



ShutdownPlus® Rolling Restart™

Automated Power-cycling of VMware vSphere VMs
across vSphere Hosts using ShutdownPlus Rolling
Restart

Product Overview and Implementation White Paper

www.vmware.com/rollingrestart



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Introduction

You already know the advantages of using VMware VMs on ESXi hosts. And, if you're using them with Independent and Nonpersistent disks, the VMs get restored to their main image at each power off/power on cycle.

Additionally, if your VMs are used as terminal servers, you also know it's an industry standard practice to restart them periodically to clear issues and keep top performance. But, in order to have minimal impact to end-users, administrators must babysit the servers and/or schedule a "restart window" for the server restarts. This wastes both administrators' time and company resources, and impacts end users through work interruptions and/or server downtime. Even with standard servers, you may have decided there's a benefit from doing a power-cycle periodically to restore the main servers' image. Thinking of using a script to do all of this? Scripts can't go near the levels that ShutdownPlus Rolling Restart goes into the operating system to ensure reliable and clean restarts. And they all call (or internally call) shutdown.exe, tsshutdown.exe, or a public common API to restart the server.

How, then, do you combine both of the benefits of power-cycling your ESXi VMs with zero-impact to end users? By using ShutdownPlus Rolling Restart to automate power-cycling for your VMs! Its patent-pending process enables administrators to **automatically restore the VM's main image without impact to any end users!** The software has been in use worldwide for over 13 years, and from the beginning its core functionality has always been about refreshing terminal servers without impacting end-users.

ShutdownPlus Rolling Restart Power-Cycle Solution

ShutdownPlus Rolling Restart (RR) communicates with ESXi hosts to power-cycle (power off, then power on) VMs. The benefits of this configuration is that each VM's master image is restored automatically, without impacting end-users.

The VMs and ESXi hosts must be configured as follows:

1. Each VM that is power-cycled in a group must be setup with an **Independent and Nonpersistent disk**.
2. Each VM must have the ShutdownPlus Rolling Restart client installed in its main image.
3. Each ESXi host must have its SSH server enabled and running (ShutdownPlus Rolling Restart uses both APIs and SSH commands to communicate with ESXi hosts). By default, SSH is running and enabled on port 22, unless the administrator has modified these parameters.

ShutdownPlus Rolling Restart must be configured as follows:

1. Each ESXi host must be setup within the ShutdownPlus Rolling Restart console. ShutdownPlus Rolling Restart dynamically queries for the location of the server VM defined within ShutdownPlus Rolling Restart groups.
2. ESXi hosts can be verified for correct logon credentials and port from within the ShutdownPlus Rolling Restart console.

In ShutdownPlus Rolling Restart's user processing method of "Silent Mode", users are unaware and not impacted as ShutdownPlus Rolling Restart waits for them to logoff on their own or within 3rd party software idle timeout configuration settings. Once all users are logged off, ShutdownPlus Rolling Restart powers off the server. After communicating with the ESXi host and checking various parameters, the ShutdownPlus Rolling Restart powers on the VM, which uses its main image.

Now a perfectly 'new' VM image is available, and it all took place **with no administrator intervention and with no user impact**.

How to Implement ShutdownPlus Rolling Restart for Power-Cycling

ShutdownPlus Rolling Restart is configured the same as a restart schedule, with just two additional steps: 1) Define the ESXi hosts, and 2) Choose the power-cycle schedule option. Follow these steps to implement ShutdownPlus Rolling Restart for your ESXi VMs:

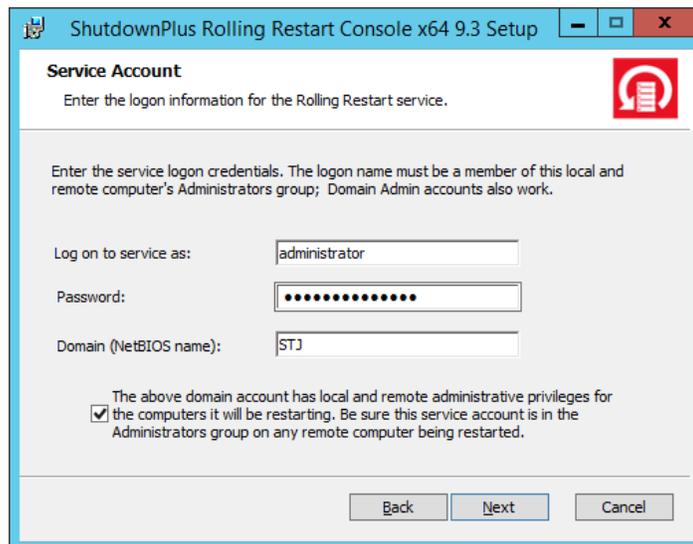
1) Prepare for rollout

ShutdownPlus Rolling Restart consists of two parts: a console and a client. The console is where all configuration takes place, and the client software is required for the advanced functions needed to ensure a successful power off. Only one console is needed, but there can be multiple consoles in complex environments, The console needs to be installed on a management server/workstation that is available 24/7 because it manages all of the clients and communicates with them to initiate actions. For flexibility, the console can be installed on any Windows server or workstation on the network.

2) Install the console

Once you have decided on a console computer, install the setup program on the console.

IMPORTANT: During installation, the setup will ask for logon credentials for the ShutdownPlus Rolling Restart service. These credentials are preferably from a Domain Administrator account, but they can be from any account that is a member of the client computers' Administrators group. This example uses the administrator logon from domain STJ:



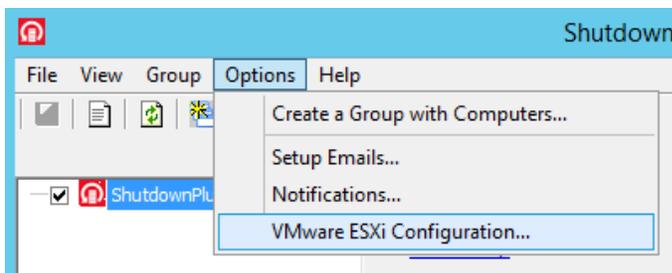
3) Deploy ShutdownPlus Rolling Restart clients to the VMs

Install the ShutdownPlus Rolling Restart client to each VM image you want to power cycle. This can be done either through the console or on the VM directly. In this step, the **Independent** disk on the VM needs changed to unchecked temporarily while the ShutdownPlus Rolling Restart Client software is installed. After it's installed, change the disk back to **Independent/Nonpersistent**.

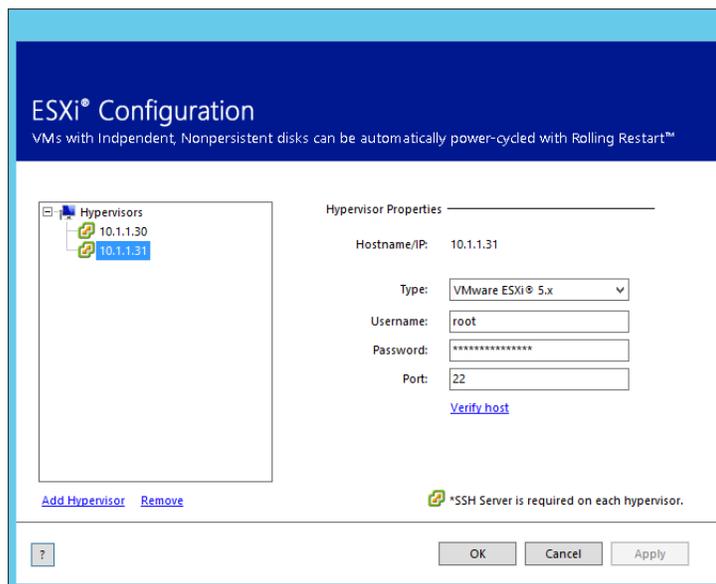
4) Define ESXi hosts; verify connectivity and SSH on hosts

To power cycle the VMs, ShutdownPlus Rolling Restart only needs the names of the ESXi hosts. It will automatically query each host for its VMs as they are power-cycled, allowing administrators to move VMs from one host to another as demands change.

