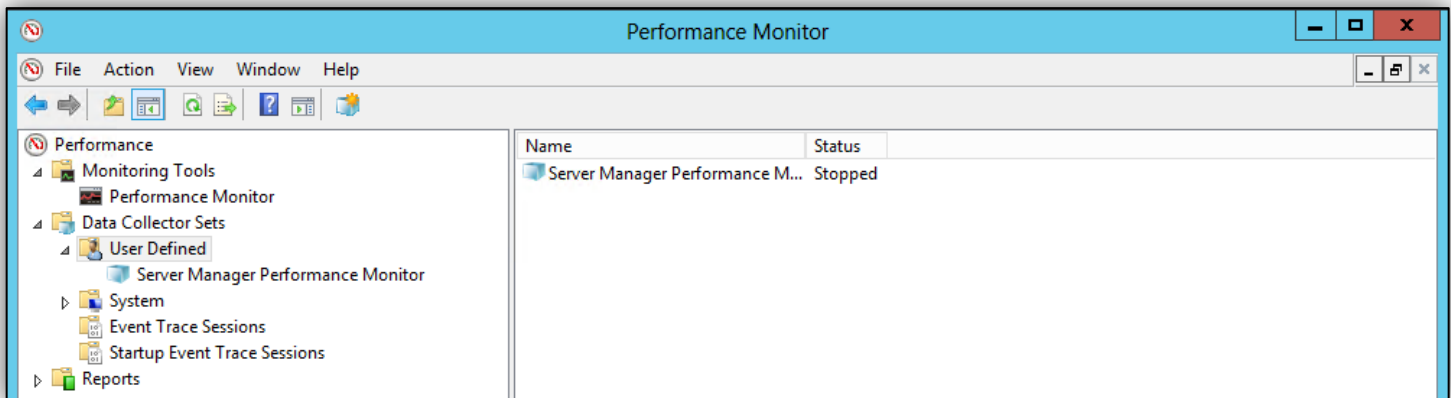


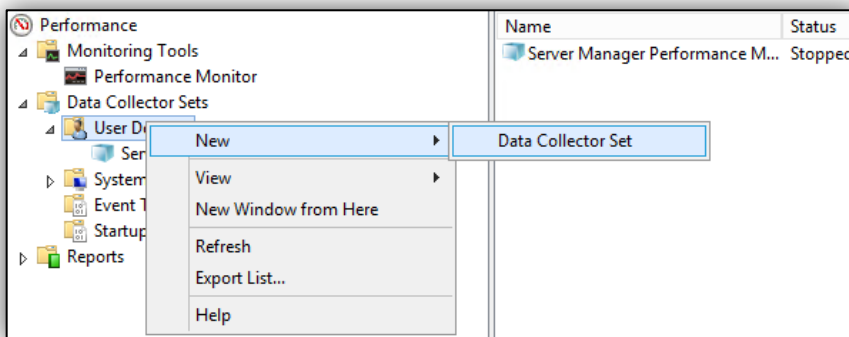
Perfmon Collection Setup Instructions for Windows Server 2008R2+

Performance statistics are critically vital for the long-term health and capacity management of an enterprise environment. Unless a third-party performance statistics collection utility, such as Microsoft System Center, is already in place in an environment, Perfmon on each Windows Server can be configured to constantly record performance statistics for future use.

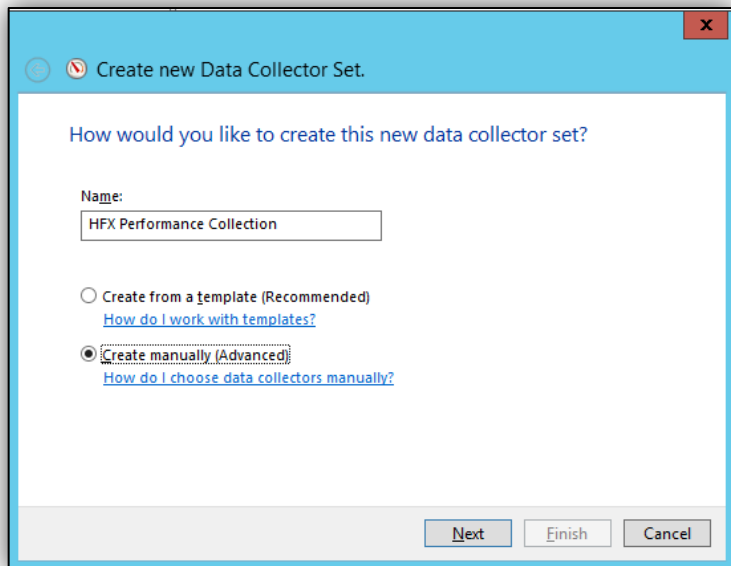
Open Windows Perfmon and expand the Data Collector Sets, User Defined tree item.



