



Cisco Service Control Management Suite Subscriber Manager User Guide

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About this Guide

This document is a guide to the configuration and management of the Subscriber Manager (SM) application. It contains explanations of relevant concepts and terminology in addition to instructions on how to install, configure, and use the SM.



Note

The guide assumes a basic familiarity with the telecommunications equipment and installation procedures, concepts of the Service Control Management Suite, the SCE 1000 and SCE 2000 platforms, and their related components.

This *Cisco SCMS Subscriber Manager User Guide* documents the application that processes subscriber records and maintains the subscriber database for use by the SCE platform. It contains instructions for installing the SM and the TimesTen database, editing and installing the configuration file, and managing the system using the Command-Line Utilities (CLU). It also specifies how to configure a Service Control deployment to support subscriber integration in its various forms.

This guide is intended for the system administrator and the networking or computer technician who is responsible for the on-site installation and configuration of the Subscriber Manager (SM) application. It is also intended for the operator who will be responsible for daily operations of the SM.

This introduction provides information about the following topics:

- [Document Revision History, page xii](#)
- [Organization, page xiv](#)
- [Related Publications, page xv](#)
- [Conventions, page xvi](#)
- [Obtaining Documentation and Submitting a Service Request, page xvii](#)

Document Revision History

Cisco Service Control Release	Part Number	Publication Date
Release 3.1.5 LA	OL-7199-08	July, 2007

Description of Changes

- Added support for IPs over VPN. See [Information About Handling VPNs](#), page 6, [Radius.Subscriber ID Section](#), page 13, [How to Manage Subscribers, Mappings, and Properties \(p3subs\)](#), page 15, [Managing VPN Entities \(p3vpn\)](#), page 17, [Information About the p3subs Utility](#), page 24, and [Information About the p3vpn Utility](#), page 32.

Cisco Service Control Release	Part Number	Publication Date
Release 3.1.0	OL-7199-07	May, 2007

Description of Changes

- Added support for data synchronization with cascaded SCEs. See [Step 2Configure the SCE platform repository](#), page 4, [SCE.XXX Section](#), page 17, and [Working with Cascade SCE Setups](#), page 11.
- Increase in the number of subscribers that can be handled by the system. See [Step 2Determine the system memory settings](#), page 11.
- Solaris 10 now supported. See [System Requirements](#), page 6.
- Push and Pull mode support automatic domain roaming. See [Domains](#), page 12.
- Added Redundancy Status field to output of **p3net** CLU. See [Examples of using the p3net Utility](#), page 15.
- Changes to installation procedure. See [Installing the Subscriber Manager](#), page 11.
- Changes to upgrade procedures. See [How to Upgrade the Subscriber Manager](#), page 22.
- Changes to the supported character set for Subscriber-Id. See [Subscriber ID](#), page 5.

Cisco Service Control Release	Part Number	Publication Date
Release 3.0.6	OL-7199-06	January, 2007

Description of Changes

- New feature added to remove inactive subscribers from the SM database. See [Inactive Subscriber Removal Section](#), page 10.
- Updated the **p3sm** CLU to display information about the removal of inactive subscribers. See [Information About the p3sm Utility](#), page 19.

Cisco Service Control Release	Part Number	Publication Date
Release 3.0.5	OL-7199-05	November, 2006

Description of Changes

- Changes to the RPC.Server sections of the configuration file to include PRPC server security level. See [RPC.Server Section, page 16](#).
- Changes to **p3rpc** CLU. See [p3rpc Utility, page 17](#).
- Addition of formatting rules for the subscriber ID. See [Subscriber ID, page 5](#).
- Addition of case insensitivity to the subscriber ID. See [SM General Section, page 3](#).

Cisco Service Control Release	Part Number	Publication Date
Release 3.0.3	OL-7199-04	July, 2006

Description of Changes

- Changes to upgrade procedure. See [Upgrading from a Standalone Setup, page 22](#).
- Updated installation software requirements to include Red Hat 4.

Cisco Service Control Release	Part Number	Publication Date
Release 3.0.3	OL-7199-03	May, 2006

Description of Changes

- Updated installation software requirements to include Solaris 10 and Red Hat 4.
- Updated installation procedures to reflect removal of support for TimesTen, DSNs, and Java.
- Added new section covering upgrade procedure from version 3.0 to 3.0.3. See [Upgrading from a Cluster Setup Version 3.x, page 27](#) Upgrading from a Cluster Setup Version 3.x.
- Changes to the procedure to uninstall VCS agents. See [Uninstalling VCS Agents, page 37](#).
- Added new sections detailing the RDR Server configuration. See [RDR Server Section, page 18](#).
- Added new section detailing MPLS-VPN configuration. See [MPLS-VPN Section, page 16](#).
- Added arguments for MPLS/VPN mappings. See [How to Manage Subscribers, Mappings, and Properties \(p3subs\), page 15](#) and [Information About the p3subs Utility, page 24](#).

Cisco Service Control Release	Part Number	Publication Date
Release 3.0	OL-7199-02	December, 2005

Description of Changes

- Reorganization of documentation. No major changes or new features were added to this revision.
- Change in RAM and Memory Configuration Parameters Versus Number of Subscribers table.

Cisco Service Control Release	Part Number	Publication Date
Release 2.5.7	OL-7199-01	August, 2005

Description of Changes

- First version of this document.

Organization

The major sections of this guide are as follows:

Table 1 **Documentation Organization**

Chapter	Title	Description
Chapter 1	General Overview, page 1	Presents an overview of the Cisco Service Control Solution and the SCE platform
Chapter 2	Introducing the Subscriber Manager, page 1	Describes the Subscriber Manager solution, the handling of subscribers, the fundamentals and management of the SM application
Chapter 3	Subscriber Manager Fail-Over, page 1	Describes topics that are related to using the Subscriber Manager together with clusters and redundancy
Chapter 4	Installation and Upgrading, page 1	Describes the installation and basic configuration procedures for the SM and how to perform an upgrade of the SM
Chapter 5	Configuration and Management, page 1	Describes the SM configuration and management procedures and how to use the Command-Line Utilities (CLU)
Appendix A	Configuration File Options, page 1	Provides a description of all parameters that can be configured by using the Subscriber Manager configuration file
Appendix B	Command-Line Utilities, page 1	Describes the Command-Line Utilities (CLU) that the SM uses to manage and maintain the application
Appendix C	CPE as Subscriber in Cable Environment, page 1	Deals with the special case when the Customer Premise Equipment (CPE) is considered as the subscriber in the Cisco Service Control solution for a cable environment, such as DSL and Wireless.

Table 1 **Documentation Organization (continued)**

Chapter	Title	Description
Appendix D	Troubleshooting, page 1	Describes the error messages, probable causes, and solutions of the SM application
Appendix E	Veritas Cluster Server, page 1	Provides basic guidelines for the Veritas Cluster Server configuration in an SM cluster installation

Related Publications

Use this *Cisco SCMS Subscriber Manager User Guide* in conjunction with the following Cisco documentation:

- *Cisco Service Control Application for Broadband (SCA BB) User Guide*
- *Cisco SCE 1000 or SCE 2000 platform User Guides*

Conventions

This document uses the following conventions:

Table 2 **Docuemntation Conventions**

Convention	Description
boldface font	Commands and keywords are in boldface .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[]	Elements in square brackets are optional.
{ x y z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string, or the string will include the quotation marks.
screen font	Terminal sessions and information that the system displays are in <code>screen font</code> .
boldface screen font	Information you must enter is in boldface screen font .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screenfont</i> .
<>	Nonprinting characters, such as passwords, are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



Note

Means *reader take note* . Notes contain helpful suggestions or references to materials not covered in this manual.

Means *reader be careful* . In this situation, you might do something that could result in equipment damage or loss of data.

Means *reader be warned* . In this situation, you might do something that could result in bodily injury.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.





CHAPTER 1

General Overview

This chapter provides a general overview of the Cisco Service Control solution. It introduces the Cisco Service Control concept and the Service Control capabilities.

It also briefly describes the hardware capabilities of the Service Control Engine (SCE) platform and the Cisco specific applications that together compose the total Cisco Service Control solution.

- [Information About the Cisco Service Control Concept, page 1-1](#)
- [Cisco Service Control Capabilities, page 1-3](#)
- [The SCE Platform, page 1-4](#)
- [Information About Management and Collection, page 1-5](#)

Information About the Cisco Service Control Concept

- [The Cisco Service Control Solution, page 1-1](#)
- [Service Control for Broadband Service Providers, page 1-2](#)

The Cisco Service Control Solution

The Cisco Service Control solution is delivered through a combination of purpose-built hardware and specific software solutions that address various service control challenges faced by service providers. The SCE platform is designed to support classification, analysis, and control of Internet/IP traffic.

Service Control enables service providers to create profitable new revenue streams while capitalizing on their existing infrastructure. With the power of Service Control, service providers have the ability to analyze, charge for, and control IP network traffic at multigigabit wire line speeds. The Cisco Service Control solution also gives service providers the tools they need to identify and target high-margin content-based services and to enable their delivery.

As the downturn in the telecommunications industry has shown, IP service providers' business models need to be reworked to make them profitable. Having spent billions of dollars to build ever larger data links, providers have incurred massive debts and faced rising costs. At the same time, access and bandwidth have become commodities where prices continually fall and profits disappear. Service providers have realized that they must offer value-added services to derive more revenue from the traffic and services running on their networks. However, capturing real profits from IP services requires more than simply running those services over data links; it requires detailed monitoring and precise, real-time control and awareness of services as they are delivered. Cisco provides Service Control solutions that allow the service provider to bridge this gap.

Service Control for Broadband Service Providers

Service providers of any access technology (DSL, cable, mobile, and so on) targeting residential and business consumers must find new ways to get maximum leverage from their existing infrastructure, while differentiating their offerings with enhanced IP services.

The Cisco Service Control Application for Broadband adds a new layer of service intelligence and control to existing networks that can:

- Report and analyze network traffic at subscriber and aggregate level for capacity planning
- Provide customer-intuitive tiered application services and guarantee application SLAs
- Implement different service levels for different types of customers, content, or applications
- Identify network abusers who are violating the Acceptable Use Policy
- Identify and manage peer-to-peer, NNTP (news) traffic, and spam abusers
- Enforce the Acceptable Use Policy (AUP)
- Integrate Service Control solutions easily with existing network elements and BSS/OSS systems

Cisco Service Control Capabilities

The core of the Cisco Service Control solution is the purpose-built network hardware device: the Service Control Engine (SCE). The core capabilities of the SCE platform, which support a wide range of applications for delivering Service Control solutions, include:

- Subscriber and application awareness—Application-level drilling into IP traffic for real-time understanding and controlling of usage and content at the granularity of a specific subscriber.
 - Subscriber awareness—The ability to map between IP flows and a specific subscriber in order to maintain the state of each subscriber transmitting traffic through the SCE platform and to enforce the appropriate policy on this subscriber's traffic.

Subscriber awareness is achieved either through dedicated integrations with subscriber management repositories, such as a DHCP or a Radius server, or via sniffing of Radius or DHCP traffic.

- Application awareness—The ability to understand and analyze traffic up to the application protocol layer (Layer 7).

For application protocols implemented using bundled flows (such as FTP, which is implemented using Control and Data flows), the SCE platform understands the bundling connection between the flows and treats them accordingly.

- Application-layer, stateful, real-time traffic control—The ability to perform advanced control functions, including granular BW metering and shaping, quota management, and redirection, using application-layer stateful real-time traffic transaction processing. This requires highly adaptive protocol and application-level intelligence.
- Programmability—The ability to quickly add new protocols and easily adapt to new services and applications in the ever-changing service provider environment. Programmability is achieved using the Cisco Service Modeling Language (SML).

Programmability allows new services to be deployed quickly and provides an easy upgrade path for network, application, or service growth.

- Robust and flexible back-office integration—The ability to integrate with existing third-party systems at the service provider, including provisioning systems, subscriber repositories, billing systems, and OSS systems. The SCE provides a set of open and well-documented APIs that allows a quick and robust integration process.
- Scalable high-performance service engines—The ability to perform all these operations at wire speed.

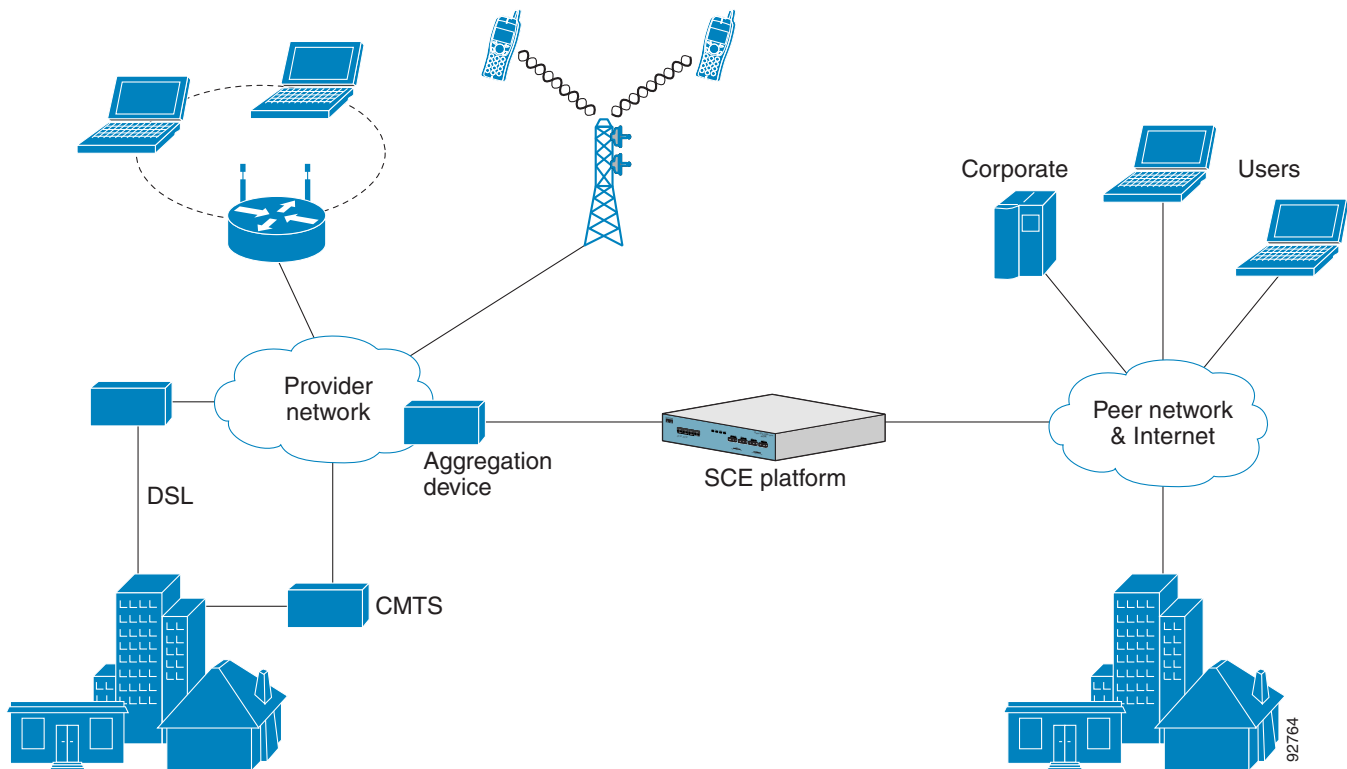
The SCE Platform

The SCE family of programmable network devices is capable of performing application-layer stateful-flow inspection of IP traffic, and controlling that traffic based on configurable rules. The SCE platform is a purpose-built network device that uses ASIC components and RISC processors to go beyond packet counting and delve deeper into the contents of network traffic. Providing programmable, stateful inspection of bidirectional traffic flows and mapping these flows with user ownership, the SCE platforms provide real-time classification of network usage. This information provides the basis of the SCE platform advanced traffic-control and bandwidth-shaping functionality. Where most bandwidth shaper functionality ends, the SCE platform provides more control and shaping options, including:

