiple jobs locally or remotely. These capabilities are defined within the "Solution" branch of WB Simulation as well as in the WB Remote Solution Manager.

This memo hopes to introduce this capability, especially with regards to solving multiple jobs locally on a Windows machine.

2. Synchronous Solutions:



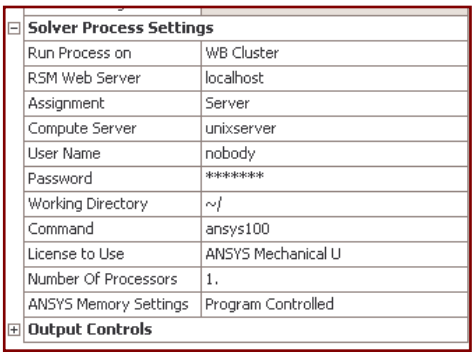
Solver Process Settings	
Run Process on	Local Machine
Number Of Processors	1.
ANSYS Memory Settings	Program Controlled
Output Controls	

The default solution behavior in WB Simulation is to solve models *synchronously*. This means that when the user initiates a solution by clicking on the "Solve" icon, any *Environments* on and below the currently selected branch will be solved, and results will be automatically retrieved.

The specification of synchronous solution can be verified under the *Solution* branch Details view, as shown on the right. When "Run Process On" is set to "Local Machine," this reflects a synchronous solution. The number of processors used for solving can also be specified (default is to use two processors, if available).

This method is useful when the user only has a single ANSYS license. Also, by having multiple *Model* branches and/or several *Environment* branches in the same WB Simulation database, a user can select the parent branch and solve multiple *Environemnts* sequentially.

3. Asynchronous Solution:



Solver Process Settings	
Run Process on	WB Cluster
RSM Web Server	localhost
Assignment	Server
Compute Server	unixserver
User Name	nobody
Password	*******
Working Directory	~/
Command	ansys100
License to Use	ANSYS Mechanical U
Number Of Processors	1.
ANSYS Memory Settings	Program Controlled
Output Controls	

An *asynchronous* solution allows a user to solve the model on remote machine(s). Generally speaking, there are three configurations supported in WB Simulation:

- Solving directly on a UNIX or Linux machine
- Solving on a WB cluster
- Solving using Platform LSF software

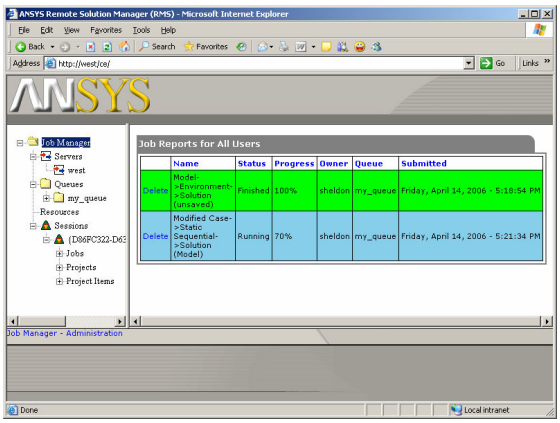
When solving directly to a UNIX or Linux machine, the "Run Process on" should be set to "WB Cluster". The "RSM Web Server" can be left as "localhost," and "Assignment" should be changed to "Server". Through this method, the UNIX/Linux hostname and login information can be specified, and the solution will be submitted to that UNIX/Linux machine.

The WB cluster method requires use of Windows machines configured appropriately.[1] Through the use of IIS and .NET, a *Web Service Machine* running Windows Server 2003 or later[2] receives requests to solve jobs on *Compute Server Machines*. Queues and compute server designations are set on the web service machine. A user can then run WB Simulation on a separate PC and monitor/submit jobs to the web service machine, which then sends the jobs to be solved on compute servers, based on the queue selected.

[1] Details on configuring a WB cluster can be found in the "ANSYS Workbench Products Remote Solution Manager Configuration Guide" in the *Installation and Configuration Guides*

[2] Windows XP can actually be used instead of Windows Server 2003 if the user only has PCs running Windows XP.

When the WB cluster method is used, jobs can be monitored and controlled on the web service machine from the RSM webpage, as shown on the right (default page is /ce on the web service machine).



The benefit of such an approach is that once queues and server designations are configured on the web service machine, users just need to select which queue they would like to run the analyses on. The file transfer and submission of the jobs is taken care of by the web service machine, and users can monitor the jobs either from this webpage or through the RSM Solution Status functionality (discussed later in Section 4).

(Note that if Windows XP is used for the web service machine, IIS needs to be installed from "Control Panel: Add/Remove Programs > Add/Remove Windows Components". .NET Framework also needs to be downloaded and installed from the Microsoft website after installing IIS – otherwise, the user would need to run the program "aspnet_regiis.exe –i" to register IIS with .NET. Simple sharing should also be turned off to enable the user to explicitly specify permissions for folders. Lastly, through "Control Panel: Administrative Tools > Component Services > Computers > My Computer: Properties," COM Internet Services should be enabled on the web service machine. If any problems or errors occur, be sure to review the Event Viewer logs for information on what services may have failed after consulting the ANSYS documentation for details on setting up the web service machine, servers, and clients.)

The user can also utilize Platform Computing's LSF software[3] to submit jobs to queues of compute servers. (Use of LSF is not discussed here, and the user should refer to LSF documentation for details.)