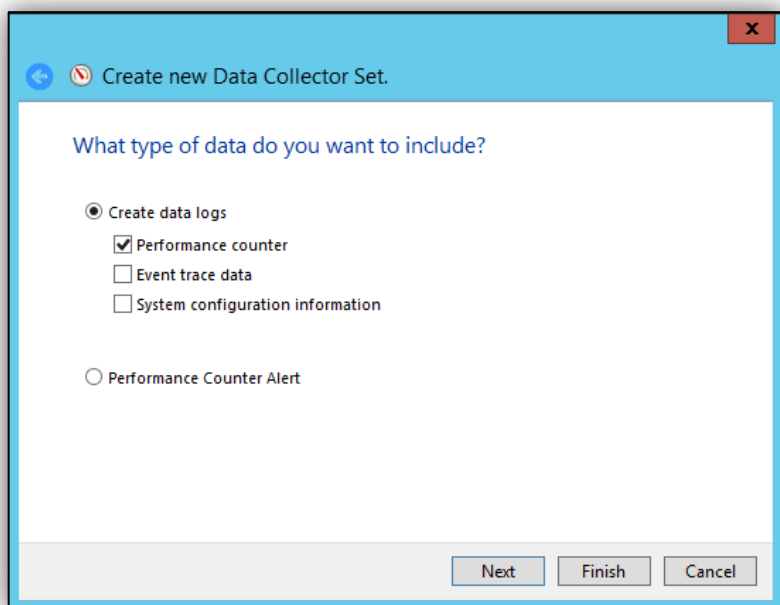
Right-click on User Defined, select New, and select Data Collector Set.



Name the Data Collector Set appropriately, and select Create manually (Advanced).



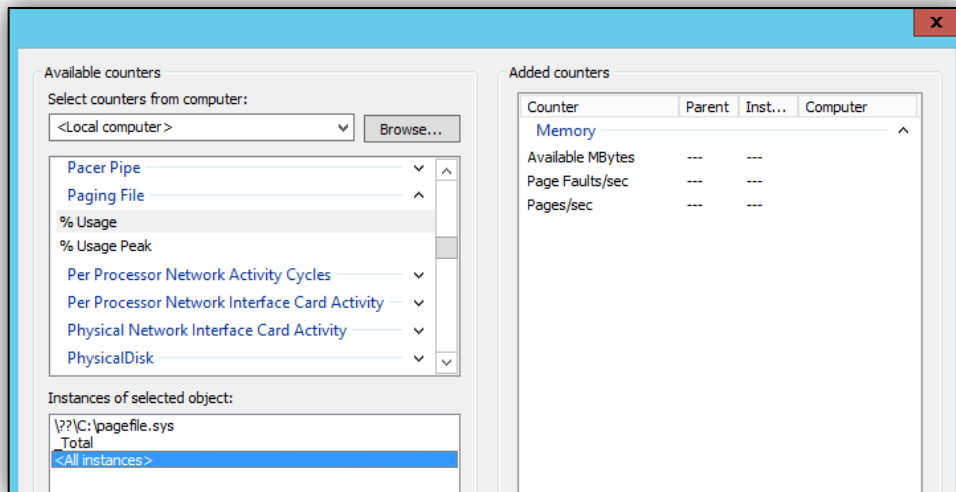
Select Create data logs and then check Performance Counter. Select Next.



Set the Sample interval to thirty seconds. We find we get solid granularity without consuming much disk space at 30 seconds. Next, click the 'Add' button, then select the following counters.



Note: If a counter has multiple instances of a selected object, make sure you select **<All instances>** instead of **Total** so the counters are separated appropriately. This option helps you get individual statistics for objects like CPU cores or disk drive letters.



Windows Server Counters

Note: Warning and alerting thresholds are given as a starting point for some counters to be used with monitoring tooling. Use these as a starting point and tailor to your environment. If no value is listed, then this counter is relatively subjective, based on your environment and workload characteristics, and blanket thresholds cannot be given without further workload context.