- Layer 7 stateful wire-speed packet inspection and classification
- Robust support for over 600 protocols and applications, including:
 - General—HTTP, HTTPS, FTP, TELNET, NNTP, SMTP, POP3, IMAP, WAP, and others
 - P2P file sharing—FastTrack-KazaA, Gnutella, BitTorrent, Winny, Hotline, eDonkey, DirectConnect, Piolet, and others
 - P2P VoIP—Skype, Skinny, DingoTel, and others
 - Streaming and Multimedia—RTSP, SIP, HTTP streaming, RTP/RTCP, and others
- Programmable system core for flexible reporting and bandwidth control
- Transparent network and BSS/OSS integration into existing networks
- Subscriber awareness that relates traffic and usage to specific customers

The following diagram illustrates a common deployment of an SCE platform in a network.

Figure 1-1 SCE Platform in the Network



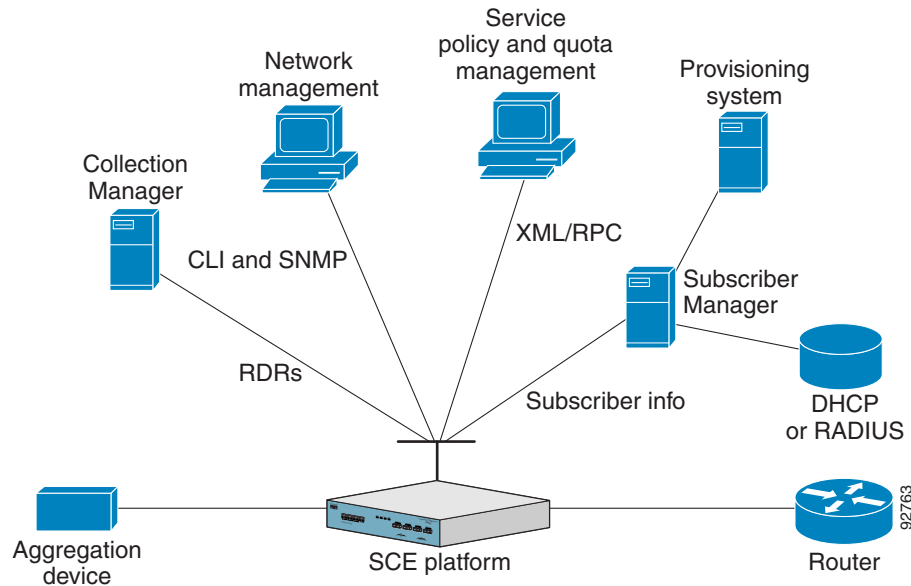
Information About Management and Collection

The Cisco Service Control solution includes a complete management infrastructure that provides the following management components to manage all aspects of the solution:

- Network management
- Subscriber management
- Service Control management

These management interfaces are designed to comply with common management standards and to integrate easily with existing OSS infrastructure.

Figure 1-2 Service Control Management Infrastructure



Network Management

Cisco provides complete network FCAPS (Fault, Configuration, Accounting, Performance, Security) Management.

Two interfaces are provided for network management:

- Command-line interface (CLI)—Accessible through the Console port or through a Telnet connection, the CLI is used for configuration and security functions.
- SNMP—Provides fault management (via SNMP traps) and performance monitoring functionality.

Subscriber Management

Where the Cisco Service Control Application for Broadband (SCA BB) enforces different policies on different subscribers and tracks usage on an individual subscriber basis, the Cisco Service Control Management Suite (SCMS) Subscriber Manager (SM) may be used as middleware software for bridging between the OSS and the SCE platforms. Subscriber information is stored in the SM database and can be distributed between multiple platforms according to actual subscriber placement.

The SM provides subscriber awareness by mapping network IDs to subscriber IDs. It can obtain subscriber information using dedicated integration modules that integrate with AAA devices, such as Radius or DHCP servers.

Subscriber information may be obtained in one of two ways:

- Push Mode—The SM pushes subscriber information to the SCE platform automatically upon logon of a subscriber.
- Pull Mode—The SM sends subscriber information to the SCE platform in response to a query from the SCE platform.

Service Configuration Management

Service configuration management is the ability to configure the general service definitions of a service control application. A service configuration file containing settings for traffic classification, accounting and reporting, and control is created and applied to an SCE platform. The SCA BB application provides tools to automate the distribution of these configuration files to SCE platforms. This simple, standards-based approach makes it easy to manage multiple devices in a large network.

Service Control provides an easy-to-use GUI to edit and create these files and a complete set of APIs to automate their creation.

Data Collection

The Cisco Service Control solution generates usage data and statistics from the SCE platform and forwards them as Raw Data Records (RDRs), using a simple TCP-based protocol (RDR-Protocol). The Cisco Service Control Management Suite (SCMS) Collection Manager (CM) software implements the collection system, listening in on RDRs from one or more SCE platforms and processing them on the local machine. The data is then stored for analysis and reporting functions, and for the collection and presentation of data to additional OSS systems such as billing.



CHAPTER 2

Introducing the Subscriber Manager

This module describes the Subscriber Manager solution, the handling of subscribers, and the fundamentals and management of the SM application.

Information About the Subscriber Manager

The Subscriber Manager (SM) is a middleware software component that supplies subscriber information for multiple SCE platforms in deployments where dynamic subscriber awareness is required. It does this in one of two ways:

- By pre-storing the subscriber information
- By serving as a stateful bridge between an AAA system or a provisioning system and the SCE platforms

The SCE platforms use subscriber information to provide subscriber-aware functionality, per-subscriber reporting, and policy enforcement.

Some Cisco Service Control solutions can also operate without subscriber awareness:

- Subscriber-less—Control- and link-level analysis functions are provided at a global device resolution.
- Anonymous subscriber—The system dynamically creates "anonymous" subscribers per IP address. User-defined IP address ranges may then be used to differentiate between anonymous subscribers policies.
- Static subscriber awareness—Subscriber awareness is required, but allocation of network IDs (mainly IP addresses) to subscribers is static.

In these three modes, the SCE platform handles all subscriber-related functionality and an SM module is not required.



Note

Starting with SM version 2.2, you can configure the SM to operate either with or without a cluster of two SM nodes. The added functionality when operating in a cluster topology provides powerful new features such as fail-over and high availability. The information in most of this module is applicable whether using a cluster or not. However, for clarity, information that is applicable only when using a cluster is presented in the [Subscriber Manager Fail-Over, page 3-1](#) module.

Subscribers in the Cisco Service Control Solution

A *subscriber* is defined as a managed entity on the subscriber side of the SCE platform, to which accounting and policy are applied individually. The subscriber side of the SCE platform is the side that points to the access or downstream part of the topology, as opposed to the network side of the SCE platform, which points to the core of the network.

Information About Handling Subscribers

The SM addresses the following issues in allowing dynamic subscriber awareness:

- **Mapping**—The SCE platform encounters flows with network IDs (IP addresses) that change dynamically, and it requires dynamic mapping between those network IDs and the subscriber IDs. The SM database contains the network IDs that map to the subscriber IDs. This is the main functionality of the SM. Starting from version 3.1.5 the subscriber mappings are enhanced to support private IP addresses within a VPN in addition to pure IP addresses. See [Information About Handling VPNs, page 2-6](#) for more information.
- **Policy**—The SM serves as a repository of policy information for each subscriber. The policy information may be preconfigured to the SM, or dynamically provisioned when the mapping information is provided.
- **Capacity**—The SCE platform or platforms may need to handle (over time) more subscribers than they can concurrently hold. In this case, the SM serves as an external repository for subscriber information, while only the online or active subscribers are introduced to the SCE platform.
- **Location**—The SM supports the functionality of sending subscriber information only to the relevant SCE platforms, in case such functionality is required. This is implemented using the domains mechanism or the Pull mode (see [Pull Mode, page 2-9](#)).

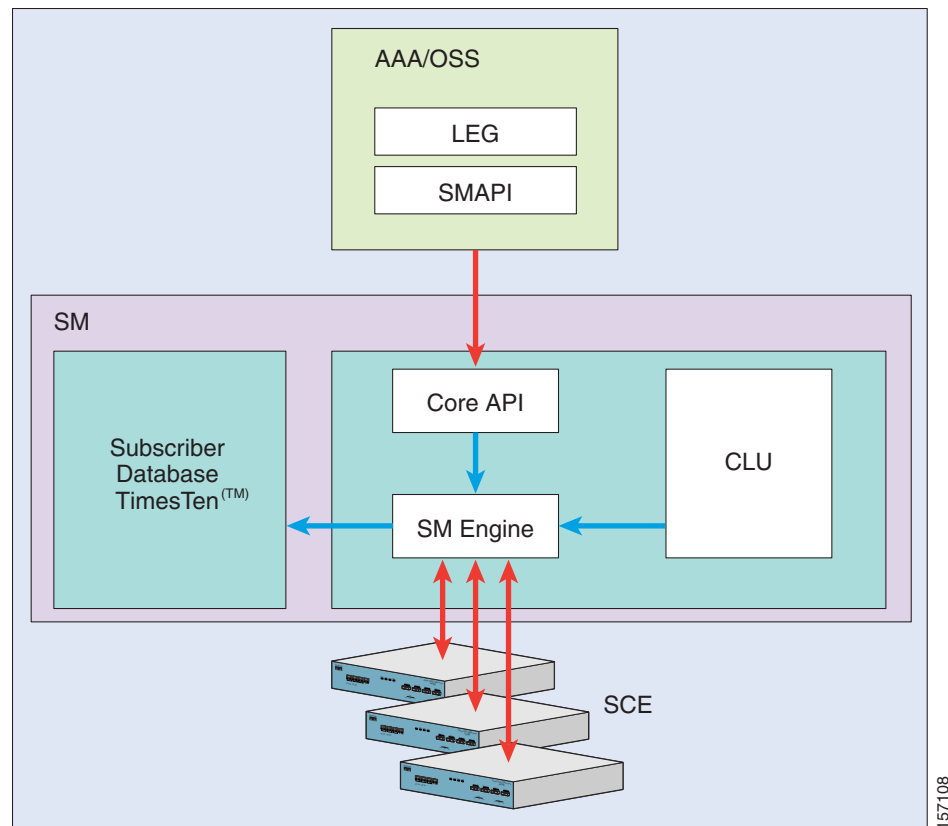
The SM database (see [SM Database, page 2-5](#)) can function in one of two ways:

- As the only source for subscriber information when the SM works in standalone mode
- As a subscriber information cache when the SM serves as a bridge between a group of SCE devices and the customer Authentication, Authorization, and Accounting (AAA) and Operational Support Systems (OSS).

Flow of Subscriber Information

The following figure shows the flow of subscriber information through the SM.

Figure 2-1 Flow of Subscriber Information



The flow takes place as follows:

- Subscriber information enters the SM in one of two ways:
 - Automatically upon the subscriber going online—A Login Event Generator (LEG) software module that integrates with the customer AAA system (such as DHCP Server, RADIUS, or Network Access System (NAS)) identifies a subscriber login event, and sends it to the SM by using the SM API.
 - Manual setup—Subscriber information is imported into the SM from a file or by using the Command-Line Utilities (CLU).
- Automatic and manual modes can be combined. For example, all subscribers may be loaded to the SM via manual setup, and a subset of the subscriber record (domain, network ID, and so on) changed automatically through the SM API.
- In automatic mode, the SCMS SM Java or C/C++ APIs are used for delegating subscriber information to the SM (see the *Cisco SCMS SM Java API Programming Guide* or the *Cisco SCMS SM C/C++ API Programming Guide*).

- The SM Engine:
 - Stores subscribers in the subscriber database
 - Introduces subscriber information to SCE Platforms
- The information may be passed automatically to the SCE platform, or it may reside in the SM database until the SCE platform requests the information.

The SM may be configured with more than one SCE platform. These SCE platforms may be grouped into domains. Each domain represents a group of SCE platforms that serve the same group of subscribers.

Number of Subscribers in the SM

The subscribers of the service provider may be divided into the following logical types (at any given moment):

- Offline subscriber—A subscriber that currently does not have any IP address and as such does not generate any IP traffic. Such subscribers are not stored in the SCE platform.
- Online subscriber—A subscriber that is currently online. At any particular time, a certain number of online subscribers will be idle, that is, connected to the service provider but not generating any IP traffic.
- Active subscriber—An online subscriber that is generating IP traffic (such as by browsing the Internet or downloading a file).

In addition, the total number of subscribers is all the subscribers whose IP traffic might be traversing through the SCE platforms in a specific deployment.

There are four general scenarios for a network system using the SCE platforms:

- Total number of subscribers can be statically stored in a single SCE platform.
This is the simplest, most reliable scenario. It may not require the use of the SM.
- Total number of subscribers exceeds the capacity of the SCE platform, but the number of online subscribers predicted at any time can be statically stored in the SCE platform.
It is recommended to use the SM in Push mode. See [Push Mode, page 2-8](#).
- Number of online subscribers exceeds the capacity of the SCE platform, but the number of active subscribers predicted at any one time can be statically stored in the SCE platform.
The SM must be used in Pull mode. See [Pull Mode, page 2-9](#).
- Number of active subscribers predicted at any one time exceeds the capacity of the SCE platform.
Multiple SCE devices must be installed to divide the subscribers among the SCE platforms. If the system is divided into domains (see [Domains, page 2-12](#)), so that the SM knows in advance to which SCE platform a particular subscriber should be sent, Push mode may be used. Otherwise, Pull mode is required.

