Software Product Description

PRODUCT NAME: VAX Performance Advisor, Version 2.1 **SPD 27.71.04**

DESCRIPTION

The VAX Performance Advisor (VPA) is a DECwindows based VMS layered product that reduces the time and effort required to manage and monitor VAX system performance, as well as plan for future resource requirements. It can be used with standalone VAX, VAXcluster and Local Area VAXcluster systems, as well as Mixed-interconnect VAXcluster systems.

VPA gathers VMS system data and through the application of expert system technology, analyzes the data, identifies specific conditions causing performance degradation, and presents detailed evidence to support its conclusions. Further, VPA provides recommendations for attaining improved system performance.

In addition to its expert system analysis, the VAX Performance Advisor assists in capacity planning exercises by providing data archival and graphing capabilities for long term trend analysis, and performance modeling to determine future system performance given changes in workload or configuration.

The components of VPA are:

- Performance Knowledge Base and Rule Compiler
- Analysis, Reporting and Graphing
- Workload Characterization, Performance Modeling, "What If" Analysis, and Prediction Reporting
- Data Archiving and Data Extraction
- Data Collection and Storage

Performance Knowledge Base and Rule Compiler

The VAX Performance Advisor contains a knowledge base of rules and thresholds which it uses to analyze VAX system data. VPA rules fall into five categories: Memory, CPU, I/O, Cluster, and Miscellaneous.

The VPA knowledge base may be modified and expanded at the user's discretion. To integrate new rules, modify existing rules, or effectively turn off existing rules, the user creates an auxiliary knowledge base. In subsequent analysis, the user can then specify the use of user created rules to augment VPA's factory rules.

Analysis, Reporting and Graphing

VPA aids the system manager in monitoring system activities and in making performance evaluations by quickly identifying performance problems. Through its analysis, VPA will also identify potential bottlenecks and the specific device on which the bottleneck will occur.

VPA reports are generated at the request of the user and include: the Analysis Report, the Performance Evaluation Report, VPA Graphs, and the Raw Data Dump Report. VPA reports can be generated from either daily or historical data, with the exception of the analysis report which is generated from daily data files only.

Analysis Report

The VPA Analysis Report contains conclusions drawn from the VPA analysis as well as recommendations for improving system performance. In addition to identifying performance related problems and recommendations, the Analysis Report contains the conditions under which the identified problems occurred, along with supporting evidence to substantiate VPA conclusions. The Analysis Report is generated from daily VPA data files and therefore, is most useful for daily and weekly system performance analysis.

A Brief Analysis Report is also available, identifying the rules which fired during the analysis period, and a one line synopsis of the problem statement.

Performance Evaluation Report

The Performance Evaluation Report provides system statistics which can assist the system manager in gauging the impact of changes made to the system. It is particularly useful in monitoring system performance after implementation of a VPA recommendation.

This report provides summaries of disk and tape activity, CPU and memory utilization, as well as detailed statistics on workload data, interactive, batch, and network processes. The Performance Evaluation Report is generated from either daily or archived data.

Specifically, the Performance Evaluation Report provides information on:

- Resource usages by all the images and/or users which were active during the reporting time period
- Summaries of workload characteristics for any user defined workload classification, or for the default workload classification of interactive, batch and network processes
- Summaries of workload characteristics by user-group and transaction families
- Locking traffic summary
- Summary tables of SCS data, including CI, NI, and Adapter statistics for each SCS circuit
- Disk utilizations and summaries
- Summary of tape activity for individual systems as well as clusterwide
- CPU and memory usage summaries
- Summary of pool resources by node
- "Hot File" activity, as defined by the most frequently accessed files per disk

Graphs

VPA provides a facility to graphically represent the data which has been collected in the VPA database. VPA graphing provides the system manager with "pictures" of the system's performance metrics and is a robust source of information from which a better understanding of resource utilization and overall workload characteristics is obtained.

A wide range of predefined graphs are provided along with the ability to define custom graphs. Graphs can be created in various output formats, including ReGIS, ANSI, and PostScript®, in either pie charts or line graphs.

System data may be graphed for any length of time using either daily or archived data as the source. This can be an effective way to study the long term performance trends of any VAX standalone or VAXcluster System.

Dump Report

This report provides data from the VPA database in user readable format. The user may select to dump the full database record, or may choose to dump a portion of the database record by selecting data from the following categories:

- Metrics
- Parameters
- Processes
- Disks and Disk Caches
- Tapes
- Communications
- System configuration and SCS
- CPU
- Rules
- Hotfiles

Workload Characterization, Performance Modeling, "What If" Analysis, and Prediction Reporting

Workload Characterization

VPA allows the system manager to define the system's total workload in terms of manageable units which VPA will then report against. Workloads and groups of workloads (workload families) are used in model generation and can be reported against in VPA's Performance Evaluation Reports or Graphics. Workloads can be defined according to users, images, UIC's, or any combination of these.

Performance Modeling and "What If" Analysis

The VPA modeling component is used to predict the performance of standalone, CI-VAXcluster, Local Area VAXcluster, Mixed Interconnect VAXcluster and multiple CI-VAXcluster systems, and to determine system performance levels for various workloads and configurations.

