CA Common Services for OpenVMS

Integration Guide

r3.2

CA Product References

This document references the following CA products:

- CA Network and System Management (CA NSM)
- CA Console Management for OpenVMS
- CA System Watchdog for OpenVMS
- CA Performance Management for OpenVMS
- CA Job Management for OpenVMS
- CA NSM System Monitoring Option for OpenVMS
- CA Universal Job Management Agent for OpenVMS

Contact CA

Contact Technical Support

For your convenience, CA provides one site where you can access the information you need for your Home Office, Small Business, and Enterprise CA products. At http://ca.com/support, you can access the following:

- Online and telephone contact information for technical assistance and customer services
- Information about user communities and forums
- Product and documentation downloads
- CA Support policies and guidelines
- Other helpful resources appropriate for your product

Provide Feedback

If you have comments or questions about CA product documentation, you can send a message to techpubs@ca.com.

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Contents

Chapter 1: Managing Your OpenVMS Infrastructure

CA Network and System Management (CA NSM) revolutionizes eBusiness management by delivering intelligent end-to-end management of eBusiness performance and dynamic visualization of the whole environment. Your business is judged by the services you provide. CA NSM ensures that you continually deliver the best possible service to your customers (both internal and external).

CA NSM is your passport to new world eBusiness. It lets you deliver optimal service to your customers by maintaining the health and strength of all the resources that deliver eBusiness services. By extending the reach of traditional Information Technology and Web asset management, CA NSM takes your existing knowledge and information base and your IT management services, to their unlimited potential of Internet magnitude and Internet speed.

OpenVMS is a critical component of the eBusiness infrastructure; the CA NSM solution offers the most comprehensive support in the industry today. The CA NSM family of solutions for OpenVMS is divided into a number of complimentary solutions.

This section contains the following topics:

The Purpose of this Guide

This guide provides you with an overview of the scope and usability of this product. It is intended for the reader who wants to do the following:

- Understand the features of this product.
- Get an architectural overview of how the OpenVMS solutions integrate into a heterogeneous management solution.
- Integrate this product into a CA NSM Network and Systems Management Manager™ (CA NSM) or into CA Common Services™ (CCS).

Management Solutions for OpenVMS

This family of solutions provides managers and agents for OpenVMS. The technology is based on the original POLYCENTER family of products and enables management of OpenVMS systems from other OpenVMS systems. When you integrate CA NSM with OpenVMS, it gives you the ability to manage your OpenVMS environment from a single point of control. You also gain the ability to leverage many of the advanced features of CA NSM. These features include correlation, Integrated Event Management and Visualization. The family consists of the following products:

CA Console Management for OpenVMS (formerly CommandIT)

CA® Console Management for OpenVMS gives you remote access and control of all the consoles in your enterprise from a central location. It can scan console messages for known patterns, send alerts for critical events, and perform all console functions, including remote shutdowns and reboots. With load balancing and failover capabilities, it eliminates the need to have local resources for routine system management and handles your centralized operational needs around the clock.

CA System Watchdog for OpenVMS (formerly WatchIT)

CA® System Watchdog for OpenVMS lets you to keep a watchful eye on your enterprise-wide OpenVMS environment. It enables you to monitor and maintain system availability, reliability and performance. Watchdog's ability to centrally monitor systems, networks, processes and subsystem events and then send alerts indicating events occurred helps you to keep your mission-critical systems healthy and available. Automatic detection and notification helps optimize your operational expenses. CA System Watchdog for OpenVMS also provides the ability to automate user-written corrective actions.

CA Performance Management for OpenVMS (formerly AdviseIT)

CA® Performance Management for OpenVMS provides comprehensive performance management. Leveraging over 20 years of development experience, Performance Management evolved from the VAX Performance Advisor (VPA) through DECps, POLYCENTER Performance Advisor, Data Collector, AdviseIT and CA TNG for OpenVMS Performance. This is the industry's premier product!

CA Job Management for OpenVMS (formerly ScheduleIT)

CA® Job Management for OpenVMS ensures that all your critical jobs are successfully run on your enterprise-wide systems at the scheduled times and in the desired sequence. This simplifies managing complex interdependent jobs. Enterprise-wide job scheduling, automated job execution, co-ordination of job dependencies, and real-time monitoring of job execution helps you automate your operations and achieve significant increase in productivity.

CA NSM Options for OpenVMS

CA NSM options for OpenVMS are built on CA NSM Agent Common Services, and require a CA NSM Manager on either UNIX or Windows. The options available include the following items:

CA NSM System Monitoring Option for OpenVMS

CA NSM includes an advanced agent architecture that provides lightweight intelligent agents to monitor critical system parameters, resources and applications. The following agents are available:

- **CA NSM System Agent for OpenVMS** - The CA NSM System Agent for OpenVMS provides unparalleled system monitoring capability for both system and cluster-wide resources. The agent monitors resources like CPU, memory, process availability, job and print queues, system parameters and disks. When the agent is deployed on multiple systems within the cluster, the agents are configured in a high-availability mode. This means only one agent monitors cluster-wide resources. Should the system go down, another agent within the cluster takes responsibility for monitoring cluster-wide resources.
- **CA NSM Log Agent for OpenVMS** - The caiLogA2 agent is specifically designed to monitor the contents of ASCII log files for simple and complex patterns, and to monitor for the existence and non-existence of a file.

CA Universal Job Management Agent for OpenVMS

The CA Universal Job Management Agent (CA UJMA) lets you manage scheduled tasks on OpenVMS as part of a heterogeneous scheduling solution. CA UJMA supports CA NSM Job Management Option and CA AutoSys Workload Automation running on Windows and UNIX. CA UJMA also supports the CA Workload Automation solutions on z/OS. For more information on the Managers that CA UJMA supports, see the *CA NSM Universal Job Management Agent Getting Started* guide.

For More Information

After reading through this guide, you can refer to the numerous resources available to you for additional information. The DVD-ROM or CD-ROM included with this product contains useful instructional documents that showcase your software as well as detailed explanations about the product's comprehensive, feature-rich components. Many of these products also provide an extensive context-sensitive online help system.

Chapter 2: CA Common Services

The underlying infrastructure for many CA solutions is CA Common Services™ (CCS). Composed of a comprehensive set of management, infrastructure, and visualization services, CCS is the foundation and glue that automatically integrates a rich array of CA products into a collective enterprise solution. CCS also provides a single point of integration between CA solutions and user-written applications. Platform support, event management, communications, and visualization are just a few of the many core services available in CCS. An impressive host of functions continually improves the efficiency of your business while reducing resource utilization.

This section contains the following topics:

Understanding CCS

CCS is installed quickly and easily as part of your CA product so you do not have to worry about additional installations or difficult deployments. CCS also provides significant resource savings, because only those components that are actually required get installed. The desired components are selected from a menu of items in visualization, management, and infrastructure services. CCS offers great flexibility in the selection of suitable components, as indicated by the following partial list of components in the CCS bundle.

CCS Component	Function
Event Management	Management
Common Enterprise Tools	Infrastructure
WorldView 2D Map Interface	Visualization
WorldView 3D Map Interface	Visualization
WorldView Common Services	Infrastructure
Common Communications	Infrastructure
Report Explorer	Visualization
Agent Technology Common Services	Infrastructure
Management Command Center	Visualization
Agent Technology Distributed State Machine	Management

CCS Component	Function
Event Wireless Management	Management
ManagedPC Components	Management

CCS includes runtime modules and provides a Software Development Kit (SDK) for third parties to integrate the runtimes with your CA product and to facilitate the rapid incorporation of specific CA technologies.

- **Runtime Component**-A set of programs and modules that complements the Software Development Kit and is used to provide runtime functionality. The runtime modules are chargeable.
- **SDK**- A component that provides the APIs and utilities required to develop solutions that integrate with your CA product. The SDK offers the opportunity to integrate custom applications with CA architecture, including WorldView, Agent Technology, and Enterprise Management. The SDK provides an extensive set of APIs that lets you manipulate classes and objects in the Common Object Repository, create agents to instrument custom resources, and much more.

  Tip: For more information about the Software Development Kit, see the *CA SDK Developer Guide*. Each CA solution has the runtime modules it requires embedded in the product.

Any third-party product that is enhanced with the Software Development Kit can communicate and integrate with any of the CA solutions containing the specific common services (such as Event Management) for which an integration has been performed.

