Scripting vFlash Partition Management

This Dell Technical White Paper provides information about scripting in the vFlash partition management of iDRAC with Lifecycle Controller on Dell PowerEdge servers.

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Executive summary

vFlash is an iDRAC with Lifecycle Controller feature that helps automate server deployment and management by providing a comprehensive set of storage management functions that make the best use of the vFlash storage space.

This paper describes the interface (WS-Man) used to manage vFlash storage from a scripting environment.
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Introduction

vFlash is a function of Dell Lifecycle controller on Dell PowerEdge 11th and 12th generation servers that provides shared storage space between a server system and its iDRAC. The storage itself is from a vFlash SD card, with a size up to 16GB, inserted into the system. This shared space adds flexibility to systems management functions.

The vFlash service provides several user interfaces for managing vFlash storage including the iDRAC GUI, remote WSMAN service, and various RACADM commands. This paper describes the CLI (WS-MAN) commands for vFlash service.

vFlash storage space is managed in partitions. An operator can create up to 16 vFlash partitions, and each partition can have a size of up to 4GB. When partitions are attached, vFlash runtime emulates the partitions to the server system as removable USB storage devices.

This paper includes examples of the following functionality, using WinRM for Microsoft® Windows® systems and Openwsman for Linux systems:

- Enable the vFlash service and initialize a vFlash SD card.
- Create and format an empty vFlash partition.
- Format a vFlash partition.
- Attach and detach a vFlash partition to the system as a removable USB storage device.
- Create a vFlash partition from a partition image.
- Copy a vFlash partition to a network share.
- Delete a vFlash partition.
- Change a vFlash partition to read-only or read-write.

For an overview of vFlash, see the whitepaper vFlash: An Overview.

For a description and examples of related RACADM commands, see the Integrated Dell Remote Access Controller 7 (iDRAC7), Version 1.0.0, User’s Guide.

Before You Begin

Before you begin, it is recommended to take the following steps:

1. Make sure the target system is a Dell™ PowerEdge™ server with iDRAC enabled, configured, and network accessible for WS-MAN communication.
2. For Windows systems, make sure the WinRM command line interface is configured and ready. (see *Installation and Configuration of Windows Remote Management*).

   For Linux systems, make sure the Openwsman command line interface is built, installed, and ready.

3. Make sure the target system has an Enterprise or higher license, access privileges for Virtual Media, and privilege for vFlash features.

4. Switch the SD card write-protect tab to writable.

**VFlash Examples**

All scripts in this paper use *uuu* for the user name, *ppp* for the password, and `<p_addr>` in place of the iDRAC IP address. Replace these variables with the actual values for your environment.

Typical script output is indicated by this font.

**Enable vFlash service and initialize a vFlash card**

A vFlash card is an SD card that is compatible with the iDRAC system. Before a vFlash operation can be performed, you must enable the vFlash service so the system can access the inserted SD card.

Additionally, you must initialize the vFlash card before creating partitions. The initialization process creates structural files on the card to maintain vital vFlash partition information. The files are in a proprietary format and should not be changed in any way, or the vFlash system will see the SD card as not initialized.

```
vFlashStateChange.xml:
<p:RequestedState>1</p:RequestedState> // 1=Enable, 2=Disable
</p:VFlashStateChange_INPUT>
```

**Command line to enable vFlash:**

```
```

VFlashStateChange_OUTPUT
Return Value = 0

**Command line to initialize the vFlash card:**

```bash
```

**InitializeMedia_OUTPUT**

```
Job

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

ReferenceParameters


SelectorSet

Selector: InstanceID = JID_191589853005, __cimnamespace = root/dcim

ReturnValue = 4096
```

Use the “InstanceID” returned above to check the operation status. When the command returns with **JobStatus = Completed**, the operation is complete and the user can check the SD properties.

**Command line to poll the job status:**

```bash
```

**DCIM_LifecycleJob**

```
ElapsedTimeSinceCompletion = 2

InstanceID = JID_191589853005

JobStartTime = NA
```
JobStatus = Completed
JobUntilTime = NA
Message = Initialize media successful
MessageArguments = NA
MessageID = VF048
Name = VFlashInitialize:Media
PercentComplete = 100

Command line to view vFlash property:
winrm e http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_VFlashView
-u:uuu -p:ppp -r:https://<ip_addr>/wsman -SkipCNcheck -SkipCAcheck -encoding:utf-8 -a:basic
DCIM_VFlashView

   AvailableSize = 970
   Capacity = 976
   ComponentName = vFlash SD Card
   FQDD = Disk.vFlashCard.1
   HealthStatus = OK
   InitializedState = Initialized
   InstanceID = Disk.vFlashCard.1
   LastSystemInventoryTime = 20111020222458.000000+000
   LastUpdateTime = 20111020222458.000000+000
   Licensed = true
   VFlashEnabledState = true
   WriteProtected = false
Create and format a vFlash partition

A vFlash partition resides on the vFlash card as a disk image file. The largest size of a partition image file is 4GB.

