Web Service Eventing Support for Hardware Inventory and Monitoring

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Hari Venkatachalam
Chitrak Gupta

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Executive Summary

This technical white paper discusses the implementation of Web Services Eventing (WS-Eventing) for hardware inventory change events and hardware monitoring notification events. The white paper aims to describe the indication management infrastructure for managed hardware in a server.

1 Introduction

WS-MAN is a standard based protocol defined by DMTF used by systems management consoles. WS-MAN provides methods for inventoring, monitoring and controlling system devices. WS-MAN specification also defines a protocol for incident management. Web Services-Eventing (WS-Eventing) defines a protocol for a console (subscriber) to register interest (subscription) with a server web service (event source) in receiving the messages containing the server's events (notifications or event messages). Clients or consoles interested in receiving the WS-Eventing from a WS-Man implementation can subscribe for the hardware inventory changes (additions and removals) and hardware monitoring (power change, OS boot) notifications. WS-Eventing is a powerful tool in managing the system asynchronously, wherein a script developer can take actions on certain subscribed incidents. For example, a workflow can be written to monitor a sensor and if the sensor reading goes over a threshold value, a server restart must be performed. This can be performed by polling the sensor or by subscribing to the events and waiting for the event to occurr.

2 WS-Eventing on iDRAC

This white paper is an extension to the existing WS-Eventing behavior for LifeCycle JobAlert Indications and covers the hardware notification part of eventing mechanism. WS-Eventing for LifeCycleJobAlert Indications white paper has to be referred for the following:. For information on

- Prerequisites to Enable WS-Eventing on iDRAC
- Create Event Subscriptions
    - Event Sink
    - Expiry time
    - Subscription Identifier
- Renew Subscription
- Deleting Subscription

see

http://en.community.dell.com/techcenter/extras/m/white_papers/20436967/download.aspx

3 Enabling alerts

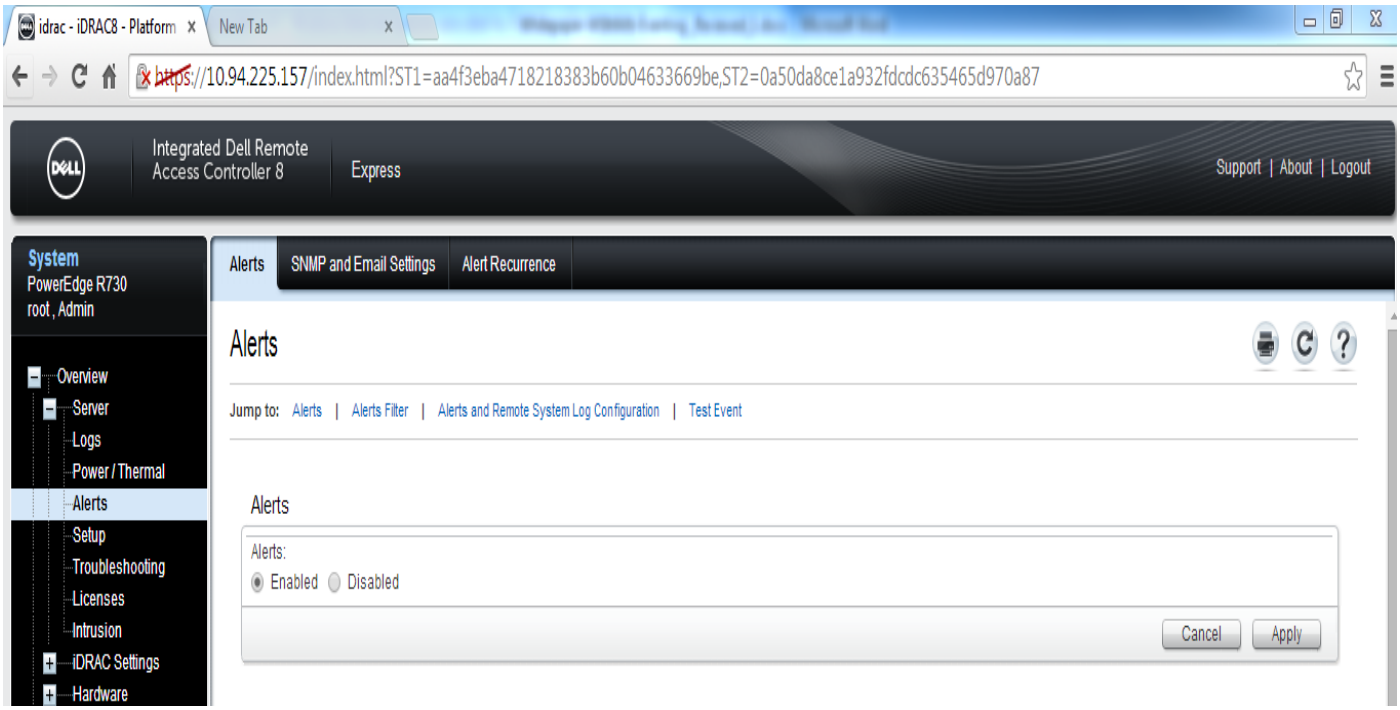
To globally enable or disable the alerts, clients can use the `DCIM_iDRACCardService.ApplyAttributes()` or DCIM_iDRACCardService.SetAttribute() method from the DCIM iDRAC Card Profile. You can send a request for the following form to globally enable the Alerts.

