Hewlett Packard Enterprise

Data Center Automation Suite 2016.10

Windows Patch Management
Performance Characterization

Contents

Summary of performance results

HPE tested the Windows Patch Management functionality of Data Center Automation Suite version 2016.10 in the HPE Performance lab. The aim was to validate the overall throughput and resource demand for a well-defined workload.

The DCA Suite 2016.10 is a virtual appliance that provisions and manages servers and data center operations more effectively.

In this study, the HPE Performance team exercised the capabilities of DCA Operations Portal, Operations Orchestration and Server Automation in a patching scenario for Windows-based managed servers.

With DCA Operations Portal you can patch Windows managed servers by leveraging the Patch Policy remediation feature in Server Automation.
Server Automation's Windows patching feature uses Microsoft Windows's patching tools to install patches on managed servers.

The throughput data was measured at DCA Operations Portal level. This white paper details the analysis of DCA's Windows Patching performance capabilities.

Test case description

The HPE Performance team selected the following test case based on typical customer usage of the feature **Patching Windows 2012 R2 servers with a 15-patch set**. All 15 patches are applicable and can be installed.

The implemented Windows Patch management test case:
- installs 15 patches amounting to a payload of 66.8 MB in size.

- concurrently patches up to 1000 Windows 2012 R2 managed servers with the 15-patch set grouped in a Patch Policy.

- uses a Server Automation managed server device group with the Patch Policy attached.

All remediate jobs were submitted via the DCA UAPI.

For more information about the hardware and software configuration of the tested environment, see **Appendix: Test system configuration**.

Performance results

Job throughput is measured in number of managed servers processed per minute. This is computed by dividing the number of managed servers on which the job is run by the total execution time of the job.

Overall job throughput

The overall job throughput represents an average of two iterations for each load level: 1, 100, 200, 500 and 1000 managed servers.

The highest achieved throughput is 7.27 servers/minute at a workload of 1000 managed servers.
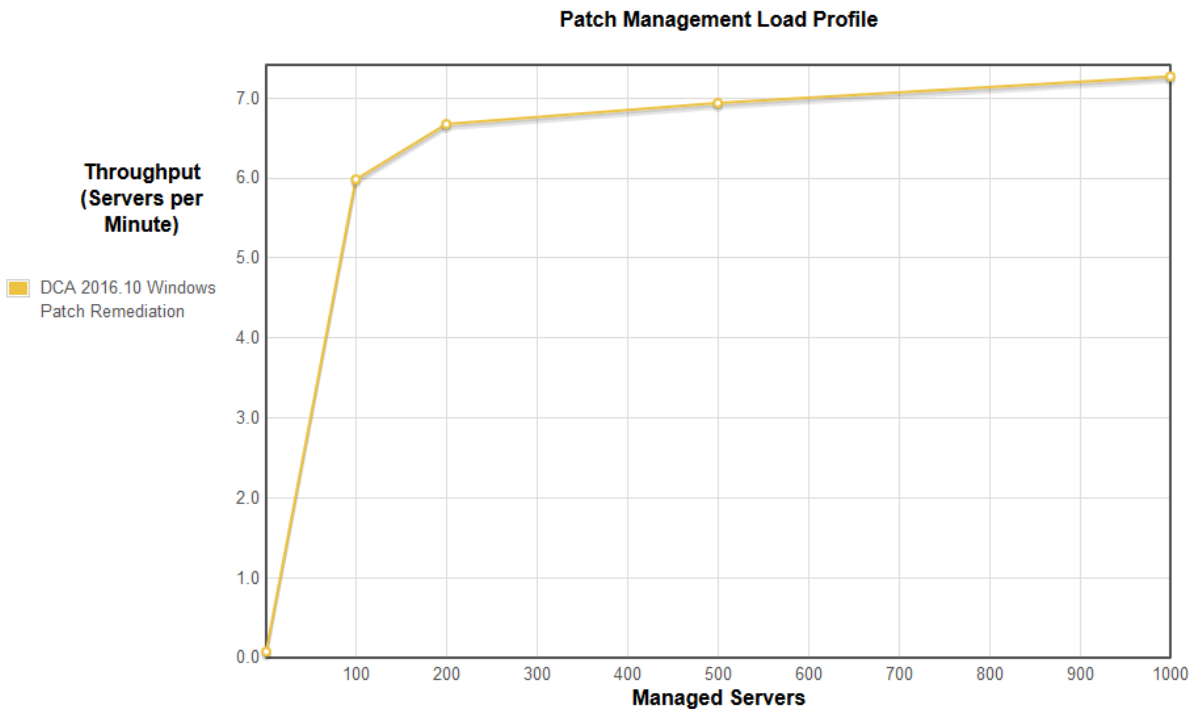

Figure 1: Windows patch remediation job throughput (managed servers per minute)

Resource utilization on DCA Virtual Appliance

Remediation in DCA is characterized by a balanced resource demand on the DCA Virtual Appliance, where the DCA Operations Portal, Operations Orchestration and Server Automation applications share hardware resources managed by the same operating system.

The following graphics show the CPU and network usage for a DCA server processing a patch remediation job on 100 managed servers.