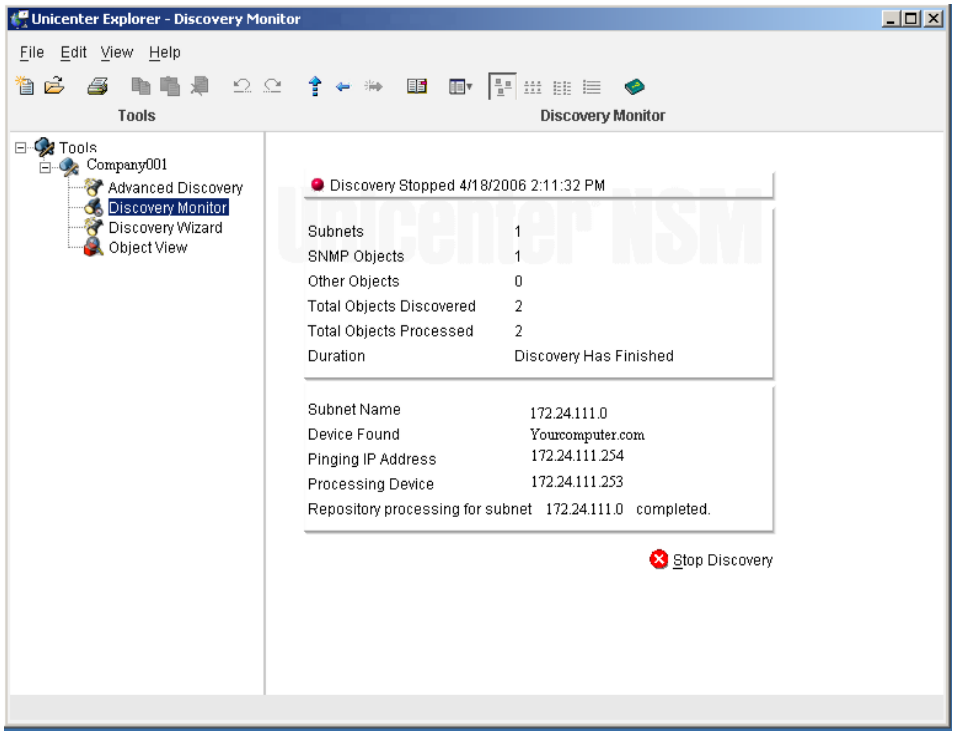
Two typical scenarios when a vendor or third-party can use CCS are as follows:

- **Integration**-Integrate an existing third-party product so that it can communicate with your CA solution.
- **OEM**-Develop a third-party product in which the partner provides added value by embedding CA technology in the product. The embedded technology could be a complete CA solution (such as CA NSM) or a CCS runtime component (such as Event Management).

Note: Not all CCS components are available on every platform. Virus Scan, for example, is available only on Windows.

Enterprise Discovery

Use the comprehensive Enterprise Discovery (IP Discovery) feature to easily identify your entire network. Depending on your requirements and the size of your enterprise, you can adjust Enterprise Discovery to run on a single network segment or over the entire enterprise. You can even schedule Enterprise Discovery to run at a certain time on a specific day.



IP Discover does the following:

The Discovery Monitor keeps you apprised of the Discovery process.

- As it finds computers, servers, routers, applications, and so forth, it creates objects that represent these entities and stores the objects in a database called the Common Object Repository. The Discovery Monitor keeps you apprised of the Discovery process as it searches your networks.
- The discovery of Storage Area Network (SAN) devices is seamless with the rest of the managed devices.
- WorldView presents a dramatic, real-world graphical representation of the discovered objects.

Worldview

Whether your world is several machines used for word processing in an office or a global network of PCs, servers, routers, and sophisticated applications and business processes, you can explore it in the Real World Interface, WorldView.

WorldView consists of the 3D Map (with enhanced rendering and animation), 2D Map, and Association Browser. These components offer a complete and authentic view of your business.

WorldView objects are displayed as bitmaps representing objects in the 2D Map view. The state of an object (normal to critical) is represented using various colors so you can immediately recognize its severity. By default, a red object indicates a critical state while a green object indicates a normal state. Parent objects dissolve into child objects, and the child object size and positioning information remains associated with the parent object. Linked objects carry properties, as with other objects.

Tip: You can instruct the Installation Wizard to place sample data in the WorldView repository (also known as the Common Object Repository). Simply click the Fill Sample Data in Repository check box on the Repository Settings tab of the Database Selection, Creation, and Configuration dialog. The sample data lets you start looking at the various features without discovering your network. However, if you do not discover your network, you cannot manage it.

2D Map

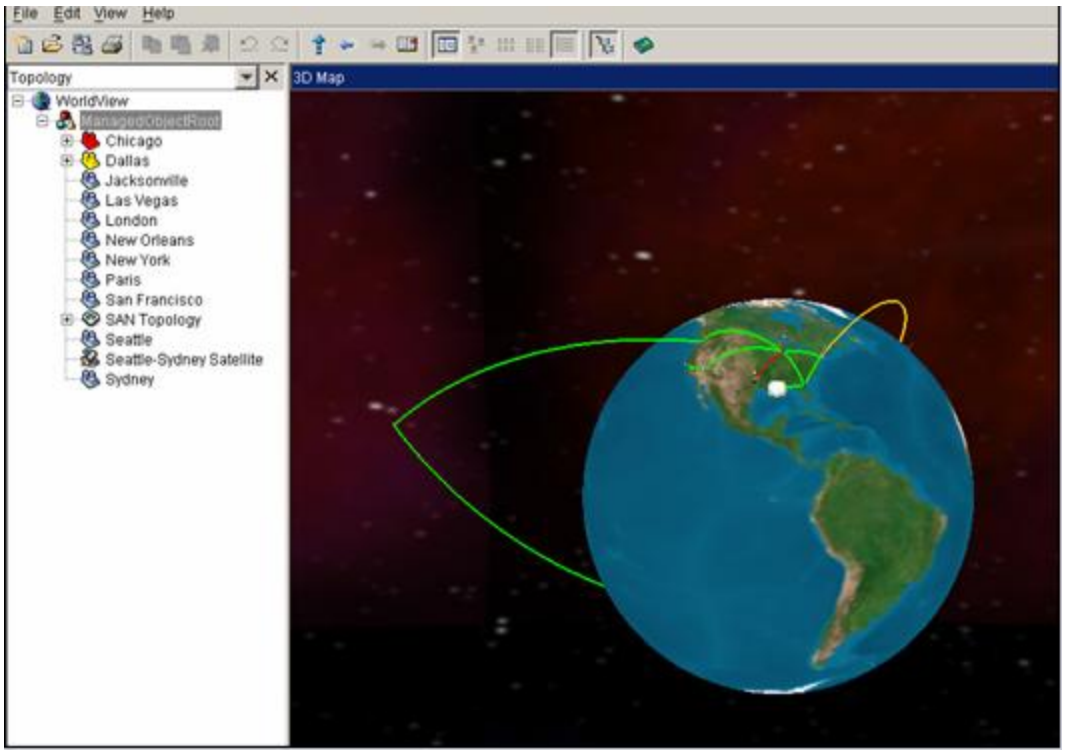
The 2D Map is a powerful user interface that acts as an infrastructure navigator and controller, letting you view any part of your business, at any time, with the click of a button.

The following 2D Map provides a graphical representation of your IT infrastructure and customized Business Process Views. It offers an overview of the structure of your network using icons to depict your resources. It is all right there on the screen-networks, subnetworks and segments, PCs, servers, routers-everything you need to see.

3D Map

Virtual reality. You have heard of it, now you can experience it. From a single console, you can travel throughout the environment that runs your business without getting on a plane or hailing a cab.

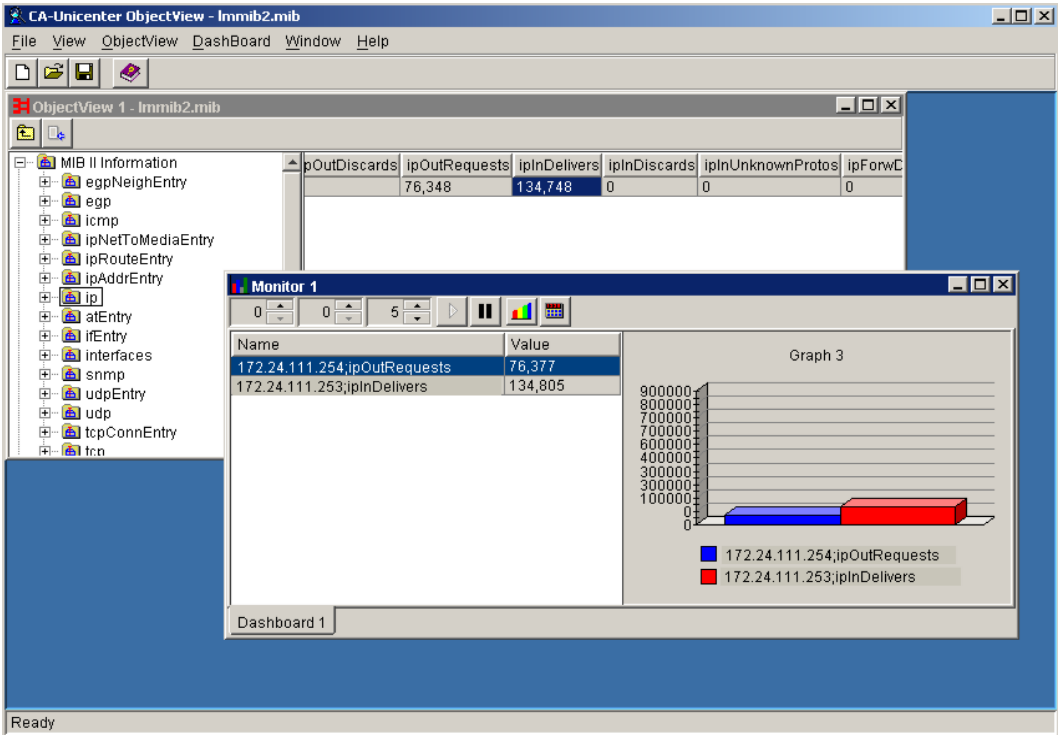
Real time representations of your networks let you view the problem that a machine or application is experiencing, right down to the interface card in a router or a routine in an application, as shown in the following example.



