VistA System Monitor (VSM) 4.0

User Manual

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Revision History

Date	Revision	Description	Author
01/22/2024	1.3	Updates for Patch KMP*4.0*4: Table 3: • Changed Field #1.05 in File #8969 from TASKMAN SCHEDULE FREQUENCY to **HTTP REQUEST MAX LENGTH**. • Changed Field #1.06 in File #8969 from TASKMAN SCHEDULE START to **MONITOR START DELAY**.	• Capacity and Performance Engineering (CPE) Development Team • VistA Infrastructure Shared Services (VISS) Tech Writer
03/14/2023	1.2	Updates for Patch KMP*4.0*3: • Updated organizational references throughout: Changed references from "Enterprise Program Management Office (EPMO)" to "Software Product Management (SPM). • Section 1.1: Added reference to "InterSystems' IRIS." • Section 1.2: Updated failsafe bullets. • Sections 2.2.1 and 2.2.2: Removed references to VistA TaskMan in the Intro text. • Updated Table 3: Added Note to **TASKMAN SCHEDULE FREQUENCY**, **TASKMAN SCHEDULE START**, and **TASKMAN OPTION** entries. • Section 2.2.6: Updated intro text.	• Capacity and Performance Engineering (CPE) Development Team • VISS Tech Writer
07/01/2021	1.1	Updates for Patch KMP*4.0*2: Added the new Time Drift metric to Table 4.	CPE Development Team
07/22/2020	1.0	Initial VistA System Monitor (VSM) 3.0 User Manual: • Upgraded to real time VistA System Monitor. • Changed transmission to real time using HyperText Transport Protocol (HTTP). • Updated the following monitors: o VistA Timed Collection Monitor	CPE Development Team

Date	Revision	Description	Author
		(VTCM) o VistA Storage Monitor (VSTM) o VistA Business Event Monitor (VBEM) o VistA Message Count Monitor (VMCM) o VistA HL7 Monitor (VHLM) • Added the following new monitors: o Vista coversheet Monitor (VCSM). o VistA Error Trap Monitor (VETM).	

Table of Contents

List of Figures

List of Tables

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) 4.0 software, which is the **third** iteration of data collected as the overall capability has progressed.

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:

- **Software Product Management (SPM)—**System engineers and Capacity Management personnel responsible for enterprise capacity planning and system architecture.

- **System Administrators—**System administrators and Capacity Management personnel at local and regional Department of Veterans Affairs (VA) sites who are responsible for computer management and system security on the VistA M Servers.

- **SPM Developers—**VistA legacy development teams.

- **Product Support (PS)**.

Disclaimers

Software Disclaimer

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Documentation Disclaimer

This manual provides an overall explanation of using the VistA System Monitor (VSM) 4.0, which is the **third** iteration of data collected as the overall capability has progressed 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 (OIT) Software Product Management (SPM) 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
	NOTE / REF: Used to inform the reader of general information including references to additional reading material.
	CAUTION / RECOMMENDATION / DISCLAIMER: 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:

  o The first three digits (prefix) of any Social Security Numbers (SSN) begin with either "**000**" or "**666**".

  o 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

- "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.