To define ESXi hosts, from the Options menu in ShutdownPlus Rolling Restart, choose VMware ESXi Configuration. SSH is part of the communication methods used:



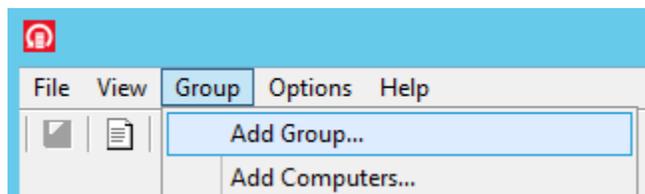
Next, add each ESXi host (by hostname or IP) and enter its credentials. The 'root' username is preferred as it already is setup by default for SSH access. Click on the Verify option to make sure the console can properly connect to each host:



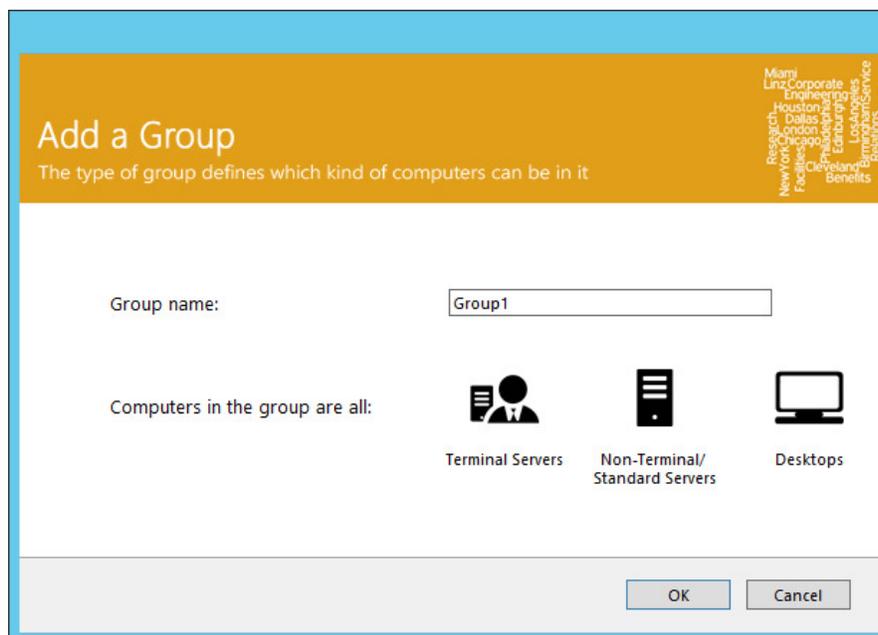
5) Create RR Groups to manage servers

Groups in ShutdownPlus Rolling Restart are used to automate power-cycles/restarts of servers. Each group can have a different power-cycle/restart schedule options. Decide how you want to organize groups and the servers in them. Note that the VMs on a host can span over different groups. What this means is that the VMs on Host1 (VM1,VM2,VM3) and the VMs on Host2 (VM4,VM5,VM6) might be in different groups. So, for example, Group1 might contain VM1, VM2 and VM4, while Group 2 might contain VM3, VM5, and VM6.

Choose the option to add a group from the Group menu:



Now choose the options that define the group. Enter the Group Name and type of computers in the group:



IMPORTANT: servers must all be of the same type (terminal server or server)

