

# **VistA System Monitor (VSM) 1.0**

## **Technical Manual**



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## Revision History

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# Orientation

## How to Use this Manual

The purpose of this guide is to provide instructions for use and maintenance of the Veterans Health Information Systems and Technology Architecture (VistA) Capacity and Performance Engineering (CPE) VistA System Monitor (VSM) 1.0 software.

Throughout this manual, advice and instructions are offered regarding the use of the VSM software and the functionality it provides for Veterans Health Information Systems and Technology Architecture (VistA) software products.

## Intended Audience

The intended audience of this manual is the following stakeholders:

- Enterprise System Engineering (ESE)—System engineers and Capacity Management personnel responsible for enterprise capacity planning and system architecture.
- Information Resource Management (IRM)—System administrators and Capacity Management personnel at Department of Veterans Affairs (VA) sites who are responsible for computer management and system security on the VistA M Servers.
- Product Development (PD)—VistA legacy development teams.
- Product Support (PS).

## Disclaimers

### Software Disclaimer

This software was developed at the Department of Veterans Affairs (VA) by employees of the Federal Government in the course of their official duties. Pursuant to title 17 Section 105 of the United States Code this software is *not* subject to copyright protection and is in the public domain. VA assumes no responsibility whatsoever for its use by other parties, and makes no guarantees, expressed or implied, about its quality, reliability, or any other characteristic. We would appreciate acknowledgement if the software is used. This software can be redistributed and/or modified freely provided that any derivative works bear some notice that they are derived from it, and any modified versions bear some notice that they have been modified.

### Documentation Disclaimer

This manual provides an overall explanation of using the VistA System Monitor (VSM) 1.0 software; however, no attempt is made to explain how the overall VistA programming system is integrated and maintained. Such methods and procedures are documented elsewhere. We suggest you look at the various VA Internet and Intranet SharePoint sites and websites for a general orientation to VistA. For example, visit the Office of Information and Technology (OI&T) Product Development (PD) Intranet Website.





**DISCLAIMER: The appearance of any external hyperlink references in this manual does *not* constitute endorsement by the Department of Veterans Affairs (VA) of this Website or the information, products, or services contained therein. The VA does *not* exercise any editorial control over the information you find at these locations. Such links are provided and are consistent with the stated purpose of this VA Intranet Service.**

# Documentation Conventions

This manual uses several methods to highlight different aspects of the material:

- Various symbols are used throughout the documentation to alert the reader to special information. [Table 1](#) gives a description of each of these symbols:

**Table 1: Documentation symbol descriptions**

Symbol	Description
	<b>NOTE / REF:</b> Used to inform the reader of general information including references to additional reading material.
	<b>CAUTION / RECOMMENDATION / DISCLAIMER:</b> Used to caution the reader to take special notice of critical information.

- Descriptive text is presented in a proportional font (as represented by this font).
- Conventions for displaying TEST data in this document are as follows:
  - The first three digits (prefix) of any Social Security Numbers (SSN) begin with either “000” or “666”.
  - Patient and user names are formatted as follows:
    - *<APPLICATION NAME/ABBREVIATION/NAMESPACE>PATIENT,<N>*
    - *<APPLICATION NAME/ABBREVIATION/NAMESPACE>USER,<N>*

Where “*<APPLICATION NAME/ABBREVIATION/NAMESPACE>*” is defined in the Approved Application Abbreviations document and “*<N>*” represents the first name as a number spelled out or as a number value and incremented with each new entry.

For example, in VSM (KMPV) test patient and user names would be documented as follows:

- KMPVPATIENT,ONE or KMPVUSER,ONE
- KMPVPATIENT,TWO or KMPVUSER,TWO
- KMPVPATIENT,THREE or KMPVUSER,THREE
- KMPVPATIENT,14 or KMPVUSER,14
- Etc.

- “Snapshots” of computer online displays (i.e., screen captures/dialogues) and computer source code is shown in a *non*-proportional font and may be enclosed within a box.
  - User’s responses to online prompts are **bold** typeface and highlighted in yellow (e.g., **<Enter>**). The following example is a screen capture of computer dialogue, and indicates that the user should enter two question marks:

Select Primary Menu option: **??**

- Emphasis within a dialogue box is **bold** typeface and highlighted in blue (e.g., **STANDARD LISTENER: RUNNING**).
- Some software code reserved/key words are **bold** typeface with alternate color font.
- References to “<Enter>” within these snapshots indicate that the user should press the **Enter** key on the keyboard. Other special keys are represented within < > angle brackets. For example, pressing the **PF1** key can be represented as pressing <PF1>.
- Author’s comments are displayed in italics or as “callout” boxes.



**NOTE:** Callout boxes refer to labels or descriptions usually enclosed within a box, which point to specific areas of a displayed image.

- This manual refers to the M programming language. Under the 1995 American National Standards Institute (ANSI) standard, M is the primary name of the MUMPS programming language, and MUMPS is considered an alternate name. This manual uses the name M.
- All uppercase is reserved for the representation of M code, variable names, or the formal name of options, field/file names, and security keys (e.g., the XUPROGMODE security key).



**NOTE:** Other software code (e.g., Delphi/Pascal and Java) variable names and file/folder names can be written in lower or mixed case (e.g., CamelCase).

## Documentation Navigation

This document uses Microsoft® Word’s built-in navigation for internal hyperlinks. To add **Back** and **Forward** navigation buttons to the toolbar, do the following:

1. Right-click anywhere on the customizable Toolbar in Word (*not* the Ribbon section).
2. Select **Customize Quick Access Toolbar** from the secondary menu.
3. Select the drop-down arrow in the “**Choose commands from:**” box.
4. Select **All Commands** from the displayed list.
5. Scroll through the command list in the left column until you see the **Back** command (green circle with arrow pointing left).
6. Select/Highlight the **Back** command and select **Add** to add it to your customized toolbar.
7. Scroll through the command list in the left column until you see the **Forward** command (green circle with arrow pointing right).
8. Select/Highlight the **Forward** command and select **Add** to add it to the customized toolbar.
9. Select **OK**.



You can now use these **Back** and **Forward** command buttons in the Toolbar to navigate back and forth in the Word document when selecting hyperlinks within the document.



**NOTE:** This is a one-time setup and is automatically available in any other Word document once you install it on the Toolbar.