  o 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: ??
```

  o Emphasis within a dialogue box is **bold** typeface and highlighted in blue (e.g., STANDARD LISTENER: RUNNING).

  o Some software code reserved/key words are **bold** typeface with alternate color font.

  o 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>**.

  o Author's comments are displayed in italics or as "callout" boxes.

  i **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** [DILIST] option on the **Data Dictionary Utilities** [DI DDU] 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) Deployment, Installation, Back-Out, and Rollback Guide (DIBRG)*

- *VistA System Monitor (VSM) User Manual* (this manual)

- *VistA System Monitor (VSM) Technical 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/

Redacted 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.

Unredacted VistA documentation and software can be downloaded from the Product Support (PS) Network File Share (NFS) (formerly known as the "Anonymous Directories.

1 Introduction

1.1 Purpose

The VistA System Monitor (VSM) 3.0 software is intended to collect Caché and VistA metrics related to system capacity and business usage. The package is made up of the following seven collectors:

- **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 twice monthly. This now includes the size of each global and information regarding the "**0**" node of each VistA file.

- **VistA Business Event Monitor (VBEM)**—Collects Caché metrics for VistA functions (Menu Options, TaskMan Jobs and Remote Procedure Calls).

- **VistA Message Count Monitor (VMCM)**—Collects inbound and outbound Health Level Seven (HL7) and HL7 Optimized (HLO) message counts per logical link at regularly scheduled intervals.

- **VistA HL7 Monitor (VHLM)**—Collects metadata about HL7 messages (**SYNC** and **ASYNC**) as well as HLO messages at regularly scheduled intervals.

- **VistA Coversheet Monitor (VCSM)**—Collects timing and metadata for CPRS coversheet loads at regularly scheduled intervals.

- **VistA Error Trap Monitor (VETM)**—Collects error trap data at regularly scheduled intervals.

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

VSM provides automated VistA monitoring services developed by Capacity and Performance Engineering (CPE). This entails the daily capture of VistA-related Caché metrics. These metrics are automatically transferred to the CPE national database for storage and analysis.

This software is designed to be fully automated, *not* needing support from the local or regional system administrators. However, support features are available for both local support staff and remote CPE engineers for situations that may call for hands on support.

The current version of this software is intended for VistA sites running on InterSystems' Caché or IRIS.

1.2 Data Collection

VSM monitors are designed to collect data over the course of each day:

1. Data is transferred to the CPE national database at each collection interval.

2. Upon receipt of this data the national server sends an acknowledgement to the site.

3. Once the site receives this acknowledgement it immediately deletes that data from its system.

4. If data is *not* received it will be stored on the VistA system and resent up to the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file at which time it will be purged. This is set to **seven** (**7**) days by default.

As a failsafe:

- A purge function is executed: At **12:01** each morning the Cach? Task Manager runs the **KMPVRUN** routine. This routine is responsible for starting each individual monitor. Prior to starting each monitor, the **KMPVRUN** routine calls **PURGEDLY^KMPVCBG**. This line tag/routine deletes any data that is older than the number of days specified in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for that monitor type.

- A "**warning**" message is sent to the CPE support email address if data is found older than **1** day.

- There is a "**kill switch**" available to the sites in case of emergency. This is detailed in Section 2.2.6, "DEL—Delete Data Action."

- Lastly, there is also an application programming interface (API) that CPE can call to stop monitors and delete data on a node by node basis if necessary.

1.2.1 VistA Timed Collection Monitor (VTCM)

The **VistA Timed Collection Monitor (VTCM)** is intended to collect and send Caché metrics on a regularly scheduled interval. By default, this interval is every **five** (**5**) minutes and should *not* be changed without consultation with CPE support. Data collected includes the following metrics:

- Global References

- Routine Lines Executed

- Physical Block **READ**s/**WRITE**s

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.2   VistA Storage Monitor (VSTM)

The **VistA Storage Monitor (VSTM)** is intended to collect storage metrics twice monthly (i.e., the **1st** and the **15th** of each month). Data collected includes:

- Total Storage Per Directory (**Cach?.dat** file)
- Global Sizes
- **Zero** Node Metadata

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.3   VistA Business Event Monitor (VBEM)

The **VistA Business Event Monitor (VBEM)** is intended to collect and send Cache metrics for the following VistA functions on a regularly scheduled interval:

- Menu Options
- TaskMan Jobs
- Remote Procedure Calls

By default, this interval is every **five (5)** minutes and should *not* be changed without consultation with CPE support. Data collected includes the following metrics: functionality for VistA functions. This functionality replaced the legacy Resource Utilization Monitor (RUM). Data collected includes:

- CPU Time
- Routine Lines
- Global References
- Occurrences

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.4   VistA Message Count Monitor (VMCM)

The **VistA Message Count Monitor (VMCM)** is intended to collect and send HL7 and HLO message counts on logical links on a regularly scheduled interval. By default, this interval is every **15** minutes and should *not* be changed without consultation with CPE support. Data collected include inbound and outbound message counts from logical links as well as HLO queues.

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.5   VistA HL7 Monitor (VHLM)

The **VistA HL7 Monitor (VHLM)** is intended to collect and send metadata about both HL7 and HLO messages. By default, this interval is every **15** minutes and should *not* be changed without consultation with CPE support. Data collected includes:

- Message Size
- Logical Link
- Sending/Receiving Application
- Sending/Receiving Locations
- Subscriber Protocol

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

 REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.6   VistA Coversheet Monitor (VCSM)

The **Vista Coversheet Monitor (VCSM)** is intended to collect and send coversheet timing and metadata on a regularly scheduled interval. By default, this interval is every **15** minutes and should *not* be changed without consultation with CPE support. Data collected includes:

- Coversheet Processing Time
- User Information
- Patient DFN

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

 REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.2.7   VistA Error Trap Monitor (VETM)

The **Vista Error Trap Monitor (VETM)** is intended to collect and send error trap data on a regularly scheduled interval. By default, this interval is every **15** minutes and should *not* be changed without consultation with CPE support. Data collected includes:

- Error Name

- Error Location

- Line Causing the Error

If the data is *not* successfully received, then it is stored on site for retransmission.

There is a purge function that is executed every morning. This function deletes data that is older than the value set in the DAYS TO KEEP DATA (#1.01) field in the VSM CONFIGURATION (#8969) file for this monitor.

REF: For functional and operational details, see Section 2, "VSM Operation."

A list of metrics collected by this monitor can be found in "Appendix A—VistA System Monitor (VSM) Metrics."

1.3   Data Storage and Analysis

Data transferred to the CPE national server is stored in Caché Object/SQL tables. This data is then used for CPE analysts supporting operations and business functions.

The data collected at the VistA sites is collected in a fashion that allows CPE to directly correlate VSM data with that collected from other monitoring and collection tools currently in use. This data is used for purposes, such as:

- Capacity Planning

- System/Infrastructure Engineering

- Business Analysis

- Application Performance Monitoring

1.4 Package Management

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:

  o Start and stop monitors.

  o View operational parameters.

  o Configure operational parameters.

  o Delete all locally stored data in case of emergency.

  REF: These actions are documented in Section 2, "VSM Operation."

- **National CPE Support:** This software can be managed remotely allowing for changes in configuration as needed.

2   VSM Operation

2.1   VSM MANAGEMENT Option

The **VSM MANAGEMENT** [KMPV VSM MANAGEMENT] option is located under the **Capacity Planning** [XTCM MAIN] menu, as shown in Figure 1:

Figure 1: VSM Management Menu