Figure 1 SOAP Request for ApplyAttributes

```
<?xml version="1.0" encoding="utf-8" ?>
- <s:Envelope xmlns:n1="http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_iDRACCardService" xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing" xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">
  - <s:Header>
      <wsa:Action s:mustUnderstand="true">http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_iDRACCardService/ApplyAttributes</wsa:Action>
      <wsa:To s:mustUnderstand="true">https://10.94.225.157:443/wsman</wsa:To>
      <wsman:ResourceURI s:mustUnderstand="true">http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_iDRACCardService</wsman:ResourceURI>
      <wsa:MessageID s:mustUnderstand="true">urn:uuid:8bbed670-1c62-11e4-848b-a4db30b94049</wsa:MessageID>
      <wsman:OperationTimeout>PT300.0S</wsman:OperationTimeout>
    - <wsa:ReplyTo>
        <wsa:Address>http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous</wsa:Address>
      </wsa:ReplyTo>
    - <wsman:SelectorSet>
        <wsman:Selector Name="__cimnamespace">root/dcim</wsman:Selector>
        <wsman:Selector Name="SystemCreationClassName">DCIM_ComputerSystem</wsman:Selector>
        <wsman:Selector Name="SystemName">DCIM:ComputerSystem</wsman:Selector>
        <wsman:Selector Name="CreationClassName">DCIM_iDRACCardService</wsman:Selector>
        <wsman:Selector Name="Name">DCIM:iDRACCardService</wsman:Selector>
      </wsman:SelectorSet>
    </s:Header>
  - <s:Body>
    - <n1:ApplyAttributes_INPUT>
        <n1:AttributeName>IPMILan.1#AlertEnable</n1:AttributeName>
        <n1:AttributeValue>Enabled</n1:AttributeValue>
        <n1:Target>iDRAC.Embedded.1</n1:Target>
      </n1:ApplyAttributes_INPUT>
    </s:Body>
  </s:Envelope>
```

Users can also log in to iDRAC Web interface and go to the **Alerts** page to enable the alerts.