## How to Obtain Technical Information Online

Exported VistA M Server-based software file, routine, and global documentation can be generated using Kernel, MailMan, and VA FileMan utilities.



**NOTE:** Methods of obtaining specific technical information online is indicated where applicable under the appropriate section.

## Help at Prompts

VistA M Server-based software provides online help and commonly used system default prompts. Users are encouraged to enter question marks at any response prompt. At the end of the help display, you are immediately returned to the point from which you started. This is an easy way to learn about any aspect of VistA M Server-based software.

## Obtaining Data Dictionary Listings

Technical information about VistA M Server-based files and the fields in files is stored in data dictionaries (DD). You can use the List File Attributes option on the Data Dictionary Utilities menu in VA FileMan to print formatted data dictionaries.



**REF:** For details about obtaining data dictionaries and about the formats available, see the “List File Attributes” section in the “File Management” section in the *VA FileMan Advanced User Manual*.

## Assumptions

This manual is written with the assumption that the reader is familiar with the following:

- VistA computing environment:
  - Kernel—VistA M Server software
  - VA FileMan data structures and terminology—VistA M Server software
- Microsoft® Windows environment
- M programming language

## Reference Materials

Readers who wish to learn more about VSM should consult the following:

- *VistA System Monitor (VSM) Installation Guide*
- *VistA System Monitor (VSM) User Manual*
- *VistA System Monitor (VSM) Technical Manual* (this manual)
- Capacity and Performance Engineering (CPE) website (for more information on CPE services).

This site contains other information and provides links to additional documentation.

VistA documentation is made available online in Microsoft® Word format and in Adobe® Acrobat Portable Document Format (PDF). The PDF documents *must* be read using the Adobe® Acrobat Reader, which is freely distributed by Adobe® Systems Incorporated at: <http://www.adobe.com/>

VistA documentation can be downloaded from the VA Software Document Library (VDL):  
<http://www.va.gov/vdl/>



**REF:** See the [VistA System Monitor \(VSM\) manuals on the VDL](#).

VistA documentation and software can also be downloaded from the Product Support (PS) Anonymous Directories.

# 1 Process Overview

The VistA System Monitor (VSM) 1.0 software is intended to collect Caché and VistA metrics related to system capacity and business usage. The package is made up of multiple collectors. The first collectors to be deployed are the following:

- VistA Timed Collection Monitor (VTCM)—Collects Caché metrics at regularly scheduled intervals such that they can be used in conjunction with metrics gathered via other deployed collection tools.
- VistA Storage Monitor (VSTM)—Collects storage metrics for each database once daily.

This data is used for understanding VistA systems as they relate to the infrastructure on which they are deployed.

As a general rule, any VSM monitor follows the following process (specifics for any monitor are listed below separately):

1. Metrics are either collected on a periodic basis or aggregated to a similar time period. This allows metrics to be used in conjunction with those from other tools already being used within the VA.
2. Metrics are transferred from the VistA sites to the VSM national database via MailMan on a regular periodic schedule. This schedule is determined by the type of monitor, but in most cases is nightly.
3. Metrics are purged from the VistA sites quickly. Under normal situations the metrics are deleted from the sites upon receipt of the acknowledgment from the VSM national database. A purge is run at the start of any VSM monitor that deletes any data older than the time period specified in the VSM CONFIGURATION file for that monitor.

In some cases, the collection routine may need to run on each separate node of a VistA system. This is accomplished via a task in the Caché Task Manager. The Caché Task Manager executes a routine each morning immediately after midnight. This routine looks at each monitor in the VSM CONFIGURATION file. It first checks to see if the monitor's ONOFF value is set to **ON**. If so, it checks to see if the monitor has an entry in its CACHE DAILY TASK field (#1.03). This field represents the name of the collection routine for a given monitor. If there is an entry in this field then the Caché task executes the RUN linetag of this routine.

## 1.1 VistA Timed Collection Monitor (VTCM) Specific Process

### 1.1.1 VTCM Monitor—Starting and Stopping

#### 1.1.1.1 Starting VTCM Monitor

To start the VTCM monitor use the VSM MANAGEMENT menu option and choose the **STRT** action. Choose **VTCM** at the monitor prompt. This does two things:

1. Sets the ONOFF field to **ON** in the VSM CONFIGURATION file for the VTCM entry.
2. Schedules the TaskMan task, which is responsible for transferring the metrics to the VSM national database. This TaskMan task is scheduled using the values found in the TASKMAN SCHEDULE FREQUENCY and TASKMAN SCHEDULE START fields in the VSM CONFIGURATION file for the VTCM entry.



**NOTE:** Collection of metrics does *not* commence until the next execute of the Caché Task Manager task.

### 1.1.1.2 Stopping VTCM Monitor

To stop the VTCM monitor use the VSM MANAGEMENT menu option and choose the **STOP** action. Choose **VTCM** at the monitor prompt. This does two things:

1. Sets the ONOFF field to **OFF** in the VSM CONFIGURATION file for the VTCM entry.
2. Un-schedules the TaskMan task started in the **STRT** action.

The collector stops upon its next iteration as it checks the ONOFF value before each collection.



**NOTE:** If the collection job is stopped via the VSM MANAGEMENT option then metric collection does *not* restart until 12:01 AM on the following day. If needed, collection can be started manually, but *must* be done on each separate node. To do this, enter the following at a programmer prompt on each node:

```
D RUN^KMPVVTCM
```

### 1.1.2 VTCM Metric Collection

VTCM Metrics are collected via the routine KMPVVTCM. This routine reads values from the ^CacheTemp.SysMetrics global on a periodic basis as specified by the COLLECTION INTERVAL field in the VSM CONFIGURATION file entry for VTCM. The default value is every five minutes.

Metrics are stored for the day in the ^KMPTMP(“KMPV”,“VTCM” global by day (\$H), node and time slot.



**REF:** For details on file metrics, see Section [1.1.3](#).

The collection routine (KMPVVTCM) runs until the start of a new day (new \$H value) unless the ONOFF value is set to **OFF** via the VSM MANAGEMENT application. Upon the next iteration of the collection process the monitor checks this value and quits if turned **OFF**. If the monitor is turned **OFF** and back **ON**, metric collection does *not* resume until the start of the next day when the Caché Task Manager starts that day’s collection.