```
Select Systems Manager Menu Option: Capacity Planning

     RUM   RUM Manager Menu ...
     CPG   Capacity Planning Mail Group Edit
     TLS   CP Tools Manager Menu ...
     VSM   VSM MANAGEMENT

Select Capacity Planning Option: VSM MANAGEMENT
```

ℹ️   **NOTE:** The **VSM MANAGEMENT** [KMPV VSM MANAGEMENT] option requires the user to hold the KMPVOPS security key.

The **VSM MANAGEMENT** [KMPV VSM MANAGEMENT] option displays the VSM MANAGEMENT List Manager application, as shown in Figure 2:

Figure 2: VSM Management Display

This option provides status and operational actions for each monitor installed (see Section 2.2, "Status and Operational Actions"). Installed monitors are listed with their **Monitor Key** and **Full Name** for clear identification.

Table 2 lists the information displayed for each monitor:

Table 2: VSM MANAGEMENT Display Description

Field Caption	Description
Monitor	The **four**-character Monitor Key associated with the specific monitor.
Status	**ON** or **OFF** status of monitor.
Days Not Sent	This is the number of days where data has not been received by the national database.
Version	Current version number of the monitor.

REF: Screen shots and descriptions of each action in the "VSM MANAGEMENT" screen are listed in Section 2.2, "Status and Operational Actions."

2.2 Status and Operational Actions

2.2.1 Start Monitor Action

The **STRT** (Start Monitor) action sets the ONOFF (#.02) field in the VSM CONFIGURATION (#8969) file to **1** (**ON**) for the given monitor.

Upon starting a monitor, a message is sent to the CPE national server to automatically update its configuration file with the new monitor state.

Figure 3: Start Monitor

```
VSM MANAGEMENT                Jun 15, 2020@08:35:42           Page:    1 of    1