Counter Group	Counter Set	Warning	Alerting
Memory	Available Mbytes	< 2000	< 1000
	Page Faults / sec		
	Page Reads / sec		
	Page Writes / sec		
	Pages / sec		
Network Interface	Bytes Received / sec		
	Bytes Sent / sec		
Paging File	% Usage		
PhysicalDisk	% Idle Time		
	Avg. Disk Bytes / Read		
	Avg. Disk Bytes / Write		
	Avg. Disk sec / Read	> 0.025	> 0.030
	Avg. Disk sec / Write	> 0.020	> 0.025
	Disk Read Bytes / sec		
	Disk Reads / sec		
	Disk Write Bytes / sec		
	Disk Writes / sec		
Processor	% Privileged Time		
	% Processor Time		
	% User Time		
Processor Information	% of Maximum Frequency	< 100	< 100

System	Processor Queue Length	> 3x CPU count	> 5x CPU count
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If this server is virtualized on VMware vSphere, add the following VMware-specific counters.

Counter Group	Counter Set	Warning	Alerting
VM Memory	Memory Active in MB		
	Memory Ballooned in MB	> 0	> 0
	Memory Swapped in MB	> 0	> 0
	Memory Used in MB		
VM Processor	% Processor Time		
	CPU stolen time	> 0.025	> 0.035
	Effective VM Speed in MHz		
	Host processor speed in MHz		

If the server is virtualized on Microsoft Hyper-V, add the following Hyper-V-specific counters.

Counter Group	Counter Set	Counters (Otherwise select all)
Overall health	Hyper-V Virtual Machine Health Summary	%Guest Run (_Totals) %Hypervisor Run Time (_Totals) %Idle Run Time (_Totals)
	Hyper-V Hypervisor	
Processor	Hyper-V Hypervisor Logical Processor	
	Hyper-V Hypervisor Root Virtual Processor	
	Hyper-V Hypervisor Virtual Processor	
Memory	Hyper-V Hypervisor Partition	2M GPA Pages Deposited Pages Virtual Processors
	Hyper-V Root Partition	
	Hyper-V VM Vid Partition	Physical Pages Allocated Remote Physical Pages
Networking	Hyper-V Virtual Switch	
	Hyper-V Legacy Network Adapter	
	Hyper-V Virtual Network Adapter	
Storage	Hyper-V Virtual Storage Device	
	Hyper-V Virtual IDE Controller	

If the server is a Microsoft Hyper-V host, add the following Hyper-V-specific counters. Select all instances for each counter.

Counter Group	Counter Set
Hyper-V Hypervisor Partition	Virtual Processors
Hyper-V Hypervisor Virtual Processor	% Guest Run Time
	% Hypervisor Run Time
	% Remote Run Time
	% Total Run Time

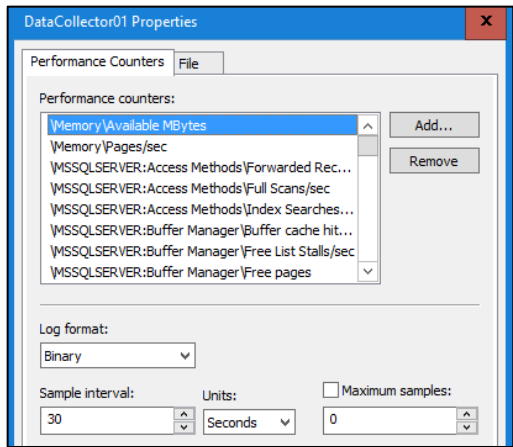
	CPU Wait Time Per Dispatch
Hyper-V Virtual Network Adapter	Bytes Received / sec
	Bytes Sent / sec
Hyper-V Virtual Storage Device	Read Bytes / sec
	Write Bytes / sec
	Read Operations / sec
	Write Operations / sec
	Queue Length
	Latency

If the server contains one or more SQL Server instances, add the following counters for each SQL Server instance. If you are using one or more named SQL Server instances, please update the Counter Group name with “MSSQL\$InstanceName:” instead of “SQL Server:”.

