



# Remotely Running Automated Diagnostics Using WS-Man and RACADM Commands

This technical white paper describes the tasks to remotely run the diagnostics reports using RACADM and WS-Man commands, and then exporting the results to CIFS or NFS.

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## Executive Summary

This technical white paper describes the task to remotely run hardware diagnostics and export the results of the last completed diagnostics to a remote network share (CIFS or NFS) using command line interfaces (CLI) and running appropriate WS-Man or RACADM commands.



# 1 Deployment and Configuration Guide for Remote Automated Diagnostics

In the current work atmosphere, any IT organization has to troubleshoot a wide range of potential issues that may arise in enterprise production environments. Any organization stores its data in its servers which are prone to problems, resulting in the downtime of servers. Server diagnostics is one of the best tools, which comes to the rescue of these organizations. In order to avoid downtime, Dell server diagnostics tools are designed to provide early warning about server health conditions. These diagnostics tools prevent any possible downtime and also provide an effective method of fault isolation. These tools also help in root cause analysis, whenever hardware failures occur. Briefly, Dell server diagnostics tools give an alarm at the right time to prevent any possible server downtime, whereby, the organizations and its clients are at safe hands.

Along with Hardware diagnostics, Dell also provides the following features for troubleshooting:

- DSET (Dell System E-support tool) to collect the hardware, storage, and operating system details from the servers.
- Tech-Support Report (TSR) allows for remotely gathering inventory (hardware details) information
- Remote automated diagnostics need the 'prerequisites' such as iDRAC firmware, Lifecycle Controller, BIOS, and diagnostics DUPs. Enterprise diagnostics are divided into three types:
  1. **Express:** The Express diagnostics runs a test package for each server subsystem, but does not run the full set of tests available in the package for each subsystem. Test package contains the tests of system, storage, disk memory, etc.
  2. **Extended:** The Extended diagnostics runs all available tests in each test package for all subsystems. The diagnostics tool runs on the host and the longest run is not expected to take longer than eight hours (heuristics based of 4TB hard disk drive (HDD) test estimate. All HDDs are tested in parallel) even if both Express and Extended tests are run.
  3. **LongRun:** The long run diagnostics runs both Express and Extended tests.



## 1.1 Currently Supported Diagnostics

1. **Server Diagnostics Tool:** You must start the server with utility partition. Download a utility, and then create a bootable disk space to run diagnostics.
2. **Lifecycle Controller:** Lifecycle Controller supports manual and local diagnostics for the target systems. To boot to UEFI and locally start diagnostics, press <F10> or <F11>.

Note: However, the diagnostics feature provides only local control and output.

Dell introduced the "Remote Automated Diagnostics" in the 12<sup>th</sup> generation server and later with the following versions:

- iDRAC 1.50.50 and later
- Lifecycle Controller2 1.3.0 and later
- BIOS 1.5.1 and later

## 1.2 Configuration Prerequisites

- A software license for 12<sup>th</sup> generation Dell PowerEdge servers.

For more information about managing licenses using iDRAC Web interface, log on to iDRAC, click **Overview > Server > Licenses**, and then read the iDRAC Online Help information by pressing the question mark symbol (?) in the upper-right corner of the page.

- The server must have a valid service tag (seven characters).
- You must have login and server control privileges.
- Updated firmware versions of (12<sup>th</sup> generation) iDRAC, Lifecycle Controller, BIOS, and Diagnostics DUPs.
- Express license. There is no feature license.

Constraints

- Only one diagnostics job can be scheduled and run at a time.

## 1.3 Remote Automated Diagnostics

This feature provides you the ability to remotely run hardware diagnostics and export the results of the last completed diagnostics to a remote network share (CIFS/NFS) using commands such as WS-Man and RACADM.

### 1.3.1 Feature Details

The major features for remote automated diagnostics are as follows:

- A diagnostics is run as a Lifecycle Controller job.
- A remote diagnostics can be run at a scheduled time.



- A diagnostics job can be run immediately.
- You must specify a reboot type with a job. For more information about reboot types, see section 1.4.3 of this white paper.
- Pending diagnostics jobs can be cancelled.
- A job can be specified to run as an Express, or Extended, or else LongRun diagnostics type.
- Diagnostics selections will not run tests that require a user interaction.
- Errors indicating failures will be in the Lifecycle Controller log.
- Overall results of successful or unsuccessful diagnostics is sent using Simple Network Management Protocol (SNMP) and WS-Eventing.
- The results from last diagnostics run are available and retrievable remotely. Lifecycle Controller job status such as 'completed' or 'failed' are stored in the Lifecycle Controller log. The result file produced by diagnostics can be retrieved remotely using RACADM or new WS-Man method.
- SNMP traps are not newly added as part of this feature.

