Troubleshooting Hyper-V.
Notes from the field.

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Facing a problem is not the real problem...
...it’s an opportunity to learn something new!
Let me show you some of them...
The case of: Living checkpoints...
The case of: Living checkpoints...
The case of: Living checkpoints...

**Symptoms...**

- VDI VM is rapidly consuming more and more disk space each time the user logs off.
- VDI VM is even malfunctioning after 50 user login processes.
- It’s the Windows Server 2012 R2 with Hyper-V.

No more info available!
The case of: Living checkpoints...

Troubleshooting...

- Investigating VM behavior in the Hyper-V Manager shows that the VM automatically creates a new checkpoint when the user logs off and reverts to a checkpoint called RDV_Rollback.
- What’s the “RDV_Rollback” checkpoint?
- So when the user logs off the checkpoint “RDV_Rollback” is applied.
- Why does the VM creates each time a new checkpoint?
- When I try to manually apply the checkpoint, the new one is created as well.

I know the cause of the problem now...
The case of: Living checkpoints...

Cause...
The case of: Living checkpoints...

Solution...
The case of: Living checkpoints...
The case of: Unexpected CPU Utilization
The case of: Unexpected CPU Utilization
The case of: Unexpected CPU Utilization

Symptoms...

- Host is sometimes hitting 100% CPU utilization.
- It's happening even when hosted VMs are not consuming so much CPU.
- It's Windows Server 2008 R2 SP1 Datacenter host with Hyper-V role.

No more info available.
The case of: Unexpected CPU Utilization

Troubleshooting...

- Performance monitors confirm the noted behavior.
  - Hyper-V Hypervisor Logical Processor: % Hypervisor Run Time = 0 – 100
  - Hyper-V Hypervisor Virtual Processor: % Guest Run Time = 0 – 10 {for sum of all VMs}

- Is there any other application/service running in the root partition? No.
- When I stop all running VMs, everything is working just fine. No high CPU utilization.
- I can see quite a lot of VMs on this host. There is 290 running VMs.
- How many logical processors does the Hyper-V host have? 16 (2 quad-core CPUs).

I know the cause of the problem now...
The case of: Unexpected CPU Utilization

**Cause...**

- Total count of virtual processors = 386
- Total count of logical processors = 16
- Processor ratio = 386:16 ~ 24:1
- Supported Processor ratio for server VMs on WS 2008 R2 SP1 = 12:1
- Hyper-V CPU Scheduler is overloaded. The customer is running unsupported configuration.
The case of: Unexpected CPU Utilization

Solution...

- Migrate some VMs to other Hyper-V host.
- Upgrade server hardware.
- Upgrade to Windows Server 2012 minimum.
The case of: Unexpected CPU Utilization
The case of: Heavy Cluster Network Traffic
The case of: Heavy Cluster Network Traffic
The case of: Heavy Cluster Network Traffic

Symptoms...

- Network switch connecting Hyper-V Cluster nodes is processing huge traffic.
- It’s nearly permanent.
- It’s not affected by Live Migration.
- It’s affecting guest OS read performance.
- It’s Windows Server 2012 R2 Datacenter host with Hyper-V role.

No more info available.
The case of: Heavy Cluster Network Traffic

Troubleshooting...

- Performance monitoring on the network device confirms the noted behavior.
  - Traffic sent/received on the cluster nodes ports is around 300MB/s.
- Is there any change during Live Migration? No.
- Is there any change during Performance Test? Yes! Higher disk read is causing higher network traffic.
- When I stop all running VMs, everything is working just fine. No high network utilization.
- What kind of network traffic is consuming the bandwidth? SMB.
- Where are virtual hard disks stored? Cluster Shared Volume.
- Is there any excessive CSV utilization? Yes! Metadata IO/sec.
- Is there any storage connection issue? No. No redirected access happening. Perf count confirms.
- During the healthcheck of CSV I can see different values for SIZE and SIZE ON DISK values.

I know the cause of the problem now...
The case of: Heavy Cluster Network Traffic

Cause...

- CSV is using Data Deduplication feature.
- Because data on the CSV are deduplicated each read operation requires sparse/reparse point read. This is causing heavy CSV metadata traffic.
- Using deduplication on the CSV which is not used for VDI is not supported.
The case of: Heavy Cluster Network Traffic

Solution...

- Disabled data deduplication on the CSV.
- Maximize CSV network throughput.
The case of: Heavy Cluster Network Traffic
Problems solving principles...
1. Ask the right questions and stay curious.
2. Analyze and gather data.
3.

Think. Stay simple!
Implement the solution.
Your PC ran into a problem that it couldn't handle, and now it needs to restart.