### 1.1.3 VTCM Metric Transmission

Separately, TaskMan kicks off a routine to mail the collected metrics to the VSM national database.

1. TaskMan executes the **SEND^KMPVVTCM** routine.
  - a. The time of this task is set via the TASKMAN SCHEDULE START field in the VSM CONFIGURATION file entry. By default it runs at 1AM. This task:
    - i. Kills (deletes) any data older than the time period specified in the DAYS TO KEEP DATA field in the VSM CONFIGURATION file.
    - ii. Sends an informational mail message to Capacity and Performance Engineering (CPE) support for data older than 1 day but less than the kill date, and then sends/resends the data
    - iii. Sends data for prior day.
2. For each day that data is sent an entry is made in ^KMPTMP(“KMPV”,“VTCM”,DLY,\$H) with the mail message number.
3. The data for each day is deleted once an ACK mail message is received from the CPE server.

## 1.2 VistA Storage Monitor (VSTM) Specific Process

### 1.2.1 VSTM Monitor—Starting and Stopping

#### 1.2.1.1 Starting VSTM Monitor

To start the VSTM monitor use the VSM MANAGEMENT menu option and choose the **STRT** action. Choose **VSTM** at the monitor prompt. This does two things:

1. Sets the ONOFF field to **ON** in the VSM CONFIGURATION file for the VSTM entry.
2. Schedules the TaskMan task, which is responsible for transferring the metrics to the VSM national database. This TaskMan task is scheduled using the values found in the TASKMAN SCHEDULE FREQUENCY and TASKMAN SCHEDULE START fields in the VSM CONFIGURATION file for the VSTM entry.



**NOTE:** Collection of metrics does *not* commence until the next execute of the Caché Task Manager task.

#### 1.2.1.2 Stopping VSTM Monitor

To stop the VSTM monitor use the VSM MANAGEMENT menu option and choose the **STOP** action. Choose **VSTM** at the monitor prompt. This does two things:

1. Sets the ONOFF field to **OFF** in the VSM CONFIGURATION file for the VTCM entry.
2. Un-schedules the TaskMan task started in the **STRT** action.

The collector stops upon its next iteration as it checks the ONOFF value before each collection.



**NOTE:** The VSTM collector runs only one time per day when started by the Caché Task Manager KMPVRUN task. Collections begin on the day following the day the monitor is turned **ON**.

### 1.2.2 VSTM Metric Collection

VSTM Metrics are collected via the KMPVVSTM routine. This routine executes a portion the %FreeCnt routine logic to collect storage metrics for each database.

Metrics are collected on the 15<sup>th</sup> and last day of the month and stored for the day in the ^KMPTMP(“KMPV”,“VSTM” global by day (\$H) and node.



**REF:** For details on file metrics, see Section [1.2.3](#).

The collection routine (KMPVVSTM) runs once upon being started by the Caché Task Manager if the ONOFF value is set to **ON**.

### 1.2.3 VSTM Metric Transmission

Separately, TaskMan kicks off a routine to mail the collected metrics to the VSM national database.

1. TaskMan executes the **SEND^KMPVVSTM** routine.
  - a. The time of this task is set via the TASKMAN SCHEDULE START field in the VSM CONFIGURATION file entry. By default it runs at 1AM. This task:
    - i. Kills (deletes) any data older than the time period specified in the DAYS TO KEEP DATA field in the VSM CONFIGURATION file.
    - ii. Sends an informational mail message to CPE support for data older than 1 day but less than the kill date, and then sends/resends the data.
    - iii. Sends data for prior day.
2. For each day that data is sent an entry is made in ^KMPTMP("KMPV","VSTM",DLY,\$H) with the mail message number.
3. The data for each day is deleted once an ACK mail message is received from the CPE server.

## 2 Files

This section lists the files associated with the VistA System Monitor (VSM) application. The files are:

- [VSM CONFIGURATION File \(#8969\); Global: ^KMPV\(8969\)](#)
- [VSM MONITOR DEFAULTS File \(#8969.02\); Global: ^KMPV\(8969.02\)](#)
- [VSM CACHE TASK LOG File \(#8969.03\); Global: ^KMPV\(8969.03\)](#)
- [^KMPTMP\("KMPV","VTCM"—Temporary Data Storage\)](#)

### 2.1 VSM CONFIGURATION File (#8969); Global: ^KMPV(8969)

#### 2.1.1 Data Dictionary

Figure 1: VSM CONFIGURATION File (#8969)—Data Dictionary

CROSS REFERENCED BY: MONITOR KEY(B)	
^KMPV(8969,D0,0)= (#.01) MONITOR KEY [1F] ^ (#.02) ONOFF [2S] ^ (#.03) FULL NAME [3F] ^	
(#.04) VERSION [4N] ^ (#.05) VERSION INSTALL DATE [5D] ^	
^KMPV(8969,D0,1)= (#1.01) DAYS TO KEEP DATA [1N] ^ (#1.02) COLLECTION INTERVAL [2N] ^	
(#1.03) CACHE DAILY TASK [3F] ^ (#1.04) ALLOW TEST SYSTEM [4S] ^	
(#1.05) TASKMAN SCHEDULE FREQUENCY [5F] ^ (#1.06) TASKMAN SCHEDULE START [6F] ^	
(#1.07) TASKMAN OPTION [7F] ^	
^KMPV(8969,D0,2)= (#2.01) LAST START TIME [1D] ^ (#2.02) LAST STOP TIME [2D] ^	
^KMPV(8969,D0,2)= (#2.03) LAST RUN TIME [3N] ^	
^KMPV(8969,D0,3)= (#3.01) NATIONAL DATA EMAIL ADDRESS [1F] ^	
(#3.02) NATIONAL SUPPORT EMAIL ADDRESS [2F] ^	
(#3.03) VSM CFG EMAIL ADDRESS [3F] ^ (#3.04) LOCAL SUPPORT EMAIL ADDRESS [4F] ^	