### 1.3.2 Workflow

- You can select to either the start time of a schedule or you can start immediately.
- Select type of diagnostics to run
  - Express
  - Extended
  - LongRun
- Create Diagnostics job.
- After a job is successfully run, server will boot into UEFI and launch Diagnostics in unattended mode. A job is shown as running, but percentage completion status of a job is not shown in the form of a status bar.
- After the completion of a job, results file from the most recent completed run is available.
- Start exporting the results to a target destination (CIFS or NFS share).
- Export of job may take more than five seconds on the basis network performance and size of file.

### 1.3.3 Objective

This feature will allow you to remotely run hardware diagnostics through console application or remote scripts, and collect results by running appropriate commands. Interfaces such as WS-Man and RACADM provide a mechanism to run the diagnostics and export the results of the last completed diagnostics to a remote network share (CIFS or NFS) in a text format.



### 1.3.4 Audience

Make sure that the following prerequisites are met before performing Remote Diagnostics:

- A software license for 12th generation Dell PowerEdge servers. For more information about managing licenses using iDRAC Web interface, log in to iDRAC, click **Overview** > **Server** > **Licenses**, and then read the iDRAC Online Help information by pressing the question mark symbol (?) in the upper-right corner of the page.
- You must have login and server control privileges.
- Latest Diagnostics must be installed on the system.

## 1.4 Overview of Remote Automated Diagnostics

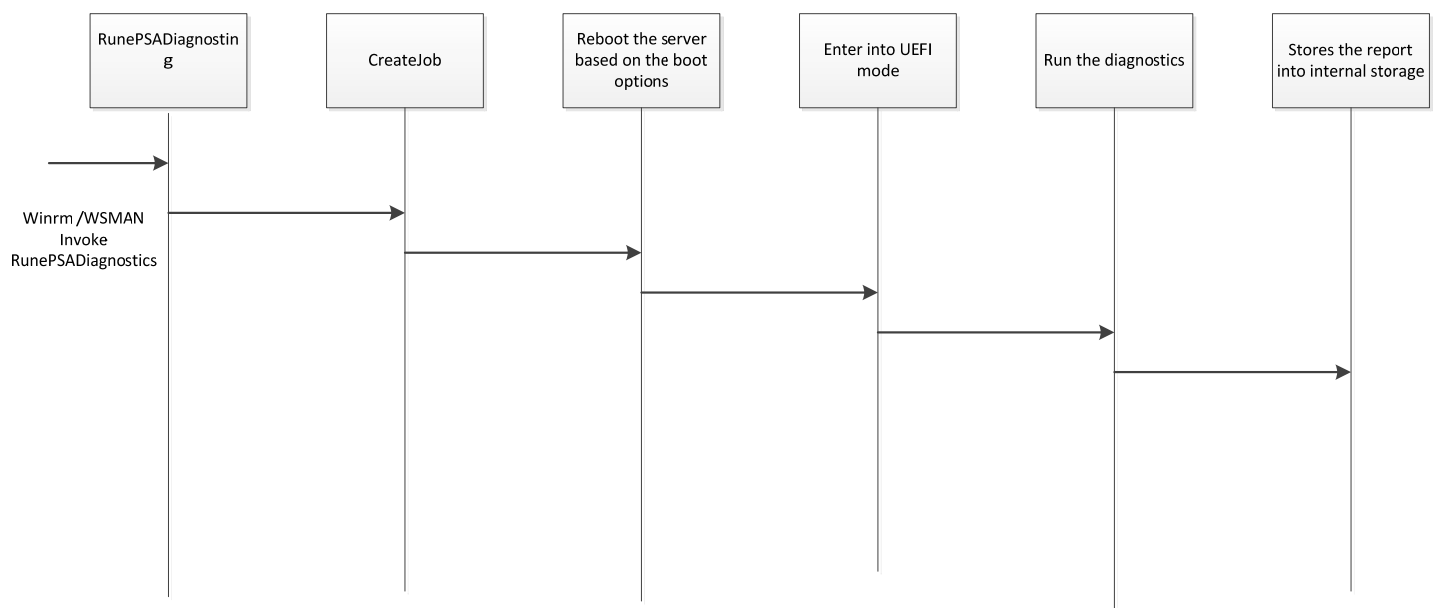
Remote Automated Diagnostics provides two methods to perform the diagnostics and export the results.