For a detailed analysis on the performance of a patch remediation job at Server Automation level, see the HPE *Server Automation 10.50 Windows Patch Management Performance Characterization* whitepaper.

CPU usage on a DCA server running a patch remediation job for 100 managed servers
As highlighted in Figure 2, a patch remediation flow in DCA starts with moderate CPU usage in the job preparation stage.

The first phases of the remediation job, analysis and the staging (download) phase are characterized by moderate to high CPU usage. While the target managed servers are processing the workload, usage decreases on the DCA Server, with spikes in the verification and compliance stages.
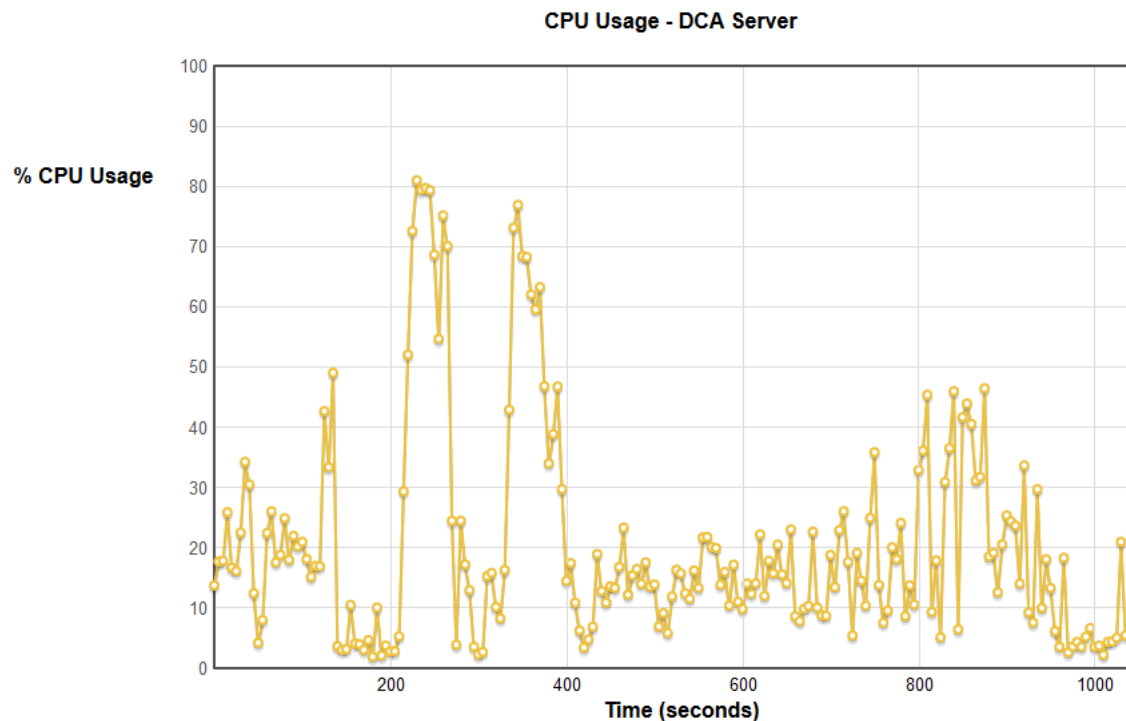

Figure 2: CPU usage for a DCA server while performing a patch remediation job on 100 managed servers

Network utilization on a DCA server running a patch remediation job for 100 managed servers
Figure 3 shows the network utilization pattern during a patch remediation job. Usage spikes correspond to the download phase of the remediation job, reaching up to 110 MB/s in the tested environment.