For specific scenarios using the SM with multiple servers and/or SCE platforms, see [System Configuration Examples, page 4-8](#).

SM Database

The SM uses a commercial relational database from TimesTen, optimized for high performance and with a background persistency scheme. The In-Memory Database efficiently stores and retrieves subscriber records.

A subscriber record stored in the SM Database (SM-DB) consists of the following components:

- Subscriber name (key)—A string identifying the subscriber in the SM. Maximum length: 64 characters. This can be case-sensitive or case-insensitive depending on the configuration file. By default, the database is case-sensitive. If the database is case-insensitive, the SM will convert the name to lower case when updating or querying the database.
- Domain (secondary key)—A string that specifies which group of SCE devices handles this subscriber.
- Subscriber network IDs (mappings)—A list of network identifiers, such as IP addresses. The SCE uses these identifiers to associate network traffic with subscriber records.
- Subscriber policy—A list of properties that instruct the SCE what to do with the network traffic of this subscriber. The content of this list is application specific.
- Subscriber state (for example, quota used)—A field that encodes the subscriber state, recorded by the last SCE, to handle the network traffic of this subscriber.

You can access the subscribers using one of two indexes:

- Subscriber name
- Subscriber name + domain

Note that in cluster redundancy topology, the active machine database replicates the subscriber data to the standby machine database. For additional information, see the [Subscriber Manager Fail-Over, page 3-1](#) module.

Subscriber ID

The Subscriber ID is a string representing a subscriber that is a unique identifier for each subscriber from the customer perspective. For example, it may represent a subscriber name or a CM MAC address. This section lists the formatting rules of a subscriber ID.

It can contain up to 64 characters. All printable characters with an ASCII code between 32 and 126 (inclusive) can be used; except for 34 ("), 39 ('), and 96 (^).

For example:

```
String subID1="john";
String subID2="john@yahoo.com";
String subID3="00-B0-D0-86-BB-F7";
```

Information About Handling VPNs

A VPN is a named entity that is added to the SM and contains VPN mappings. A VPN may contain several MPLS/VPN mappings, or a single VLAN mapping. Subscribers that are part of a VPN do not contain VPN mappings directly, instead they contain a set of IP mappings of the form IP@VPN.

The SM addresses the following issues in allowing dynamic VPN awareness:

- Mapping—A set of MPLS-VPN mappings, or a single VLAN mapping.
 - A VLAN mapping comprises a simple VLAN-ID.
 - MPLS-VPN mappings are comprised of the Provider Edge (PE) router loopback IP address, the Route Target (RT) or Route Distinguisher (RD), downstream labels, and the IP ranges that correspond to the label.



Note

A single VPN cannot hold both mapping types.

- Location—The SM supports sending VPN information only to the relevant SCE platforms, if this is required. This is implemented using the domains mechanism. The domain of a subscriber within a VPN must be identical to the VPN's domain.

VPN entities are supported only when the SM is configured to work in "Push Mode".

Management of VPN with VLAN Network IDs

VPNs with VLAN network IDs are managed using one of the following methods:

- Statically—Using the SM CLU.
- Automatic creation of the VPN—When a network ID of the form IP@VLAN-Id is added to a subscriber with a VLAN-Id that does not exist in the SM, the SM automatically creates a VPN with the specified VLAN-Id. The VPN name is set to the VLAN-Id value, and the VPN domain is set to the same domain as the subscriber. The benefit of this feature is that there is no need to manually configure VPNs with VLAN network IDs as they will be added automatically.

Management of VPN with MPLS/VPN Network IDs

VPNs with MPLS/VPN network IDs are managed using all of the following methods:

- Statically—Initially, the VPNs are added to the SM using their static information (i.e. the PE IP address, and the RT/RD values). This step is performed using the SM CLU.

The notation used for the MPLS/VPN mappings is RT/RD@PE-IP; e.g., 1000:1@10.10.10.10 represents a VPN with RT/RD 1000:1 of the PE router whose loopback IP address is 10.10.10.10.
- Dynamically—The BGP LEG is then responsible for adding the dynamic VPN information (i.e. the downstream label and its corresponding IP range). The dynamic information is added and removed in real-time according to the BGP updates in the network. Dynamic MPLS/VPN information is only added and stored in the SM database for VPNs that were configured statically during the previous stage.

The SCE only holds the downstream label and the PE IP for each VPN since it is the only information that is relevant for matching the flows to the subscribers. The RT/RD are used by the SM only to correctly correlate the VPN entity to the downstream labels.

Management of Subscribers with IPs over VPN

A subscriber can hold one or more of the following network ID specifications:

- **IP@VPN-name**—The IP can be a single IP or an IP range.
Overlapping IP ranges within a VPN are allowed. Mapping of a range to a subscriber is based on the longest prefix match.
- **Community@VPN-name (MPLS/VPN only)**—This network ID is used to automatically add IP ranges to subscribers (CE as subscriber mode).

Subscribers with IPs over VPN are managed using one of the following methods:

- **Statically**—Using the SM CLU
- **Dynamically**—Using the RADIUS listener, or the SM API

Subscribers with communities over VPN are used to handle the traffic of a specific customer edge (CE) router of an MPLS/VPN network. The BGP community field is used to correlate the IP routes with the CE router. The subscriber is configured with a list of communities within the VPN using the syntax 'community@VPN'. When the BGP LEG analyzes the BGP session, it also extracts the community field and adds all the IP routes in the BGP message to the subscriber that contains the same community field.

For example, suppose the following subscriber and VPN are configured in the SM:

- **VPN**—vpn1 with mappings 1000:1@10.10.10.10
- **Subscriber**—sub1 with mappings 100:100@vpn1

If a BGP update is received for VPN 1000:1@10.10.10.10 with label 10 and IP range 1.1.1.0/24, the BGP LEG adds label 10 to the mappings of vpn1, and the IP range 1.1.1.0/24@vpn1 to the mappings of sub1. The SM updates the SCE with the new MPLS label 10 of vpn1, and the new IP range 1.1.1.0/24 of sub1.

A subscriber can hold an IP@VPN network ID and a community@VPN network ID at the same time.

Information About SM Fundamentals

- [The SM API, page 2-8](#)
- [The SM Login Event Generators, page 2-8](#)
- [Information About Subscriber Introduction Modes, page 2-8](#)
- [SCE Subscriber Synchronization, page 2-11](#)
- [SCEQuarantine, page 2-11](#)
- [Working with Cascade SCE Setups, page 2-11](#)
- [Domains, page 2-12](#)
- [Information About Communication Failures, page 2-12](#)
- [SM Cluster, page 2-13](#)

The SM API

Use the SM API for:

- Altering the fields of an already existing subscriber record
- Setting up new subscribers in the SM
- Performing queries

The SM API is provided in C, C++, and Java. It serves as the bottom-most layer of every LEG.

SM API programmer references are provided in the *Cisco SCMS SM C/C++ API Programmer Guide* and the *Cisco SCMS SM Java API Programmer Guide*.

The SM Login Event Generators

The SM Login Event Generators (LEGs) are software components that use the SM API to generate subscriber-record update messages (such as login/logout) and send them to the SM. LEGs are usually installed with AAA/OSS platforms, or with provisioning systems. They translate events generated by these systems to Cisco Service Control subscriber update events.

The unique functionality of each LEG depends on the specific software package with which it interacts. For example, RADIUS LEGs, DHCP LEGs, or some provisioning third party system LEGs may be implemented. LEGs can set up subscribers or alter any of the fields of an existent subscriber record.

You can connect multiple LEGs to a single SM. Conversely, a single LEG can generate events for multiple domains.

Information About Subscriber Introduction Modes

As illustrated in [Figure 2-1](#), the SM introduces subscriber data to the SCE platforms. This operation functions in one of two modes:

- Push—This is the simpler and recommended mode.
- Pull—Use this mode only in special cases, as explained below.

Push or Pull mode is configured for the entire SM system.

For information detailing the configuration of the subscriber integration modes, see [SM General Section, page A-3](#).

Push Mode

In Push mode, immediately after adding or changing a subscriber record, the SM distributes, or pushes, this information to the relevant SCE platforms, as determined by the subscriber domain. When the subscriber starts producing traffic through the SCE platform, it is ready with the required subscriber information.

In some scenarios, factors such as capacity limitations make it impossible to use Push mode.



Note

Use Push mode only if all online subscribers associated with a domain can be loaded simultaneously into all the SCE platforms in the domain.

Pull Mode

In Pull mode, the SCE platforms are not notified in advance of subscriber information. When an SCE platform cannot associate the IP traffic with a subscriber, it will request, or pull, the information from the SM.

The advantage of Pull mode is that there is no need to know in advance which SCE platform serves which subscriber.

The disadvantages of Pull mode are:

- Increased communication in the SM-SCE link
- Increased load on the SM, as it processes incoming requests from both the SCE device and the LEG.

**Note**

By default, the SCE does not request subscriber information from the SM. You must configure anonymous groups in the SCE for the set of IP ranges that should be requested from the SM. See the SCE User Guide for more details on anonymous subscriber groups.

**Note**

Pull mode must be used when all online subscribers associated with a domain exceed the capacity of the SCE platforms in the domain (but the number of active subscribers can still be loaded into the SCE platforms in the domain).

The following table summarizes the differences between the Push mode and Pull mode:

Table 2-1 Differences Between Push Mode and Pull Mode

Aspect of Use	Push Mode	Pull Mode
When to use	For simple provisioning of subscriber information to the SCE platform	For real-time, on-demand subscriber information retrieval Used in large scale deployments: <ul style="list-style-type: none"> • When there is no way of knowing from the IP assignment process which SCE platform will be serving a particular subscriber • When the required number of logged-in subscribers is greater than the number of concurrently active subscribers that the SCE platform can handle
Functional flow at access time	<ul style="list-style-type: none"> • Subscriber network login or access • From subscriber information to LEG to SM • From SM to the relevant SCE platforms 	<ul style="list-style-type: none"> • Subscriber network login or access • From subscriber information to LEG to SM (hold in the SM database) • When the subscriber starts producing traffic that traverses the SCE platform SCE platform asks for the subscriber information • From SM (SM database) to SCE platform
Subscriber information at the SCE platform	SCE platform always has current subscriber information: <ul style="list-style-type: none"> • Immediate policy enforcement • Real-time system architecture 	SCE gets subscriber information on demand

SCE Subscriber Synchronization

The SM includes a mechanism to ensure that the SCE platforms' subscriber information is synchronized with the information in the SM database. This mechanism is activated in the following cases:

- When the SM reconnects to the SCE platform and the standby SCE within the cascade pair is not synchronized.
- After SCA BB application installation.
- If specifically requested by the user, see [Information About the p3net Utility, page B-15](#).

SCEQuarantine

From SM version 3.1.0, the SM can put an SCE into a quarantine state. This action is taken in extreme cases when the SM automatically detects that the SCE has a problem and is causing back-pressure of logon events to the SM. This action prevents the SCE from causing problems for the SM when managing subscriber information for all of the other SCEs in the network.

When the SCE is quarantined, the SM does the following:

- Disconnects from the SCE to allow the SCE to resolve the problem.
Waits for the quarantine-timeout period (starting at a minute).
- After the timeout expires the connection to the SCE is re-established and the SCE is put into a post-quarantine state for another ten minutes.

If another failure occurs within the post-quarantine-timeout period, the quarantine-timeout is doubled. The quarantine state transition is logged to the user log.

The `p3net --connect` CLU resets the quarantine state immediately.

Working with Cascade SCE Setups

From SM version 3.1.0, the SM handles cascaded SCEs as a cascade pair and not as two separate SCEs and utilizes the SCE's ability to duplicate the subscriber data between the SCEs by updating only the active SCE.

The SM connects to both SCEs but sends logon operations to only the active SCE. Similarly, the SM performs subscriber synchronization with only the active SCE.

The standby SCE learns about the subscribers from the active SCE, which allows stateful fail-over. The SM identifies a fail-over event and synchronizes the SCE that became active so that it will receive the most updated subscriber information.

Domains

The SM provides the option of partitioning SCE platforms and subscribers into subscriber domains.

The motivation for the domains concept is for enabling a single SM to handle several separate network sections, and for better control of subscriber introduction to the SCEs.

A subscriber domain is a group of SCE platforms that share a group of subscribers. The subscriber traffic can pass through any SCE platform in the domain. A subscriber can belong to only a single domain. Usually a single SCE platform serves a subscriber at any given time.

Domains are managed differently in the Push and Pull modes:

- In Push mode, all the subscribers in a subscriber domain are sent to all SCEs in the domain. The main reason for the number of SCE platforms in a single domain is redundancy.
- In Pull mode, the pull requests are handled only for subscribers in the domain of the pulling SCE platform. In Pull mode, usually a single domain covers all the subscribers.
- From SM version 3.1.0, subscribers can be moved between domains in a process known as automatic domain roaming. After receiving an update that an existing subscriber has switched domain:
 - In Push mode, the subscriber is automatically logged out from the old domain and then logged in to the new domain.
 - In Pull mode, the subscriber is automatically logged out from the old domain.



Note

Automatic domain roaming is not backward compatible with previous SM behavior.

The system is configured with one default subscriber domain called "subscribers". When adding an SCE platform to the SM, it is automatically added to this default domain, unless otherwise specified. Subscribers are also associated with this default subscriber domain, unless otherwise specified. To associate a subscriber with a different domain, first define this domain in the configuration file, and then explicitly specify it when adding the subscriber to the SM. To associate an SCE platform with a non-default subscriber domain, edit and reload the configuration file. For more information, see [Configuration and Management, page 4-1](#).

Information About Communication Failures

A communication failure may occur either on the LEG-SM communication link or on the SM-SCE communication link. A communication failure may occur due to a network failure or because the SCE, SM, or LEG has failed. High availability and recovery from an SM failure are discussed in [SM Cluster, page 2-13](#).

When configuring the system, you should consider three issues related to communication failures:

- Communication failure detection—A timeout after which a communication failure is announced
- Communication failure handling—The action to be taken when communication on the link fails
- Communication failure recovery—The action to be taken when communication on the link resumes

Failure Detection Mechanism

Either one of two mechanisms detects a communication failure:

- Monitoring the TCP socket connection state. All peers do the monitoring.
- Using a keep-alive mechanism at the PRPC protocol level

Failure Handling Mechanism

There are two configuration options for handling communication failures:

- Ignore communication failures
- Erase the subscriber mappings in its database and start handling flows without subscriber awareness

Erasing the mappings in the database is useful when you want to avoid incorrect mappings of subscribers to IP addresses. This configuration is implemented by requesting to clear all mappings upon failure.