#### 2.1.2 VSM CONFIGURATION File Field Descriptions Field Descriptions

Table 2: VSM CONFIGURATION file (#8969)—Field Descriptions

Field Name	Field Number	Description
MONITOR KEY	8969, .01	Two to four Letter acronym used to identify specific monitor
ONOFF	8969, .02	Flag used to stop or continue monitor collection
FULL NAME	8969, .03	Descriptive name for specific monitor. Usually related to the Monitor Key. For example, VTCM = VistA Timed Collection Monitor.
VERSION	8969, .04	Current version of VSM software.
INSTALL DATE	8969, .05	Date current version of software was installed.
DAYS TO KEEP DATA	8969, 1.01	Number of days that unsent data is allowed to remain in ^KMPTMP("KMPV" before the purge routine kills it. Limited to 3-7 days. Data older than this value is deleted; regardless of the reason it has <i>not</i> been sent to the national database, in order to assure global does <i>not</i> grow unchecked.
COLLECTION INTERVAL	8969, 1.02	The number in minutes used to gather or aggregate metrics. Monitors that collect metrics on a periodic basis use this value to

Field Name	Field Number	Description
		wait between collections. Monitors that collect data continuously use this value for aggregation of metrics.
CACHE DAILY TASK	8969, 1.03	The name of the routine, if applicable, to start each days collection. The Caché Task Manager calls the RUN linetag of this routine at the start of every day. This allows collection tasks to run on each node of a VistA system - front end and back end.
ALLOW TEST SYSTEM	8969, 1.04	If set to "Yes" this allows the monitors to run on test systems. Otherwise monitors exit if the current UCI is <i>not</i> set as "PROD" per ^%ZOSF("UCI").
TASKMAN SCHEDULE FREQUENCY	8969, 1.05	The value used to automatically reschedule the TaskMan tasks (e.g., 1D or 1W).
TASKMAN SCHEDULE START	8969, 1.06	The time each monitor's TaskMan task should be scheduled. (e.g., T+1@0001).
TASKMAN OPTION	8969, 1.07	The OPTION file entry used by TaskMan to schedule the daily background jobs.
LAST START TIME	8969, 2.01	Time last TaskMan task was started for a specific monitor.
LAST STOP TIME	8969, 2.02	Time last TaskMan task completed for a specific monitor.
LAST RUN TIME	8969, 2.03	Time in seconds from start to completion of most recent run for a specific monitor TaskMan task.
NATIONAL DATA EMAIL ADDRESS	8969, 3.01	Email address used to send metric data to the national Capacity and Performance Engineering (CPE) database.
NATIONAL SUPPORT EMAIL ADDRESS	8969, 3.02	Email address used to send messages to the CPE VistA CP mail group.
VSM CFG EMAIL ADDRESS	8969, 3.03	Email address used to send data other than daily metrics to CPE national database.
LOCAL SUPPORT EMAIL ADDRESS	8969, 3.04	Optional email address for local support personnel. If present, any email that would be sent to the national support group also goes to the local support group.



## 2.2 VSM MONITOR DEFAULTS File (#8969.02); Global: ^KMPV(8969.02)

### 2.2.1 Data Dictionary

Figure 2: VSM MONITOR DEFAULTS file (#8969.02)—Data Dictionary

```
CROSS REFERENCED BY: MONITOR KEY(B)

^KMPV(8969.02,D0,0)= (#.01) MONITOR KEY [1F] ^ (#.02) DAYS TO KEEP DATA [2N] ^
(#.03) COLLECTION INTERVAL [3N] ^ (#.04) CACHE DAILY TASK [4F] ^
(#.05) ALLOW TEST SYSTEM [5S] ^ (#.06) TASKMAN SCHEDULE FREQUENCY [6F] ^
(#.07) TASKMAN SCHEDULE START [7F] ^ (#.08) TASKMAN OPTION [8F] ^
KMPV(8969.02,D0,1)= (#1.01) NATIONAL DATA EMAIL ADDRESS [1F] ^
(#1.02) NATIONAL SUPPORT EMAIL ADDRESS [2F] ^ (#1.03) VSM CFG EMAIL ADDRESS [3F] ^
```

### 2.2.2 Field Descriptions

Table 3: VSM MONITOR DEFAULTS file (#8969.02)—Field Descriptions

Field Name	Field Number	Description
MONITOR KEY	8969.02, .01	Two to four letter acronyms used to identify specific monitor.
DAYS TO KEEP DATA	8969.02, .02	Number of days that unsent data is allowed to remain in ^KMPTMP("KMPV" before the purge routine kills it. Limited to 3-7 days. Data older than this value is deleted; regardless of the reason it has <i>not</i> been sent to the national database, in order to assure global does <i>not</i> grow unchecked.
COLLECTION INTERVAL	8969.02, .03	The number in minutes used to gather or aggregate metrics. Monitors that collect metrics on a periodic basis use this value to wait between collections. Monitors that collect data continuously use this value for aggregation of metrics.
CACHE DAILY TASK	8969.02, .04	The name of the routine, if applicable, to start each days collection. The Caché Task Manager calls the RUN linetag of this routine at the start of every day. This allows collection tasks to run on each node of a VistA system - front end and back end.
ALLOW TEST SYSTEM	8969.02, .05	If set to "Yes" this allows the monitors to run on test systems. Otherwise monitors exit if the current UCI is <i>not</i> set as "PROD" per ^%ZOSF("UCI").
TASKMAN SCHEDULE FREQUENCY	8969.02, .06	The value used to automatically reschedule the TaskMan tasks. (e.g., 1D or 1W).
TASKMAN SCHEDULE START	8969.02, .07	The time each monitor's TaskMan task should be scheduled. (e.g., T+1@0001).
TASKMAN OPTION	8969.02, .08	The OPTION file (#19) entry used by TaskMan to schedule the daily background jobs.
NATIONAL DATA EMAIL ADDRESS	8969.02, 1.01	Email address used to send metric data to the national CPE database.
NATIONAL	8969.02, 1.02	Email address used to send messages to the CPE VistA CP mail

Field Name	Field Number	Description
SUPPORT EMAIL ADDRESS		group.
VSM CFG EMAIL ADDRESS	8969.02, 1.03	Email address used to send data other than daily metrics to CPE national database.