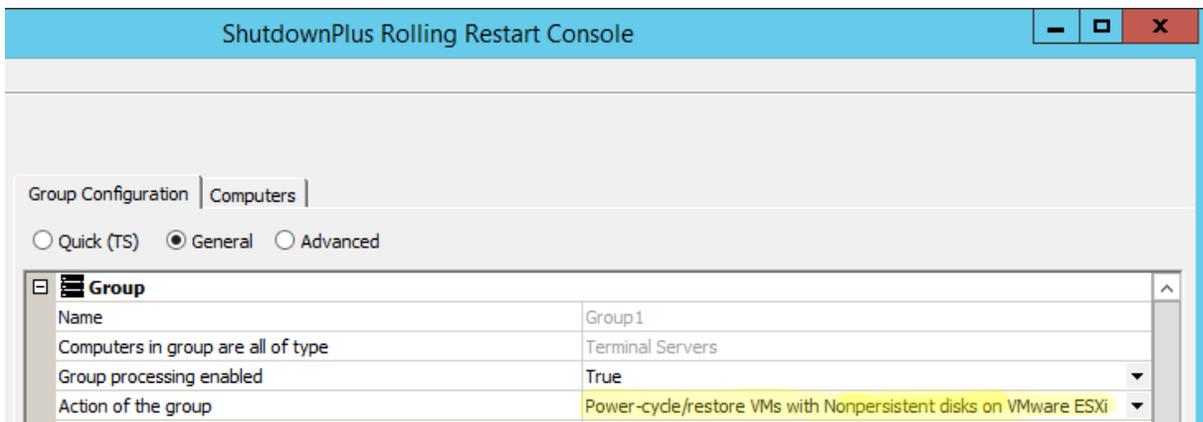
6) Add VMs to Groups

Now that the group name and type are defined, add the server names of the VMs to the group. Right-click on the group and choose Add Computers, or choose Add Computers from the Group menu:



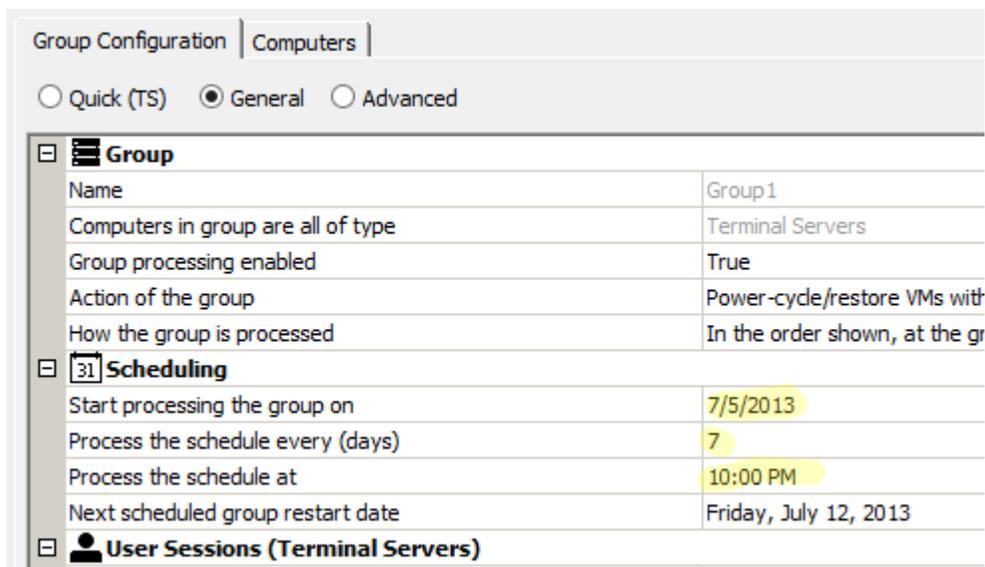
7) Choose the Power-cycle method

Under Action of the group, choose the option to Power-cycle:



8) Configure the Power-cycle date/time for the group

Set the time and date to process the VMs and the VMs will start power-cycling at that time/date:



Group Configuration | Computers |

Quick (TS) General Advanced

[-] Group	
Name	Group1
Computers in group are all of type	Terminal Servers
Group processing enabled	True
Action of the group	Power-cycle/restore VMs with
How the group is processed	In the order shown, at the gr
[-] Scheduling	
Start processing the group on	7/5/2013
Process the schedule every (days)	7
Process the schedule at	10:00 PM
Next scheduled group restart date	Friday, July 12, 2013
[-] User Sessions (Terminal Servers)	

To see the power-cycling results immediately, choose the following:

Start processing the group on: <choose today's date>

Process the schedule every (days): <set it to 1>

Process the schedule at: <enter a time +2 min from the current time on the server>

Note that the power-cycling feature may take a few minutes to power on the VM after it's powered off. During this time, ShutdownPlus Rolling Restart runs numerous tests to ensure a successful power-on.

Power-cycling / Restart Costs

Server farms are designed by the IT staff for simplicity and agility, and they are usually divided according to department or applications used. Whatever the configuration, restarting servers manually takes a long time and is unreliable, simply because the restart process needs to be managed by the IT person involved, not to mention all of the users involved, requiring hands-on involvement with users being impacted through notifications or lost work.