Not like this!
Don’t forget to celebrate ;)
Use the right tools...
Event Viewer

Hyper-V-Compute
Hyper-V-Config
Hyper-V-Guest-Driver
Hyper-V-Hypervisor
Hyper-V-StorageVSP
Hyper-V-VID
Hyper-V-VMMS
- Admin
- Networking
- Operational
- Storage
Hyper-V-VmSwitch
Hyper-V-Worker
- IdCache
International
International-RegionalOpti
Iphlpsvc
KdsSvc
Kernel-ApphelpCache
Kernel-Boot
Kernel-EventTracing
Kernel-IO

Admin
Number of events: 226

<table>
<thead>
<tr>
<th>Level</th>
<th>Date and Time</th>
<th>Source</th>
<th>Event ID</th>
<th>Task Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>10/6/2016 9:30:25 PM</td>
<td>Hyper-V-VMMS</td>
<td>12514</td>
<td>None</td>
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<td>Information</td>
<td>10/6/2016 9:29:35 PM</td>
<td>Hyper-V-VMMS</td>
<td>12514</td>
<td>None</td>
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</table>

Event 12514, Hyper-V-VMMS

General

Found a certificate for server authentication. Remote access to virtual machines is now possible.

Details

Log Name: Microsoft-Windows-Hyper-V-VMMS/Admin
Source: Hyper-V-VMMS
Event ID: 12514
Task Category: None
Level: Information
Keywords:
User: SYSTEM
Computer: DELLINSPIRIT-MAREK,janmarek.local
OpCode: Info
More Information: Event Log Online Help

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<table>
<thead>
<tr>
<th>Name</th>
<th>Id</th>
<th>Description</th>
<th>Role</th>
<th>Transport</th>
<th>Ignore</th>
<th>AssociatedInterfaces</th>
<th>PrefixList</th>
<th>Address</th>
<th>AddressMask</th>
<th>ipv6Addr</th>
<th>State</th>
<th>linkSpeed</th>
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</thead>
<tbody>
<tr>
<td>Cluster Network 1</td>
<td>27f2d19b-7e23-4ee3-a226</td>
<td></td>
<td></td>
<td>TCP/IP</td>
<td>FALSE</td>
<td>82e5107c-5375-473a-ab9f</td>
<td></td>
<td>10.10.1.0/24</td>
<td>255.255.255.0</td>
<td></td>
<td></td>
<td>3</td>
</tr>
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<td>Cluster Network 2</td>
<td>e6efdf1f6-474b-410a-bd7b</td>
<td></td>
<td></td>
<td>TCP/IP</td>
<td>FALSE</td>
<td>57d9b74d-8d9e-4afe-86f7</td>
<td></td>
<td>10.10.3.0/24</td>
<td>255.255.255.0</td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td>Cluster Network 3</td>
<td>1a5029c7-7961-40bb-b6b9</td>
<td></td>
<td></td>
<td>TCP/IP</td>
<td>FALSE</td>
<td>d3cdef35-82bc-4a60-8ed4</td>
<td></td>
<td>157.xx.xx.0/22</td>
<td>255.255.255.255</td>
<td>2001:4898</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Log Properties - DiagnosticVerbose (Type: Operational)

Full Name: Microsoft-Windows-FailoverClustering/DiagnosticVerbose
Log path: %SystemRoot%\System32\Winer\Logs\Microsoft-Windows-FailoverClustering\%4Dia
Log size: 37.50 MB (09,325,696 bytes)
Created: Wednesday, October 29, 2014 4:17:57 PM
Modified: Tuesday, November 4, 2014 10:07:48 AM
Accessed: Wednesday, October 29, 2014 4:17:57 PM

Enable logging:
Maximum log size (KB): 38400

When maximum event log size is reached:
- Overwrite events as needed (oldest events first)
- Archive the log when full, do not overwrite events
- Do not overwrite events (Clear logs manually)

[--- Microsoft-Windows-FailoverClustering/DiagnosticVerbose ---]

[Verbose] 00000244.00001644::2015/04/22-01:04:29.623 DBG
[RCM] rcm::PreemptionTracker::GetPreemptedGroups()
1. Expand
2. Double-click
Welcome to the Performance Analysis of Logs (PAL) tool analysis wizard. This wizard will guide you through the process of analyzing your log file(s).

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About the Author
Email: clinth@microsoft.com
Blog
Support

PAL v2

http://pal.codeplex.com/

Written by Clint Huffman (clinth@microsoft.com) and various other contributors.
If you have any questions, problems, or feedback with this tool, then please post it to the discussion forum at http://pal.codeplex.com
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License Information
If the counter has a value higher than 0.5 MB then make sure your CSV disks are not in redirected mode. Or you are using a lot of dynamic expanding VHD.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Counter</th>
<th>Min</th>
<th>Avg</th>
<th>Max</th>
<th>Hourly Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum assigned memory is not enough</td>
<td>\Hyper-V Dynamic Memory VM</td>
<td>83</td>
<td>83</td>
<td>83</td>
<td>0</td>
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<tr>
<td>Maximum assigned memory is not enough</td>
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</tr>
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Thank You!

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