ObjectView

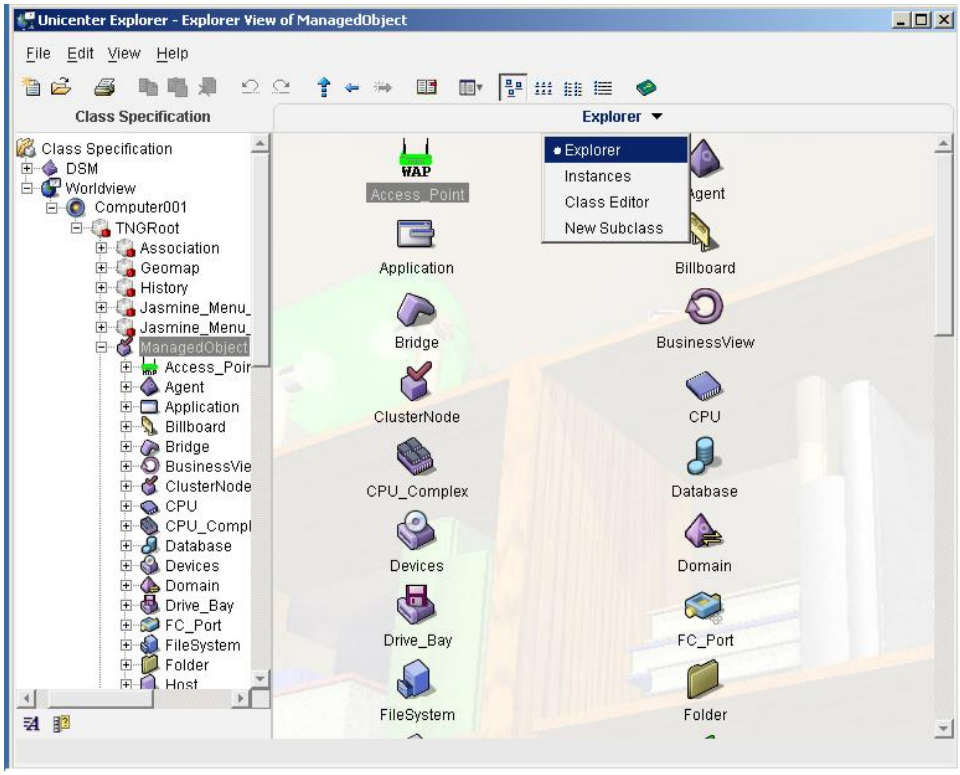
The 2D and 3D Maps provide a complete business overview of the entire organization. ObjectView lets you take a deeper look at each of the objects displayed on the maps. Each resource has Management Information Base (MIB) information-a collection of attributes of the device or the application-such as performance, status, and so on.

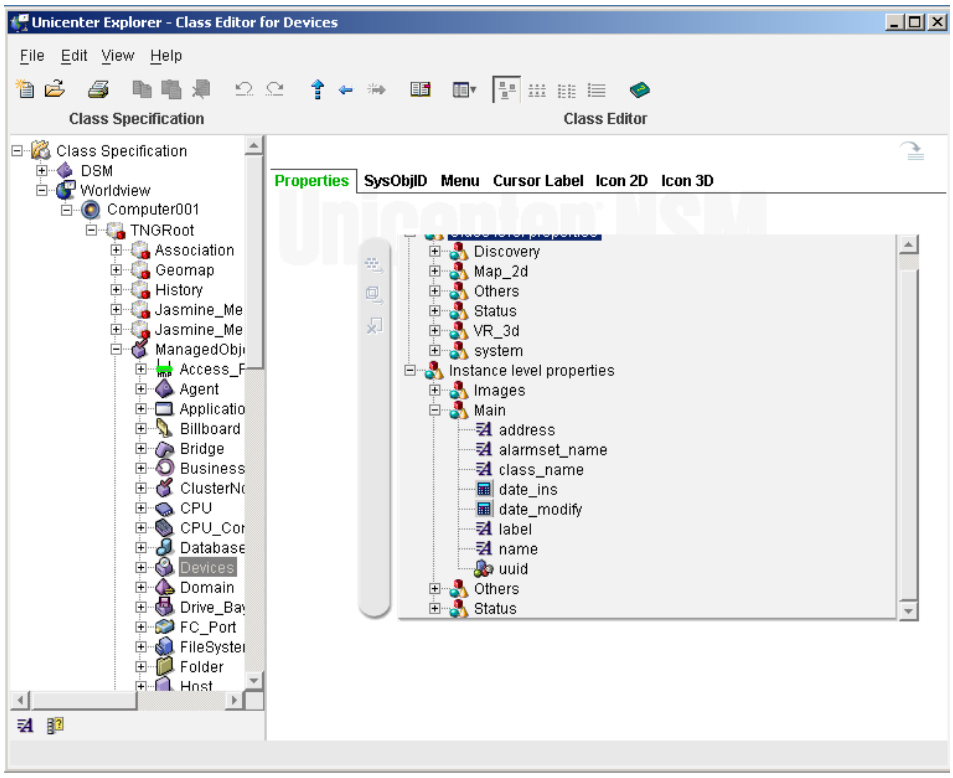
Accessed directly from the 2D Map, 3D Map, or Object Browser, ObjectView displays minute details of the device or application, letting you know the exact status of that resource at any time of day or night. As is the case with other components, this is done from a single console, as shown in the following example:



Class Specification

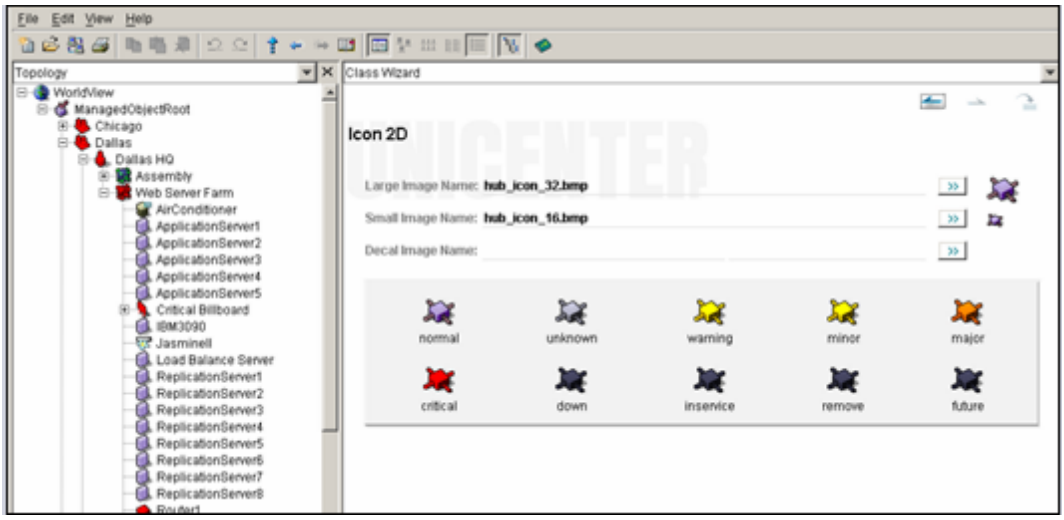
The Class Specification displays all the properties of each class in an easy-to-understand and intuitive manner. The Class Specification lets you view or modify classes as shown in the following examples:




Unicenter Explorer - Class Editor for Devices
File Edit View Help
Class Specification
Class Editor
Class Specification
DSM
Worldview
Computer001
TNGRoot
Association
Geomap
History
Jasmine_Me
Jasmine_Me
ManagedObj
Access_F
Agent
Applicatio
Billboard
Bridge
Business
ClusterN
CPU
CPU_Cor
Database
Devices
Domain
Drive_Ba
FC_Port
FileSyste
Folder
Host
Properties
SysObjID
Menu
Cursor Label
Icon 2D
Icon 3D
Discovery
Map_2d
Others
Status
VR_3d
system
Instance level properties
Images
Main
address
alarmset_name
class_name
date_ins
date_modify
label
name
uuid
Others
Status

Class Editor

An extensive set of classes is available to you. To meet your business requirements, you may want to modify existing classes or create new ones for your specific objects. The Class Editor is an easy-to-use facility that guides you through the process of modifying existing classes or adding new ones to the Common Object Repository, as shown in the following example:



The Billboard

The billboard lets you view up-to-date information about objects whose true (not propagated) severity changes. When an object's severity changes, the billboard displays that object only if it is a child of the billboard's siblings (*siblings* are objects at the same level in the topology). Siblings are not included because their changes can be seen at the same level as the billboard. In this way, only truly severe objects are contained in the billboard and allowed to bubble up to a particular level, limiting your view to only those objects you need to see. The billboard refreshes with a real-time update of monitored resources just like Dynamic Business Process Views.

You can change the severity level of objects that the billboard contains. By default, the billboard contains critical objects. If you want to set the severity level lower, for example, to minor, objects with severities of minor, major, and critical appear in the billboard.

Dynamic Business Process Views

This facility lets you collect WorldView objects based on a query or set of queries. Based on your query, the system keeps the set of objects contained in the Dynamic Business Process View up-to-date based on WorldView notifications. If something changes in an object, the system checks whether the change fits the query. If so, it adds the object to the Dynamic Business Process View. If the change no longer fits the query, it is removed from the Dynamic Business Process View. Dynamic Business Process Views are similar to the billboard, letting you scope the query to objects at a level of your choosing in the topology.

To create Dynamic Business Process Views, first choose an object whose children you want to limit your view to in the 2D Map. Then, in Design mode, use the Tool Palette, drag the Dynamic BPV class (Classes, ManagedObject, BusinessView, DynamicBPV) to the 2D Map, and rename it to define the query. To set up a query for this newly created Dynamic Business Process View, right-click on it and choose Viewers, Dynamic BPV Query View.