Failure Recovery Mechanism

The SM recovers from communication failures by resynchronizing the SCE platform with the SM database.

SM Cluster

The SM supports high availability using the Veritas Cluster Server (VCS) technology. In a high availability topology, the SM software runs on two machines, designated as the active machine and the standby machine. Subscriber data is continuously replicated from the active to the standby machine, ensuring there is minimal data loss in case of active SM failure. When the active machine fails, the standby machine discovers the failure and becomes active. For additional information, see the [Subscriber Manager Fail-Over, page 3-1](#) module.

SM Management

SM management includes configuration, fault management, logging management, and performance management.

Configure the SM using the following:

- Configuration file (**p3sm.cfg**)—For setting all configuration parameters of the Subscriber Manager.



Note

Changes that you make in the configuration file take effect only when you load the configuration file using the Command-Line Utilities (CLU) or when you restart the SM.

- For a detailed description of this file, see [Configuration File Options, page A-1](#).
- Command-Line Utilities (CLU)—For ongoing subscriber management and monitoring of the SM. CLU commands are shell tools that you can use to manage subscribers, install or update applications, retrieve the user log, and load the configuration file when updated.

For a complete description of the Command Line Utilities, see [Command-Line Utilities, page B-1](#).

The CLU can be invoked locally, through a Telnet (or SSH) session to the SM hosting platform.

Use the SM user log files for logging, fault, and performance management. The log file contains information regarding system events, failures, and periodic system performance reports.

Subscriber Manager Fail-Over

You can configure the SM to operate with or without a cluster. The added functionality when operating in a cluster topology provides powerful new features such as fail-over and high availability. For full details, see [Subscriber Manager Fail-Over, page 3-1](#).



CHAPTER 3

Subscriber Manager Fail-Over

This module describes topics that are related to using the Subscriber Manager together with clusters and redundancy.

As the Subscriber Manager plays a critical role in the Cisco SCA BB solution that is deployed in tier-one service provider environments, it also supports, starting with SM version 2.2, a fail-over operational mode. This feature minimizes system downtime that is caused by SM failure (as further discussed in [Information About Subscriber Manager Fail-Over, page 3-1](#)).

This section introduces various concepts that are related to using a cluster of two SM nodes in a fail-over operational mode.



Note

For the purposes of this section, it is assumed that the reader is familiar with the Veritas Cluster technology.

Information About Subscriber Manager Fail-Over

- [Overview, page 3-2](#)
- [Normal Operation, page 3-2](#)
- [Fail-Over Topology, page 3-3](#)
- [Fail-Over Operation, page 3-4](#)

Overview

The fail-over scheme that is implemented in the SM is based on the Veritas cluster technology. The cluster includes two machines, each of them running SM TimesTen and Veritas software. The Veritas Cluster Server (VCS) software consolidates the SMs and exposes a single entity by providing a single virtual IP address for the entire cluster.

The cluster software distinguishes an active and a standby machine: the active machine "owns" the virtual IP address and all network connections, while the standby machine is passive until a fail-over occurs. At fail-over, the IP address is passed from the failing server to the backup server, which becomes activated and re-establishes all network connections.

When a fail-over occurs, the LEGs lose their connection with the failed SM, and reconnect to the activated (backup) SM and retransmit their uncommitted messages. The activated SM connects to the SCE platforms and performs an SCE resynchronization.

The TimesTen database replication agent constantly replicates the SM database from the active node to the standby node. This enables a fast fail-over from one SM to another, since the subscriber data in the activated machine is always valid. The two SM nodes do not communicate except for passing the subscriber data.

The VCS uses software components called "cluster agents" to monitor and control the state of resources such as Network Interface Cards (NICs), disks, IP addresses, and processes. Cisco supplies cluster agents to monitor the SM and the TimesTen database daemon and replication agent.

As part of the cluster operation, the TimesTen database daemon and replication agents are up and running regardless of the fail-over state. The SM Veritas agent monitors the daemon and the replication agent process. In case one of them fails, a fail-over takes place.



Note

The SM software configuration on both the active and the standby machines must be *identical*. Apply the same configuration file and the same application PQI module to both machines.

The following sections describe these concepts in further detail.

Normal Operation

The two SM nodes operate in hot-standby mode, where at any given time one node (the active node) receives and processes all the SM events, while the other node (the standby node) waits and is ready to go into operation on fail-over. For enabling seamless fail-over and for minimizing the fail-over time, the two SM nodes operate without an external storage device.

During the normal operation of the cluster, the active node (selected by the cluster):

- Performs all SM functionality of a non-cluster environment
- Provides "health" information for the cluster agent
- Periodically replicates its subscriber database to the standby node

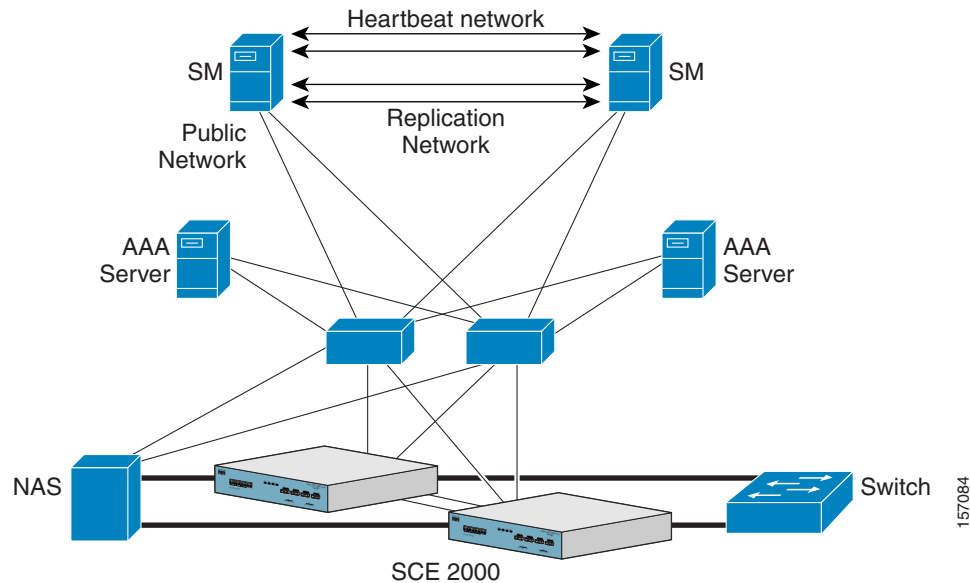
On the standby node, both the SM and the TimesTen software are running:

- The SM is fully configured. (It is applied with the same configuration file and PQI application module as the active node, but does not interfere with the active node's work.)
- The SM connects to the TimesTen database, but does not connect to the LEG and the SCE devices.
- The TimesTen software is operating as a replication client for the subscriber database, receiving and applying updates from the active node's TimesTen software.

Fail-Over Topology

The following figure depicts an SM cluster configuration in a topology with a redundant AAA server and two SCE 2000 platforms that are cascaded for redundancy.

Figure 3-1 SM Cluster Configuration for Fail-Over Topology



As already mentioned, an SM fail-over topology includes two SM nodes connected in a cluster scheme. Two dedicated (private) redundant networks interconnect the two nodes:

- Heartbeat network—Used by the Veritas Cluster Server to perform cluster monitoring and control.
- Replication network—Used by the replication process to pass the subscriber records.

The two nodes should be located in the same site, where the heartbeat network is implemented using back-to-back connectivity between the two nodes or via redundant switches. Each node in the cluster has redundant network paths (NICs) connecting it to all of the external entities with which the SM communicates (AAA, LEG, SCE).

Each node in the cluster has a minimum of six Ethernet NICs, where:

- Two NICs are used for the (private) heartbeat network
- Two NICs are used for the (private) replication network
- Two NICs are used for the public network (connectivity to SCEs and LEGs, and management of the SM)

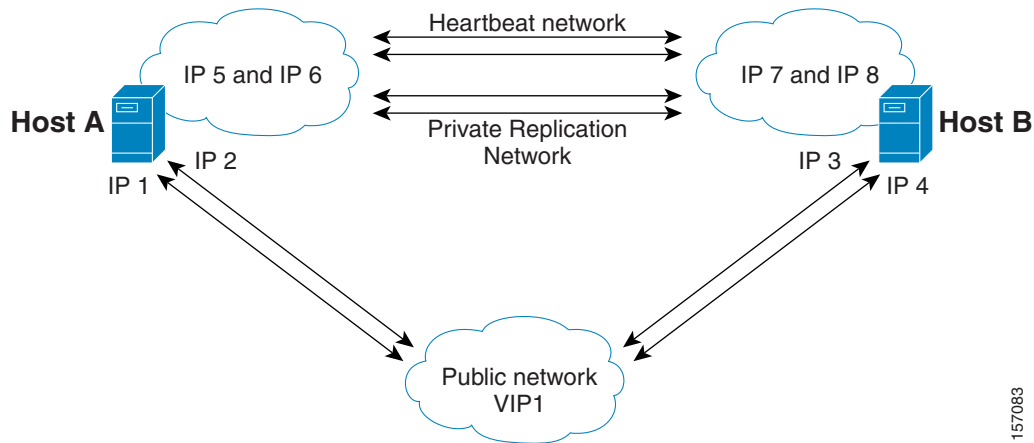
The cluster has a virtual IP (VIP) address used for communication with the external entities. Each node in the cluster has also an IP address for administration of the node/cluster, as well as an IP address for replication use.

Upon failure of the primary NIC of the public network, there is a fail-over to the secondary NIC on the same node, keeping the same IP addresses (VIP1), with no fail-over of the cluster. Upon failure of the primary NIC of the replication or heartbeat networks, there is fail-over to the secondary NIC on the same node, keeping the same IP addresses (VIP2 and VIP3), with no fail-over of the cluster.

The following diagram illustrates the usage of the regular and virtual IP addresses used in cluster configuration:

- Administration of the nodes uses IP1/IP2 and IP3/IP4 respectively.
- The cluster IP address for external clients over the public network uses VIP1.

Figure 3-2 Regular and Virtual IPs in Cluster Configuration



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For further information about replication IP configuration, see [Veritas Cluster Server, page E-1](#).

Fail-Over Operation

During normal operation, the Veritas Cluster Server mechanism automatically selects one of the SM servers to be active and the other to be standby.

The active SM server performs all the normal SM functionality. The two servers maintain the heartbeat mechanism between them, and the active server continuously replicates the subscriber database to the standby server's database.

The standby SM server acts as a hot-standby machine, so it is completely ready for taking over (becoming activated) in a minimal fail-over time.

The following types of failures trigger the fail-over mechanism:

- SM application failure, including failure of the TimesTen database.
- Failure of the TimesTen daemon of the TimesTen replication process.
- SUN server failure, due to failure of one of the resources of the server; for example, failure of both of the public network NICs.
- Manual activation of fail-over.



Note

Communication failure does *not* cause a fail-over if there is a redundant NIC. Therefore, because each SUN machine has two NICs for connecting to external devices, a failure of one of the NICs merely causes switching to the redundant NIC, without activating the fail-over mechanism.

After detecting a failure, the standby SM becomes activated, and the following occurs:

- The activated SM takes over the IP resources of the virtual IP mechanism.
- The LEGs reconnect to the activated SM.
- The activated SM creates IP connections with the SCEs and resynchronizes with them.
- The activated SM starts processing information that is sent from the different LEGs and forwards it to the SCEs.

How to Recover from Fail-Over

Different types of failures require different triggering for the recovery procedure. Some failures may recover automatically such as intra-node ports link-failure, which recovers automatically when the link revives, while others may need manual intervention.

Recovery may take place when an SM that experienced a failure is self-recovered or after it was replaced (if needed). The purpose of the recovery procedure is to take the cluster back to a fully functional mode. When the recovery procedure ends, the behavior is the same as it was after installation.

The failed SM server is recovered manually or automatically, according to the type of failure that occurred. The recovery procedures, and when they are used, are described in the following sections.

- [Machine Reboot, page 3-5](#)
- [Replacing the Server, page 3-6](#)
- [Database Duplication Recovery, page 3-6](#)
- [Database Duplication Recovery Management, page 3-7](#)

Machine Reboot

Recovering from a machine reboot is a fully automatic recovery process, where the failed SM server reboots, and after establishing a connection with the other server and synchronizing the databases, the cluster of the two SM servers is ready again for fail-over operation.



Note

This steps in this procedure are automatic.

-
- Step 1** The reboot process is run on the node.
- Step 2** VCS makes the node standby.
- Step 3** The node boots.
- Step 4** VCS establishes intra-node communication and the new node joins the cluster.
- Step 5** The TimesTen database replication process is started from the point before the reboot.
- The SM in the recovered server is ready after the database recovery process is running and the SM moves from Init state to Standby state.
-

Replacing the Server

Replacing the server is necessary when the machine has an unrecoverable physical failure. A new machine that is installed with fresh SM, TimesTen, and VCS installations replaces the server.

Replacing the server is a manual recovery, where the failed SM server is physically replaced. After connecting the new SM server to the network, configuring it and synchronizing the two databases, the cluster of the two SM servers is ready again for fail-over operation.

-
- Step 1** Connect a new server to the inter-node ports and intra-node ports (but leave the network ports disconnected).
 - Step 2** Perform the basic network and cluster configurations manually (the first time).
 - Step 3** Copy the configuration files from the active node.
Use the following CLU command if you need to copy only the **p3sm.cfg** file:

```
p3sm --load-config --remote= NEW-SM_IP
```
 - Step 4** Perform the TimesTen database duplication operation.
See [Database Duplication Recovery, page 3-6](#).
 - Step 5** Start the VCS operation on the recovered node.
 - Step 6** Connect the network ports.
The SM in the recovered server is ready after the database recovery process is completed and the SM moves from Init state to Standby state.
-

Database Duplication Recovery



Database duplication recovery is a manual recovery, which is needed when the standby node database loses synchronization with the active node database. Loss of synchronization can occur when one of the SM machines is replaced or when the replication process on the active node fails to replicate all of the data inserted to its database (replication NICs were disconnected).

-
- Step 1** Stop the cluster server (VCS) monitoring of the resources.
Use the VCS CLU **hastop -local** command to stop the VCS.
 - Step 2** Stop the SM, so it will not be affected by clearing the database.
Use the CLU command **p3sm --stop**.
 - Step 3** Stop the replication agent.
Use the CLU command **p3db --rep-stop**.
 - Step 4** Destroy the database.
Use the CLU command **p3db --destroy-rep-db**.

