Performance Management for OpenVMS Systems

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Introduction

HP's OpenVMS platform is typically used to host mission critical applications with stringent service level agreements – down time is definitely not an option. The personnel responsible for managing the OpenVMS platforms must have accurate, real time metrics and analytic capabilities at their disposal in order to assure that these mission critical systems are always performing the way they were intended to, and that the applications and services hosted on these machines are always available to the user community. The reality is that IT organizations cannot expect to manage OpenVMS and other business critical systems with the commodity solutions available from a myriad of software vendors, these systems need to be managed using software that is purpose built for OpenVMS.

IT organizations face a litany of challenges when looking to effectively manage and monitor <u>any</u> system for performance and capacity planning, let alone the business critical systems responsible for most of the workload and much of the revenue coming into the business, including:

- Understanding the IT resources needed to effectively deliver services to internal and external customers.
- Balancing service requirements and available resources to support those requirements effectively.
- Centralizing data and administrative/management capabilities.
- Rapidly identifying the root cause of performance, bottleneck or response time issues, eliminating finger pointing among departments or teams (IT versus Network, and so on.)
- Preventing outages or performance issues prior to them having a negative impact on business
- Minimizing the time the analysts spend in poring over massive amounts of disparate data from multiple sources.
- Eliminating silos or point solutions without sacrificing management capabilities.
- Extending the life of existing IT assets to reduce costs.
- Getting things accomplished in a proactive, real time fashion as opposed to being in constant reactive mode.

Most performance management and capacity planning software packages do not provide the breadth or the granularity to help the IT organization even come close to addressing these challenges. To make things worse, most IT organizations are using multiple applications to manage the performance of their infrastructure, creating problems around disparate and conflicting data and multiple data sources, burdening even further the analysts that spend most of their day poring over this data.

SightLine for OpenVMS

SightLine Systems has been providing performance and capacity management solutions to large enterprises for almost 30 years, and has been delivering VAX and OpenVMS solutions for 20 years. SightLine's applications are purpose built to support complex, mission critical systems. With SightLine, system administrators can collect current and historical information through a centralized console, providing real time status of your entire OpenVMS environment. SightLine's OpenVMS solution provides several key benefits, including the abilities to:

- Detect, diagnose, prevent and predict data loss and downtime through a wide range of analytics and automation.
- Monitor multiple OpenVMS systems (as well as other mission critical platforms) concurrently.
- Improve overall performance through proactive system tuning and troubleshooting and the ability to track and monitor a full array of OpenVMS specific parameters.
- Provide full support for the performance, reliability and availability offered by OpenVMS and its related resources via monitoring and managing OpenVMS clusters.

Commodity solutions will not allow users to have the visibility needed to manage OpenVMS systems effectively. Because they have been purpose built for OpenVMS, SightLine's solutions allow for the most efficient monitoring of those platforms in real time, and provides the granular, in-depth information needed to manage these systems effectively, including the following:

CPU Statistics

Modes Metrics - The Modes metrics describe CPU utilization both in total and by component parts. Each metric is expressed on a scale that has zero as its minimum and one hundred times the number of active processors (Active CPU Cnt) as its maximum.

States Metrics - The States metrics describe the scheduling State Queues. OpenVMS assigns processes to those queues so that their scheduler can prioritize their use of system resources. SightLine delivers the number of processes in each of these states, as well as total processes on the system. SightLine also provides the count of processes on the COM queue to indicate how many are Batch, Interactive and Network processes.

Memory Statistics

MPW Metrics - The Modified Page Writer (MPW) metrics describe the nature of activity, and performance of the Modified Page Writer Mechanism, which is the portion of the OpenVMS Swapper that maintains the Modified List.

Page Metrics - The Page metrics describe the behavior and performance of the OpenVMS memory management software. The metrics Modified List Size, Free List and Zeroed List Size measure the three respective components of the Secondary Page Cache. The remainder of the Page metrics reported by SightLine measure the rate at which various memory management activities occur.

Pool Metrics - The Pool metrics describe memory that OpenVMS allocates for its own use and the use of its requesting processes in the pool (including both Paged and Non-Page Pool). Pool metrics include request, expansion, and failure rates for both types of pool.

I/O Statistics

Disk Metrics - Disk metrics describe the level of activity and performance of your disks. All disk metrics except Disk Count are subscripted, which means that for each metric SightLine provides a value for each device on the system. This allows you to display and analyze the performance of

each individual disk relative to Operation Count, Queue Length, Disk Errors, Response Time, Disk Space, and Read and Write Rates.

Disk Controller Metrics - SightLine can report on many disk, HotFile and XFC metrics on a per-controller basis, for use by those who want to balance loads between multiple Fibre Channel paths.

FCP Metrics - The File Control Primitive (FCP) metrics describe the performance of the OpenVMS file system. They can be monitored to determine the nature, efficiency, and system impact of file operations.

XQP Metrics – The XQP metrics include call rates, XQP disk read and XQP write rates, Cache hits, CPU time, Window hits, split transfers, XQP page faults, allocations, file creations, volume lock waits, erases, and window turns.

I/O Metrics - The I/O metrics describe system-wide input/output activity. Once you become familiar with their behaviors during periods of normal activity, you can detect abnormalities by setting thresholds on those that affect (or reflect) your system's performance. Using these abnormalities as an investigative starting point, you can quickly pinpoint performance problems within your I/O subsystem. I/O metrics include Direct and Buffered I/O Rate, Log Xlate Rate, File Open Rate, Process Inswaps Rate, and Open File Count.