The problem with 3rd party built-in restart commands, batch files, and scripts is that they do not address the full needs that a restart from the OS accomplishes – and they all call shutdown.exe or tsshutdown.exe, which does nothing more than call a common and simple Windows API.

Another problem that adds to the overhead of restarting servers manually is unintentional human error. Restarts taking place off-hours increases errors, and restarting during the day interrupts users' work, and is not desirable.

Cost-wise, power-cycling/restarting just one terminal server manually costs a company an average of \$160 per server! This is consumed in administrator's time, users' time, impact to end-users, and it introduces the possibility of errors. To be effective, this process must be automated. Below is an example of an average terminal server restart. Besides the numerous benefits of using ShutdownPlus Rolling Restart, when it comes to costs, it pays for itself after just one restart:

Time for a restart to occur:	10 min including all checks involved
Time to force or wait for users to logoff	5 min
Server user count:	20 users
Average Worker Salary:	\$16/hr
Average Engineer Salary:	\$40/hr
Cost of SD+ RR software:	≈ \$100 per server
Company cost of restart:	\$160 per server (20 users * (\$16 @ 5min + \$40 @ 10min))
Lost Worker Productivity:	High if users are forced off. Lost documents/data, interrupted workflow.

Server Restart / Power-Cycle Options

Restart Option	Benefit	Result
Don't restart or power-cycle the server at all.	No administration time spent by IT staff and no end user interruptions	This is a problem situation for end users and IT staff. End users will complain of speeds, errors, lost documents, unable to logon to the server, etc. IT then has to manually manage the users and the restart simultaneously, and possibly having to rebuild the server itself. IT staff babysits servers and users lose productivity.
Run the AT command and run <code>tsshutdown.exe</code> to restart or power-off the server, or manually restart or power-cycle the servers.	Easy, cheap, fast, no administration time spent by IT staff if restarting.	Fails to do a proper logging off of users, closing Registry handles down properly, and fully unload Registry entries from the server. This causes a buildup in the Registry, slow user load times and logoff times, and a "domino effect" of potential problems. IT staff babysits servers and users lose productivity. The AT command method is not recommended by Microsoft. Power-cycling is a manual event administrators must do, wasting time.
Use the built-in restart function in 3rd party software.	Easy, fast, minimal administration time spent by IT administrators.	Does not address power-cycling. Regarding restarting, there are no reporting capabilities, retrying skipped servers, users are impacted, and IT staff still needs to manage restarts on multiple servers and respond to problems. Same drawbacks as using the AT command (see above). Overall server slow-downs. IT staff babysits servers and users lose productivity. <code>tsshutdown.exe</code> is actually being run, which only calls a common Windows API.
Use a script, batch file, write a utility, or schedule restarts and logs off users automatically.	Handles restarting benefits and users get forced to log off, or the server is skipped.	Does not address power-cycling. Regarding restarting, using just a few common Windows APIs, any admin that can write a script or batch file can logoff users and restart the server. However, this does not address the many checks and balances required to properly logoff users, clean up the registry, and properly free memory, just to name a few of the many other tasks required to ensure a successful restart. IT staff still needs to babysit servers and users lose productivity.
Use ShutdownPlus Rolling Restart, ShutdownPlus TSE, or ShutdownPlus CR	Easy, fast, inexpensive, and professional software to handle restarts	ShutdownPlus Rolling Restart has none of the shortcomings above, plus dozens tasks that can't be done using any script or batch file. It's the professional restart choice the world over. With ESXi integration, you can power-cycle your VMs and also take advantage of all of the user-management features in ShutdownPlus Rolling Restart.

Hardware and Software Requirements

The following hardware and software requirements are necessary to use this software:

- Operating System
Windows Server 2003 with Service Pack 2 or later, Windows Server 2008 with Service Pack 1 or later, Windows Server 2008 R2, or Windows Server 2012 or 2012 R2.
ESXi hosts running 5.x, 4.1, 4.0, or 3.5.
ESXi VMs running Independent and Nonpersistent disks (if power-cycling; standard restarts do not require any particular disk configuration).

- Hardware
512 MB of RAM and an i3 or better CPU is required.
The software consumes approximately 5MB-10MB RAM and 25MB drive space.

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