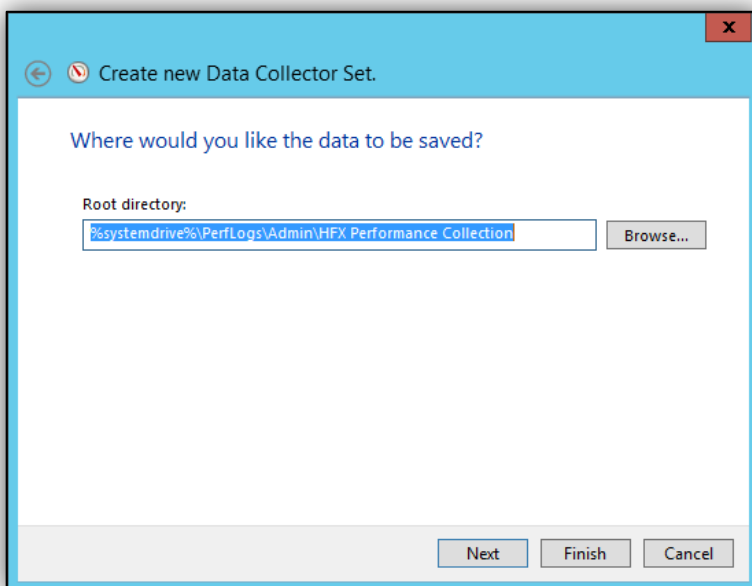
Counter Group	Counter Set	Warning	Alerting
Process (sqlservr.exe)	% Privileged Time		
	% Processor Time		
SQL Server:Access Methods	Forwarded Records/sec		
	Full Scans/sec		
	Index Searches/sec		
	Page Splits/sec		
SQL Server:Batch Resp Statistics	*		
SQL Server:Buffer Manager	Buffer cache hit ratio		
	Free List Stalls/sec		
	Lazy writes/sec		
	Page life expectancy	< 1000	< 500
	Page reads/sec		
	Page writes/sec		
SQL Server:Buffer Node	Local node page lookups/sec		
	Page life expectancy	< 1000	< 500
	Remote node page lookups/sec		
SQL Server:Databases	Transactions/sec		
SQL Server:General Statistics	User Connections		
SQL Server:Latches	Latch Waits/sec		
SQL Server:Locks	Lock Waits/sec		
	Number of Deadlocks/sec	> 0	> 0
SQL Server:Memory Manager	Target Server Memory (KB)		
	Total Server Memory (KB)		
	Memory Grants Pending	> 0	> 0
SQL Server:SQL Statistics	Batch Requests / sec		
	SQL Compilations / sec		
	SQL Re-compilations / sec		

Click OK when finished selecting the available counters. Select Next.

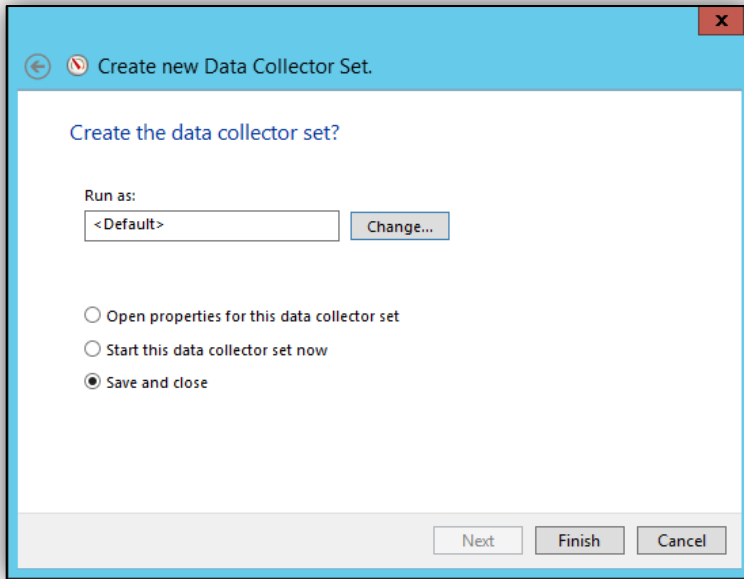
Note: Regardless if you are investigating a known issue, or just want ongoing metrics for advanced analysis purposes, set the sample interval to 30 seconds.



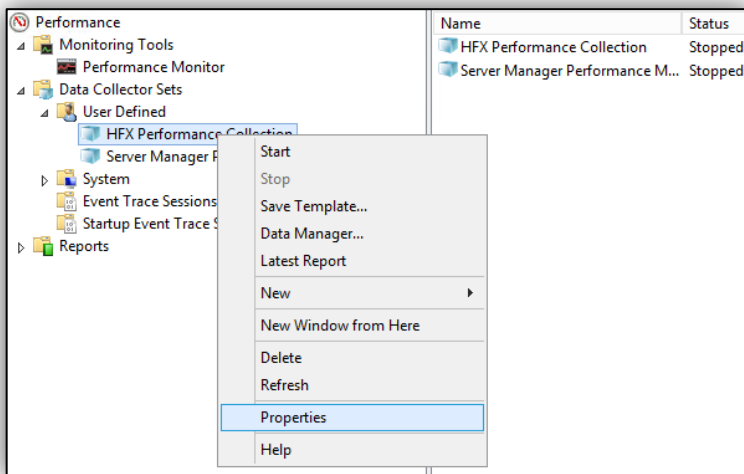
Set the root directory for the log files to be placed, if different than default.