- Step 5** Duplicate the remote database to the local machine.
Use the CLU command **p3db --duplicate**.
- Step 6** Start the cluster server monitoring of the resources.
Use the VCS CLU **hastart** command), which will automatically start the replication process and the SM.

Database Duplication Recovery Management

The two SM servers are configured using Command-Line Utilities and a configuration file (see [Configuration and Management, page 4-1](#) and [How to Configure a Subscriber Management Solution, page 4-3](#)). The actual configuration is performed for the active SM and then manually replicated for the standby SM.

- Step 1** Establish an FTP connection between the active and standby machines.
- Step 2** Copy the configuration file.
Copy the configuration file from `~pcube/sm/server/root/config/p3sm.cfg` on the active node to the standby node, and apply the SM configuration file by using the CLU command **p3sm --load-config**.
Alternatively, you can replicate the SM configuration file to the standby machine by running the CLU command **p3sm --load-config --remote=NEW-SM_IP**
- Step 3** Copy the application PQI file you installed on the active node to the standby node.
- Step 4** Install the PQI file.
Use the CLU command **p3inst --install -f PQI file path**.
- Step 5** Manually copy the database-related configuration files to the required location.
If you have made changes in the database-related configuration files, copy the files to `/etc/system` (for Solaris) or to `/etc/sysctl.conf` (for Linux), and `/var/TimesTen/sys.odbc.ini` from the active node to the standby node.
-
-  **Note** If you this step, a reboot of the standby node is required.
-
-  **Note** If the database is located in different directories in the two nodes, then the files `sys.odbc.ini` in both nodes are not identical and the actual parameter changed in the file must be copied.
-
- Step 6** Configure and administer the Veritas Cluster Server using Veritas tools.
Notifications are enabled through SNMP traps that the Veritas Cluster Server provides. The Veritas Cluster Server supports SNMP traps such as:
- Fatal failure detected (local or remote)
 - Secondary node starts fail-over procedure
 - Secondary node is operational (end of fail-over)



CHAPTER 4

Configuration and Management

This module describes how to configure and manage the SM.

- [Information About SM Configuration and Management Methods, page 4-1](#)
- [How to Configure a Subscriber Management Solution, page 4-3](#)
- [How to Use the CLU, page 4-13](#)

Information About SM Configuration and Management Methods

Configure and manage the Subscriber Manager using:

- [Configuration File, page 4-1](#) —Used for configuring the parameters that define the system behavior.
- [Command-Line Utilities, page 4-2](#) —Used mainly for viewing and for subscriber management.

The configuration file and Command-Line Utilities (CLU) give you complete control over the SM; including subscriber management, database management, and SCE network configuration and management.

Configuration File

The SM uses a configuration file, **p3sm.cfg**, located in `~pcube/sm/server/root/config/`. For a detailed description of the configuration file parameters, see [Configuration File Options, page A-1](#).

The configuration file, together with the [Command-Line Utilities, page 4-2](#), is used for configuring all the parameters that define the behavior of the SM application.

The configuration file contains the following types of parameters:

- General, system-wide parameters, such as subscriber state saving, persistency, subscriber introduction mode (Pull mode or Push mode), and topology
- Parameters for handling SM-LEG connection failure
- Parameters for handling SM-SCE connection failure
- Parameters for SCE platform configuration

- Parameters for domain configuration
 - Associating domains and SCE platforms
 - Specifying domain aliases
 - Specifying domain properties
- Auto-logout parameters, for controlling automatic logout of subscribers after timeout
- Parameters for RADIUS Listener configuration
 - Specifying NAS configuration
 - Specifying properties configuration
- Parameters for FTP, HTTP, and PRPC server configuration
- Parameters for Cable Adapter configuration
- Parameters for configuring SM operation with the TimesTen database

Usually, the parameters in the configuration file are specified once when setting up the system, and are valid throughout the system lifetime. To modify the configuration file parameters, edit the file using any text editor and reload it using the CLU (see [Reloading the SM Configuration \(p3sm\)](#), page 4-14). The configuration file can be loaded on starting or restarting the SM and by explicitly running the CLU command.

The configuration file is designed so that the same configuration file can be used in multiple SM applications of a high availability setup. This enables the user to replicate the configuration by simply copying the file from one machine to another.

Command-Line Utilities

The SM provides a set of Command-Line Utilities (CLU), which you use, together with the configuration file, to configure the parameters that might change during the operation of the SM.

The CLU enables the user to configure the SM using shells installed on the machine. CLU commands are executable only when the user is logged in to the machine using the **pcube** user account, which is always installed (see [Installation and Upgrading](#), page 5-1). The CLU is used mainly for viewing and for subscriber management.

In high availability setups, you cannot use the CLU to perform subscriber management operations on the standby SM. Moreover, the standby SM refreshes the database before performing subscriber display operations, so the operation takes longer (than for the active SM). Therefore, it is recommended to perform all subscriber operations on the active SM.

This module explains how to perform various tasks using the appropriate CLU, but it does not describe the CLU in detail. For a complete, detailed description of the CLU, see [Command-Line Utilities](#), page 4-2.

How to Configure a Subscriber Management Solution

This section explains the procedure for configuring a Cisco Service Control deployment consisting of several SCE platforms and Subscriber Manager (SM) systems in order to make it ready for subscriber integration.

This section uses the terminology and tools explained in previous chapters and, when needed, terms and configuration tools explained in the SCE 1000 and SCE 2000 User Guides.

- [Configuring the Subscriber Management Solution, page 4-3](#)
- [System Configuration Examples, page 4-8](#)

Configuring the Subscriber Management Solution

This configuration procedure applies to a single group, consisting of the following:

- A Subscriber Manager application
- A set of LEG applications or components that connect to this SM
- The SCE platforms that this SM serves

Every subscriber management solution can be divided into such groups, and this procedure can be applied to each of these groups.

Prerequisites

Before configuring any of the components in your subscriber management solution, verify that all the items on the following checklist have been successfully completed:

- The SCE platforms in your network are installed and configured as explained in the SCE 1000 and SCE 2000 User Guides.
- The SM applications in your network are installed as explained in [Installation and Upgrading, page 5-1](#).
- The Cisco Service Control Application for Broadband (SCA BB) is installed on all SCE platforms and SM systems in your network. See the *Cisco Service Control Application for Broadband User Guide* for an explanation of how to install the Service Control Application on the SCE platforms and SM systems.
- The subscriber integration concept has been determined, and an appropriate solution was designed for driving subscriber mappings and policy information into the SM. This can be implemented automatically using a LEG, or manually using the CLU.
- The subscriber introduction mode (push or pull) has been determined for each SM system, based on the number of subscribers that the relevant SCE platforms should be serving.
- The association between SCE platforms and the relevant SM systems has been determined.
- For each SM system, the association between the SCE platforms that it serves and the subscriber domains has been designed.

Step 1 Edit the SM configuration file **p3sm.cfg** according to your system definition, and reload it using the **p3sm --load-config** command.

Step 2 Configure the SCE platform repository

Use the **p3net** CLU command to verify the connection state of each SCE Platform that should be provisioned by the SM.

After the physical installation of an SCE platform (by being connected to the management network), it must be explicitly added to the SM list, or repository, of existing SCE platforms before the SM will recognize it. Conversely, after the removal of an SCE platform from that list, the SM will no longer recognize it, even though it is still physically connected.

Each SCE.XXX section defines the following configuration parameters that represent a single SCE platform, where XXX represents the SCE logical name:

- **ip**
Defines the IP address of a standalone SCE device or the two IP addresses of a cascade SCE pair.
- **port**
Defines the port through which to connect to the SCE platform. The default is 14374.

To view the SCE platforms, use the **p3net** CLU. See [Information About the p3net Utility, page B-15](#).

For further information, see [SCE.XXX Section, page A-17](#).

- a. Configure the SCE.XXX sections to add the SCE Platform to the repository.
- b. Load the SCE configuration to the SM using the **p3sm** CLU.

```
p3sm --load-config
```

- c. Verify that the SCE platform was successfully connected.

```
p3net --show
```

- d. Verify your configuration when you are finished.

```
p3net --show-all
```

Step 3 Configure the domains

Use the **p3domains** command to verify the domain configuration and that the SCE platforms are set to these domains.

When a system has more than one SCE platform, they can be configured into groups, or domains. A subscriber domain is one or more SCE platforms that share a specified group of subscribers. Before adding an SCE platform to a domain, you must add the SCE platform to the SCE platform repository.



Note

The SM is preconfigured with a single subscriber domain called *subscribers*.

Each Domain.XXX section specifies the elements (SCE platforms), aliases, and properties for one domain. It contains the following parameters:

- **elements=<logical_name1[, logical_name2, ...]>**
Specifies the names of the SCE platforms that are part of the domain.
- **aliases=alias_name1[, alias_name2, ...]**

Defines domain aliases. When subscriber information is received from the LEG with one of the aliases (for example, **alias1**), the information is distributed to the domain that matches this alias (for example, **domain_name1**). A typical alias could be a network device IP address, where, for example, each string in the values can be the IP address of a NAS or a CMTS.

**Note**

Each alias (for example, `alias_name1`) can only appear in *one* [Domain.XXX] section.

- The specification **aliases=*** means that every subscriber that does not have a domain will be put in this domain.

**Note**

Only one domain at any given time may specify this option (**aliases=***).

- `property.<name1>=<value1>[,property.<name2>=<value2>, ...]`

Defines the default policy property values for a domain. Unless the LEG/API overrides these defaults when it introduces the subscriber to the SM, the subscriber policy is set according to the default policy property values of its domain. Property values must be integers.

To view the domains, use the **p3domains** CLU. See [Information About the p3domains Utility, page B-9](#).

For further information, see [Domain.XXX Section, page A-7](#).

Step 4 Configure the SM General section

This section of the configuration file is relevant to any deployment topology. It addresses the following system-wide parameters:

- `introduction_mode`

Defines whether the SM introduces the subscribers to the SCE platforms immediately after a login operation (Push mode), or only when the SCE requests the subscriber specifically (Pull mode).

- `application_subscriber_lock`

Defines whether to lock subscriber-related operations (login, logout, etc.) at the application level. Set this flag to true in the cases when several LEG components can update subscribers simultaneously.

- `force_subscriber_on_one_sce`

Defines whether the SM supports the solution where a Cisco 7600/6500 is used for load-balancing among several SCE platforms. In this solution, when one SCE platform fails, subscriber traffic is redistributed to a different SCE platform. The SM must remove these subscribers from the failed SCE platform and send the relevant subscriber information to the new SCE platform. This parameter is relevant only in the Pull mode.

- `logon_logging_enabled`

Defines whether to enable the logging of subscriber logon events.

To view the SM settings, use the **p3sm** CLU. See [Information About the p3sm Utility, page B-19](#).

**Note**

Setting **logon_logging_enabled** to **true** will cause performance degradation. For additional information, see [SM General Section, page A-3](#).

Step 5 Configure the Data Repository section

The Data Repository section defines the SM operation with the TimesTen In-Memory Database, via the following parameters:

- `support_ip_ranges`
Defines whether the SM supports IP-Ranges.



Note Disabling this support provides better performance.

- `checkpoint_interval_in_seconds`
Defines the interval, in seconds, for calling the TimesTen checkpoints. Reducing the value affects performance, increasing the value increases vulnerability to power-down.
- `max_range_size`
Determines the maximum IP range size used in the system. This parameter is used for improving performance of the SM in Pull mode when the [**Data Repository**] section is configured with **support_ip_ranges=yes**.



Note Defining this parameter with too large a value may cause performance degradation in handling pull requests.

For further information, see [Data Repository Section, page A-19](#).

Step 6 Configure the **High Availability** section

The **High Availability** section defines in what kind of topology the SM should work, via the parameter:

- `topology`
Defines in what kind of topology the SM should work (cluster or standalone).

For further information, see [SM High Availability Setup Section, page A-4](#).

Step 7 Import subscribers to the SM from a CSV file.

This step should be performed only when using manual integration, or when performing a setup prior to the beginning of the automatic integration.

A csv file is a simple text file where each line consists of comma-separated values. Because each line may contain subscriber properties, which are application dependant, the documentation of the application that you installed on your system describes the format of a csv import file.

In most cases, when importing csv files, you should use the **p3subsdB --importCLU** command. When integrating with a cable AAA system and working in the CPE as Subscriber mode (see [CPE as Subscriber in Cable Environment, page C-1](#)), importing cable modems requires the **p3cable --import-cmCLU** command.

Step 8 Configure the SCE platforms

This step should be performed only when using the Pull mode to introduce subscribers, or when performing a special operation on SM-SCE connection failure. Use the SCE platform Command-Line Interface (CLI) to configure several configuration parameters, as discussed below.

Configuring these parameters ensures that the SCE platform correctly applies appropriate defaults to subscribers in the period between subscriber detection and pull response (for unmapped subscribers). For additional details, see the SCE 1000 or SCE 2000 User Guides.

- Anonymous groups and subscriber templates

When the SCE platform encounters network traffic that is not classified to any introduced subscriber, it checks whether the mapping of the unfamiliar subscriber belongs to one of the anonymous groups. If the subscriber belongs to an anonymous group, a new anonymous subscriber is created, and a request for an updated subscriber record is sent to the SM. The properties of the anonymous subscriber are taken from the subscriber template that is assigned to the newly created subscriber anonymous group.

- Anonymous subscriber groups

An anonymous group is a specified IP range, possibly assigned a subscriber template (defined in the next section). If a subscriber template has been assigned to the group, the anonymous subscribers generated have subscriber properties as defined by that template. If no subscriber template has been assigned, the default template is used.

Use the appropriate CLI commands to import anonymous group information from a csv file, or to create or edit these groups explicitly.

- Subscriber templates

Values for various subscriber properties for unmapped or anonymous subscriber groups are assigned in the system based on subscriber templates. A number from 0 to 199 identifies subscriber templates. CSV formatted subscriber template files define the subscriber templates 1 to 199. However, template 0 cannot change; it always contains the default values. If a template is not explicitly assigned to an anonymous group, the group uses template 0.

Use the appropriate CLI commands to import subscriber templates from a csv file, or edit these templates from the command line. Additionally, use the appropriate CLI commands to assign subscriber templates to the anonymous groups.

- Subscriber aging parameters

To prevent SCE capacity problems in Pull mode, configure the aging of introduced subscribers. The aging parameter defines a timeout, and any subscriber that does not generate traffic during this timeout interval will be automatically logged out from the SCE.