Figure 2 iDRAC Web GUI—Alerts Page



Enabling WS–Eventing Alerts on iDRAC

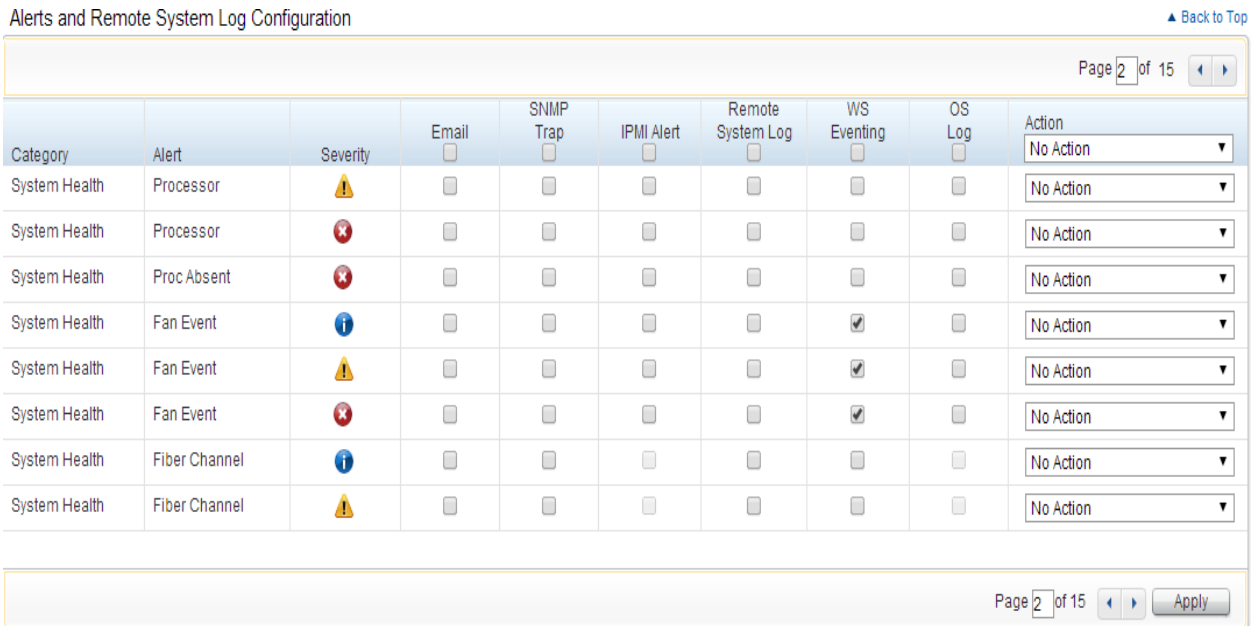
You can enable the WS–Eventing notification using the following: `DCIM_EFConfigurationService.SetEventFilterByInstanceIDs()` or `DCIM_EFConfigurationService. SetEventFilterByCategory()` method from the DCIM Event Filter profile [0]. You can send a request of the following form to enable the WS–Eventing notification.

Figure 3 WS–MAN Request to Enable WS–Eventing Alerts

```
<?xml version="1.0" encoding="utf-8" ?>
- <s:Envelope xmlns:n1="http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_EFConfigurationService" xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing" xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">
  - <s:Header>
      <wsa:Action s:mustUnderstand="true">http://schemas.dell.com/wbem/wscim/1/cim-
        schema/2/DCIM_EFConfigurationService/SetEventFilterByInstanceIDs</wsa:Action>
      <wsa:To s:mustUnderstand="true">https://10.94.225.157:443/wsman</wsa:To>
      <wsman:ResourceURI s:mustUnderstand="true">http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_EFConfigurationService</wsman:ResourceURI>
      <wsa:MessageID s:mustUnderstand="true">urn:uuid:61c4b480-1630-11e4-ae57-a4db30b94049</wsa:MessageID>
      <wsman:OperationTimeout>PT300.0S</wsman:OperationTimeout>
    - <wsa:ReplyTo>
        <wsa:Address>http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous</wsa:Address>
      </wsa:ReplyTo>
    - <wsman:SelectorSet>
        <wsman:Selector Name="__cimnamespace">root/dcim</wsman:Selector>
        <wsman:Selector Name="Name">DCIM:EFConfigurationService</wsman:Selector>
        <wsman:Selector Name="CreationClassName">DCIM_EFConfigurationService</wsman:Selector>
        <wsman:Selector Name="SystemName">systemmc</wsman:Selector>
        <wsman:Selector Name="SystemCreationClassName">DCIM_SPComputerSystem</wsman:Selector>
      </wsman:SelectorSet>
    </s:Header>
  - <s:Body>
    - <n1:SetEventFilterByInstanceIDs_INPUT>
        <n1:InstanceID>iDRAC.Embedded.1#RACEvtFilterCfgRoot#SYS_4_3</n1:InstanceID>
      </n1:SetEventFilterByInstanceIDs_INPUT>
    </s:Body>
  </s:Envelope>
```