1. **RunePSADiagnostics**: This method is used to run the diagnostics job based on the runmode switch and save the report in the internal storage area. The diagnostics job can be run in either express or extended mode, or as a long run which encompasses all diagnostics tests.

Note: A Diagnostics operation may not take more than eight hours.

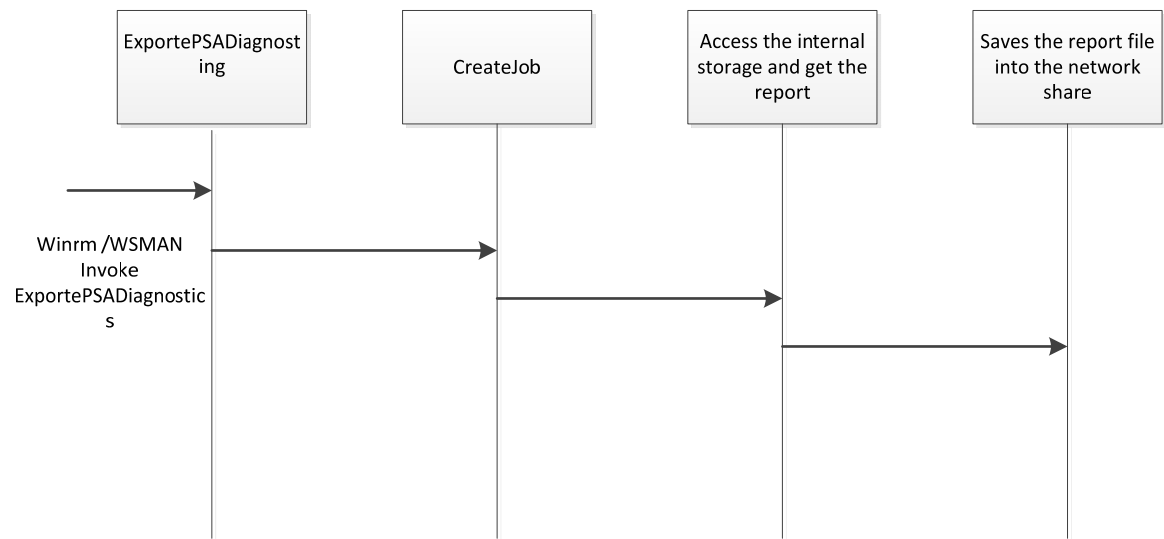
2. **ExportePSADiagnosticsResult**: This method exports the result file of the last completed diagnostics into the respective remote share directory (CIFS or NFS). The result file will have time stamps to show when the diagnostics was run.

### 1.4.1 Control Flow Diagram for RunePSADiagnostics





1.4.2 Control Flow Diagram for ExportePSADiagnosticsResult



1.4.3 Using WS-Man

These methods `RunePSADiagnostics` and `ExportePSADiagnosticsResult` are added in the `DCIM_LCService` provider.

Table 1 RunePSADiagnostics () Method: Return Code Values

Value	Description
2	Error occurred
4096	Job started: REF returned to started CIM_ConcreteJob

Table 2 RunePSADiagnostics () Method: Parameters

Qualifiers	Name	Type	Description/Values
IN, REQ	RunMode	Uint32	Type of diagnostics to run. 0 – is the express tests. 1- is extended set of tests. 2 –LongRun (all tests)
IN	RebootJobType	Uint32	Creates a specific reboot job to power cycle the host system. This parameter only creates the RebootJob and does not schedule it. Shall contain the requested reboot type: 1 - PowerCycle 2 - Graceful Reboot without



			forced shutdown 3 - Graceful Reboot with forced shutdown. <i>NOTE: This parameter only creates the RebootJob and does not schedule it.</i>
IN	ScheduledStartTime	String	Schedules the configuration job and the optional reboot job at the specified start time. A special value of "TIME_NOW" schedules the job(s) immediately. Start time for the job execution in format: yyyyymmddhhmmss. The string "TIME_NOW" means immediate.
IN	UntilTime	String	Defines a time window for scheduling the job(s). However, this parameter depends on "ScheduledStartTime" and "ScheduledStartTime" parameters. After scheduled, jobs will be run within the time window. End time for the job execution in format: yyyyymmddhhmmss. : If this parameter is not NULL, then ScheduledStartTime parameter shall also be specified.
OUT	Job	CIM_ConcreteJob REF	A reference to the ConcreteJob is returned
OUT	MessageID	String	Error MessageID is returned if the method fails to run
OUT	Message	String	Error Message in English corresponding to the MessageID
OUT	MessageArguments	String[]	Any dynamic string substitutions for the Message



Table 3 RunePSADiagnostics () Method: Standard Messages

MessageID (OUT parameter)	Message	MessageArguments[]
SYS095	Unable to unmount an iDRAC internal storage partition.	
SYS096	Required ePSA Diagnostics binary does not exist.	
SYS098	A Remote Diagnostics (ePSA) job already exists.	