- SM-SCE connection failure

To prevent incorrect classification of a subscriber's traffic during a lengthy connection failure between the SM and the SCE, configure the SM connection failure parameters.

The SCE has several alternatives for connection failures handling:

- The SCE can clear the mappings of all of the subscribers
- The SCE can put the line in cut-off mode
- The SCE does nothing

- The timeout between the connection detection and actually performing the operation is also configurable.

System Configuration Examples

This section presents and explains common subscriber management scenarios, including the correct configuration parameters for these scenarios. The following scenarios are described:

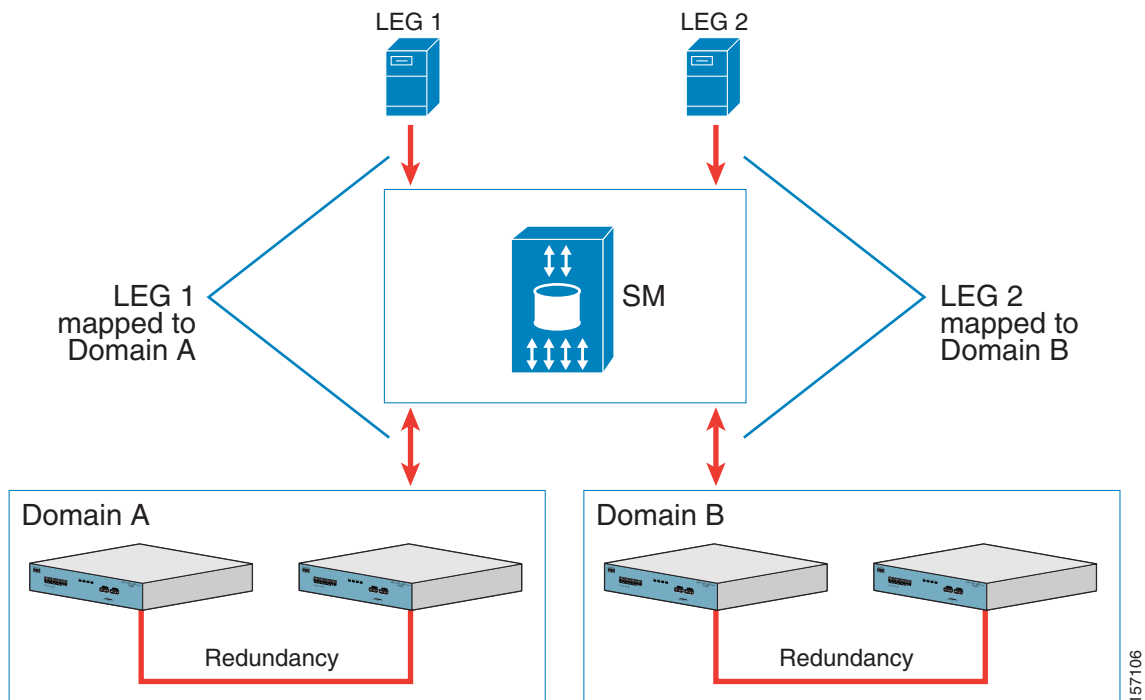
- Automatic introduction of subscribers, with Push mode and fail-over of SCE platforms
- Manual introduction of subscribers with Pull mode
- SM fail-over scenario

Automatic Introduction of Subscribers, with Push Mode and Fail-Over of SCE Platforms: Example

This example assumes the following:

- Automatic introduction of subscribers, that is, a provisioning system of an AAA system introduces the subscribers. This example assumes that integration with a DHCP server allows automatic introduction of subscribers to the SM.
- The SM is operating in Push mode.
- The application that is used includes states that should be preserved such as volume quotas states in the Service Control Application for Broadband (SCA BB).

Figure 4-1 Cable Topology with Automatic Integration with a DHCP Server, Push Mode, and Fail-Over of SCE Platforms



Note

Ensure that everything is properly installed before proceeding with configuring the SM.

The following general steps describe how to configure the SM for this scenario:

1. Edit the SM configuration file to add the SCE devices to the SCE device repository and group the SCE devices to domains as depicted in [Figure 4-1](#)
2. Edit the SM configuration file as displayed in .
3. Reload the SM configuration file using the **p3sm** CLU.
4. Import the cable modems to the SM database using the **p3cable** CLU.

This scenario does not need an SCE platform configuration.

Table 4-1 Configuration File Parameters for Automatic Integration with Push Mode in a Cable Environment

Section and Parameter	Value and Description
SM General	
introduction_mode	push
High Availability Setup	
topology	standalone The value should be set to standalone because the described scenario has just one SM.
SM-LEG Failure Handling	
timeout	300 seconds (more tolerance may be advisable for SM-LEG failures in actual configurations)
clear_all_mappings	true The value should be set to true because under the scenario conditions (automatic integration in cable environment), subscribers are likely to change their state or to logout from the SCE during an SM-LEG connection failure. You would therefore like to clean their mappings when the SM and LEG are connected again.
LEG-Domain Association	
<LEG name>	Define associations between LEGs and domains LEG-Domain associations should be defined in order that all subscriber mappings will be cleared on SM-LEG disconnection. If no association is defined, subscriber mappings will not be cleared (the clear_all_mappings value will be ignored).
Default Domains Configuration	
property	None Configure the policy here if all domains in the system have the same policy.
Domain.XXX	
aliases	Define aliases, to facilitate working in cable environment Define aliases if working with LEGs that are not aware of system domains. Alternatively, you can define domains with names that match values produced by LEGs.

Table 4-1 Configuration File Parameters for Automatic Integration with Push Mode in a Cable Environment (continued)

Section and Parameter	Value and Description
property	None Configure the policy here only if you want it to be applied to all subscribers in the domain.
allow_dynamic_CM	no The value should be set to no in order to prevent uninstalled CMs from using the network.
Auto Logout	
auto_logout_interval	60 minutes Auto-logout should be activated assuming that the AAA system cannot provide logout events, which is true in cable environments. The value defined here should be smaller than the CPE lease time in this cable environment.
grace_period	10 seconds You should define a relatively high value to eliminate mistakes because of management network delays.
max_rate	100 logouts per second You should define a value similar to the max-login rate to the SM.

Manual Introduction of Subscribers with Pull Mode: Example

This example assumes the following:

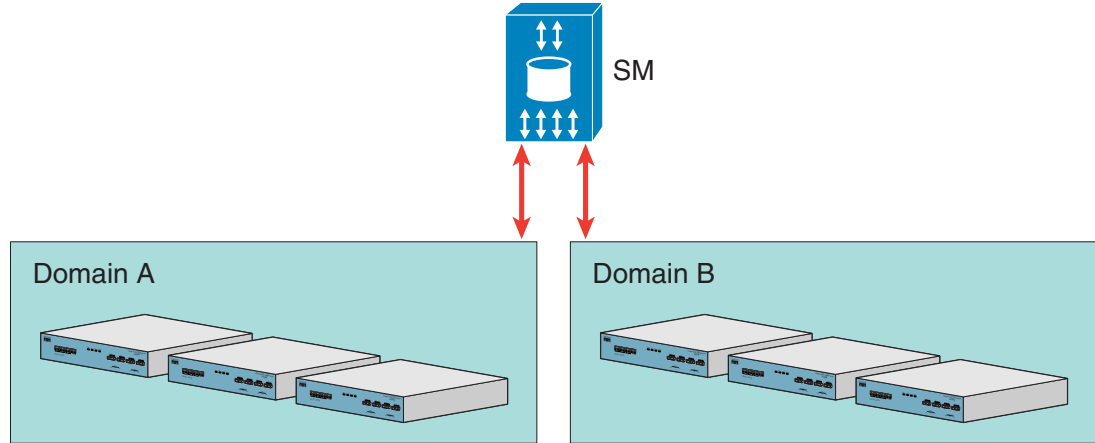
- Manual introduction of subscribers
- Pull mode
- Application that does not require preserving state



Note

Ensure everything is properly installed before proceeding with configuring the SM.

Figure 4-2 Topology with Manual Introduction of Subscribers and Pull Mode



The following general steps describe how to configure the SM for this scenario:

1. Edit the SM configuration file to add the SCE devices to the SCE device repository and group the SCE devices to domains as depicted in Figure 4-2
2. Edit the SM configuration file as displayed in Table 4-1.
3. Reload the SM configuration file using the **p3sm** CLU.
4. Import the subscribers to the SM database using the **p3subsdb** CLU (required for manual integration; there is no other way to bring subscribers into the SM.)
5. Use the SCE platform CLI to configure the system for Pull mode:
 - Subscriber templates—In accordance with application
 - Anonymous groups—In accordance with your network and subscribers
 - Introduced subscriber aging—In accordance with your network and IP address allocation scheme

Table 4-2 Configuration File Parameters for Manual Integration with Pull Mode

Section and Parameter	Value and Description
SM General	
<code>introduction_mode</code>	pull
High Availability Setup	
<code>topology</code>	standalone The value should be set to standalone because the described scenario has just one SM.
SM-LEG Failure Handling	
<code>timeout</code>	Not applicable—No LEGs are involved in the scenario (use default—60 seconds)
<code>clear_all_mappings</code>	Not applicable—No LEGs are involved in the scenario (use default—no action)
LEG-Domain Association	
<code><LEG name></code>	Not applicable—No LEGs are involved in the scenario (Use default—no mappings)

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Table 4-2 Configuration File Parameters for Manual Integration with Pull Mode (continued)

Section and Parameter	Value and Description
Default Domains Configuration	
Default policy (property.XXX)	None Configure the policy here if all domains in the system have the same policy.
Domain.XXX	
aliases	Not applicable (use default—none)
property.XXX	None Configure the policy here only if you want it to be applied to all subscribers in the domain.
allow_dynamic_CM	Not applicable—valid for cable environment only (use default – no)
Auto Logout	
auto_logout_interval	Not applicable (use default—0)
grace_period	Not applicable (use default—10)
max_rate	Not applicable (use default—50)

SM Fail-over Configuration (General): Example

When using a set-up with SM fail-over (based on two SM nodes connected in a cluster), the configuration is identical to the regular configuration, with one exception:

- The topology parameter in the [SM High Availability Setup Section, page A-4](#) should be set to cluster for both SM machines.

Other than that, SM fail-over configuration is performed normally via the **p3sm.cfg** configuration file. Manually copy the configuration file from the active SM to the standby SM.

For additional information of how to configure the VCS, see [Veritas Cluster Server, page E-1](#).

How to Use the CLU

This section introduces the Command-Line Utilities (CLU), and describes how to use the CLU for viewing, subscriber management, and other tasks when working with the SM.



Note

Some of the CLU operations and options can be specified by abbreviations. For this and additional information about the CLU, see [Command-Line Utilities, page B-1](#).

The procedures explained in the following sections invoke the following CLU commands:

```
p3batch
p3cable
p3clu
p3cluster
p3db
p3domains
p3inst
p3log
p3net
p3radius
p3rpc
p3sm
p3subs
p3subsdb
p3vpn
```

Informative Output

All CLU commands support the following operations for informative output:

Operation	Description
<code>--help</code>	Prints the help for the specified CLU command, then exits.
<code>--version</code>	Prints the SM program version number, then exits.

Parsing CLU Operations and Options

Place in quotation marks a command operation or option containing any of the following characters:

- A space character
- A separation sign (comma “,”; ampersand “&”; colon “:”)
- An escape character (backslash “\”)

A command operation or option that contains any of the following characters must have that character preceded by an escape character:

- An equal sign (=)
- A quotation mark (“ or ”)
- An escape character (backslash “\”)

The following table shows several examples of the above rules:

Operation/option contains the character	Example of how operation/option should be written
Space character	--property="file name"
Escape character (backslash "\")	--property="good\\bad"
Equal sign (=)	--property="x\=y"
Quotation marks (" or ")	--name="\"myQuotedName\" " (in the above example, inner quotation marks are escaped)
Separation characters	
comma (,)	--names="x,y"
ampersand (&)	--names="x&y"
colon (:)	--names="myHost:myDomain"

One-letter abbreviations are available for some of the operations and options. For example, **-d** is an abbreviation for **--domain**. Note that only one hyphen (-), not two, precedes the letter for an abbreviation, and that if the operation or option takes a parameter, there is a space and not an equal sign before the parameter.

Example of using full name	--domain=subscribers
Example of using abbreviated name	-d subscribers

The abbreviations are useful if you want to specify an expression to be expanded by the UNIX shell, for example:

<code>p3subsdB --import -f ~pcube/file.csv</code>	~pcube will be expanded by the UNIX shell
---	---

Reloading the SM Configuration (p3sm)

Use the **p3sm** utility to configure the SM by reloading the SM configuration file **p3sm.cfg**. Use any standard text editor to edit the configuration file.

Step 1 From the shell prompt, type `p3sm --load-config [--ignore-warnings] [--remote = OTHER_SM_IP[:port]]`

The configuration file is loaded, and the SM configuration updated accordingly.

The **--remote** option loads the configuration first to the local SM, and afterward to the remote SM (in High Availability setups).

Managing the SM (p3sm)

Use the `p3sm` utility to manage the SM on an ongoing basis. The `p3sm` utility enables you to start, stop, and resynchronize the SM.

-
- Step 1** From the shell prompt, enter a command of the format `p3sm operation [--ne-name = SCE NAME]`
For a full list of `p3sm` operations and options, see [Information About the p3sm Utility](#), page B-19.
-

Examples for Managing the SM

Stopping and Restarting the Server: Example

This example shows how to stop the server operation and then restart it.

```
p3sm --restart
```

Resynchronizing an SCE: Example

This example shows how to resynchronize an SCE whose logical name is `SCE_1000A`.

```
p3sm --resync --ne-name=SCE_1000A
```

Extracting Support Information: Example

This example shows how to extract the SM support information to a file named `support.zip`.

```
p3sm --extract-support-file --output=support.zip
```

How to Manage Subscribers, Mappings, and Properties (p3subs)

Use the `p3subs` utility to manage specific subscribers. You can add or remove subscribers. You can also manage subscriber properties and mappings with this utility.

- [Managing Subscribers, Mappings, and Properties \(p3subs\)](#), page 4-16
- [Examples for Managing Subscribers, Mappings, and Properties](#), page 4-16

Managing Subscribers, Mappings, and Properties (p3subs)

Step 1 From the shell prompt run the **p3subs** CLU command.