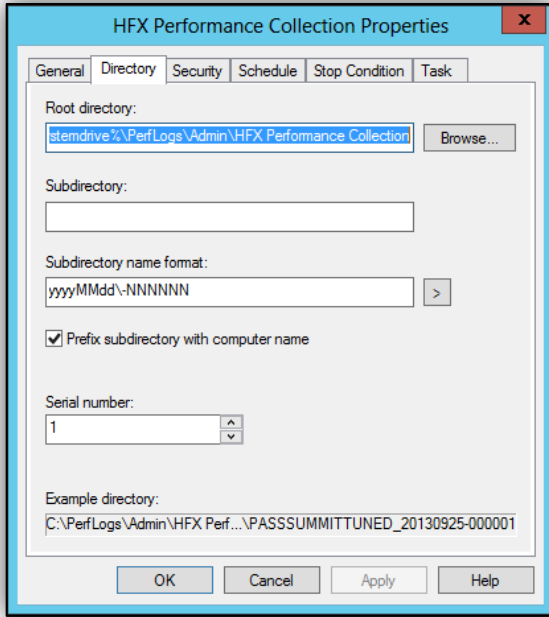
Select Finish to Save and close the new Collector Set.



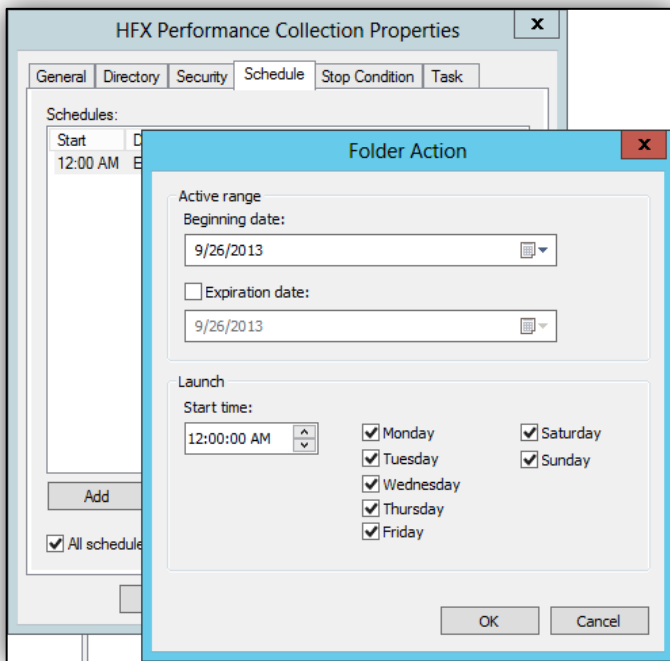
Right click on the new User Defined Collection Set, and click Properties.



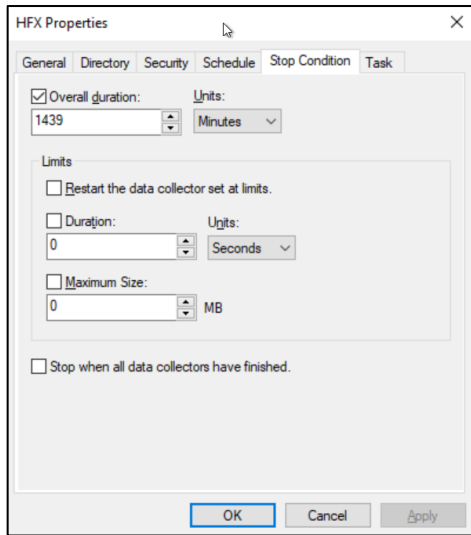
In the Directory tab, verify that the root directory and Subdirectory names are appropriate.



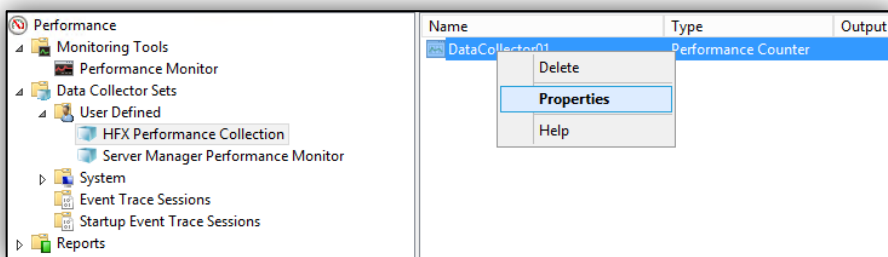
Under the Schedule tab, click Add and select the following day at 12:00 AM. If you select the current day, the log file will not start squarely at midnight and a daily analysis will take a bit more time.