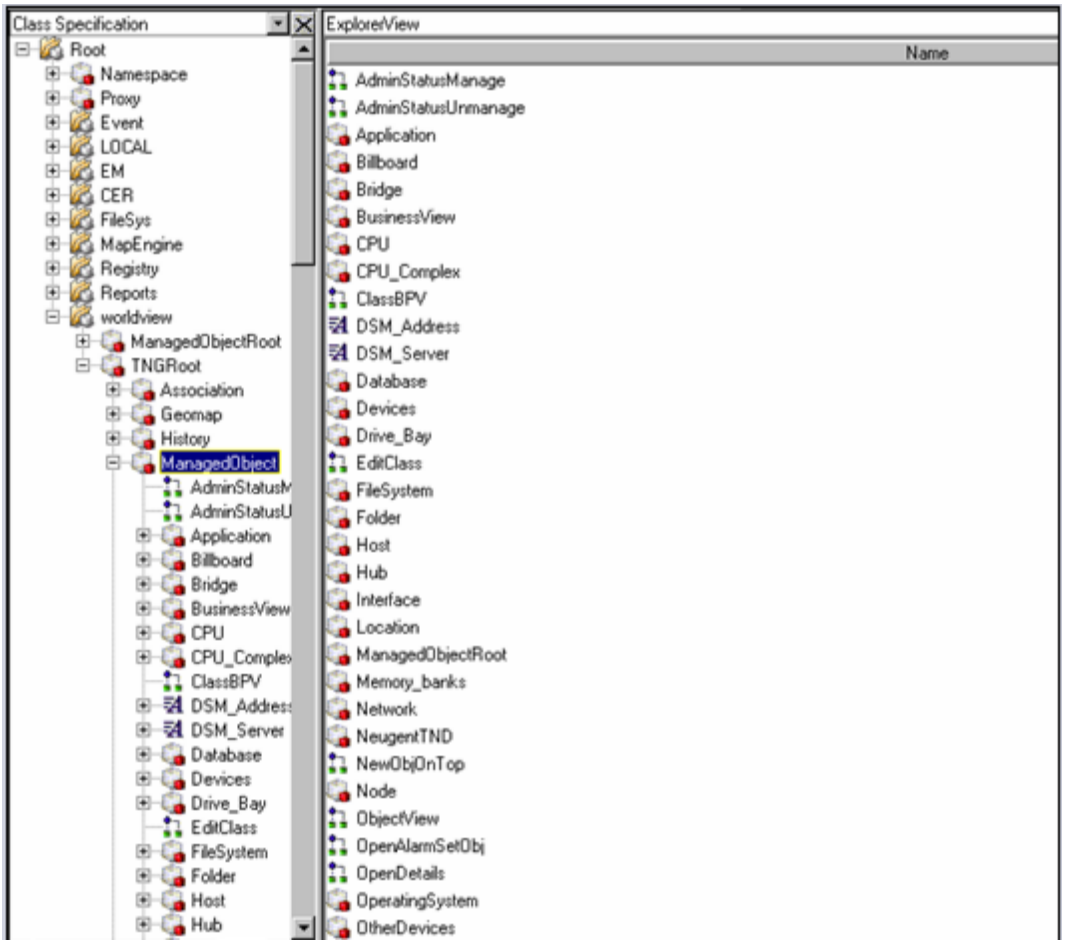
Common Object Repository

The Common Object Repository is the database where all of the objects that represent your business resources are stored. Created automatically during installation, the Common Object Repository ensures that your data is always secure and current. Severity propagation, topology, business views, billboards, and other facilities emanate from the Common Object Repository.

Management Command Center

Management Command Center (MCC) is the management portal that provides a meaningful, consolidated view of enterprise data. Whether the data source is Agent Technology, Enterprise Management, WorldView, or another application, MCC uses the same navigational trees and rightmost plug-ins for consistent user interaction. MCC provides the flexibility to launch client-side and server-side applications and batch commands as well as client-side Java applications and applets through convenient pop-up menus that are specific to the objects of a particular class. It brings all of the GUIs and the management of your enterprise under one common look-and-feel tool.

The MCC lets you view objects belonging to CCS classes and equips you with notebooks and dialogs to help you maintain your data. You can modify existing objects, create new objects, and reclassify unclassified objects found during Enterprise Discovery. As with all of the product's features and components, MCC simplifies the process of managing your business to save you time, effort, and money, as shown in the following example:



Repository Import/Export (TRIX)

TRIX is an invaluable tool for any size business. You can use TRIX to populate repositories with objects from other repositories. This means that you can populate a central corporate repository with objects from remote repositories. You always have a complete, current corporate repository, which ensures that you have the most reliable information about the status of your business.

Global Catalog

The Global Catalog is a directory of all installed CA product components. During installation, you select a common device to be used as the Global Catalog and then choose the Global Catalog machine whenever you install a component. The installed component publishes its existence to the Global Catalog.

When the MCC launches, it synchronizes with the Global Catalog to display all CA product components currently installed in your organization. Any MCC that uses the Global Catalog can see all of the deployed components throughout the organization.

Report Explorer

Now that you have all this information, how can you use it to your greatest advantage? The Report Explorer lets you customize, view, and print reports so that the extensive amount of information available to you is presented in the most meaningful format for your particular requirements.

Virus Scan

Virus - it can bring any business to its knees. CCS comes to your company's rescue with integrated antivirus software called Virus Scan. Virus Scan runs every day at midnight, but you can also run Virus Scan on demand anytime, day or night. You can specify the type of scan to be performed and the course of action to take if a virus is detected. When Virus Scan detects a virus, it automatically sends a message to the Event Console and Event Log for further action.

Enterprise Managers

Enterprise Managers are a collection of management components that employ a single, easy-to-use graphical user interface-the Event Console-to monitor and administer different events, including SNMP traps, application events, and system events.

ManagedPC

CA delivers the only out-of-the-box, eBusiness management solutions that provide complete cross-platform support for today's heterogeneous business environments. The scalable and open architecture supports any NetPC that adheres to Intel's Wired for Management (WfM) Initiative.

Here is an example of how you might use ManagedPC to streamline desktop and server management in your organization: you are in Dallas at your CA NSM console, and you know that Windows 2003 Professional needs to be reinstalled on a ManagedPC in your Beijing office.

With a few mouse clicks, you wake up (power up) the ManagedPC. ManagedPC automatically detects that Windows 2003 Professional must be reinstalled and performs the installation for you, flawlessly and seamlessly. Best of all, because of the 12-hour time difference, you do not have any downtime in Beijing-and you are able to handle the installation without any personnel! ManagedPC also supports UNIX servers.

Chapter 3: OpenVMS Solutions

CCS for OpenVMS provides a communications infrastructure for all of the CA NSM solutions running on OpenVMS. CCS for OpenVMS consists of both an OpenVMS component and a Windows Manager component that requires either CA NSM or CCS on Windows. This chapter describes the various components that constitute CCS for OpenVMS.

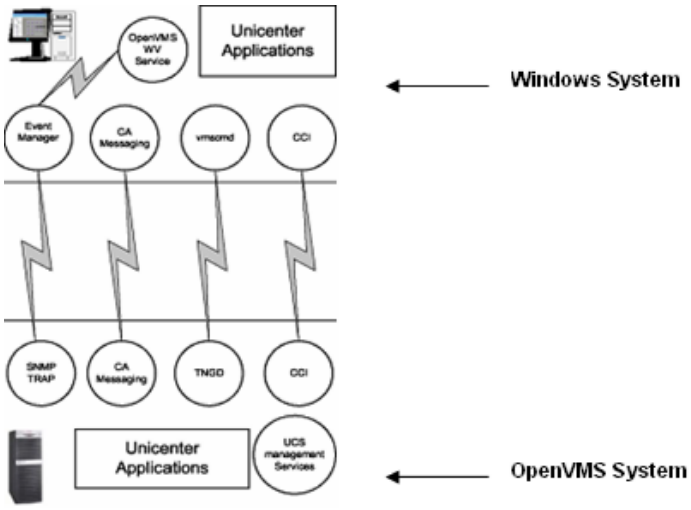
This section contains the following topics:

Architecture

CCS for OpenVMS is based on three key technologies to provide communication between the CA NSM Manager and the CCS for OpenVMS applications residing on the OpenVMS server, as shown in the following bullets:

- **Events -** Delivered to the CA NSM Manger using industry standard SNMP traps
- **CA Messaging -** Used to send and receive communication data between CA NSM Manager and CCS for OpenVMS. Also transfers performance data from OpenVMS to the Performance Manager running on Windows
- **Common Communication Interface (CCI)** - Used for heterogeneous workload scheduling to OpenVMS

Each of the communication technologies is tailored for the type of data it handles.