The command should be in the following general format:

```
p3subs operation --subscriber =Subscriber-Name[--ip =IP-address@VPN-NAME] [--vpn
=VPN-NAMES-LIST] [--community =AS:value@VPN-NAME] [--property =property-name=value]
[--domain =domain-name] [--overwrite ]
```

The subscriber on whom the operation is to be performed is specified by using the format **--subscriber=subscriber-name**. A mapping (IP address), property, or domain, if specified, uses the format displayed.



Note

If a domain is not specified, the subscriber is added to the default *subscribers* domain.

For a full list of **p3subs** operations and options, see [Information About the p3subs Utility, page B-24](#).

Examples for Managing Subscribers, Mappings, and Properties

- [Managing Subscribers, page 4-16](#)
- [Managing Mappings, page 4-16](#)
- [Mappings Specification, page 4-17](#)
- [Managing Properties, page 4-17](#)
- [Clearing the Subscriber Applicative State, page 4-17](#)

Managing Subscribers

The following examples show how to manage subscribers.

Example 1:

The following example shows how to add a subscriber with the specified IP address.

```
p3subs --add --subscriber=jerry --ip=96.142.12.7
```

Example 2:

The following example shows how to overwrite subscriber information. Because the subscriber named “jerry” already exists, the add operation would fail; however, the overwrite option allows the IP address to be overwritten.

```
p3subs --add --subscriber=jerry --ip=96.128.128.42 --overwrite
```

Managing Mappings

This example shows how to remove all the mappings for a specified subscriber.

```
p3subs --remove-all-mappings --subscriber=jerry
```


Mappings Specification

You can specify the following mapping types for each subscriber:

- IP address or range—Use the **--ip-address** option. For an IP address, use the dotted notation. A range is used to specify several consecutive mappings, for example, the notation 1.1.1.0/30 is used to specify the IP addresses 1.1.1.0 to 1.1.1.3. You can specify multiple mappings by using a comma.

**Note**

You cannot specify different types of mappings for the same subscriber.

Managing Properties

The application property names depend on the application running on your system. To find descriptions of the application property names and values, see the documentation provided with the application installed on your system.

This example shows how to set a property value for a specified subscriber.

```
p3subs --set --property=packageId=1 --subscriber=jerry
```

Clearing the Subscriber Applicative State

This example shows how to clear the applicative state of the specified subscriber. Note that this command clears only the backup copy at the SM. It does not clear the applicative state record in the SCE platform.

```
p3subs --clear-state --subscriber=jerry
```

Managing VPN Entities (p3vpn)

Use the **p3vpn** utility to manage VPNs. You can add or remove VPNs.

Step 1 From the shell prompt run the **p3vpn** CLU command.

The command should be in the following general format:

```
p3vpn operation [--vpn =VPN-NAME] [--mpls-vpn =RT@PE,... ] [--vlan =VLAN-ID] [--domain =domain-name]
```

For a full list of **p3vpn** operations and options, see [Information About the p3vpn Utility, page B-32](#).

Examples for Managing VPN Entities

Insertion of a VPN Using a VLAN-ID: Example

This example shows how to add a VPN with the specified VLAN.

```
p3vpn --add -vpn=myVpn --vlan-id=10
```

Insertion of a VPN Using MPLS/VPN: Example

This example shows how to add a VPN with the specified MPLS/VPN mappings.

```
p3vpn --add --vpn=myVpn --mpls-vpn=1:100@96.142.12.7
```

Managing the Subscriber Database (p3subsdB)

Use the **p3subsdB** utility to manage the SM database. You can import subscriber information for a group of subscribers from a CSV file into the SM database. You can also export subscriber information from the SM database to a CSV file.



Note

The format of the CSV file depends on the application. The documentation of a specific application specifies the CSV file format for that application.

For a full list of **p3subsdB** operations and options, see [Information About the p3subsdB Utility, page B-28](#).

Step 1 From the shell prompt, enter a command of the format **p3subsdB operation [--domain = domain-name] [filename]**

Examples for Managing the Subscriber Database

List all Subscribers: Example

This example shows how to list all subscribers in a specified domain.

```
p3subsdB --show-domain --domain=mainDomain
```

Importing Subscribers from a CSV File: Example

This example shows how to import subscribers from the specified CSV file.

```
p3subsdB --import --file=goldSubscriberFile.csv
```

Exporting Subscribers to a CSV File: Example

This example shows how to export subscribers with filtering options to a specified CSV file.

```
p3subsdB --export --prefix=a --output=silverSubscriberFile.csv
```

Viewing and Connecting Network Elements (p3net)

Use the **p3net** utility for viewing the connection status of network elements and trying to reconnect disconnected elements.

For a full list of **p3net** operations and options, see [Information About the p3net Utility, page B-15](#).

Step 1 From the shell prompt, enter a command of the format **p3net operation [--ne-name = logical-name]**

Example:

The following example shows how to display a network element's connection status.

```
p3net --show --ne-name=mainNE
```

Viewing Subscriber Domains (p3domains)

Use the **p3domains** utility for viewing the subscriber domains. As explained in [Introducing the Subscriber Manager, page 2-1](#), subscriber domains are groups of SCE devices that serve the same subscribers.

For a full list of **p3domains** operations and options, see [Information About the p3domains Utility, page B-9](#).

Step 1 From the shell prompt, enter a command of the format **p3domains operation [--domain = domain-name]**

Managing the Cable Support Module (p3cable)

- [Managing the Cable Support Module, page 4-19](#)
- [Examples for Managing the Cable Support Module, page 4-20](#)

Managing the Cable Support Module

In the cable environment, the SM supports two modes of operation: CM as Subscriber and CPE as Subscriber, as described in [CPE as Subscriber in Cable Environment, page C-1](#).

This section only discusses the support of the *CPE as Subscriber* mode. In this mode, the CPE is modeled as the subscriber, and it inherits its policy and domain from the cable modem (CM) through which it connects to the network. Each cable modem is linked with one or more CPEs. (For background information about special characteristics of the *CPE as Subscriber* mode in the cable environment, see [CPE as Subscriber in Cable Environment, page C-1](#)).

Use the **p3cable** utility commands to import cable modem information from a CSV file to the SM, and to export the cable modem information from the SM to a CSV file. You can also use this utility to clear the repository of all cable modems, and to show whether to allow or deny the login of CPEs that belong to unfamiliar cable modems; i.e., cable modems that do not exist in the SM database. However, for specifying whether to allow or deny such a login, use the [Cable Adapter Section, page A-19](#) section of the **p3sm.cfg** configuration file.

For a full list of **p3cable** operations and options, see [Information About the p3cable Utility, page B-5](#).

Step 1 From the shell prompt, enter a command of the format **p3cable operation [--cm = CM-name] [filename] [other CM options]**

Examples for Managing the Cable Support Module

- [Importing Cable Modems from a CSV File: Example, page 4-20](#)
- [Clearing the Repository: Example, page 4-20](#)
- [Displaying the Login Status of CPEs: Example, page 4-20](#)

Importing Cable Modems from a CSV File: Example

This example shows how to import cable modems from a CSV file.

```
p3cable --import-cm --file=CMFile.csv
```

Clearing the Repository: Example

This example shows how to clear the repository of all cable modems:

```
p3cable --clear-all-cm
```

Displaying the Login Status of CPEs: Example

This example shows how to display login status (allow/deny) of CPEs that belong to cable modems that do not exist in the SM database:

```
p3cable --show-dynamic-mode
```

Installing an Application (p3inst)

Use the **p3inst** utility to install or uninstall an application (*pqi* file). You can install an application on the SM to customize the components. You can also upgrade an existing application to a new version, or uninstall a previously installed application.

For a full list of **p3inst** operations and options, see [Information About the p3inst Utility, page B-12](#).

Step 1 From the shell prompt, enter a command of the format **p3inst operation [file options] [installation/upgrade parameters]**

Examples for Installing an Application

Installing a File: Example

This example shows how to install the specified installation file.

```
p3inst --install --file=myInstallation.pqi
```

Uninstalling a File: Example

This example shows how to uninstall the specified installation file.

```
p3inst --uninstall --file=oldInstallation.pqi
```

Viewing Information of the PRPC Interface Server (p3rpc)

Cisco provides a proprietary RPC (Remote Procedure Call) interface to the SM. Use the **p3rpc** utility to view the configuration and statistics of the PRPC server.

For a full list of **p3rpc** operations and options, see [Information About the p3rpc Utility, page B-17](#).

Step 1 From the shell prompt, enter a command of the format **p3rpc operation**

Examples for Viewing Information of the PRPC Interface Server

This example displays the statistics of the PRPC server.

```
p3rpc --show-statistics
```

Managing a Cluster of Two SM Nodes (p3cluster)

Use the **p3cluster** utility to view the redundancy state of the SM and its components. This utility also supports operations that alter the redundancy state of the SM. These operations are used by the SM Cluster Agent and for administrative tasks.

For a full list of **p3cluster** operations and options, see [Information About the p3cluster Utility, page B-7](#).

Step 1 From the shell prompt, enter a command of the format **p3cluster operation**

Examples for Managing a Cluster of Two SM Nodes

This example displays the redundancy status of the SM and its components.

```
p3cluster --show
```

Managing the User Log (p3log)

Use the **p3log** utility to configure and manage the user log. All user-related events and errors are directed to the SM user log. You can extract the contents of the user log to a specified file in order to read and save its contents. You can also clear the user log.

For a full list of **p3log** operations and options, see [Information About the p3log Utility, page B-14](#).

Step 1 From the shell prompt, enter a command of the format **p3log operation**

Examples for Managing the User Log

The following example displays how to extract the user log to a specified file.

```
p3log --extract --output=myfile
```

Viewing Statistics of the RADIUS Listener (p3radius)

Use the **p3radius** utility to view the statistics of the RADIUS Listener LEG. For information about this CLU, see the *Cisco SCMS SM RADIUS Listener LEG Reference Guide*.

Step 1 From the shell prompt, enter a command of the format **p3radius operation**

Utilities

This section describes the following:

- [Running a Batch File \(p3batch\)](#), page 4-22
- [Printing General Help About CLU Commands \(p3clu\)](#), page 4-22
- [Database Operations](#), page 4-23

Running a Batch File (p3batch)

Use the **p3batch** utility to run a batch file and execute its commands. Using any text editor, you can create a batch file that contains a series of CLU commands, one command per line. This operation (**p3batch**) enables you to run multiple operations on a single connection to the SM.

For a full list of **p3batch** operations and options, see [Information About the p3batch Utility](#), page B-4.

Step 1 From the shell prompt, enter a command of the format **p3batch [file-options] [error-options]**

Running a Batch File (Halt on Error): Example

This example shows how to run a batch file that will halt if an error occurs.

```
p3batch --file=mainBatchFile.txt
```

Running a Batch File (No Halt on Error): Example

This example shows how to run a batch file that will not halt if an error occurs.

```
p3batch --file=mainBatchFile.txt --skip-errors
```

Printing General Help About CLU Commands (p3clu)

Use the **p3clu** utility to print a list of all supported CLU utilities and operations.

Step 1 From the shell prompt, type **p3clu --help**

All CLU commands will be printed.

Database Operations

Use the **p3db** utility to manage and monitor the TimesTen database. The CLU exposes capabilities of the some of TimesTen CLUs with respect to specific needs of the SM.

For a full list of **p3db** operations and options, see [Information About the p3db Utility, page B-8](#).

Step 1 From the shell prompt, enter a command of the format **p3db operation [options]**

Examples for Database Operations

This example shows how to request the status of the replication agent, and also lists a typical response:

```
p3db --rep-statusPeer name          Host name          Port    State  Proto
-----
PCUBE_SM_REPOSITORY SM_REP1           Auto    Start  11
Last Msg Sent Last Msg Recv Latency TPS    RecordsPS Logs
-----
00:00:02      00:00:00      1.15   2723   5447   1
the subscriber DB is ok
Command terminated successfully
```




CHAPTER 5

Installation and Upgrading

This module describes how to install the Cisco Service Control Management Suite Subscriber Manager (SCMS SM); additionally, it describes how to upgrade and uninstall. This module also discusses topics related to installation, upgrading, and uninstalling.

How to Install, Upgrade, or Uninstall the Subscriber Manager

This module describes the procedures to install, upgrade, or uninstall the Subscriber Manager.

- [Information About Installing the SM, page 5-1](#)
- [Installing the Subscriber Manager, page 5-11](#)
- [Verifying the Installation, page 5-19](#)
- [Configuring the Subscriber Manager, page 5-19](#)
- [How to Perform Additional Installation Procedures, page 5-20](#)
- [Installing an Application, page 5-21](#)
- [How to Upgrade the Subscriber Manager, page 5-22](#)
- [How to Uninstall the Subscriber Manager, page 5-35](#)

Information About Installing the SM

Installing the SM is an automated process. It consists of executing an installation script residing on the root of the SM distribution files supplied by Cisco.



Note

For Solaris: The procedure also requires modifying the `/etc/system` file. Do this manually or use some other automated utility.



Note

For Linux: The procedure also requires modifying the `/etc/sysctl.conf` file. Do this manually or use some other automated utility.

Installation Overview

The installation procedure installs the following components:

- SM and Command-Line Utilities (CLU)
- TimesTen database and DSN
- Java Runtime Environment (JRE)
- SM Veritas Cluster Agents

The installation procedure also includes:

- Setting up a pcube user and group
- Adding startup and shutdown scripts
- System configuration for TimesTen (performed manually or using a script)
- Replication scheme setting (performed by running a CLU). (Relevant only for cluster setups).

After completing installation and configuration, you can use the SM to introduce subscribers to the system.

Contents of the Distribution Files

The SCMS SM components are supplied in three distribution files:

- SM for Solaris
- SM for Linux
- Login Event Generators (LEGs)

Each distribution file is supplied as a tar file, which is compressed by gzip and has an extension of **.tar.gz**. The following table lists the contents of the SM installation distribution files for Solaris and Linux.