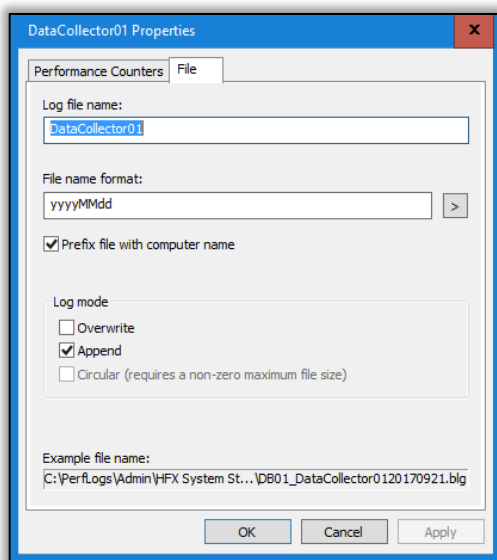
Select the Stop Condition tab. We will be sampling every 30 seconds on this server, and wish to stop the counter each night just before midnight, with a time duration of 1439 minutes. Check the Overall duration checkbox and set the value to 1439 minutes. Click OK to close out of the collector properties window.



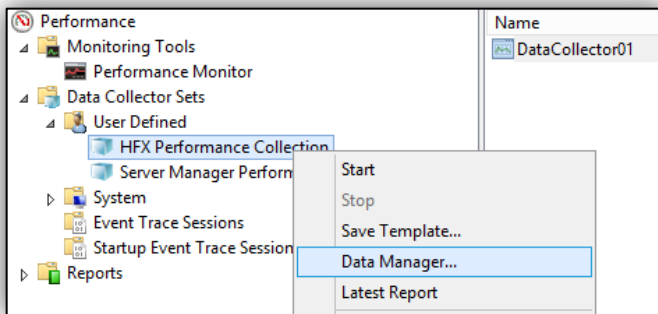
Right click on the new Collection set and select properties.



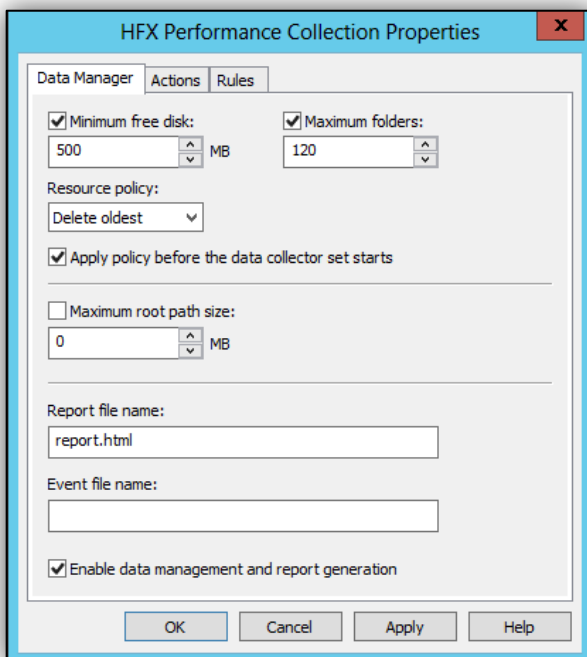
Select the File tab, enter 'yyyyMMdd' into the File name format, and check the box for 'Prefix file with computer name'. Make sure to check 'Append' on the Log mode. Select OK to save.



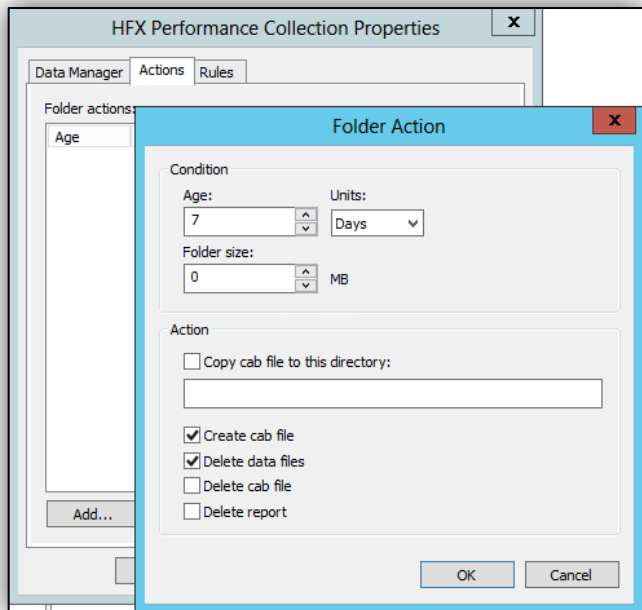
Right click on the User Defined Collection set again, and select Data Manager. This next step controls the amount of space consumed by the Perfmon data collection files.