MSCP Metrics - The MSCP metrics describe the nature of activity, level of activity, and performance of the Mass Storage Control Protocol, which provides cluster-wide access to local devices.

Files Metrics - The Files metrics describe the levels of activity and the performance of the system-wide file system, including the file system caches and other indicators. File system cache metrics include Tries, Hits, Hit Rate, Misses and Index for FIDs, Extent Cache, File Headers, Directory FCBs, Quota, Bitmap, and Directory Data.

Virtual I/O Cache Metrics – The Virtual I/O Cache metrics describe the nature of activity, level of activity, and performance of the Virtual I/O Cache, which was introduced to OpenVMS beginning with v6.0 on VAX and v1.0 on AXP systems. The Virtual I/O Cache is a single, file-oriented cache designed to improve I/O performance on stand-alone and clustered systems. For the Virtual I/O Cache, SightLine can report total pages, bytes, free pages, free bytes, pages in use, bytes in use, read attempts, read hits, read hit percentages, write attempts, write hits, write hit percentages, read bypasses, write bypasses and files retained.

eXtended File Cache (XFC) Metrics – SightLine collects XFC metrics from OpenVMS v7.3 and later. SightLine gathers all XFC performance data, including XFC Cache, Disk, and I/O Size information.

Network Statistics

DECnet Metrics - The DECnet metrics describe the level of DECnet activity on your local system. DECnet metrics include Arriving Local and Transit Packet Rates, Departing Local Packet Rate, Transit Congestion Loss Rate, and Receive Buffer Failure Rate.

Ethernet Metrics - SightLine provides information about Ethernet Performance and Levels of on the system, including Blocks Sent and Received, Data Overruns, Fails, Errors, and Buffer Availability.

SCS Metrics - The SCS metrics describe the level and activity of performance of the System Communication Services. The SCS metrics are subscripted, which means that for each metric, SightLine measures the activity for each virtual circuit. SCS metrics include Datagram Send and Receive Rates, Message Send and Receive Rates, Connection Queue Rates, and additional metrics related to Block Data Transfers.

SYSGEN Statistics

Dynamic SYSGEN Metrics - The Dynamic SYSGEN category contains System Generation parameters that you can change while the system is running. In other words, you can implement changes to Dynamic SYSGEN parameters without rebooting your system. In some cases, changes to these parameters take effect almost immediately. Other times, changes take effect only after certain non-routine external events occur. Wherever possible, the SightLine data dictionary displays the effective time of any changes you make.

Static SYSGEN Metrics - The Static SYSGEN category contains those System Generation parameters that can be implemented only by changing their values using the OpenVMS SYSGEN (or SYSMAN), or AUTOGEN utility and rebooting the system.

HotFiles Statistics

The HotFiles statistics show the files that have the most activity. The activity may be based on the number of reads/writes or the amount of data read/written. A user-defined minimum "score" can be used to determine the level of activity a file must have for a given interval before it is considered a "HotFile". The user may also choose (by filename) which files to include or exclude from HotFiles report, for example, one could choose to ignore all .EXE files from the statistics.

Workload Statistics

SightLine can be configured so that process data (CPU usage, page faults, Direct I/O, Buffered I/O, average memory usage, image activations and total process count) can be reported based on Groupings you define, dividing the processes into separate workloads according to UIC, Account Username, Processname Image, Mode or combinations thereof. This makes it much easier to identify rogue users or applications, and is used by some customers for chargeback purposes.

Lock Manager Statistics

SightLine can report rates for new and conversion enqueues, enqueue waits, enqueues not queued, dequeues, blocking ASTs, deadlock searches, deadlock finds, total locks and total resources.

Distributed Lock Manager Statistics

SightLine collects metrics that describe the activity required for the Distributed Lock Manager to synchronize operations across a clustered system. Reported metrics include rates for incoming and outgoing messages in support of each of the Lock Manager's functions in the cluster.

Virtual Balance Set Statistics

Rates can be reported for bytes read, bytes written, real and virtual transitions, map buffer allocations, real slot availability, virtual selection failure rates, virtual map hit rates, map count, fluid balance, recopy rate, and Virtual Balance Set CPU time.

DEC Distributed Transaction Manager Statistics

DDTM is the protocol used for two-phase commits by RMS, Oracle Rdb and Oracle DBMS. As of OpenVMS v7.3.1, HP has also documented it for public use. SightLine can report on DDTM rates for start, prepare, abort, end, 1-phase commits, remote branch and remote add branch as well as a range of transaction lengths.

Uptime Statistics

SightLine will report on total uptime since the last boot or uptime for the current month either on a 24-hour basis for the full week or divided according to a schedule of selected time periods.

Galaxy Events

For systems that are instances in an OpenVMS Galaxy, SightLine can provide notification of various Galaxy-related events, such as other instances joining and leaving the Galaxy, CPUs becoming active or inactive in the instance, CPUs joining or leaving the configure set for the instance, updates to the Galaxy configuration tree, modifications to CPU I/O preferences, and time differential changes.

Galaxy Statistics

For ongoing data pertaining to a system which is an instance in an OpenVMS Galaxy, SightLine can report shared memory statistics (total, used, free, bad and CPP count), CPUs active, made active, made inactive, added to the configure set, leaving the instance, instances joined, Instances left,

Tree updates, potential CPUs, number of times the Galaxy has been incarnated, as well as, identification information regarding the particular Galaxy member.

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