The modeling component includes a graphical modeling interface from which "what-if" analyses can be performed dynamically. A baseline model is automatically configured based on information from the VPA database. This baseline model becomes the starting point for making changes to the configuration or workload and can be validated against the Performance Evaluation Report. Users can add, delete or change any hardware component or workload, and examine the impact on performance by viewing various performance metrics displayed, such as: utilization, response times, throughput, queue length, service time,

probabilities, transaction per second, and I/Os per second. The various models can be saved for further evaluation. These "what-if" analyses form the foundation of capacity plans.

The performance statistics are provided in either summary or detailed reports and include:

- Resource utilization
- Response time
- Throughput per transaction class as well as aggregate
- Performance information for each CPU, HSC, disk, channel, adapter, and CI or Ethernet bus for both current and projected workloads or configurations
- System level parameters

Prediction Reporting

VPA provides a prediction reporting capability which automatically determines system performance based on an incremental workload of 25, 50, 75, and 100 percent or until a system component becomes saturated. This report also indicates the smallest workload at which a component will saturate.

VPA defines this saturation point as 90% utilization, however, this number can be modified according to users' requirements.

Prediction Reporting identifies bottlenecks before they occur, thereby allowing the system manager to be proactive in eliminating bottlenecks and providing a consistent level of system performance to the user base.

Data Archiving and Data Extraction

Data Archiving

VPA provides data archiving capabilities so that the VMS performance data collected by VPA on a daily basis can be used in long-term performance studies. When VPA daily data files are archived, the resultant data files are known as history files. History files, which can be used as the data source for generating Performance Evaluation Reports, Dump Reports, Performance Models and Graphs, are created according to user-specified reduction scheme(s). The user has the ability to define specifically how the data will be archived by defining history file descriptor elements, such as the granularity, periodicity, time interval, model data, workload family, retention period, schedule, and holiday schedule. The size of the history file is dependent on the data reduction scheme selected with the most important element being the interval size defined. The size of reduced data, in blocks, is about 10 times smaller than it is in daily form.

Data Extraction

VPA provides data extraction procedures which may be called explicitly from user written programs. This facility allows system and application programmers to call VPA library procedures for extraction of daily VPA data. VPA provides record definitions for the following languages: Ada, BASIC, BLISS, C, DATATRIEVE, FORTRAN, LISP, MACRO, PASCAL, and PL/I.

Data Collection and Storage

VPA records VMS system data for subsequent processing by the VPA advisor. The data collector runs as a detached process and is activated at system start up. VPA supports data collection and reporting for a maximum of 5000 concurrent processes.

VPA collects data according to a user defined schedule maintained in a schedule file; default collection is 24 hours per day, 7 days per week. The data collection schedule should be consistent for each node in the VAXcluster system to ensure all critical pieces of system data are collected. The data collector will automatically shut off when the disk on which the raw VPA data files reside has insufficient free space.

Features

VPA provides capabilities for the user to effectively manage the performance of an existing system (performance management) and also to plan for future computer resources (capacity planning).

Performance Management

- VPA analyzes system workload data, identifies performance related problems and provides recommendations for improved performance.
- Users can effectively change existing VPA rules, turn off existing rules, and add rules specific to their application or environment.
- VPA identifies: future bottlenecks before they occur; processes which may be using inordinate amounts of system resources; and the most frequently accessed files per disk, often referred to as "Hot Files".
- Access to the daily VPA data is available through a callable interface which supports nine languages.
- Graphical representation of VPA data files allows the system manager to visually evaluate system performance.
- Histograms of CPU utilization, disk I/O, memory utilization and terminal I/O for each node in the VAXcluster system are available.

- Support for single VAX processors, VAXcluster, Local Area VAXcluster, and Mixed-interconnect VAXcluster, and multiple CI-VAXcluster systems is provided.
- Analysis of data can be performed from any VAX processor in the VAXcluster system without system shutdown.
- Data collection is easily defined by the user for automatic collection of system performance data.
- VPA analysis can be performed for a maximum of one week; VPA data can be archived and presented for any length of time in both report and graph format.

Capacity Planning

- A graphical modeling interface provides an easy-to-use tool for performing multiple "what-if" analyses.
- System performance data can be archived and graphed for trend analysis.
- Workloads can be grouped into meaningful categories; VPA will report resource utilization for each grouping.
- Performance modeling allows the user to understand the impact that changes in workload or configuration will have on overall system performance.
- Performance modeling is supported for standalone VAX systems, CI-VAXcluster, Local Area VAXcluster, Mixed Interconnect VAXcluster, and multiple CI-VAXcluster Systems.
- "What If" analysis provides performance characteristics of the system before actual changes are implemented.
- Prediction Reporting identifies the workload at which system components will saturate and performance bottlenecks will occur.

HARDWARE REQUIREMENTS

VAX, MicroVAX, VAXstation or VAXserver configuration as specified in the System Support Addendum (SSA 27.71.04-x).

SOFTWARE REQUIREMENTS *

VMS Operating System

* Refer to the System Support Addendum (SSA 27.71.04-x) for availability and required versions of prerequisite/optional software.

ORDERING INFORMATION

Software Licenses: QL-VE5A*-**
Software Media: QA-VE5AA-**
Software Documentation: QA-VE5AA-GZ
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