Table 4 ExportePSADiagnosticsResult () Method: Return Code Values

Value	Description
2	Error occurred
4096	Job started: REF returned to started CIM_ConcreteJob

Table 5 ExportePSADiagnosticsResult () Method: Parameters

Qualifiers	Name	Type	Description/Values
IN, REQ	IPAddress	String	IP address of network share
IN, REQ	ShareName	String	Network sharepoint address
IN, REQ	FileName	String	Diagnostics Result File name
IN, REQ	ShareType	UInt8	Type of network share (NFS=0 and CIFS=2)
IN	Username	String	The username to be used to access the network share for the export result
IN	Password	String	The password to be used to access the network share
OUT	Job	CIM_ConcreteJob REF	A reference to the ConcreteJob is returned
OUT	MessageID	String	Error MessageID is returned if the method fails to run
OUT	Message	String	Error Message in English corresponding to the MessageID
OUT	MessageArguments	String[]	Any dynamic string substitutions for the Message
OUT	MessageID	String	Error MessageID is returned if the method fails to run



Table 6 ExportePSADiagnosticsResult () Method: Standard Messages

MessageID (OUT parameter)	Message	MessageArguments[]
SYS083	Unable to export ePSA Diagnostics results because iDRAC internal storage could not be accessed.	Parameter name, see in the above mentioned Table.
SYS084	Export of ePSA Diagnostics results did not complete successfully because the iDRAC internal storage containing the results could not be accessed.	
SYS085	Successfully exported the ePSA Diagnostics results.	
SYS086	Unable to copy the ePSA Diagnostics results file to the network share.	
SYS095	Unable to unmount an iDRAC internal storage partition.	
SYS096	Required ePSA Diagnostics binary does not exist.	
SYS098	A Remote Diagnostics (ePSA) job already exists.	
SYS099	Unable to export the diagnostics results because the results do not exist.	



## 1.4.4 Command to Run Diagnostics

```
winrm i RunePSADiagnostics http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem  
+CreationClassName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LC  
Service -u:%Username% -p:%Password% -r:https://%IPAddress%/wsman -SkipCNCheck  
-SkipCACheck -encoding:utf-8 -a:basic  
@{RunMode="1";RebootJobType="2";ScheduledStartTime="TIME_NOW"}
```

Note: Job will be created after a command is successfully run.

Example:

```
winrm i RunePSADiagnostics http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem  
+CreationClassName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LC  
Service -u:root -p:calvin -r:https://10.94.161.123/wsman -SkipCNCheck -  
SkipCACheck -encoding:utf-8 -a:basic  
@{RunMode="1";RebootJobType="2";ScheduledStartTime="TIME_NOW"}
```

RunePSADiagnostics\_OUTPUT

Job

EndpointReference

Address =

http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous

ReferenceParameters

ResourceURI = http://schemas.dell.com/wbem/wscim/1/cim-  
schema/2/DCIM\_LifecycleJob

SelectorSet

Selector: InstanceID = JID\_668777011296, \_\_cimnamespace =  
root/dcim

ReturnValue = 4096



## 1.4.5 Command to Verify Job Status

```
winrm e http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LifeCycleJob -u:%Username% -p:%Password% -  
r:https://%IPAddress%/wsman -SkipCNcheck -SkipCAcheck -encoding:utf-8-a:basic
```

### Example

```
winrm e http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LifeCycleJob -u:root -p:calvin -  
r:https://10.94.161.123/wsman -SkipCNcheck -SkipCAcheck -encoding:utf-8-  
a:basic
```

#### DCIM\_LifeCycleJob

```
ElapsedTimeSinceCompletion = null  
  
InstanceID = JID_660055291735  
  
JobStartTime = TIME_NOW  
  
JobStatus = Scheduled  
  
JobUntilTime = TIME_NA  
  
Message = Task successfully scheduled.  
  
MessageArguments = NA  
  
MessageID = JCP001  
  
Name = Remote Diagnostics  
  
PercentComplete = 0
```