## 2.3 VSM CACHE TASK LOG File (#8969.03); Global: ^KMPV(8969.03

### 2.3.1 Data Dictionary

Figure 3: VSM CACHE TASK LOG file (#8969.03)—Data Dictionary

CROSS REFERENCED BY: DATE(B)
INDEXED BY: DATE & NODE (C)
^KMPV(8969.03,D0,0)= (#.01) DATE [1D] ^ (#.02) NODE [2F] ^ (#.03) VTCM RUNTIME [3D] ^ (#.04) VSTM RUNTIME [4D] ^

### 2.3.2 Field Descriptions

Table 4: VSM CACHE TASK LOG file (#8969.03)—Field Descriptions

Field Name	Field Number	Description
DATE	8969.02, .01	Run date for specific monitor as started from The Caché Task Manager.
NODE	8969.02, .02	Specific node on which collection routine was run.
VTCM RUNTIME	8969.02, .03	Time the VistA Timed Collection Monitor (VTCM) was started in VA FileMan datetime format.
VSTM RUNTIME	8969.02, .04	Time the VistA Storage Monitor (VSTM) was started in VA FileMan datetime format.

## 2.4 ^KMPTMP("KMPV","VTCM"—Temporary Data Storage

^KMPTMP is a temporary global used by multiple KMP packages including KMPV – VistA System Manager.



**CAUTION:** This global is *not* in VA FileMan format and should *not* be journaled.

The following sections document how the VTCM and VSTM monitors use this global.

### 2.4.1 VTCM Usage of ^KMPTMP

Figure 4: VTCM Usage of ^KMPTMP

```
^KMPTMP("KMPV","VTCM","DLY",$H) = MSG Number until ACK rec'd
    $H: Internal format for date
    MSG Number: The number of the MailMan message that sent this day's data. Node
    will be deleted upon receipt of ACK from the VSM national server

^KMPTMP("KMPV","VTCM","DLY",$H,Node,TimeSlot)=DATA
    $H: Internal format for date
    Node: Name of node from which the data was collected
    TimeSlot: $H time format representing the time interval of the collected data (data
    is aggregated to number of seconds for the configured COLLECTION INTERVAL).
    Ex. 300 is 5 minutes after midnight - or 00:05AM
        1200 is 20 minutes after midnight - or 00:20AM
        86100 is 1435 minutes past midnight - or 11:35PM
    DATA: "^" delimited string containing collected metric values.
    Global References ^ Global References Per Second ^ Global Sets and Kills ^ Logical
    Block
    Requests ^ Physical Block Reads ^ Physical Block Writes ^ Processes ^ Routine
    Commands ^ Routine Lines ^ Routine References ^ SMH Memory Used ^ SMH PageUsed ^
    CSP Sessions ^ Cache Efficiency ^ ECP Client Bytes Per Second ^ ECP Server Bytes
    Per Second ^ Paging ^ Page Space ^ Physical Memory

^KMPTMP("KMPV","VTCM","TRANSMIT" -- runtime only node used to pass data to MailMan
```

### 2.4.2 VSTM Usage of ^KMPTMP

Figure 5: VSTM Usage of ^KMPTMP

```
^KMPTMP("KMPV","VSTM","DLY",$H) = MSG Number until ACK rec'd
    $H: Internal format for date
    MSG Number: The number of the MailMan message that sent this day's data. Node
    will be
    deleted upon receipt of ACK from the VSM national server

^KMPTMP("KMPV","VSTM","DLY",$H,Node,Database)=DATA
    $H: Internal format for date
    Node: Name of node from which the data was collected
    Database: Name of the Caché database. (ex: mgr, vaa, cache, rou, etc.)

    DATA: "^" delimited string containing collected metric values.
    Max Size ^ Size ^ Available ^ %Free ^ Disk Free

^KMPTMP("KMPV","VSTM","TRANSMIT" -- runtime only node used to pass data to MailMan
```

### 3 Routines

This section lists the routines and line tags for VistA System Monitor (VSM) monitors. The routines include:

- [VistA Timed Collection Monitor \(VTCM\) Specific Routines](#)
- [VistA Storage Monitor \(VSTM\) Specific Routines](#)
- [VSM Utility Routines](#)

#### 3.1 VistA Timed Collection Monitor (VTCM) Specific Routines

Table 5: VTCM Routines

Routine	Line Tag	Description
<b>KMPVVTCM</b>	<b>Collect Caché Metrics for the VistA Timed Collection Monitor</b>	
	RUN	Collect metrics per configured interval and store in ^KMPTMP("KMPV","VTCM","DLY". Called via the Caché Task Manager.
	SEND	Format daily metric data to for MailMan transmission.
	TRANSMIT	Transmit daily data to the VSM national server.

#### 3.2 VistA Storage Monitor (VSTM) Specific Routines

Table 6: VSTM Routines

Routine	Line Tag	Description
<b>KMPVVSTM</b>	<b>Collect Caché Metrics for the VistA Timed Collection Monitor</b>	
	RUN	Entry point. Determines if metrics should be collected for that day.
	METRICS	Collect metrics per configured interval and store in ^KMPTMP("KMPV","VSTM","DLY". Called via the Caché Task Manager.
	SEND	Format daily metric data to for MailMan transmission.
	TRANSMIT	Transmit daily data to the VSM national server.

### 3.3 VSM Utility Routines

Table 7: VSM Utility Routines

Routine	Line Tag	Description
<b>KMPVCSRV</b>	<b>VSM Server Routine for VistA Functions</b>	
	EN	Server routine entry point.
	ACK	Receive acknowledge VSM receipt of VTCM data – delete from local node.
	GETSTAT	Returns current status of VSM.
	RESEND	Resend data for one or more monitors.
	SETCFG()	Change VSM configuration via national server change request.
	KMPUPDEF	Update VSM MONITOR DEFAULTS file. Optionally apply defaults to VSM CONFIGURATION file.
	CTMLOG	Returns the run history recorded in the VAM CACHE TASK LOG file.
<b>KMPVCCFG</b>	<b>VSM Configuration Functions</b>	
	CFGARR(KMPVMKEY,KMPVCFG ,KMPVFLAG)	Return configuration by monitor in array.
	GETDEF(KMPVMKEY,KMPVDEF, KMPVFLAG)	Return default configuration in array.
	CFGSTR(KMPVMKEY,KMPVFLAG)	Return configuration in "^" delimited string.
	GETVAL(KMPVMKEY,KMPVFLD,KMPVFILE ,KMPVFLAG)	Retrieve value from VSM CONFIGURATION or VSM MONITOR DEFAULTS files.
	SETONE(KMPVMKEY,KMPVFNAM ,KMPVVAL,KMPVERR,KMPVLOG)	Set a value into the VSM CONFIGURATION file.
	SETVALS(KMPVMKEY,KMPVFVAL, KMPVERR,KMPVLOG)	Set multiple values into the VSM CONFIGURATION file.
	RESTCFG(KMPVMKEY)	Restore default configuration to VSM CONFIGURATION file.
	STRSTP(KMPVMKEY,KMPVSTIME)	Record run time values.
	SYSCFG()	Return system configuration values.
	MONSTAT(KMPVTEXT)	Return status information for all configured monitors.
	USERNAME(KMPVDUZ)	Return users name from DUZ.
	PROD()	Return “Prod” if production, “Test” otherwise.
<b>KMPVCBG</b>	<b>VSM Background Utility Functions</b>	