When a vFlash system emulates a partition image file as a removable USB storage device, it emulates in one of the following modes: Floppy, Hard Disk Drive, or Compact Disk. Partition mode information is stored in the structure files on vFlash card.

CreatePartition.xml:

```xml
    <p:Size>100</p:Size>
    <p:SizeUnit>1</p:SizeUnit> // 1=MB, 2=GB
    <p:PartitionType>1</p:PartitionType> // 1=FLOPPY, 2=HDD
    <p:PartitionIndex>3</p:PartitionIndex>
    <p:OSVolumeLabel>Label3</p:OSVolumeLabel>
</p:CreatePartition_INPUT>
```

Command line to create a vFlash partition:

```
```

CreatePartition_OUTPUT

```
Job

    EndpointReference

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

    ReferenceParameters


    SelectorSet

        Selector: InstanceID = JID_256697726234, __cimnamespace = root/dcim

        ReturnValue = 4096
```

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Poll job status.

DCIM_LifecycleJob

ElapsedTimeSinceCompletion = 0

InstanceID = JID_256697726234

JobStartTime = NA

JobStatus = Completed

JobUntilTime = NA

Message = Empty partition creation successful

MessageArguments = NA

MessageID = VF005

Name = VFlashCreate:Partition3

PercentComplete = 100

An operator can also remotely list vFlash partition information.

Command line to list all vFlash partitions:

```
```

...

DCIM_OpaqueManagementData

AccessType = Read Only

AttachedState = Detach

CreationClassName = DCIM_OpaqueManagementData

DataFormat = Raw

DeviceID = DCIM_OpaqueManagementData:Partition3

ElementName = VFlash

Name = Label3
PartitionIndex = 3
PartitionType = Floppy
Size = 100
SystemCreationClassName = DCIM_ComputerSystem
SystemName = DCIM:ComputerSystem

Command line to list just one vFlash partition by specifying the DeviceID of the partition (e.g. Partition3):

```
winrm g http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_OpaqueManagementData
?DeviceID=DCIM_OpaqueManagementData:Partition3+CreationClassName=DCIM_OpaqueManagementData+SystemCreationClassName=DCIM_ComputerSystem+SystemName=DCIM:ComputerSystem
-a:basic
```

DCIM_OpaqueManagementData

AccessType = Read Only
AttachedState = Detach
CreationClassName = DCIM_OpaqueManagementData
DataFormat = Raw
DeviceID = DCIM_OpaqueManagementData:Partition3
ElementName = VFlash
Name = Label3
PartitionIndex = 3
PartitionType = Floppy
Size = 100
SystemCreationClassName = DCIM_ComputerSystem
SystemName = DCIM:ComputerSystem
Format a vFlash partition

After a vFlash partition is created, it is not formatted to any particular file system type; however, you can format the raw partition to one of the following: - FAT16, FAT32, Ext2, or Ext3.

The format operation can be performed out-of-band from iDRAC or in-band from the operating system when the vFlash partition is attached (emulated as a USB device) to the system.

FormatPartition.xml:

```xml
  <p:PartitionIndex>3</p:PartitionIndex>
  <p:FormatType>4</p:FormatType> // RAW=0, EXT2=1, EXT3=2, FAT16=3, FAT32=4
</p:FormatPartition_INPUT>
```

Command line to format a vFlash partition:

```
```

Job EndpointReference

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

ReferenceParameters

```
```

SelectorSet

```
Selector: InstanceID = JID_256705567366, __cimnamespace = root/dcim
ReturnValue = 4096
```

Poll the job status.

```
DCIM_LifecycleJob
```
ElapsedTimeSinceCompletion = 0
InstanceID = JID_256705567366
JobStartTime = NA
JobStatus = Completed
JobUntilTime = NA
Message = Partition formatting successful
MessageArguments = NA
MessageID = VF009
Name = VFlashFormat:Partition3
PercentComplete = 100

Attach/detach a vFlash partition

Attaching and detaching a vFlash partition refers to starting and stopping vFlash emulation of a removable USB storage device. Once emulation starts, the vFlash partition acts as if a new USB device is attached (inserted) to the server system. Similarly, when the emulation stops, the virtual USB device is detached (removed).