Under the Data Manager tab, set the minimum free disk, maximum folders (equal to the number of days you wish to retain), Resource policy, and then check 'Apply policy before the data collector starts' and 'Enable data management and report generation'. In this example, 500MB of free space on the C: drive will be retained, 120 days of logging will be stored, the oldest file will be deleted in order, and performance reports will automatically be created each night.



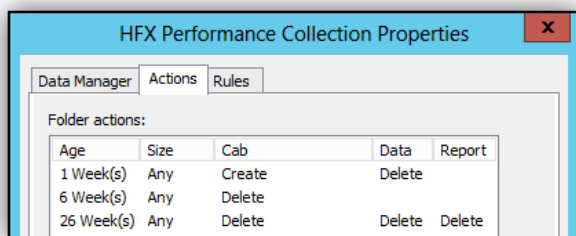
Next, we must clean up after the creation of the daily Perfmon reports. Select the Actions tab and select Add.



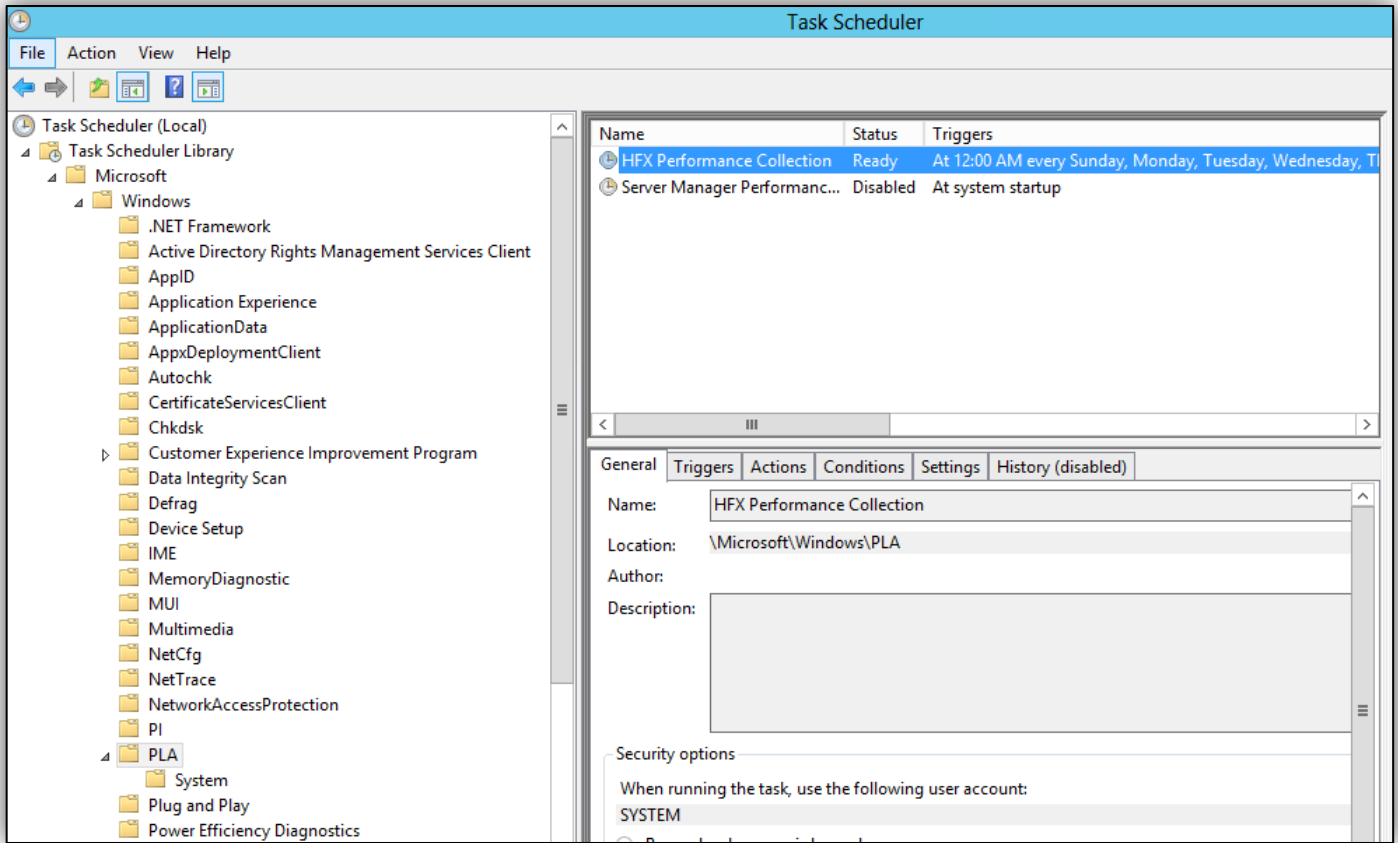
Create three Actions. You can set the durations to any frequency you wish. As an example, the following creates three actions.