<b>Routine</b>	<b>Line Tag</b>	<b>Description</b>
	MONLIST(KMPVML)	Return list of configured Monitors.
	STARTMON(KMPVMKEY)	Schedule transmission task in TaskMan and set ONOFF to ON.
	STOPMON(KMPVMKEY)	Un-schedule transmission task in TaskMan and set ONOFF to OFF.
	RESCH(KMPVMKEY,KMPVERR)	Reschedule transmission task in TaskMan.
	DESCH(KMPVMKEY,KMPVERR)	De-schedule transmission task in TaskMan.
	CANMESS(MTYPE,KMPVMKEY, KMPVSITE,KMPVD)	Repeatable, configured mail messages.
	SUPMSG(KMPVTEXT)	Send email to national and local support mail groups.
	DBAMSG(KMPVTEXT)	Send email to local support mail group.
	CFGMSG(KMPVRQNAM)	Send configuration data to update Location Table at National VSM Database.
	PURGEDLY(KMPVMKEY)	Purge any data older than VSM CONFIURATION file specifies.
	KMPVTSK(NAMESPACE)	Creates a Task in the Caché Task Manager to start the VSM collection driver each day. Passing no namespace attempts to \$ZDEFNSP.
<b>KMPVLM</b>	<b>List Manager Functions</b>	
	EN	Main entry point for VSM MANAGEMENT menu option.
	HDR	Header Code.
	INIT	Initialize variables and list array.
	BUILD	Build array with collector status information.
	STARTMON	Supports List Manager protocol 'STRT Start Monitor'.
	STOPMON	Supports List Manager protocol 'STOP Stop Monitor'.
	VIEWCFG	Supports List Manager protocol 'VIEW View CFG'.
	EDITCFG	Supports List Manager protocol 'EDIT Edit CFG'.
	RESTCFG	Supports List Manager protocol 'REST Restore CFG'.

<b>Routine</b>	<b>Line Tag</b>	<b>Description</b>
	KILL(KMPVMKEY)	Supports List Manager protocol 'DEL Delete Data.
	PICKMON()	Supports selection of Monitor Type for List Manager functions.
	REFRESH	Refresh display.
	HELP	Help code.
	EXIT	Exit code.
	EXPND	Expand code.
<b>KMPVRUN</b>	<b>VSM Caché Task Manager Driver</b>	
	RUN	Loop VSM CONFIGURATION file and run collection routine for monitors set to "ON".
	CLEANUP	Purge old data in VSM CACHE TASK LOG file and release lock.
	ERR	Error trap as routine is called from Caché Task Manage.
<b>KMPVPST1</b>	<b>Post Install Routine for KMPV*1.0*0</b>	
		Creates entries in the VSM CONFIGURATION and VSM MONITOR DEFAULT files.

## 4 Exported Options

This section lists the options in the Option file (#19) exported with VistA System Monitor (VSM).

### 4.1 KMPV VSM MANAGEMENT Option

Figure 6: KMPV VSM MANAGEMENT Option

NAME: <b>KMPV VSM MANAGEMENT</b>	MENU TEXT: VSM MANAGEMENT
TYPE: run routine	CREATOR: L,J
LOCK: KMPVOPS	ROUTINE: EN^KMPVLM
UPPERCASE MENU TEXT: VSM MANAGEMENT	

### 4.2 KMPV VTCM DATA TRANSMISSION Option

Figure 7: KMPV VTCM DATA TRANSMISSION Option

NAME: <b>KMPV VTCM DATA TRANSMISSION</b>	MENU TEXT: KMPV VTCM DATA TRANSMISSION
TYPE: run routine	CREATOR: L,J
DESCRIPTION: Daily background job to send VTCM metrics to national database. This job should be scheduled to run during non-peak hours.	
ROUTINE: SEND^KMPVVTCM	SCHEDULING RECOMMENDED: YES
KEEP FROM DELETING: Yes	UPPERCASE MENU TEXT: KMPV VTCM DATA TRANSMISSION

### 4.3 KMPV VSTM DATA TRANSMISSION Option

Figure 8: KMPV VSTM DATA TRANSMISSION Option

NAME: <b>KMPV VSTM DATA TRANSMISSION</b>	MENU TEXT: KMPV VSTM DATA TRANSMISSION
TYPE: run routine	CREATOR: L,J
PACKAGE: CAPACITY MANAGEMENT - VSM	
DESCRIPTION: Background job to send VSTM metrics to national database. This job should be scheduled to run during non-peak hours.	
ROUTINE: SEND^KMPVVSTM	SCHEDULING RECOMMENDED: YES
KEEP FROM DELETING: Yes	
UPPERCASE MENU TEXT: KMPV VSTM DATA TRANSMISSION	

### 4.4 KMPV-CLIENT-SRV Option

Figure 9: KMPV-CLIENT-SRV Option

NAME: <b>KMPV-CLIENT-SRV</b>	MENU TEXT: KMPV-CLIENT-SRV
TYPE: server	CREATOR: L,J
ROUTINE: KMPVCSRV	SERVER ACTION: RUN IMMEDIATELY
SERVER MAIL GROUP: CPE-CP-SUPPORT	
SUPPRESS BULLETIN: NO (DEFAULT) SEND A BULLETIN	
UPPERCASE MENU TEXT: KMPV-CLIENT-SRV	

### 4.5 KMPV MANAGEMENT MENU

For details on this menu, see Section [8.2.3](#).



## 5 Archiving

Data is removed nightly from the sites. There are no special archiving procedures required with the VistA System Monitor (VSM) 1.0 software.

## 6 Application Programming Interfaces (APIs)

There are no VSM callable routines, entry points, or Application Programming Interfaces (APIs) that can be called by other software.