#### DCIM\_LifeCycleJob

```
ElapsedTimeSinceCompletion = 1  
  
InstanceID = RID_660055293253  
  
JobStartTime = TIME_NOW  
  
JobStatus = Reboot Completed  
  
JobUntilTime = TIME_NA  
  
Message = Reboot is complete.  
  
MessageArguments = NA
```



MessageID = RED030

Name = Reboot3

PercentComplete = NA

## 1.4.6 Command to Export ePSA Diagnostics Result

```
winrm i ExportePSADiagnosticsResult http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem  
+CreationClassName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LC  
Service -u:root -p:calvin -r:https://10.94.161.123/wsman -SkipCNCheck -  
SkipCACHeck -encoding:utf-8 -a:basic  
@{ IPAddress="%SharepathIPAddress%"; ShareName="%ShareName%"; ShareType="%ShareT  
ype%"; Username="%UserName%"; Password="%PassWord%r"; FileName="%FileName%" }
```

### Example

```
winrm i ExportePSADiagnosticsResult http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem  
+CreationClassName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LC  
Service -u:root -p:calvin -r:https://10.94.161.123/wsman -SkipCNCheck -  
SkipCACHeck -encoding:utf-8 -a:basic  
@{ IPAddress="10.94.192.100"; ShareName="CommonShare"; ShareType="2"; Username="d  
rac"; Password="tiger"; FileName="psa.txt" }
```

ExportePSADiagnosticsResult\_OUTPUT

Job

EndpointReference

Address =

http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous

ReferenceParameters

ResourceURI = http://schemas.dell.com/wbem/wscim/1/cim-  
schema/2/DCIM\_LifecycleJob

SelectorSet

Selector: InstanceID = JID\_668771356675, \_\_cimnamespace =  
root/dcim

ReturnValue = 4096



### 1.4.7 Command to Verify Job Status

```
winrm e http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LifeCycleJob -u:%Username% -p:%Password% -  
r:https://%IPAddress%/wsman -SkipCNcheck -SkipCAcheck -encoding:utf-8-a:basic
```

## 1.5 Using RACADM

RACADM being a command line interface (CLI) feature, you can enter a script to run the commands for quick results.

The racadm diagnostics command options are as follows:

-m <Mode>	Type of diagnostics mode 0: Express 1: Extended 2: Both
-f	: Name of the Configuration file.
-l	: Network Share Location.
-u	: Username of the remote share from where the file will be imported.
-p	: Password of the remote share from where the file will be imported.
-r <reboot type>	: Type can be one of the following pwr cycle: PowerCycle Graceful: Graceful Reboot without forced shutdown Forced : Graceful Reboot with forced shutdown
-s <Start Time>	: Specifies a start time for job to be scheduled in yyyyymmddhhmmss format. TIME_NOW means immediate (default)
-e <Expiration Time>	: Specifies expiry time for the job execution in yyyyymmddhhmmss format. TIME_NA means wait time not applicable (default)

To run Remote Diagnostics

```
$racadm diagnostic run -m <Mode> -r <reboot type> -s <Start Time> -e  
<Expiration Time>
```

Modes can be: 0-express, 1-Extended, 2-Both.

Reboot types can be: Graceful, Forced or pwr cycle.

Start Time can be: TIME\_NOW, TIME\_NA or time needs to be entered using "yyyyymmddhhmmss" format.

Expiration Time: Time needs to be entered using "yyyyymmddhhmmss" format.





## Usage Examples

```
/tmp/manju # racadm diagnostics run -m 1 -r graceful
```

Remotediagnostic Run is Successful

## To Export the RemoteDiagnostics report

```
racadm diagnostic export -f <file name> -l <NFS / CIFS share> -u <username> -  
p <password>
```

Note: Export command should be executed only after the run command is being executed.

## Usage Examples

```
/tmp$ racadm diagnostics export -f test -l //10.94.162.74/hari -u  
administrator -p dell_123
```

Remotediagnostic Export is Successful



## 2 Conclusion

This feature enables you to remotely initiate a diagnostics run on multiple systems during system maintenance, and to collate the run logs at a later time. Proactively, running diagnostics on the servers in a data center enables a system administrator to diagnose hardware issues before they actually occur.

### 2.1 Learn more

For more information about the enterprise-class servers of Dell, go to [Dell.com/PowerEdge](https://Dell.com/PowerEdge)

### 2.2 About the Authors

Sreelakshmi V, Pushkala Iyer, Charles Stracener, Siva Reddy, and George Loegel are software developers in the iDRAC and WS-Man teams of Lifecycle Controller.