Users can also log in to iDRAC Web interface and navigate to Configuration category and filter the required events

Figure 4 iDRAC Web GUI WS–Eventing Notification



4 Hardware inventory change and hardware monitoring notification events

iDRAC generates notifications for hardware inventory change events and hardware monitoring . You can subscribe to the following:

- DCIM_AlertIndication – Hardware inventory change events and hardware monitoring notification events.

Following subscription is for receiving all events of type DCIM_AlertIndication

```
<wse:Subscribe>
  <wse:Delivery Mode="http://schemas.xmlsoap.org/ws/2004/08/eventing/DeliveryModes/Push">
    <wse:NotifyTo>
      <wsa:Address>http://10.210.136.17/:5985</wsa:Address>
    </wse:NotifyTo>
  </wse:Delivery>
  <wse:Expires>PT600.000000S</wse:Expires>
  <wsman:Filter Dialect="http://schemas.dmtf.org/wbem/cql/1/dsp0202.pdf">
    SELECT * FROM DCIM_AlertIndication
  </wsman:Filter>
</wse:Subscribe>
```

The filter specified "`SELECT * FROM DCIM_AlertIndication`" is a query that filters the iDRAC8–generated events.

4.1.1 Subscription response at event sink

```
<?xml version="1.0" encoding="UTF-8" ?>
- <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
  xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd" xmlns:n1="http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AlertIndication">
  - <s:Header>
      <wsa:To>http://10.94.94.127:80/eventsink</wsa:To>
      <wsa:MessageID>uuid:0bd43366-ff15-1f15-8047-3848f6ddf95c</wsa:MessageID>
      <wsman:Action>http://schemas.dell.com/wbem/wscim/1/cim-schema/2/DCIM_AlertIndication</wsman:Action>
    </s:Header>
  - <s:Body>
      <n1:SystemName />
      <n1:ProbableCause>0</n1:ProbableCause>
      <n1:OwningEntity>DCIM</n1:OwningEntity>
      <n1:AlertingManagedElement>:</n1:AlertingManagedElement>
      <n1:OtherAlertingElementFormat>SystemServiceTag:SystemFQDN</n1:OtherAlertingElementFormat>
      <n1:AlertingElementFormat>1</n1:AlertingElementFormat>
      <n1:MessageID>PWR1000</n1:MessageID>
      <n1:Message>The system performance restored.</n1:Message>
      <n1:EventID>2275</n1:EventID>
      <n1:FQDD />
      <n1:SystemFQDN />
      <n1:SystemServicetag />
      <n1:Severity>3</n1:Severity>
      <n1:SubCategory>PWR</n1:SubCategory>
      <n1:Category>System Health</n1:Category>
      <n1:PerceivedSeverity>3</n1:PerceivedSeverity>
      <n1:OtherAlertType />
      <n1:AlertType>5</n1:AlertType>
      <n1:Description />
      <n1:IndicationTime>20140726040921.391938-300</n1:IndicationTime>
      <n1:IndicationFilterName>05ad0ac1-ff15-1f15-8038-3848f6ddf95c</n1:IndicationFilterName>
    </s:Body>
  </s:Envelope>
```

5 Examples commands using openwsman client and DCIM_AlertIndication output

Source for the WS–Man client can be found at http://sourceforge.net/projects/openwsman/files/wsmancli/. Users can download this source, compile, and then install it on a UNIX–based operating system to send the WS-Man commands. The following are examples for sending WS-Man commands related to WS-Eventing .