**Command line to attach a vFlash partition (e.g. Partition3):**

AttachPartition_OUTPUT

Job

EndpointReference

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

ReferenceParameters

SelectorSet

Selector: InstanceID = JID_256644128994, __cimnamespace = root/dcim

ReturnValue = 4096

Poll the job status.
DCIM_LifecycleJob

ElapsedTimeSinceCompletion = 0

InstanceID = JID_256644128994

JobStartTime = NA

JobStatus = Completed

JobUntilTime = NA

Message = Attach partition successful

MessageArguments = NA

MessageID = VF036

Name = VFlashAttach:Partition3

PercentComplete = 100

Command line to detach a vFlash partition (e.g. Partition3):


DetachPartition_OUTPUT

Job

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

ReferenceParameters


SelectorSet

  Selector: InstanceID = JID_256644711234,
  __cimnamespace = root/dcim

  ReturnValue = 4096

Poll the job status.
DCIM_LifecycleJob

  ElapsedTimeSinceCompletion = 0

  InstanceID = JID_256644711234

  JobStartTime = NA

  JobStatus = Completed

  JobUntilTime = NA

  Message = Detach partition successful

  MessageArguments = NA

  MessageID = VF038

  Name = VFlashDetach:Partition3

  PercentComplete = 100

Create a vFlash partition from a disk image

A vFlash partition can also be created by loading a disk image directly onto vFlash. For example, an operator can load a DVD ISO image to the vFlash and make it a vFlash partition. Later, the vFlash partition can be attached to the server system as a removable USB DVD device.

CreatePartitionUsingImage.xml:
Command line to load an image to vFlash as a partition:

```
```

Poll the job status.

```
DCIM_LifecycleJob
```

Job

```
EndpointReference
Address =
http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous
ReferenceParameters
SelectorSet
Selector: InstanceID = JID_256730250896,
__cimnamespace = root/dcim
ReturnValue = 4096
```
ElapsedTimeSinceCompletion = 0
InstanceID = JID_256730250896
JobStartTime = NA
JobStatus = Completed
JobUntilTime = NA
Message = Image partition creation successful
MessageArguments = NA
MessageID = VF007
Name = VFlashCreateUsingImage:Partition10
PercentComplete = 100

Copy a vFlash partition to a network share

A vFlash partition can also be copied to a network share.

ExportDataFromPartition.xml:

  <PartitionIndex>10</PartitionIndex>
  <ShareType>2</ShareType>
  <IPAddress>xxx.xxx.xxx.xxx</IPAddress>
  <SharePath>/cifs</SharePath>
  <ImageName>firm.db</ImageName>
  <Workgroup>americas</Workgroup>
  <Username>Administrator</Username>
  <Password>Dell123</Password>
</ExportDataFromPartition_INPUT>

Command line to copy a vFlash partition to a remote network share:

```
```

ExportDataFromPartition_OUTPUT
Delete a vFlash partition

An existing vFlash partition can be removed from the SD Card once it is no longer needed.

Command line to delete a vFlash partition:
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DeletePartition_OUTPUT

ReturnValue = 0

Change a vFlash partition from read-only to read-write

Partitions are created as read-only. The ModifyPartition() method allows you to change the state of the partition from read-only to read-write and vice versa.

ModifyPartition.xml:

  <p:PartitionIndex>10</p:PartitionIndex>  
  <p:AccessType>3</p:AccessType> // 1=Read-Only, 3=Read-Write
</p:ModifyPartition_INPUT>

Command line to change a vFlash partition access type:


ModifyPartition_OUTPUT

ReturnValue = 0

Summary

The remote service functions of vFlash partition management provide great flexibility for a system administrator. Combined with any scripting language—for example, Perl, Python, or the Windows command shell—a system administrator can perform vFlash operations remotely and automatically.
Additional Resources

Whitepaper - vFlash: An Overview

Whitepaper - How to use vFlash via GUI/USC

Integrated Dell Remote Access Controller 7 (iDRAC7), Version 1.0.0, User’s Guide

Web Services for Management (WSMAN):
http://dmtf.org/standards/wsm

Learn more about firmware inventory as defined by the Dell CIM profile specification:
http://www.delltechcenter.com/page/DCIM.Library.Profiles.DCIM+Software+Inventory+Profile+1.0

Learn more about firmware update as defined by the Dell CIM profile specification:
http://www.delltechcenter.com/page/DCIM.Library.Profile.DCIM+Software+Update+Profile+1.0

Learn more about job control as defined by the Dell CIM profile specification:
http://www.delltechcenter.com/page/DCIM+Job+Control+Profile+1.1

WSMAN Interface Guide for Linux:
http://attachments.wetpaintserv.us/BMJk79WsVP3F0jwI50xR_w2088275

WSMAN Interface Guide for Windows:
http://attachments.wetpaintserv.us/utYVFQFaHmnfG_LHEnx1YQ2026735

WSMAN command line open source for Linux (Openwsman):
http://sourceforge.net/projects/openwsman/

WSMAN command line for Windows (Winrm):

All about Lifecycle Controller in iDRAC:
http://support.dell.com/support/edocs/software/smusc/smlc/lc_1_5/index.htm