The asynchronous solution capability provides many benefits:

- The computing is done on a remote compute server, so the user's PC can be used for other purposes and not be bogged down by the computation
- The current WB Simulation database can be saved and closed, and a different model can be opened for the user to work on
- Depending on the number of licenses available and the configuration of the WB cluster, more than one analysis may be initiated at a given time, leading to faster turnaround times for multiple jobs
- If *ANSYS PrepPost* licenses are available, these can be used to perform the pre- and post-processing tasks in WB Simulation while regular ANSYS licenses (e.g., *ANSYS Mechanical* or *ANSYS Multiphysics*) can be used to solve the model. This can be a cost-effective way of managing multiple ANSYS licenses for many users.

However, there are some points to keep in mind when using asynchronous solution:

- An additional ANSYS license is required to initiate the solution on the remote compute server
- Some features, such as *Convergence* objects or Thermal-Stress simulations, are not supported[4]
- Real-time parsing of solver output, monitoring convergence behavior, or tracking deformation/temperature/contact quantities is not available
- It is important to note that while the model is being solved, the user cannot change any input parameters. This is done so as to prevent inconsistencies between the model and the retrieved results once solution is completed.
- Some configuration needs to be done in order to enable this type of computing environment

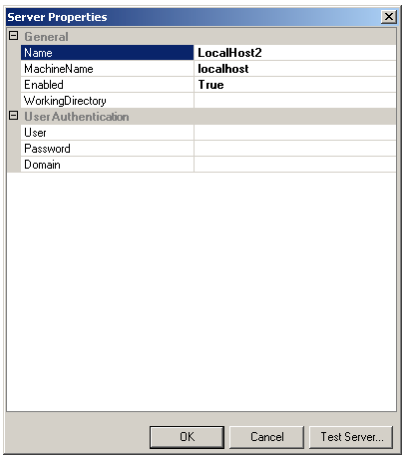
[3] Platform Computing homepage: http://www.platform.com/

[4] Please refer to "Simulation Help | Using Simulation Features | Synchronous and Asynchronous Solutions" in the *Release 10.0 Documentation for ANSYS Workbench* for a listing of items unsupported in asynchronous solutions

4. Using Remote Solution Manager Locally:

Another option is the ability to combine both of these features. The Remote Solution Manager (RSM) can be used locally to allow a user to run multiple jobs from different WB Simulation databases.

The RSM is the icon  on the bottom-right part of the Windows Taskbar. By right-clicking on this icon and selecting "Open Job Status…", the ANSYS Solution Status Monitor will appear, listing running, pending, and completed jobs.



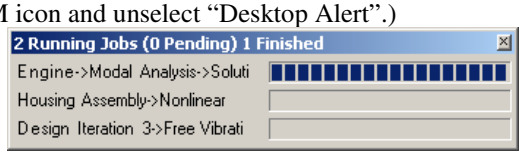
The first thing to note is that there are two items the user can configure – servers and queues – similar to the aforementioned asynchronous remote solution methods.

Servers are compute servers, and this can either be the local machine or a remote UNIX/Linux workstation. *If the user has dual processors and wants to solve two jobs simultaneously, additional server with "Name = LocalHost2" (this is arbitrary), "MachineName = localhost", and "Enabled=True" can be created, as shown on the right.*

Queues can be thought of as the grouping of compute servers. If a user just wants to solve locally, the default queue of "Local" is sufficient. *Per the above scenario, if the user wants to solve two jobs simultaneously on a dual processor PC, the "Local" queue should be opened and both "LocalHost" and "LocalHost2" should be active under "Assigned Servers".*

Once this is complete, in WB Simulation under the *Solution* branch, the user may use the local RSM by selecting "Run Process on = WB Cluster" with "RSM Web Server = localhost". The queue name would be the same as above (default is "Local"). The "License to Use" should also be specified since, as noted above, asynchronous solutions require an additional license *even if solved locally* because this allows the user to solve one model via RSM while working on a different WB Simulation database.

Once jobs are submitted, they will be queued to the local RSM. The user can then save the model and exit WB Simulation or work on a different model. If *Desktop Alert* is activated on the RSM icon on the Taskbar, a listing of pending and running jobs will appear in a small, separate window. (To remove this window, right-click on the RSM icon and unselect "Desktop Alert".)



The jobs will be solving in a directory called "ce_" (where "_" is a number) in the Windows temporary directory (designated by the system environment variable TEMP). When the solution is complete, the user can open the WB Simulation database and right-click on the *Solution* branch to "Get Results".

Besides the benefits noted above, this method allows Windows users to run two jobs simultaneously on their dual-processor machine. This doesn't require running two instances of Workbench Simulation, and by only having the ANSYS solver running, additional memory is freed up for larger jobs.

Some additional points to note:

- The user should not completely log out or shutdown the computer, as that will halt any running jobs
- There are two RSM applications that are required – WBProcStat.exe (WB Process Status) and JMService.exe (Job Manager Service) – and these applications should not be terminated

5. Conclusion:

Using the Remote Solution Manager allows WB Simulation users to solve asynchronously on remote machines, which may be faster, dedicated compute servers, leaving the user's desktop computer free to perform other functions. Even for those running locally, however, asynchronous solving provides additional benefits such as enabling the user to run and/or queue multiple jobs from different WB Simulation databases as well as allowing the user to operate WB Simulation independent of the currently solved model.

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http://ansys.net/ansys/?mycat=search&mytype=Tips&mycategory=Sheldon

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