- 7 days, create cab and delete data files.
- 6 weeks, delete cab file
- 26 weeks, delete cab, data, and report files.

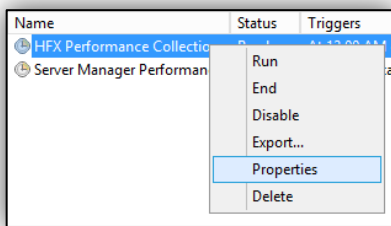
Your end result should resemble the following.



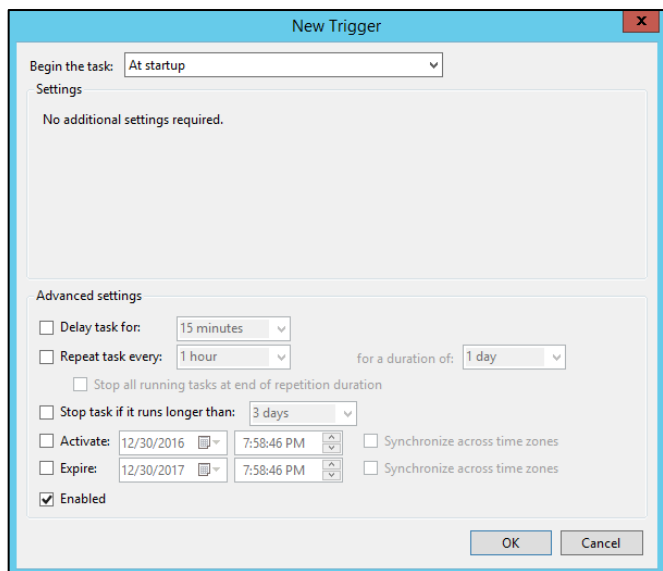
Now, to ensure that the log file starts at Midnight each night and stops other copies of the job that might be mis-scheduled, open Windows Task Scheduler. Perfmon actually uses the Windows Task Scheduler to routinely execute the job on the scheduled intervals. This job is well hidden. Expand Task Scheduler Library, Microsoft, windows, and select PLA.



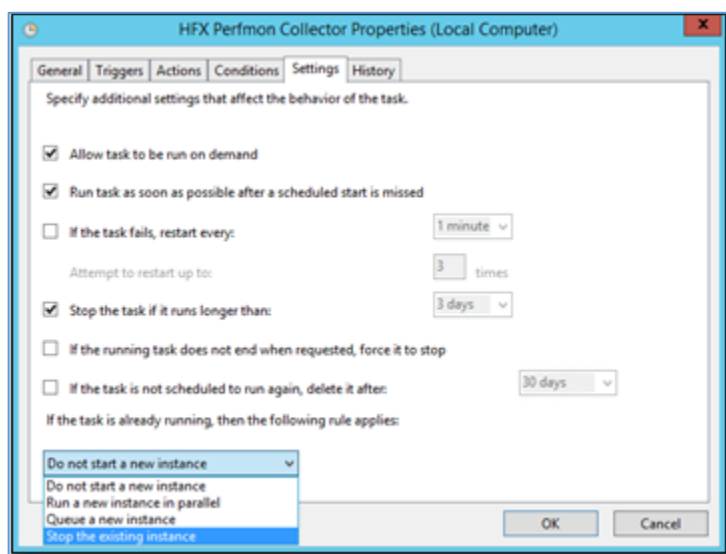
Right click on the job, and click Properties.



In the properties for the job, select the Triggers tab. Add a trigger to the Weekly trigger created by the Perfmon setup process. Select 'At startup' in the Begin the task dropdown. Click OK. This process starts up the Perfmon counter at the time of the next server startup.



Now select the Settings tab, and change the dropdown menu at the bottom from ‘Do not start a new instance’ to ‘Stop the existing instance’. Also, check the box next to ‘Run task as soon as possible after a scheduled start is missed.’



Perfmon is now configured to set up and record all vital base-level system statistics of this environment. Feel free to tailor the counters and configuration to your environment’s requirements.

Note: A bug exists on Windows Server 2019 where the Perfmon collector fails to startup periodically during the evening recycling window. If this happens, refer to Microsoft’s knowledge base at the following link:

<https://learn.microsoft.com/en-us/troubleshoot/windows-server/performance/user-defined-dcs-doesnt-run-as-scheduled>