Payload is downloaded in batches on target managed servers, ranging throughout most of the second quarter of the total duration of the job.
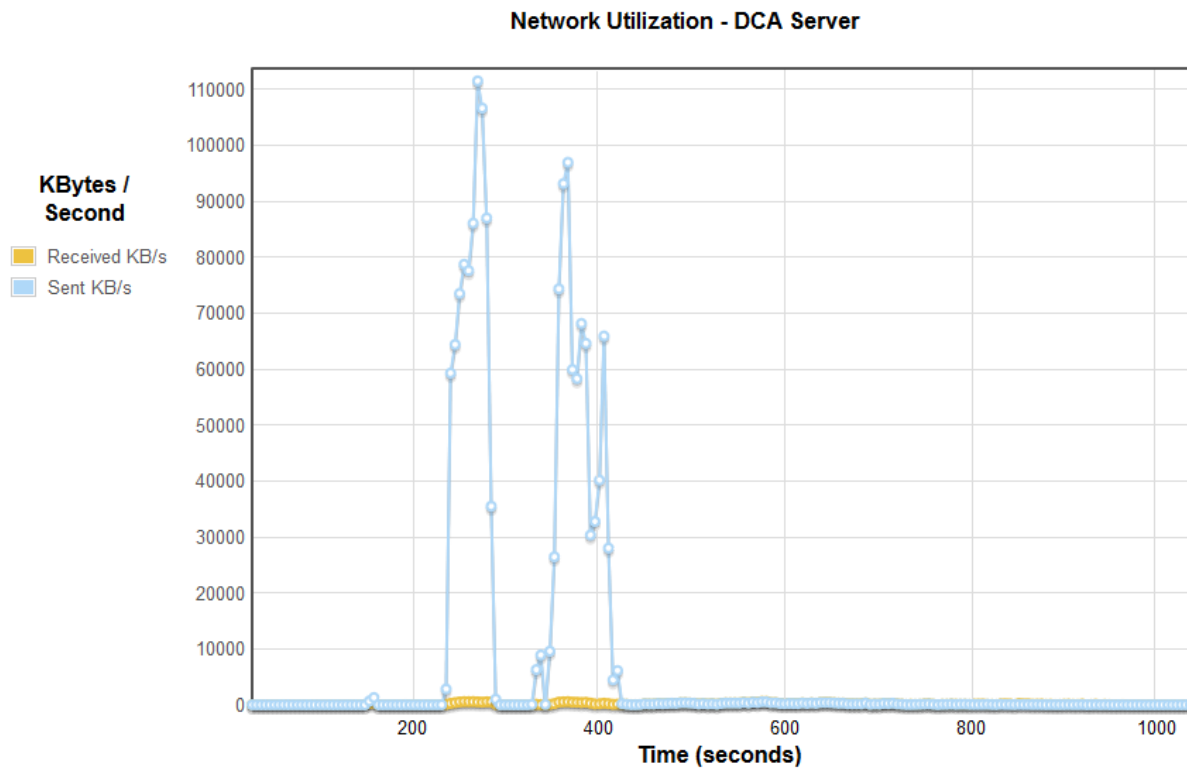

Figure 3: Network utilization for a DCA server while performing a patch remediation job on 100 managed servers

Tunable configuration parameters
The HPE Performance team adjusted the following system configuration parameters to facilitate stable operations:

Increase SA Device Remediation timeout at DCA level
DCA Administration Portal enables you to configure the SA Remediation timeout parameter[1].
In requests targeting a large number of managed servers, the remediation operation may reach the default timeout value of 3600 seconds. For this test, the HPE Performance team increased this value to 18000 seconds.

Increase Server Automation way.remediate.package_alarm_timeout
The remediate operation includes the action phase, which implies a workload on the managed server proportional to the payload being remediated. When the number of managed servers in a job is large enough, this operation may reach the default timeout value set to 3600 seconds. In this study, this value has been increased to 10200 seconds. The value of this parameter can be tuned from the SA Client[2].

Increase Server Automation way.remediate.get_dicts_timeout
The *get_dicts_timeout* tuning parameter in SA is similar to *package_alarm_timeout.* It limits the number of seconds allowed for getting a list of installed software in the remediation action phase.

By default, this parameter is set to 1800 seconds but has been increased to 7200 seconds to work around timeout issues encountered at heavy workload levels. You can change the value of this parameter from the SA Client[3].

For this test, all other configuration parameters use the default values.

Conclusions

For the tested configuration, DCA patch remediation performs concurrent operations achieving a steady state with maximum throughput recorded at **7.27** servers per minute, at a workload level of 1000 Windows 2012 R2 managed servers.
This throughput is computed in the context of a well-defined payload: 15 applicable Windows patches. Different representative patch sets would exhibit correspondingly different characteristics.

Most of the overall patching workload is performed by the native patching operation of the Windows 2012 R2 Server on the managed servers.

Resource utilization on the DCA server is characterized by medium CPU and network usage throughout the remediation job.

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[1] Designs > Sequenced > Resource Offerings > Managed Servers > Lifecycle > Provisioning Stages / Deploying > During > SA Device Remediation
[2] Administration View > System Configuration / Configuration Parameters > way.remediate.package_alarm_timeout
[3] Administration View > System Configuration / Configuration Parameters > way.remediate.get_dicts_timeout

Appendix: Test system configuration
DCA Server

ESXI host specifications	• ESXi 5.1 • HW: Model: HP ProLiant BL460c Gen9 • CPU: 16 CPUs x 2.6 GHz Intel Xeon E5-2640 • Memory: 256 GB
VM specifications	• Disk: 256 GB Linux ext4 • CPU: 8x vCPU @ 2.60GHz , Memory: 32 GB
Network configuration	Network: 10 GBPS LAN, dedicated VLAN
Software specifications	• OS: CentOS 6.5 64-bit • DCA Suite 2016.10

Managed servers

Managed servers	Windows 2012 R2 VMware VMs

ESXI host specifications	• ESXi 5.1
	• Hardware:
	   o Model: HP ProLiant BL460c Gen8
	   o CPU: 16 CPUs x 2.6 GHz Intel Xeon E5-2670
	   o Memory: 192 GB

VM specifications	• Local Disk: 40 GB NTFS • CPU: 2 vCPUs @ 2.60GHz • Memory: 4 GB
Network configuration	Network: 10 GBPS LAN, dedicated VLAN
Software specifications	OS: Windows Server 2012 R2 64-bit
Additional notes	VMs are evenly distributed across 28 VMware ESXi hosts

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Feedback on Windows Patching Performance White Paper (Data Center Automation Suite 2016.10)

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