## 7 External Relationships

### 7.1 Caché Task Manager

[Table 8](#) details the parameters used to enter the task in the Caché Task Manager to start the monitors on each node. This is created by running the KMPVTSK line tag of the KMPVCBG routine. The person running this line tag/routine *must* have either of the following roles:

- %All
- %Manager

**Table 8: Caché Task Manager Task Values**

Field	Entry
Task Name:	KMPVRUN
Description:	Start VSM Collection Drivers
Namespace to run task in:	Default routine namespace - usually 3-letter site acronym (e.g., CTX for Central Texas)
Task type:	RunLegacyTask
ExecuteCode:	D RUN^KMPVRUN
Task priority:	Priority Normal
Run task as this user:	Username of person setting up task
Open output file when task is running?	No
Output file:	Leave blank
Reschedule task after system restart?	Yes

The task should be scheduled to run once daily at 1:00 AM.

## 7.2 Dependencies

### 7.2.1 Packages

VSM is dependent on the following packages:

**Table 9: VSM Required Packages**

<b>Software</b>	<b>Version</b>	<b>Patch Information</b>
Kernel	8.0	Fully patched
Kernel Toolkit	7.3	Fully patched
VA FileMan	22.0	Fully patched
MailMan	8.0	Fully patched

## 8 Internal Relationships

This section lists entries in various VistA files necessary for the operation of VistA System Monitor (VSM).

### 8.1 LIST TEMPLATE File (#409.61)

#### 8.1.1 KMPV MANAGEMENT List Template

Figure 10: KMPV MANAGEMENT List Template

NAME: <b>KMPV MANAGEMENT</b>	TYPE OF LIST: PROTOCOL
RIGHT MARGIN: 80	TOP MARGIN: 9
BOTTOM MARGIN: 13	OK TO TRANSPORT?: NOT OK
USE CURSOR CONTROL: YES	PROTOCOL MENU: KMPV MANAGEMENT MENU
SCREEN TITLE: VSM MANAGEMENT	ALLOWABLE NUMBER OF ACTIONS: 2
AUTOMATIC DEFAULTS: YES	HIDDEN ACTION MENU: VALM HIDDEN ACTIONS
ITEM NAME: Monitor	COLUMN: 2
WIDTH: 8	DISPLAY TEXT: Monitor
ITEM NAME: Status	COLUMN: 12
WIDTH: 6	DISPLAY TEXT: Status
DEFAULT VIDEO ATTRIBUTES: R	
ITEM NAME: LastTransmission	COLUMN: 20
WIDTH: 20	DISPLAY TEXT: Last Transmission
ITEM NAME: DLY	COLUMN: 42
WIDTH: 5	DISPLAY TEXT: DLY
DEFAULT VIDEO ATTRIBUTES: B	
ITEM NAME: COMP	COLUMN: 49
WIDTH: 5	DISPLAY TEXT: COMP
DEFAULT VIDEO ATTRIBUTES: B	
ITEM NAME: NextTransmission	COLUMN: 56
WIDTH: 20	DISPLAY TEXT: Next Transmission
ITEM NAME: Monitor	COLUMN: 2
WIDTH: 8	DISPLAY TEXT: Monitor
ITEM NAME: Status	COLUMN: 12
WIDTH: 6	DISPLAY TEXT: Status
DEFAULT VIDEO ATTRIBUTES: R	
ITEM NAME: LastTransmission	COLUMN: 20
WIDTH: 20	DISPLAY TEXT: Last Transmission
ITEM NAME: DLY	COLUMN: 42
WIDTH: 5	DISPLAY TEXT: DLY
DEFAULT VIDEO ATTRIBUTES: B	
ITEM NAME: COMP	COLUMN: 49
WIDTH: 5	DISPLAY TEXT: COMP
DEFAULT VIDEO ATTRIBUTES: B	
ITEM NAME: NextTransmission	COLUMN: 56
WIDTH: 20	DISPLAY TEXT: Next Transmission
DEFAULT VIDEO ATTRIBUTES: R	
EXIT CODE: D EXIT^KMPVLM	HEADER CODE: D HDR^KMPVLM
HELP CODE: D HELP^KMPVLM	ENTRY CODE: D INIT^KMPVLM

## 8.2 PROTOCOL File (#101)

### 8.2.1 KMPV DELETE DATA Protocol

Figure 11: KMPV DELETE DATA Protocol

NAME: <b>KMPV DELETE DATA</b>	ITEM TEXT: Delete Data
TYPE: action	CREATOR: L,J
ENTRY ACTION: D KILL^KMPVLM	TIMESTAMP: 63419,42385

### 8.2.2 KMPV EDIT CFG Protocol

Figure 12: KMPV EDIT CFG Protocol

NAME: <b>KMPV EDIT CFG</b>	ITEM TEXT: Edit CFG
TYPE: action	CREATOR: L,J
ENTRY ACTION: D EDITCFG^KMPVLM	TIMESTAMP: 63417,36668

### 8.2.3 KMPV MANAGEMENT MENU Protocols

The following protocols on the KMPV MANAGEMENT MENU are stored in the PROTOCOL File (#101):

Figure 13: KMPV MANAGEMENT MENU

NAME: <b>KMPV MANAGEMENT MENU</b>	ITEM TEXT: KMPV MANAGEMENT MENU
TYPE: menu	CREATOR: L,J
COLUMN WIDTH: 26	MNEMONIC WIDTH: 6
ITEM: KMPV START MONITOR	MNEMONIC: STRT
SEQUENCE: 1	
ITEM: KMPV STOP MONITOR	MNEMONIC: STOP
SEQUENCE: 2	
ITEM: KMPV VIEW CFG	MNEMONIC: VIEW
SEQUENCE: 3	
ITEM: KMPV DELETE DATA	MNEMONIC: DEL
SEQUENCE: 6	
ITEM: KMPV RESTORE CFG	MNEMONIC: REST
SEQUENCE: 5	
ITEM: KMPV EDIT CFG	MNEMONIC: EDIT
SEQUENCE: 4	
HEADER: D SHOW^VALM	MENU PROMPT: Select Action
TIMESTAMP: 63452,46698	