          VistA System Monitor(VSM) -- Status and Configuration


Monitor                                     Status  Days Not Sent  Version
VBEM: VISTA BUSINESS EVENT MONITOR          OFF      0                3
VCSM: VISTA COVERSHEET TIMING MONITOR       OFF      0                3
VETM: VISTA ERROR TRAP MONITOR              ON       0                3
VHLM: VISTA HL7 MONITOR                     ON       0                3
VMCM: VISTA MESSAGE COUNT MONITOR           ON       0                3
VSTM: VISTA STORAGE MONITOR                 ON       0                3
VTCM: VISTA TIMED COLLECTION MONITOR        ON       0                3

          Enter ?? for more actions
STRT   Start Monitor        VIEW  View CFG          INFO   Contact Info
STOP   Stop Monitor         TEST  Allow Test        DEL    Delete Data
Select Action Quit// START    Start Monitor

Choose Monitor Type: VBEM

Do you want to start VBEM collection?? No// Y
```

2.2.2 Stop Monitor Action

The **STOP** (Stop Monitor) action sets the ONOFF (#.02) field in the VSM CONFIGURATION (#8969) file to **0** (**OFF**) for the given monitor.

The specified monitor stops collecting metrics upon its next iteration as it checks the value of the ONOFF (#.02) field in the VSM CONFIGURATION (#8969) file prior to each execution. Upon stopping a monitor, a message is sent to the CPE national server to automatically update its configuration file with the new monitor state.

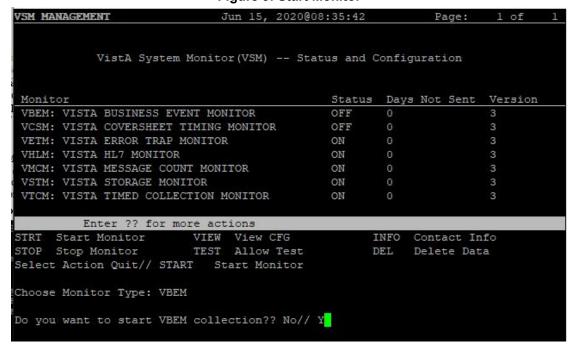**ⓘ**   **NOTE:** The monitors collect data via routines running on each individual node as started by the Caché Task Manager. Once stopped and then restarted, collections do *not* resume until the next day when the Caché Task Manager starts the monitors on each node.

Figure 4: Stop Monitor

```
VSM MANAGEMENT              Jun 15, 2020@08:32:21          Page:    1 of    1


        VistA System Monitor(VSM) -- Status and Configuration


 Monitor                                  Status  Days Not Sent  Version
 VBEM: VISTA BUSINESS EVENT MONITOR        OFF      0              3
 VCSM: VISTA COVERSHEET TIMING MONITOR     OFF      0              3
 VETM: VISTA ERROR TRAP MONITOR            ON       0              3
 VHLM: VISTA HL7 MONITOR                   ON       0              3
 VMCM: VISTA MESSAGE COUNT MONITOR         ON       0              3
 VSTM: VISTA STORAGE MONITOR               ON       0              3
 VTCM: VISTA TIMED COLLECTION MONITOR      ON       0              3


         Enter ?? for more actions
 STRT   Start Monitor        VIEW  View CFG           INFO  Contact Info
 STOP   Stop Monitor         TEST  Allow Test         DEL   Delete Data
 Select Action Quit// stop   Stop Monitor