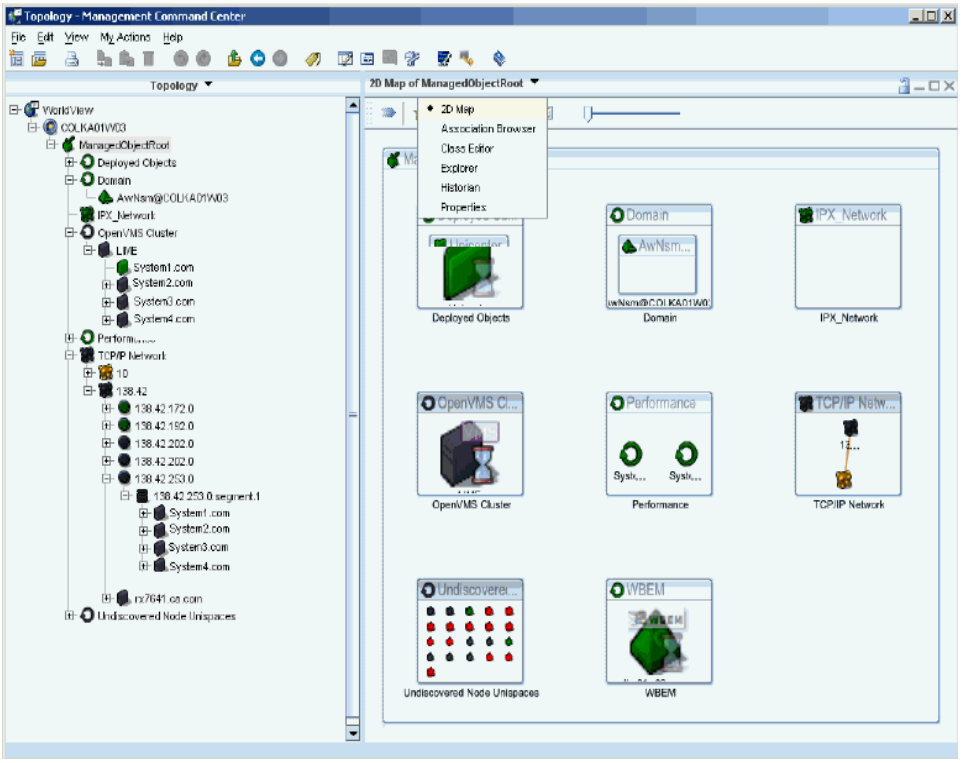
CA Common Services for OpenVMS on Windows

CCS for OpenVMS on Windows is a generic integration layer that extends the capabilities of CCS Manager and CA NSM to manage an OpenVMS infrastructure. By integrating OpenVMS into your CA NSM enterprise management infrastructure, you can truly benefit from an end-to-end eBusiness enterprise management solution.

CCS for OpenVMS on Windows provides the following benefits:

- **Integration into CA NSM MCC** - When you start the CCS for OpenVMS components on OpenVMS using the CCS for OpenVMS common startup, they inform CCS for OpenVMS on Windows what components are currently installed and running. The components currently running on the given OpenVMS node populate the Common Object Repository. Right-clicking on any populated icon lets you launch the Management Console of the underlying product. The seamless integration into CA NSM MCC gives you the power and knowledge to manage your enterprise.

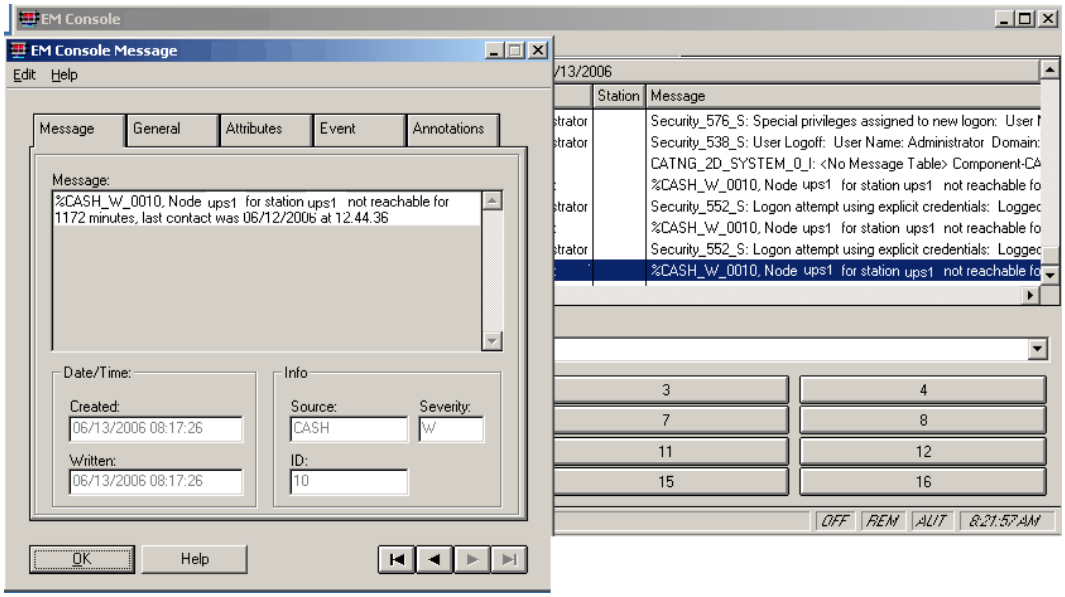
Note: To launch a Management Console this way, you need X Windows software, such as eXcursion.



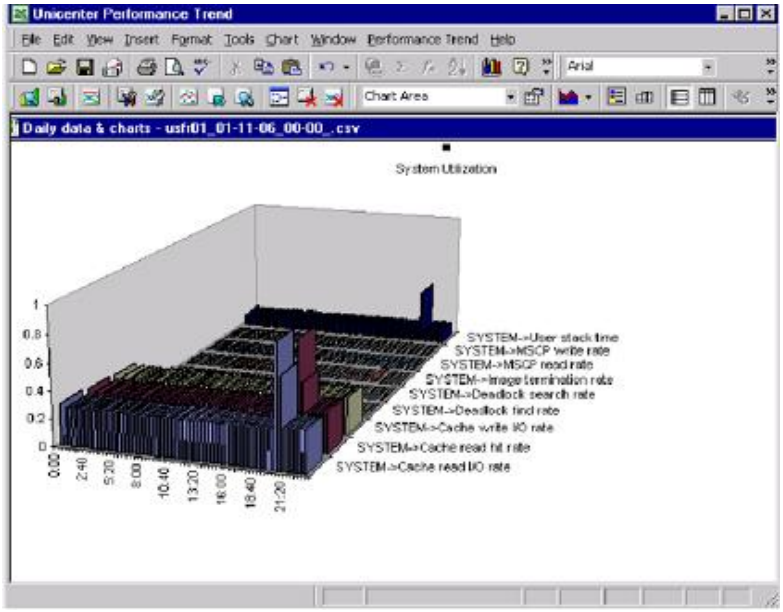
- **Integration into Event Management** - Event Management is the cornerstone of an eBusiness enterprise management solution. It lets you consolidate critical and informational messages from disparate sources across the enterprise and perform correlation, filtering, and automated actions. You can define messages and action routines to occur whenever certain events take place. The following products can send events to your Enterprise Event Console:
  - CA Console Management for OpenVMS
  - CA System Watchdog for OpenVMS
  - CA Job Management for OpenVMS
  - CA NSM Log Agent for OpenVMS
  - CA NSM System Agent for OpenVMS
  - CA Universal Job Management Agent for OpenVMS
  - Using the utility VMSCMD, you can define an action that executes a command on a given OpenVMS system.

The full code is the syntax for vmscmd:

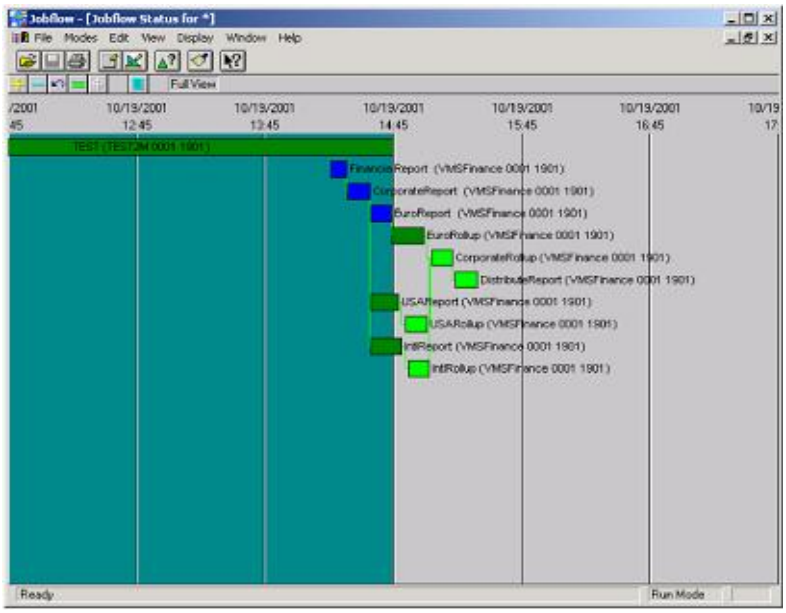
```
vmscmd <nodename> <command string>
```



- **Integration into CA NSM Systems Performance Option** - When you install CA NSM Performance Management Option on the CA NSM Manager, you can configure it to receive performance data from the CA Performance Manager for OpenVMS.



- **Integration into CA NSM Job Management** - CA NSM Job Management includes advanced reporting tools that allow for real-time graphical representation and tracking of workload schedules. CA Job Management for OpenVMS provides an interface to Jobflow Status (a component of CA Job Management for OpenVMS) to display workload status.



Installation

You install CCS for OpenVMS using an Installation Wizard. The wizard guides you through the entire installation process.

The following products ship with CCS for Windows:

- CA Console Management for OpenVMS
- CA Job Management for OpenVMS
- CA Performance Management for OpenVMS
- CA System Watchdog for OpenVMS

When you run the CA NSM Integration install, the program checks to see whether CA NSM or CCS is installed. If neither product is installed, the program installs CCS.

CA Common Services for OpenVMS on OpenVMS

CCS for OpenVMS provides the application management environment and infrastructure to communicate with other CA solutions. CCS on OpenVMS consists of the following components:

- **Installation Registry** - The installation registry helps track what CA products are currently installed on a system, manages patches that have been installed, and helps determine whether a previous version of the product is on the system. It also manages dependencies between products, so a shared component is not uninstalled inadvertently.
- **CCI** - Provides the underlying communication infrastructure that connects applications running on OpenVMS, z/OS, AS/400, Windows, UNIX, and other operating systems together.
- **CA Messaging** - CA Messaging (CAM), is a robust messaging architecture that forms the basis of CA Common Services for OpenVMS, CA NSM Option, eTrust Admin Agent on OpenVMS, and other CA solutions. CA Common Services for OpenVMS uses CAM to send and receive communication data to CA NSM Manager. CA Performance Management for OpenVMS uses CAM to transfer performance cubes to one or more CA NSM Performance Management servers.
- **Common Startup and Shutdown Procedures** - A common startup and shutdown procedure is provided as a part of CCS for OpenVMS. These common procedures ensure that all components are started in the correct order and inform the CA NSM Manager or CCS that they are running. Although each product has its own startup and shutdown, the common procedures simplify managing each individual component.