### 8.2.4 KMPV RESTORE CFG Protocol

Figure 14: KMPV RESTORE CFG Protocol

NAME: <b>KMPV RESTORE CFG</b>	ITEM TEXT: Restore CFG
TYPE: action	CREATOR: L,J
ENTRY ACTION: D RESTCFG^KMPVLM	TIMESTAMP: 63417,35298

## 8.2.5 KMPV START MONITOR Protocol

Figure 15: KMPV START MONITOR Protocol

NAME: <b>KMPV START MONITOR</b>	ITEM TEXT: Start Monitor
TYPE: action	CREATOR: L,J
ENTRY ACTION: D STARTMON^KMPVLM	TIMESTAMP: 63417,37931

## 8.2.6 KMPV STOP MONITOR Protocol

Figure 16: KMPV STOP MONITOR Protocol

NAME: <b>KMPV STOP MONITOR</b>	ITEM TEXT: Stop Monitor
TYPE: action	CREATOR: L,J
ENTRY ACTION: D STOPMON^KMPVLM	TIMESTAMP: 63417,37989

## 8.2.7 KMPV VIEW CFG Protocol

Figure 17: KMPV VIEW CFG Protocol

NAME: <b>KMPV VIEW CFG</b>	ITEM TEXT: View CFG
TYPE: action	CREATOR: L,J
ENTRY ACTION: D VIEWCFG^KMPVLM	TIMESTAMP: 63417,38175

## 8.3 FORM File (#.403)

### 8.3.1 KMPV EDIT CONFIGURATION Form

Figure 18: KMPV EDIT CONFIGURATION Form

NAME: <b>KMPV EDIT CONFIGURATION</b>	READ ACCESS: @
WRITE ACCESS: @	CREATOR: 520791172
DATE CREATED: OCT 14, 2014@14:28	DATE LAST USED: OCT 31, 2014@12:04
PRIMARY FILE: 8969	DISPLAY ONLY: NO
FORM ONLY: NO	COMPILED: YES
PAGE NUMBER: 1	PAGE COORDINATE: 1,1
PAGE NAME: Page 1	
BLOCK NAME: KMPV EDIT CFG	BLOCK ORDER: 1
BLOCK COORDINATE: 1,1	TYPE OF BLOCK: EDIT
BLOCK NAME: KMPV EDIT TITLE	BLOCK ORDER: 2
BLOCK COORDINATE: 16,1	TYPE OF BLOCK: DISPLAY

## 8.3.2 KMPV VIEW CONFIGURATION Form

Figure 19: KMPV VIEW CONFIGURATION Form

NAME: <b>KMPV VIEW CONFIGURATION</b>	READ ACCESS: @
WRITE ACCESS: @	CREATOR: 520791172
DATE CREATED: OCT 15, 2014@08:48	DATE LAST USED: OCT 31, 2014@12:03
PRIMARY FILE: 8969	DISPLAY ONLY: YES
FORM ONLY: NO	COMPILED: YES
PAGE NUMBER: 1	PAGE COORDINATE: 1,1
PAGE NAME: Page 1	
BLOCK NAME: KMPV VIEW CFG	BLOCK ORDER: 1
BLOCK COORDINATE: 1,1	TYPE OF BLOCK: DISPLAY
BLOCK NAME: KMPV VIEW TITLE	BLOCK ORDER: 2
BLOCK COORDINATE: 16,1	TYPE OF BLOCK: DISPLAY

## 8.3.3 Database Integration Agreements (IAs)

Figure 20: VSM Database Integration Agreements (IAs)

This version of VSM software is dependent on the following Integration Agreements		
IA#:	Name-Components:	Usage:
-----	-----	-----
10097	%ZOSV-GETENV, \$\$OS, \$\$VERSION	Supported
10112	VASITE-\$\$SITE	Supported
10060	New Person File	Supported
1966	DBIA1966	Subscription
2734	MESSAGE & MAILBOX UTILITIES API-\$\$NETNAME	Supported
10073	MAILMAN: Message Body Access, including Servers-REC	Supported
6247	Direct KMPV read to KMPTMP	Private

# 9 Global Variables

There are no VSM global variables.

# 10 Security

## 10.1 Mail Group

Optionally, sites can enter a local email address in the Edit CFG action under the VSM MANAGEMENT option. The local support mail group receives the same informational email messages that go to national support mail group.



**NOTE:** There are no bulletins or alerts.

## 10.2 Remote Systems

Data collected includes only system metrics. None of the following data is collected:

- Personal Identification Information (PII)
- Personal Health Information (PHI)
- Patient, clinician, or financial data collected

Examples of data collected include:

- Number of global reads/writes per time period.
- Amount of storage space used by the system in question.

Data transmissions:

- VTCM data is sent to the CPE national database on a nightly basis.
- VSTM data is transmitted on the 15<sup>th</sup> and last day of each month. This data is transmitted using standard MailMan messages.

Receipt of data is confirmed with a MailMan message sent in response. This message triggers the site to delete the data at the site.

## 10.3 Archiving

For VSM archiving information, see Section [5](#).

## 10.4 Interfacing

VSM software operates on standard VistA software and hardware.

## 10.5 Electronic Signatures

VSM does *not* use of electronic signatures.

## 10.6 Security Menus and Options

VSM does *not* distribute any security menus or options.

## 10.7 Security Keys

The KMPVOPS security key is needed to access the VSM Management Menu. This key should only be given to those who manage VSM.

**Figure 21: KMPVOPS Security Key**

NAME: <b>KMPVOPS</b>	DESCRIPTIVE NAME: VSM OPERATIONS LOCK
----------------------	---------------------------------------

## 10.8 File Security

For a list of files exported with VSM, see Section [2](#).

## 10.9 References

For a list of document and other references, see the "[Reference Materials](#)" section.

# 11 Troubleshooting

There are no known issues or anomalies related to the VistA System Monitor (VSM) 1.0 software.

This software is intended to run automatically in the background and should require no operational support under normal operations. However, for those times where support is needed there are two mechanisms within this package to provide such functionality:

- **Local Operational Support:** There is a List Manager Application installed with this package that allows the local support staff to:
  - Start and stop monitors
  - View operational parameters
  - Configure operational parameters
  - Delete all locally stored data in case of emergency



**REF:** These actions are documented in Section 2 in the *VistA System Monitor (VSM) User Manual*.

- **National CPE Support:** Additionally, this software has the capability to receive requests for the same functions via MailMan messages from the CPE VSM Support group.