 Choose Monitor Type: VBEM

 Do you want to stop VBEM collection?? No//
```

2.2.3 View CFG Action

The **VIEW** (View CFG [configuration]) action opens a read-only ScreenMan display. This provides an at-a-glance view of how the selected monitor is configured (Figure 5). Displayed fields are from the VSM CONFIGURATION (#8969) file. A definition of these fields is listed in Table 3.

Figure 5: View Configuration

Table 3 lists and defines the fields in the VSM CONFIGURATION (#8969) file:

Table 3: View Configuration Field Definitions

Field Name	Field Number	Description
MONITOR KEY	8969, .01	**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	8969, .05	Date current version of software was installed.

Field Name	Field Number	Description
DATE		
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 reason it has *not* been sent to the national database, in order to assure global does *not* 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 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 day's collection. The Caché Task Manager calls the **RUN** line tag 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 *not* set as **PROD** per **^%ZOSF("UCI")**.
HTTP REQUEST MAX LENGTH	8969, 1.05	This number represents the maximum number of characters that can be sent in a single HyperText Transport Protocol (HTTP) Request body.
MONITOR START DELAY	8969, 1.06	This number represents the maximum number of seconds to delay starting the VSM monitors. The purpose is to lower the arrival rate of HTTP messages at the receiving application.
TASKMAN OPTION	8969, 1.07	**Deprecated.** The OPTION (#19) file entry used by TaskMan to schedule the daily background jobs.
START PERFMON	8969, 1.08	The **KMPVRUN** routine executes daily immediately after midnight: • If **START PERFMON** is set to **1**, then this routine attempts to start the Performance Monitor if it is *not* running. • If **START PERFMON** is set to **0**, this section of code is skipped.
ENCRYPT	8969, 1.09	• If set to **1** (**YES**), then VSM HTTP requests are sent using Secure Socket Layer (SSL)/Transport Layer Security (TLS) encryption (HTTPS). • If set to **0** (**NO**), then HTTP requests will be sent *without* SSL/TLS encryption (HTTP).
LAST START TIME	8969, 2.01	**Deprecated.**
LAST STOP	8969, 2.02	**Deprecated.**

Field Name	Field Number	Description
TIME		
LAST RUN TIME	8969, 2.03	**Deprecated.**
NATIONAL DATA EMAIL ADDRESS	8969, 3.01	**Deprecated:** Messages are now sent via HyperText Transport Protocol (HTTP).
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	**Deprecated:** Messages are now sent via HTTP.
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.
NATIONAL IP ADDRESS	8969, 4.01	This field holds the IP address of the national system receiving VSM metric data transmissions.
NATIONAL FQDN	8969, 4.02	This field holds the fully qualified domain name of the service receiving metric data from VSM.
NATIONAL PORT	8969, 4.03	This field contains the port number of the national service receiving VSM metrics. This field is only used if the following ports are *not* to be used: • HTTP: Standard port **80**. • HTTPS: Port **443**.
API KEY	8969, 4.04	Header key for Amazon Web Services (AWS) API Gateway.

2.2.4 Allow Test Action

The **TEST** (Allow Test) action opens an editable ScreenMan display. This allows the user to change the ALLOW TEST SYSTEM (#1.04) field in the VSM CONFIGURATION (#8969) file to **YES** or **NO**. If this value is set to **NO,** then the monitor will *not* run on a test system.

- Changes *must* be saved upon exiting the ScreenMan display in order to take effect.
- Changes take effect immediately.

Upon editing a monitor configuration parameter, a message is sent to the CPE national server to automatically update its configuration file with the new monitor state.

Figure 6: Allow Test

```
VSM MANAGEMENT              Jun 15, 2020@08:44:50         Page:   1 of   1


         VistA System Monitor(VSM) -- Status and Configuration


Monitor                                  Status  Days Not Sent  Version
 VBEM: VISTA BUSINESS EVENT MONITOR      OFF     0              3
 VCSM: VISTA COVERSHEET TIMING MONITOR   OFF     0              3
 VETM: VISTA ERROR TRAP MONITOR          ON      0              3
 VHLM: VISTA HL7 MONITOR                 ON      0              3
 VMCM: VISTA MESSAGE COUNT MONITOR       ON      0              3
 VSTM: VISTA STORAGE MONITOR             ON      0              3
 VTCM: VISTA TIMED COLLECTION MONITOR    ON      0              3

          Enter ?? for more actions
STRT  Start Monitor        VIEW  View CFG          INFO  Contact Info
STOP  Stop Monitor         TEST  Allow Test        DEL   Delete Data
Select Action Quit// TEST   Allow Test

Choose Monitor Type: VBEM
Do you want to set ALLOW TEST to NO for VBEM? No// █
```
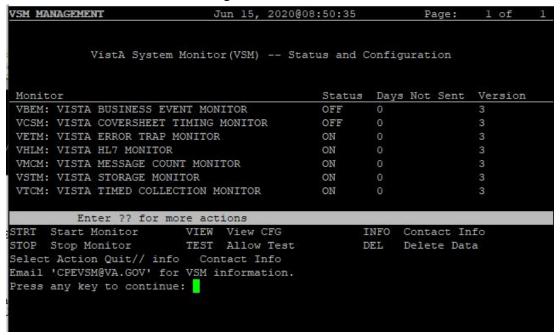
2.2.5   Contact Info Action

The **INFO** (Contact Info) action displays the name of the CPE email group that should be contacted with any questions or problems.

Figure 7: Contact Info