Enabling Alerts

```
wsman invoke -a ApplyAttributes -h [idrac-ip] -P 443 -u [username] -p [password] -N
root/dcim
http://schemas.dmtf.org/wbem/wscim/1/cimschema/
2/root/dcim/DCIM_iDRACCardService?CreationClassName="DCIM_iDRACCardService",Nam
e="DCIM:iDRACCardService",SystemCreationClassName="DCIM_ComputerSystem",SystemName=
"D
CIM:ComputerSystem" -k Target=iDRAC.Embedded.1 -k
AttributeName=IPMILan.1#AlertEnable -k
AttributeValue=Enabled -V -v -R -o -m 256 -c dummy
```

Enabling WS–Eventing Alerts

```
wsman invoke -a SetEventFilterByInstanceIDs -h [idrac-ip] -P 443 -u [username] -p
[password] -N
root/dcim http://schemas.dmtf.org/wbem/wscim/1/cimschema/
2/root/dcim/DCIM_EFConfigurationService?SystemCreationClassName="DCIM_SPComputer
System",CreationClassName="DCIM_EFConfigurationService",SystemName="systemmc",Name=
"DCI
M:EFConfigurationService" -k
InstanceID=iDRAC.Embedded.1#RACEvtFilterCfgRoot#JCP_5_3 -k
RequestedNotification=6 -k RequestedAction=0 -V -v -R -o -m 256 -c dummy
```

Subscription Request

```
wsman subscribe 'http://schemas.dmtf.org/wbem/wscim/1/*' -x "SELECT * FROM
DCIM_AlertIndication" -D 'http://schemas.dmtf.org/wbem/cql/1/dsp0202.pdf' -Z
'http://<event-sink ip>:<port>/eventsink' -h [idrac-ip] -P 443 -u [username] -p
[password] -v -j utf-8 -
y basic -R -o -m 256 -N root/dcim -c dummy -V -r 3000
```

Renew Request

```
wsman renew -i uuid:9e369e25-c894-1894-8016-335b54cb2b78 -h [idrac-ip] -P 443 -u
[username]
-p [password] -v -j utf-8 -y basic -R -o -m 256 -N root/interop -c dummy -V -r
12000
```

Unsubscribe Request

```
wsman unsubscribe -i uuid: 9e369e25-c894-1894-8016-335b54cb2b78 -h [idrac-ip] -P
443 -u
```

```
[username] -p [password] -v -j utf-8 -y basic -R -o -m 256 -N root/interop -c dummy
-V
```

- Device Addition (*DCIM_AlertIndication*), this event is sent to all subscribers on every new device addition to the server. There will be one event of this type generated for every new device added.

DCIM_AlertIndication		
Datatype	**Property Name**	**Sample Value**
Datetime	IndicationTime	20010101003016.263355+000
String	Description	Null
uint16	AlertType	5 (Device Alert)
string	OtherAlertType	Null
uint16	PerceivedSeverity	2 = Informational
string	Category	System Health
string	SubCategory	FAN
uin16	Severity	3
string	SystemServiceTag	7654321
string	SystemFQDN	myserver.domain.com
string	FQDD	Fan.Embedded.1
string	EventID	2153
string	Message	Fan 1 is removed
string	MessageID	FAN0006
string[]	MessageArguments	Null
uint16	AlertingElementFormat	1 (Other)
String	OtherAlertingElementFormat	FQDD
String	AlertingManagedElement	Fan.Embedded.1
String	OwningEntity	DCIM
Uint16	ProbableCause	0 (Unknown)
String	SystemName	myserver.domain.com

References

Document Name	Document Link
LC Integration Best Practices	http://en.community.dell.com/techcenter/extras/m/white_papers/20066173.aspx
WS-Eventing Specification	DSP0226, Web Services for Management 1.1.1
DMTF Indication Profile	DSP1054_1.0.0.pdf, Indication Profile
DCIM Event Filter Profile	http://en.community.dell.com/techcenter/extras/m/white_papers/20263517

DCIM iDRAC Card Profile	http://en.community.dell.com/techcenter/systems-management/w/wiki/3513.dcim-idrac-card-profile-1-2