  The CCS startup command is the following:

  ```
  @sys$startup:capoly$startup.com
  ```

  The CCS shutdown command is the following:

  ```
  @sys$startup:capoly$shutdown.com
  ```

  For more information on starting and stopping CA Common Services, see the chapter "Starting and Stopping CCS."
- **Configuring CCS Startup and Shutdown Procedures** - You can configure CCS for OpenVMS Common Startup and Shutdown procedures to automatically startup and shutdown various installed CA NSM components and specify the locations of where events should be directed. To perform this configuration, run the following command procedure:

  ```
  @sys$manager:capoly$set_startup_params
  ```

  A menu displays the components you can configure.

- **Integration to Windows** - CCS includes a set of integration services that handles communication between the CA NSM Manager running on Windows and the solutions running on OpenVMS. These services are responsible for the launching of X Windows GUIs on the Management station, accepting commands from vmscmd, and providing job flow information to CA NSM Job Management Job Flow Status. The integration also includes two command line executables, CAPOLY$CASEND and CAPOLY$TRAP to send events to a Windows client. For more information on capoly$trap, see the appendix "Using CCS Communications Utilities."

Installation

CCS is installed as part of the associated product. You do not need to do a separate installation. Also, only the necessary components are installed and activated, reducing the memory footprint.

Chapter 4: Starting and Stopping CCS

To start OpenVMS product daemons, add the following line to the OpenVMS system startup file SYSTARTUP_VMS.COM:

```
@SYS$STARTUP:CAPOLY$STARTUP
```

To shut down OpenVMS product daemons, add the following line to the OpenVMS system shutdown file SYS$MANAGER:SYSHUTDWN.COM:

```
@SYS$STARTUP:CAPOLY$SHUTDOWN
```

SYS$STARTUP:CAPOLY$STARTUP.COM starts the products selected for startup in the parameters file SYS$SPECIFIC:[UNIVMS.BIN]STARTUP_PARAMS.COM. During installation VMSINSTAL prompts you to choose the components that you want to start automatically and stores this information in the parameters file as shown in the following figure:

```
CA NSM for OpenVMS - product startup selection
---------------------------------------------------------------

1   CA Job Management ..............................   YES
2   CA Job Management Agent ........................   YES
3   CA Universal Job Management Agent ..............   YES
4   CA NSM Jobflow Support .........................   YES
5   CA Job Management NSM/CCS Integration ..........   YES
6   CA Console Management ..........................   YES
7   CA System Watchdog .............................   YES
8   CA System Watchdog NSM/CCS Integration .........   YES
9   CA Performance Management Agent ................   YES
10  CA NSM Performance Trend Cube ..................   YES
11  CA Common Services OpenVMS Gateway .............   YES
```

If you want to change the startup selection later, you can run the command file SYS$MANAGER:CAPOLY$SET_STARTUP_PARAMS.COM

Appendix A: Using CCS Communications Utilities

The integration includes two command-line executables to send events to a Windows client: CAPOLY$CASEND and CAPOLY$TRAP.

The following information helps you maximize your usage of these application tools. This information includes how to define a symbol, how to use CAPOLY$CASEND, and how to use CAPOLY$TRAP.

This section contains the following topics:

Defining a Foreign Symbol

Defining a foreign symbol lets you pass parameters to an image (executable). For example, to define a foreign symbol for catrap use the following command:

```
CATRAP == "$capoly$bin:capoly$trap.exe"
```

To use the new symbol, type catrap followed by the parameters you want to send. For example, the following command passes parameters p1, p2, and p3 to catrap:

```
catrap p1 p2 p3
```

Using CAPOLY$CASEND

CASEND is a simplified version of CAPOLY$TRAP that sends an informational message using SNMP traps to one or more CA NSM Managers. To use CASEND, the following steps are required:

1. Define a foreign symbol:
2. casend :== $capoly$bin:capoly$casend.exe

3. Arguments for CAPOLY$CASEND:

Value	Usage	Description
message	message	The message you want to send, as a quoted string
destination-nodes	destination-node	Target systems for the message

By default, CASEND will send the message to nodes defined by the logical CAPOLY$TRAP_DST. If a comma-separated list of nodes is provided as the second argument, then the trap will be sent to these nodes and not the nodes defined by the logical.

For example:

```
casend “This is a test message”
```

or

```
casend “This is a host message” hosta,hostb,hostc
```

Using CAPOLY$TRAP

CAPOLY$TRAP is equivalent to CATRAP on other CA NSM platforms. To use CAPOLY$TRAP, the following steps are required:

1. Define a foreign symbol:

   ```
   catrap :== $capoly$bin:capoly$trap
   ```

2. Arguments of CAPOLY$TRAP:

Value	Usage	Description
destination-node	destination-node	Target system for the message
enterprise	enterprise	OID for your enterprise
agent-addr	agent-addr	Address of the agent
generic-trap	generic-trap	Trap type
specific-trap	specific-trap	Specific trap type
time-stamp	time-stamp	Time of message
-d	[-d]	Hex dump of packet

Value	Usage	Description
-v	[-v]	Verbose output
-t	[-t *timeout*]	Overrides default timeout, where *timeout* identifies the new timeout
-r	[-r *retries*]	Overrides default number of tries, where *retries* identifies the new number of retries
-p	[-p *port*]	Identifies the port to use instead of 162, where *port* identifies the new port
-c	[-c *community*]	Overrides default community string, where *community* identifies the new community string

Note: You can make enterprise, agent-addr, and time stamp default by using a null (“”) string.

For example:

```
catrap hosta 1.3.6.1.4.1.791.2.8.2.2.2  "" 6 2 ""
1.3.6.1.4.1.791.2.8.2.2.2.1 octetstring “My string A”
1.3.6.1.4.1.791.2.8.2.2.2.1 octetstring “My String B”
```

Notes:

- The enterprise OID 1.3.6.1.4.1.791 is CA OID. You *must* not use this OID as part of your application. Using CA or another organization's OID might cause management applications that use SNMP traps to behave in an undetermined manner.
- If your organization does not have an Enterprise OID, you can obtain one from the Internet Numbers Authority by sending an email to iana@isi.edu.

Configuring Message Timeouts

For Windows

The Registry value MsgTimeout is the lifetime (timeout) in seconds for outgoing CAM messages. It allows you to control message timeout according to your network capabilities. The default value is 10 seconds. The parent Registry key is:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\UNIVMS
```

On OpenVMS

The logical name UNIVMS_MSG_TIMEOUT is the lifetime (timeout) in seconds for outgoing CAM messages. It allows you to control message timeout according to your network capabilities. The default value is 10 seconds. To change the value, edit SYS$STARTUP:CAPOLY$STARTUP.COM. Remove the comment from the line that defines the logical name. Change the value as desired and save the changes.

Appendix B: Using Performance Cubes

The Performance Agent component of CA Performance Management for OpenVMS can create a performance data file, called a cube, which is readable by CA NSM Performance Manager on the CA NSM Management station. When you install the Performance Agent on OpenVMS, you are asked questions related to the creation of this cube, including if you want to activate the Performance Cube functionality.

Note: You do not have to activate this functionality for CA Performance Agent for OpenVMS to function properly on an OpenVMS system.

When activated, Performance Agent creates a cube file and periodically transfers that cube file to the CA NSM Management station. When you install CA Performance Agent on an OpenVMS system, the following text file is created:

```
CAPOLY$DATA:CAPOLY$CUBE_OPTIONS.DAT
```

This file is created whether or not a CA NSM Management Station exists and whether or not you activate the functionality. Creating this file ensures that you do not have to completely reinstall CA NSM Performance Agent for OpenVMS to activate the functionality. This file contains the following information:

- **CA NSM Management Station Name** - Identifies the name of the CA NSM Management Station Name. If you do not have a CA NSM Management station, you should enter a fictitious nodename when prompted. The fictitious nodename is stored in the CAPOLY$DATA:CAPOLY$CUBE_OPTIONS.DAT text file. You can change this name using any text editor. Look for the keyword DATABASE and change the node name accordingly. For example, if the node name entered during installation was NSMMGT1, the text file contains the following line:

  ```
  DATABASE "NSMMGT1"
  ```

  To change the node name, replace NSMMGT1 with the correct node name.

- **Timeband** - Identifies the length of the interval that the data represents. When you are prompted for timeband during installation, enter a number in minutes. The default is 60. In the CAPOLY$DATA:CAPOLY$CUBE_OPTIONS.DAT text file, this information is stored in seconds. Look for the keyword TIMEBAND in the data file. For example, the default of 60 minutes is represented as the following code:

  ```
  TIMEBAND "3600"
  ```

  To change the interval, replace 3600 seconds with the desired interval expressed in units of seconds.

- **Data Items** - Identifies the data items to be included in the cube file. The following code represent default entries:

  ```
  PROCESS  "Process process page count"   Y
  PROCESS  "Process WorkSet size limit"   N
  ```

  Where Y indicates that the "Process process page count" data is to be included and the N indicates that the "Process WorkSet size limit" data is not to be included in the cube file. You can edit the file by changing the Y and N to get the desired data.

The following lists include the default data items and their default setting (Y or N) in the cube options supplied during the installation. Data items are organized into groups of related items.

For a brief description and interpretation of these data items, see chapter 5 of the *CA Performance Management for OpenVMS Performance Agent Administrator* guide.

This section contains the following topics:

PROCESS Data Items

- PROCESS "Process CPU time" Y
- PROCESS "Process pagefault rate per cpu sec" Y
- PROCESS "Process pagefault IO rate per cpu sec" N
- PROCESS "Process direct IO rate" Y
- PROCESS "Process buffered IO rate" Y
- PROCESS "Process global page count" N
- PROCESS "Process process page count" Y
- PROCESS "Process WorkSet size limit" N
- PROCESS "Process WorkSet default" N
- PROCESS "Process WorkSet quota" N
- PROCESS "Process WorkSet extent" N

- PROCESS "Process uptime" N
- PROCESS "Process image activation rate" N
- PROCESS "Process compute queue time" Y
- PROCESS "Process disk operation rate" Y
- PROCESS "Process disk thruput rate" Y
- PROCESS "Process tape operation rate" N
- PROCESS "Process tape thruput rate" N
- PROCESS "Process terminal input rate" N
- PROCESS "Process terminal thruput rate" N
- PROCESS "Process think ms time" N
- PROCESS "Process virtual address space used" Y
- PROCESS "Process response ms time" N
- PROCESS "Process Kernel threads max" N
- PROCESS "Process Kernel threads real" N
- PROCESS "Process Kernel threads active" N

DISK Data Items

- DISK "Disk operations rate" Y
- DISK "Disk thruput rate" Y
- DISK "Disk service time" Y
- DISK "Disk queue length" Y
- DISK "Disk paging operations rate" Y
- DISK "Disk paging thruput rate" N
- DISK "Disk swap operations rate" Y
- DISK "Disk swap thruput rate" N
- DISK "Disk busy time" Y
- DISK "Disk measurement interval" N
- DISK "Disk read operations rate" Y
- DISK "Disk MSCP operations rate" Y

- DISK "Disk MSCP paging/swapping rate" N
- DISK "Disk MSCP thruput rate" N
- DISK "Disk split operations rate" Y
- DISK "Disk error rate" N
- DISK "Disk free blocks" N
- DISK "Disk total blocks" N
- DISK "Disk directory index cache pages" N
- DISK "Disk quota cache entries" N
- DISK "Disk FID cache entries" N
- DISK "Disk extent cache entries" N
- DISK "Disk file header cache pages" N
- DISK "Disk directory data cache pages" N
- DISK "Disk storage bitmap cache pages" N

MAGTAPE Data Items

- MAGTAPE "Magtape operations rate" Y
- MAGTAPE "Magtape thruput rate" Y
- MAGTAPE "Magtape service time" N
- MAGTAPE "Magtape queue length" N
- MAGTAPE "Magtape busy time" N
- MAGTAPE "Magtape measurement interval" N
- MAGTAPE "Magtape read operations rate" Y
- MAGTAPE "Magtape error rate" N

COMM Data Items

- COMM "Comm operations rate" Y

CPU Data Items

- CPU "CPU kernel mode time" Y
- CPU "CPU executive mode time" Y
- CPU "CPU supervisor mode time" Y
- CPU "CPU user mode time" Y
- CPU "CPU interrupt level time" Y
- CPU "CPU compatibility mode time" Y
- CPU "CPU null time" Y
- CPU "CPU multiprocessor synchronization time" Y
- CPU "CPU vector processing time" Y

HOTFILE Data Items

- HOTFILE "File service ms time" N
- HOTFILE "File operation rate" N
- HOTFILE "File thruput kb rate" N
- HOTFILE "File read rate" N
- HOTFILE "File split rate" N
- HOTFILE "File window turn rate" N
- HOTFILE "File paging rate" N
- HOTFILE "File swapping rate" N
- HOTFILE "File MSCP operation rate" N

CONFIG Data Items

- CONFIG "SCS datagrams send rate" Y
- CONFIG "SCS datagrams receive rate" Y
- CONFIG "SCS datagrams discard rate" N
- CONFIG "SCS message send rate" Y
- CONFIG "SCS message receive rate" Y
- CONFIG "SCS block send data initiate rate" N
- CONFIG "SCS block send data kb thruput rate" Y
- CONFIG "SCS block request data initiate rate" N

- CONFIG "SCS block request data kb thruput rate" N
- CONFIG "SCS block transfer kb mapped rate" N
- CONFIG "SCS connection queued for send credit rate" N
- CONFIG "SCS connection queued for buffer descs rate" N

SYSTEM Data Items

- SYSTEM "Process count" Y
- SYSTEM "Scheduler collided page wait time" N
- SYSTEM "Scheduler resource wait time" N
- SYSTEM "Scheduler common event wait time" N
- SYSTEM "Scheduler pagefault wait time" N
- SYSTEM "Scheduler local event wait time" N
- SYSTEM "Scheduler local event time ouswapped" N
- SYSTEM "Scheduler hibernate time" N
- SYSTEM "Scheduler hibernate time outswapped" N
- SYSTEM "Scheduler suspend time" N
- SYSTEM "Scheduler suspend time outswapped" N
- SYSTEM "Scheduler free page wait time" N
- SYSTEM "Scheduler compute queue time" Y
- SYSTEM "Scheduler compute queue time outswapped" Y
- SYSTEM "Scheduler current time" N
- SYSTEM "Interrupt stack time" Y
- SYSTEM "Kernel stack time" N
- SYSTEM "Exec stack time" N
- SYSTEM "Supervisor stack time" N
- SYSTEM "User stack time" Y
- SYSTEM "Compatibility mode time" N
- SYSTEM "Idle time" Y
- SYSTEM "MP synchronization time" N
- SYSTEM "Page fault rate" Y

- SYSTEM "Page fault read read" N
- SYSTEM "Page fault read IO rate" N
- SYSTEM "page fault write rate" N
- SYSTEM "Page fault write IO rate" N
- SYSTEM "Page faults from free list rate" N
- SYSTEM "Page faults from modified list rate" N
- SYSTEM "Demand zero page fault rate" N
- SYSTEM "Global page fault rate" N
- SYSTEM "Transition page fault rate" N
- SYSTEM "System page fault rate" Y
- SYSTEM "Free list page rate" Y
- SYSTEM "Modified list page rate" Y
- SYSTEM "Direct IO rate" Y
- SYSTEM "Buffered IO rate" Y
- SYSTEM "Mailbox read rate" N
- SYSTEM "Mailbox write rate" N
- SYSTEM "Logical name translation rate" N
- SYSTEM "Inswap rate" Y
- SYSTEM "File window miss rate" N
- SYSTEM "Split Transfer rate" Y
- SYSTEM "Transfers w/o window turn rate" N
- SYSTEM "Directory LRU hit rate" N
- SYSTEM "Directory LRU misse rate" N
- SYSTEM "Quota cache hit rate" N
- SYSTEM "Quota cache misse rate" N
- SYSTEM "File ID cache hit rate" N
- SYSTEM "File ID cache misse rate" N
- SYSTEM "Extent cache hit rate" N
- SYSTEM "Extent cache misse rate" N
- SYSTEM "File header cache hit rate" N
- SYSTEM "File header cache misse rate" N
- SYSTEM "Directory data block hit rate" N

- SYSTEM "Directory data block misse rate" N
- SYSTEM "Storage bit map cache hit rate" N
- SYSTEM "Storage bit map cache misse rate" N
- SYSTEM "File open rate" Y
- SYSTEM "Erase QIO rate" N
- SYSTEM "XQP volume synch lock rate" N
- SYSTEM "XQP volume synch lock wait rate" N
- SYSTEM "XQP directory and volume synch lock rate" N
- SYSTEM "XQP directory and volume synch lock wait rate" N
- SYSTEM "XQP access lock rate" N
- SYSTEM "XQP cache free space wait rate" N
- SYSTEM "File system CPU time" Y
- SYSTEM "DECNET arriving local packet rate" N
- SYSTEM "DECNET departing local packet rate" N
- SYSTEM "DECNET transit packet rate" N
- SYSTEM "DECNET transit congestion loss rate" N
- SYSTEM "DECNET receiver buffer failure rate" N
- SYSTEM "Local new ENQ request rate" N
- SYSTEM "Incoming new ENQ request rate" N
- SYSTEM "Outgoing new ENQ request rate" N
- SYSTEM "Local conversion ENQ request rate" N
- SYSTEM "Incoming conversion ENQ request rate" N
- SYSTEM "Outgoing conversion ENQ request rate" N
- SYSTEM "Local dequeue ENQ request rate" N
- SYSTEM "Incoming dequeue ENQ request rate" N
- SYSTEM "Outgoing dequeue ENQ request rate" N
- SYSTEM "Enqueue requests wait rate" N
- SYSTEM "Enqueue requests not queued rate" N
- SYSTEM "Local blocking ASTs queued rate" N
- SYSTEM "Incoming blocking ASTs queued rate" N
- SYSTEM "Outgoing blocking ASTs queued rate" N
- SYSTEM "Incoming directory operations rate" N

- SYSTEM "Outgoing directory operations rate" N
- SYSTEM "Incoming deadlock detection message rate" N
- SYSTEM "Outgoing deadlock detection message rate" N
- SYSTEM "Deadlock search rate" Y
- SYSTEM "Deadlock find rate" Y
- SYSTEM "User memory page count" N
- SYSTEM "Terminal reads(not used)" N
- SYSTEM "Terminal writes(not used)" N
- SYSTEM "Image activation rate" Y
- SYSTEM "Image termination rate" Y
- SYSTEM "Lock ID table length" N
- SYSTEM "Lock IDs in use count" N
- SYSTEM "Resource table length" N
- SYSTEM "Resources in use count" N
- SYSTEM "Non-paged pool length" N
- SYSTEM "Non-paged free block count" N
- SYSTEM "Non-paged free blocks leq 32 count" N
- SYSTEM "Non-paged free byte count" N
- SYSTEM "Non-paged maximum block count" N
- SYSTEM "Non-paged minimum block count" N
- SYSTEM "Paged pool length" N
- SYSTEM "Paged free block count" N
- SYSTEM "Paged free blocks leq 32 count" N
- SYSTEM "Paged free byte count" N
- SYSTEM "Paged maximum block count" N
- SYSTEM "Paged minimum block count" N
- SYSTEM "SRP list length" N
- SYSTEM "SRPs in use count" N
- SYSTEM "IRP list length" N
- SYSTEM "IRPs in use count" N
- SYSTEM "LRP list length" N
- SYSTEM "LRPs in use count" N

- SYSTEM "IO request desc table size" N
- SYSTEM "IO request desc table queue length" N
- SYSTEM "MSCP number original buffers count" N
- SYSTEM "MSCP number free buffers count" N
- SYSTEM "MSCP tiniest buffer allowed length" N
- SYSTEM "MSCP number free pool bytes count" N
- SYSTEM "MSCP number original packets" N
- SYSTEM "MSCP number free packets count" N
- SYSTEM "MSCP buffer wait queue length" N
- SYSTEM "MSCP wait queue highwater mark" N
- SYSTEM "MSCP number split transfer rate" N
- SYSTEM "MSCP number IO fragments count" N
- SYSTEM "MSCP operation rate" N
- SYSTEM "MSCP read rate" Y
- SYSTEM "MSCP write rate" Y
- SYSTEM "Paging total pages count" N
- SYSTEM "Paging free pages count" N
- SYSTEM "Out swaps count" N
- SYSTEM "Header in swaps count" N
- SYSTEM "Header out swaps count" N
- SYSTEM "Bad page faults rate" N
- SYSTEM "Transition faults rate" N
- SYSTEM "Number of files open count" N
- SYSTEM "Interactive processes count" N
- SYSTEM "Network processes count" N
- SYSTEM "Batch processes count" N
- SYSTEM "Sample count" N
- SYSTEM "Busy" N
- SYSTEM "Swap busy" N
- SYSTEM "MIO busy" N
- SYSTEM "Any IO busy" N
- SYSTEM "Page wait" N

- SYSTEM "Swap wait" N
- SYSTEM "MMG wait" N
- SYSTEM "SYS idle" N
- SYSTEM "CPU only" N
- SYSTEM "IO only" N
- SYSTEM "CPU IO" N
- SYSTEM "Available CPUs" N
- SYSTEM "VBSSGL_CPUTICKS" N
- SYSTEM "Page size" N
- SYSTEM "Cache size in pages count" N
- SYSTEM "Cache free pages count" N
- SYSTEM "Cache pages in use count" N
- SYSTEM "Cache maximum length" N
- SYSTEM "Cache files retained count" N
- SYSTEM "Cache read I/O rate" Y
- SYSTEM "Cache read hit rate" Y
- SYSTEM "Cache write I/O rate" Y
- SYSTEM "Cache write bypass count" N
- SYSTEM "Cache read bypass count"
- SYSTEM "Overall CPU utilization" Y
- SYSTEM "Overall memory utilization" Y
-

Appendix C: IPv6

The configuration of CCS for OpenVMS Integration for IPv6 networks is discussed in detail in this chapter.

This section contains the following topics:

Configure Integration for IPv6 on OpenVMS

If you wish to communicate with CCS for OpenVMS Integration on a Windows system using IPv6 addressing, you must use this configuration on OpenVMS:

Configure Performance Cubes

If you want to communicate with CA Unicenter NSM Systems Performance Option Performance Trend using IPv6 addressing, you must configure the cube destination to use the IPv6 address of the CA Unicenter NSM Manager node. You can do this at installation time, when you are prompted to "Enter the name of the CA Unicenter NSM Management Station to receive the Performance Trend cube files". After installation, see the appendix "Using Performance Cubes" for configuration instructions.

Configure Traps

In a dual-stack environment, the default address family for CA Common Services for OpenVMS is IPv4. To enable IPv6 addressing, define the system logical CACOMMON$ENABLE_IPV6 with a value of 1, as in the following example:

```
$ define/system CACOMMON$ENABLE_IPV6 1
```

When this logical name is defined, CCS for OpenVMS will attempt to resolve host names to either an IPv4 or an IPv6 address (whichever comes first) for each CA NSM Management Station in the list CAPOLY$TRAP_DST.

Testing IPv6 addressing (For testing only)

To verify that your IPv6 connection is working properly, for your convenience you can define the following logical name on the primary and secondary nodes:

```
$ define/system CACOMMON$USE_IPV6_ONLY 1
```

When this logical name is defined, CCS for OpenVMS will attempt to resolve host names to an IPv6 address for each CA Unicenter NSM Manager node in the list equated to the logical name CAPOLY$TRAP_DST. If an IPv6 address is not available and an IPv4 address is available, the IPv4-mapped IPv6 address will be used.

Configure Integration for IPv6 on Windows

If you want to monitor OpenVMS nodes on a Windows system using IPv6 addressing, you need to be aware of the following configuration requirements.

CCS

If you want to communicate with CCS for OpenVMS Integration on a Windows system using IPv6 addressing, you must use the following configuration on Windows:

- The CA NSM Manager node (on Windows) must have an IPv6 address.
- Each Windows system to which you send event traps must be running CCS for OpenVMS r3.2 and either NSM r11.2 or CCS r11.2.
- Each Windows system must have the SNMP Trap Service configured as described in the section SNMP Trap Service (see page 54).
- If your Windows system is running NSM r11.1 or a previous release, you need to upgrade to NSM version r11.2 or deinstall NSM prior to installing CCS for OpenVMS r3.2 so that CCS r11.2 will be installed.

NSM/CCS Repository

To discover nodes with IPv6 addresses and add them to NSM/CCS Repository, the following CA components are required on Windows:

- CA Common Discovery (CA CD)
- Management Command Center (MCC)

CA CD can be installed from the CCS for OpenVMS media. CA CD requires Java JRE and Apache Tomcat to be installed. If JRE and Tomcat are not already installed on your CA Unicenter NSM Manager system, the NSM r11.2 or CCS r11.2 installation can install them.

If you are installing from NSM r11.2, select the following from the Installation Wizard Component Selection list: Management Command Center (this will install JRE) and Web Reporting Service (this will install Apache Tomcat).

If you are installing from CCS r11.2, all required components are pre-selected and installed for you.

We suggest the following installation sequence:

To Install from NSM r11.2

1. Install NSM with at least Management Database, WorldView, WorldView Provider, Event Management, Event Management Provider, Management Command Center, and Web Reporting Service.
2. Install CA CD from the OpenVMS media.

   The CA CD installation prompts for Java JRE and Apache Tomcat locations. If JRE and Tomcat were installed by NSM r11.2 or CCS r11.2, their default locations are, respectively:

   ```
   C:\Program Files\CA\SC\JRE.ccs\1.5.0_11
   C:\Program Files\CA\SC\Tomcat.ccs\5.5.23
   ```

3. Install CCS for OpenVMS.

To install from CCS r11.2 embedded in CCS for OpenVMS:

1. Start the CCS for OpenVMS install.
2. When prompted, start CCS r11.2 install and proceed with the pre-selected components, at minimum.

   When the CCS r11.2 setup completes, proceed with the CCS for OpenVMS installation.
3. Reboot, if required
4. Install CA CD. The CA CD installation prompts for Java JRE and Apache Tomcat locations.

If JRE and Tomcat were installed by NSM r11.2 or CCS r11.2, their default locations are, respectively:

```
C:\Program Files\CA\SC\JRE.ccs\1.5.0_11
C:\Program Files\CA\SC\Tomcat.ccs\5.5.23
```

SNMP Trap Service

The SNMP Trap Service on Windows 2003 and older does not support IPv6. To support IPv6 on this platform, you must manually configure the catrapmuxd service as follows:

1. Stop all CA Unicenter NSM services with the following command:

   ```
   C:\> unicntrl stop all
   ```

2. Run services.msc. Stop and disable "SNMP Trap Service".

3. Configure catrapmuxd as a replacement for the SNMP Trap Service with the following command:

   ```
   C:\> catrapmuxd UniConfig
   ```

   Which results in the following:

   ```
   C:\> catrapmuxd UniConfig
   Port 162 is not in use, configuration continuing...
   Catrapd will use port 6163 to listen for traps.
   TRAPMUX: Displaying current configuration file...
    C:\Program Files\CA\SC\CCS\WVEM\caiuser\catrapmux.conf
   CATRAPD:6163
   CATRAPMUX_CMD:6161
   AWS_SNMP:6162
   TRAPMUX: CA Trap Multiplexer installed successfully.
   TRAPMUX: Starting CA Trap Multiplexer.
   ```

   If you do not complete step 2, you will see the following result:

   ```
   C:\> catrapmuxd UniConfig
   CA Trap Multiplexer requires port 162 which is currently being used
   by another service or process (null)
   You must configure your processes or services so that
   port 162 is free before installing CA Trap Multiplexer
   ```

   To correct this, run step 2.

4. Restart the CA Unicenter NSM services with the following command:

   ```
   C:\> unicntrl start all
   ```

5. Verify the configuration with the following command:

   ```
   C:\>  netstat -a -b
   ```

   Verify in the output that catrapmuxd is listening on port "snmptrap" (161) and catrapd is listening on port 6163.

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