```
VSM MANAGEMENT              Jun 15, 2020@08:50:35         Page:   1 of   1


         VistA System Monitor(VSM) -- Status and Configuration


Monitor                                  Status  Days Not Sent  Version
 VBEM: VISTA BUSINESS EVENT MONITOR      OFF     0              3
 VCSM: VISTA COVERSHEET TIMING MONITOR   OFF     0              3
 VETM: VISTA ERROR TRAP MONITOR          ON      0              3
 VHLM: VISTA HL7 MONITOR                 ON      0              3
 VMCM: VISTA MESSAGE COUNT MONITOR       ON      0              3
 VSTM: VISTA STORAGE MONITOR             ON      0              3
 VTCM: VISTA TIMED COLLECTION MONITOR    ON      0              3

          Enter ?? for more actions
STRT  Start Monitor        VIEW  View CFG          INFO  Contact Info
STOP  Stop Monitor         TEST  Allow Test        DEL   Delete Data
Select Action Quit// info   Contact Info
Email 'CPEVSM@VA.GOV' for VSM information.
Press any key to continue: █
```
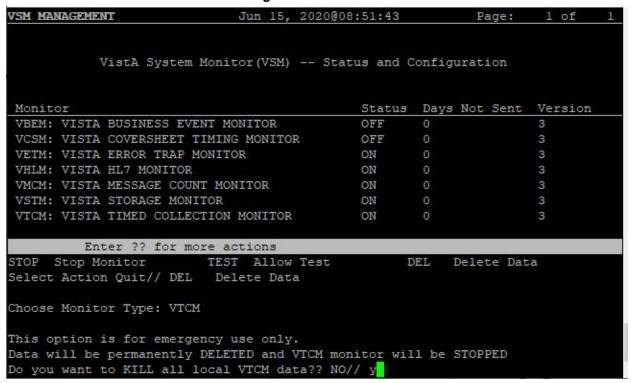
2.2.6 DEL—Delete Data Action

The **DEL** (Delete Data) action is *__for emergency use only__*. This action deletes *__all__* data residing on the back-end node for the specified monitor and sets the ONOFF (#.02) field in the VSM CONFIGURATION (#8969) file to **OFF (0)**. This action is effectively an emergency "**kill switch**". If data needs to be deleted on front-end nodes contact CPE to execute an API to accomplish this.

Upon deletion of data, a message is sent to the CPE national server to automatically update its configuration file and alert CPE support that there is an emergency.

⚠️ **CAUTION: This action can be taken *without* consultation with CPE support staff. However, it should only be taken in the case of an emergency, such as an unchecked growth in global size due to unforeseen circumstances. This option is effectively a monitor "kill switch."**

Figure 8: Delete Data

```
VSM MANAGEMENT              Jun 15, 2020@08:51:43          Page:    1 of    1


           VistA System Monitor(VSM) -- Status and Configuration


  Monitor                                    Status  Days Not Sent  Version
  VBEM: VISTA BUSINESS EVENT MONITOR          OFF      0               3
  VCSM: VISTA COVERSHEET TIMING MONITOR       OFF      0               3
  VETM: VISTA ERROR TRAP MONITOR              ON       0               3
  VHLM: VISTA HL7 MONITOR                     ON       0               3
  VMCM: VISTA MESSAGE COUNT MONITOR           ON       0               3
  VSTM: VISTA STORAGE MONITOR                 ON       0               3
  VTCM: VISTA TIMED COLLECTION MONITOR        ON       0               3

          Enter ?? for more actions
STOP   Stop Monitor         TEST   Allow Test        DEL    Delete Data
Select Action Quit// DEL    Delete Data

Choose Monitor Type: VTCM

This option is for emergency use only.
Data will be permanently DELETED and VTCM monitor will be STOPPED
Do you want to KILL all local VTCM data?? NO// y
```

3   Appendix A—VistA System Monitor (VSM) Metrics

3.1   VistA Timed Collection Monitor (VTCM)

Table 4 lists the metrics collected by the **VistA Timed Collection Monitor (VTCM)**:

Table 4: VistA Timed Collection Monitor (VTCM) Metrics

Metric – Per Second	Metric – Per Count
Disk Reads per Second	Application Errors
Disk Writes per Second	Block collisions
Global References per Second	Block Collision Samples
Global Sets per Second	Cache Efficiency
Journal Entries per Second	CSP Sessions
Logical Reads per Second	ECP Application Server Rate
Routine Commands per Second	ECP Data Server Rate
Routine References per Second	Global References per Second (InterSystems count)
Metrics - Status	License Current
Database Space	License High
ECP Application Server	License Limit
ECP Database Server	Processes
Journal Space	Serious Alerts
Journal Status	Time Drift
Last Backup	**Metrics - Memory**
Lock Table	Total SMH Memory Used
Shadow Server	SMH Pages Used
Shadow Source	Configure SMH Memory
System Uptime	Total Shared Memory Heap
Write Daemon	Total Available SMH Pages
	Total Available Memory SMT Table
	Total Available Memory General String Table

3.2   VistA Storage Monitor (VSTM)

Table 5 lists the metrics collected by the **VistA Storage Monitor (VSTM)**:

Table 5: VistA Storage Monitor (VSTM) Metrics

Metric - Storage	Metric – Zero Node
Database	Maximum size allowed for database growth
Disk	Current size of database in MBs
Directory	Available disk space for database in MBs
Max Size MB	File Number
Current Size MB	File Name
Block Size	Global Root
Blocks per Map	Version
Free Space MB	Entries
Free Blocks	Last ID
Is System Directory	**Metrics - Globals**
Expansion Size MB	Directory
Disk Free Space MB	Name
	Allocated MB
	Used MB

3.3   VistA Business Event Monitor (VBEM)

Table 6 lists the metrics collected by the **VistA Business Event Monitor (VBEM)**:

Table 6: VistA Business Event Monitor (VBEM) Metrics

Metrics	Dimensions
Occurrences	Event
CPU Time	Event Namespace
Routine Commands	Event Package
Global References	Event Source
Elapsed Time	Event Type
Process Count	Parent Event

3.4   VistA Message Count Monitor (VMCM)

Table 7 lists the metrics collected by the **VistA Message Count Monitor (VMCM)**:

Table 7: VistA Message Count Monitor (VMCM) Metrics

Metric	Metric
HL7 Messages Received per Logical Link	HL7 Messages To Send per Logical Link
HL7 Messages Processed per Logical Link	HL7 Messages Sent per Logical Link
HLO Messages Sent	HLO Messages Received
Link Name	Link State

3.5   VistA HL7 Monitor (VHLM)

Table 8 lists the metrics collected by the **VistA HL7 Monitor (VHLM)**:

Table 8: VistA HL7 Monitor (VHLM) Metrics

Metric	Metric
Application Acknowledgment Time	Commit Acknowledgement Time
Event Count	Event Protocol
Event Type	Header Type
HLO Type	Logical Link
Message Length	Message Type
Priority	Queue
Receiving Application	Receiving Site FQDN
Receiving Site Number	Sending Site Application
Sending Site FQDN	Sending site Number
Subscriber Protocol	Synchronization Type
Transmission Time	Transmission Type

3.6   VistA Coversheet Monitor (VCSM)

Table 9 lists the metrics collected by the **VistA Coversheet Monitor (VCSM)**:

Table 9: VistA Coversheet Monitor (VCSM) Metrics

Metric	Metric
Foreground Foreground Time	Background Time
Client DUZ	Client Name (system)
Client IP	Patient DFN

3.7   VistA Error Trap Monitor (VETM)

Table 10 lists the metrics collected by the **VistA Error Trap Monitor (VETM)**:

Table 10: VistA Error Trap Monitor (VETM) Metrics

Metric	Metric
Error Number	Timestamp
Database	Instance
Node Type	Error
Last Global Reference	Current IO
ZA Value	ZB Value
Current ZIO	Job Number
Process Name	Username
Alternate Job Number	Line