Table 5-1 Contents of SM Distribution Files

Path	Name	Description
DIST_ROOT		Cross-platform files
	hooks.sh	User-defined function for upgrade
	install	Typical installation procedure description
	install-sm.sh	SM installation script
	install-vcs-agents.sh	VCS agents installation script
	linux-def.sh	Linux-specific definitions (only in the Linux distribution file)
	solaris-def.sh	Solaris-specific definitions (only in the Solaris distribution file)
	MANIFEST	CD information
	p3sm.sh	Startup and shutdown script
	Prerequisites	System minimal requirements list

Table 5-1 Contents of SM Distribution Files (continued)

Path	Name	Description
	sm-common.sh	General installation script
	sm-dist.tar.gz	SM distribution
	tt-sysconf.sh	TimesTen system configuration script
	uninstall-sm.sh	SM uninstall script
	upgrade-sm.sh	SM upgrade script
	vcs-agents-dist.tar.gz	VCS agents distribution
	install-def.cfg	Contains definitions for several SM parameters that can be configured before SM installation or upgrade.
	verify-subscriber.sh	Script to verify whether a subscriber exists without running the SM. To be used when performing a cluster upgrade.
	cluster-upgrade.sh	Upgrade script for cluster installations.
DIST_ROOT /Java/		Java Runtime Environment files
	j2re1.4.2_13-linux.tar.gz	JRE for Linux (only in the Linux distribution file)
	j2re1.4.2_13-solaris.tar.gz	JRE for Solaris (only in the Solaris distribution file)
	LICENSCE	JRE license
DIST_ROOT /TimesTen/		TimesTen files
	pqb_resp_uninst.txt	Response file for TimesTen uninstall
	pqb-odbc-ini.txt	Open Database Connectivity (ODBC) definitions
	pqb-response60.txt	Response file for TimesTen installation
	pqb-sys-odbc-ini.txt	Open Database Connectivity (ODBC) definitions
	TT604LinuxRH32.tar.Z	TimesTen for Linux (only in the Linux distribution file)
	TT604Sparc64.tar.Z	TimesTen for Solaris 64-bit (only in the Solaris distribution file)
DIST_ROOT/scripts	.bash_profile	User profile for bash
	.cshrc	User profile for C-Shell
	scmssm.sh	User profile utility file for bash

Table 5-1 Contents of SM Distribution Files (continued)

Path	Name	Description
	scmssm.csh	User profile utility file for C-Shell
	dropRep.sql	SQL file used during the upgrade procedure
	install-dsn.sh	TimesTen DSN configuration script
	installjava.sh	JRE installation script
	install-tt.sh	TimesTen installation script
DIST_ROOT/.scripts	get_name.sql	SQL file used during the upgrade procedure
	p3db	Utility file used by the installation/upgrade procedures

The following table lists the contents of the LEG distribution file:

Table 5-2 Contents of the LEG Distribution File

Path	Name	Description
DIST_ROOT		Cross-platform files
	MANIFEST	Distribution information
DIST_ROOT/bgp_leg		Border Gateway Protocol (BGP) LEG files
	bgp_leg.tar.gz	BGP LEG distribution
	Install	LEG installation procedure description
	install-bgp-leg.sh	BGP LEG installation script
	linux-def.sh	Linux-specific definitions
	sm-common.sh	General installation script
	solaris-def.sh	Solaris-specific definitions
DIST_ROOT/cnr_leg		Cisco Network Register (CNR) LEG files
	cnr-leg-dist.tar.gz	CNR LEG distribution
	Install	LEG installation procedure definitions
DIST_ROOT/Lease_Query_Leg		Lease Query LEG files
	dhcp_forwarder.tar.gz	DHCP Forwarder distribution
	Install	LEG installation procedure description
	install-forwarder.sh	DHCP Forwarder installation script

Table 5-2 Contents of the LEG Distribution File (continued)

Path	Name	Description
	linux-def.sh	Linux-specific definitions
	sm-common.sh	General utility script
	solaris-def.sh	Solaris-specific definitions
DIST_ROOT/Lease_Query_LEG/sce		Lease Query LEG SCE files
	leaseq.pqi	DHCP Lease Query LEG distribution
	dhcp_pkg.cfg	Default configuration file for package association
DIST_ROOT/Lease_Query_LEG/sm		Lease Query LEG SM files
	leaseq.pqi	DHCP Lease Query LEG distribution
DIST_ROOT/rdr_dhcp_leg		SCE-Sniffer DHCP LEG files
	Install	LEG installation procedure description
	rdrdhcp.pqi	SCE-Sniffer DHCP LEG distribution
DIST_ROOT/rdr_radius_leg		SCE-Sniffer RADIUS LEG files
	Install	LEG installation procedure distribution
	rdradius.pqi	SCE-Sniffer RADIUS LEG distribution
DIST_ROOT/sce_api		SCE Subscriber API files
	Readme	API setup procedure description
	sce-java-api-dist.tar.gz	API distribution
DIST_ROOT/sm_api		SM API files
	Readme	API setup procedure description
	sm-c-api-dist.tar.gz	C API distribution
	sm-java-api-dist.tar.gz	Java API distribution

Documentation

The SM installation distribution file contains the following documents:

- Manifest—Contains the version and build numbers for all components from which the distribution files were built
- Install—The SCMS SM typical installation procedures
- Prerequisites—Minimal system requirements for installation of the SM

System Requirements

You can install the SM on the following platforms:

- Solaris—SUN SPARC machine running Solaris. See [Table 5-2](#), and [Table 5-3](#).
- Linux—Machine with Intel-based processor running Linux. See [Table 5-2](#), and [Table 5-4](#).

The machine should conform to the system requirements listed in the following tables.



Note

The specifications listed in [Table 5-2](#) are minimal. They should be verified in order to guarantee specific performance and capacity requirements.

Table 5-3 *Minimal System Hardware Requirements*

Item	Requirement
CPU	<ul style="list-style-type: none"> • SUN SPARC, 64-bit, minimum 500 MHz (for Solaris) • INTEL processor, 32-bit, minimum 1 GHz (for Linux Red Hat)
RAM	Minimum 1 GB; see Table 5-5 or Table 5-7 .
Free Disk Space	Minimum 3 GB total, of which: <ul style="list-style-type: none"> • Minimum 1 GB free on partition where VARDIR (SM database repository) is installed • Minimum 0.5 GB free on partition where PCUBEDIR (SM files) is installed • Minimum 200 MB free on partition where /tmp is mounted
Network Interface	Depends on whether or not the configuration includes a cluster: <ul style="list-style-type: none"> • Without cluster—One (1) 100BASE-T Ethernet • With cluster—Six (6) 100BASE-T Ethernet
CD-ROM drive	Recommended



Note

For the hardware and software system requirements for the Veritas Cluster Server, see [Veritas Cluster Server, page E-1](#).

Table 5-4 Solaris System Software Requirements

Item	Requirement
OS	Solaris 5.9 64-bit or later; currently, only 64-bit versions of Solaris 5.9 and 5.10 are supported. Solaris Core Installation
System Packages	Mandatory: <ul style="list-style-type: none"> • SUNWbash—GNU Bourne-Again shell (bash) • SUNWgzip—GNU Zip (gzip) compression utility • SUNWzip—Info-Zip (zip) compression utility • SUNWlibC—Sun Workshop Compilers Bundled libC • SUNWlibCx—Sun WorkShop Bundled 64-bit libC • sudo (superuser do) package Optional: <ul style="list-style-type: none"> • SUNWadmap—system administration applications • SUNWadmc—system administration core libraries

**Note**

It is strongly recommended to apply the latest patches from SUN. You can download the latest patches from the SUN patches website.

Table 5-5 Red Hat System Software Requirements

Item	Requirement
OS	Red Hat Enterprise Linux AS/ES 3.0/4.0; currently, only 32-bit versions are supported. Red Hat Core Installation
System Packages	Mandatory: <ul style="list-style-type: none"> • GNU Bourne-Again shell (bash-2.05b-29.i386.rpm) • GNU Data Compression Program (gzip-1.3.3-9.i386.rpm) • File compression and packaging utility (zip-2.3-16.i386.rpm) • Standard C++ libraries for Red Hat Linux 6.2 backward compatibility (compat-gcc-7.3-2.96.122.i386.rpm) • sudo (superuser do) package For integrating with the C API: <ul style="list-style-type: none"> • GNU cc and gcc C compilers (gcc-3.2.3-20.i386.rpm) • C++ support for the GNU gcc compiler (gcc-3.2.3-20.i386.rpm)

**Note**

It is strongly recommended to apply the latest patches from Red Hat.

Installation Procedures

All installations can be performed by executing an installation script located on the root of the SM distribution file.

In most cases, the SM installation script is the only script needed for completing the installation.

The installation script displays messages describing the significant steps that are being performed. These messages are also sent to the system log for future reference. See [Logging Script Messages, page 5-9](#) for more information about the system log messages.

If you try to install the SM on a machine on which the SM is currently running, or to a directory in which the SM is already installed (even if not running), the operation will fail and you will be requested to upgrade the SM. See [How to Upgrade the Subscriber Manager, page 5-22](#).

The specific installation procedure to be applied depends on the required SM topology.

For the installation procedure for the standalone topology, see [Installing the Subscriber Manager, page 5-11](#).

For the installation procedure for the cluster topology, see [Installing an SM Cluster, page 5-20](#).

Information About System Changes Made by Installation Scripts

This section describes the system changes applied automatically by the SM installation. The SM installation adds a dedicated user and group, and startup and shutdown scripts.

- [Logging Script Messages, page 5-9](#)
- [pcube User and Group, page 5-9](#)
- [Startup and Shutdown Scripts, page 5-9](#)
- [Bash and C-Shell Profiles for the User pcube, page 5-10](#)

Logging Script Messages

Script messages are logged into the system log in the following manner:

- For Solaris—The installation scripts log all their messages into the system log, which is usually the file located at `/var/adm/messages`. The messages are logged to the `user.info` syslog category.
- For Linux—The installation scripts log all their messages into the system log, which is usually the file located at `/var/log/messages`. The messages are logged to the `user.info` syslog category.

pcube User and Group

During installation, a user named `pcube` is created (unless it already exists) with its own group. This user owns all installed SM and CLU files. The user home directory is the installation directory selected during installation. For security purposes, the user is initially created with a locked password. You must assign a new password.

Startup and Shutdown Scripts

The SM is started on boot to run level 2, and is stopped when leaving this run level (for example, when the machine is shut down).

The installer installs the following files for startup and shutdown:

- For Solaris:

```
-rwxr--r-- 1 root other /etc/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc0.d/K44p3sm ->/etc/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc1.d/K44p3sm ->/etc/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc2.d/S92p3sm ->/etc/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rcS.d/K44p3sm ->/etc/init.d/p3sm
```

- For Linux:

```
-rwxr--r-- 1 root other /etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc0.d/K44p3sm ->/etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc1.d/K44p3sm ->/etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc2.d/S92p3sm ->/etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc3.d/S92p3sm ->/etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc5.d/S92p3sm ->/etc/rc.d/init.d/p3sm
lrwxrwxrwx 1 root other /etc/rc.d/rc6.d/K44p3sm ->/etc/rc.d/init.d/p3sm
```

The TimesTen installer creates similar startup and shutdown scripts.

Bash and C-Shell Profiles for the User pcube

The SM is controlled using the CLUs that are located in `~pcube/sm/server/bin`. If such shell-profiles do not exist, the installation and upgrade scripts create profiles setting the CLU directory in the user **pcube** path environment variable.

This operation can be performed manually as well by copying the content of these profile scripts (`scmssm * files`) from the SM distribution under `DIST_ROOT/scripts/`.

Information About Advanced System Memory Configuration

- [Configuring /var/TimesTen/sys.odbc.ini, page 5-10](#)
- [Configuring the SM Process Memory Settings, page 5-10](#)

Configuring /var/TimesTen/sys.odbc.ini

Some installations might require changing TimesTen parameters so that the database will run as desired. However, do not make any changes if the default values suit your requirements.

Setting the multi-processor optimization

If your system is a multi-processor machine, the value of the **SMPOptLevel** parameter of the `Pcube_SM_Repository` in the `sys.odbc.ini` file should be set to 1. Otherwise, it should be set to 0 or not set at all. The installation script automatically sets this parameter according to the number of available processors.

Setting the database size

If your system needs to support more than 100,000 subscribers, set the values of the **PermSize** and **TempSize** parameters of the `Pcube_SM_Repository` in the `sys.odbc.ini` file.

See [Step 2Determine the system memory settings, page 5-11](#).

For example:

```
PermSize=500
TempSize=150
```

**Note**

If you change the database size, you must also make the following changes:

- Solaris—Set the value of parameter `shmsys:shminfo_shmmax` in the `/etc/system` file to be larger than the sum of **PermSize** and **TempSize**.
- Red Hat—Set the value of parameter `kernel.shmmax` in the `/etc/sysctl.conf` file to be larger than the sum of **PermSize** and **TempSize**.

Configuring the SM Process Memory Settings

By default, the SM process uses 256 MB of RAM memory. However, in certain application component configurations, the SM process needs to allocate additional memory to work correctly. Setting an environment variable called **PCUBE_SM_MEM_SIZE** with the desired memory size (in megabytes) instructs the SM start-up scripts to allocate the defined memory size for the SM process.

You can set the memory size value for this environment variable for the user **pcube**, or you can configure the desired process memory size in the `sm.sh` file located in the root directory of the user **pcube** (`~pcube/sm.sh`).

The following example, which shows a line in the `sm.sh` file, defines a memory size of 512 MB for the SM process:

```
PCUBE_SM_MEM_SIZE=512
```

**Note**

You can configure **PCUBE_SM_MEM_SIZE** in the **install-def.sh** script file before running the installation script. This ensures that the SM will be installed with the correct value configured.

**Note**

To prevent performance degradation because of memory swapping, make sure that the machine has enough RAM for the SM process, the SM database, and all of the other applications running on this machine.

**Note**

To determine the correct memory values for your installation, see [Step 2 Determine the system memory settings, page 5-11](#).

Installing the Subscriber Manager

This section describes how to install the Subscriber Manager.

**Note**

In a high availability setup (see [SM Cluster, page 2-13](#)), you must install the SM Cluster VCS agents. See [Installing SM Cluster Agents, page 5-20](#).

Prerequisites

Make sure that the disk space requirements listed in [System Requirements, page 5-6](#) are satisfied.

Step 1

Extract the distribution files.

Before you can install the SM, you must first load and extract the distribution files on the installed machine or in a directory that is mounted to the installed machine.

- a. Download the distribution files from the Cisco web site.
- b. Use FTP to load the distribution files to the SM.
- c. Unzip the files using the **gunzip** command.

```
gunzip SM_dist_<version>_B<build number>.tar.gz
```

- d. Extract the tar file using the **tar** command:

```
tar -xvf SM_dist_<version>_B<build number>.tar
```

Step 2

Determine the system memory settings

Set the system memory configuration requirements according to the maximum number of subscribers. There are two methods to determine the system memory settings: without the Quota Manager or with the Quota Manager.

The following tables list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is disabled.

Table 5-6 *Memory Configuration Parameters Versus Number of Subscribers: without Quota Manager*

Maximum Number of Subscribers	(TimesTen Memory Settings) Shared Memory	(TimesTen Memory Settings) PermSize	(TimesTen Memory Settings) TempSize
100,000	512 MB	200 MB	100 MB
500,000	1024 MB	512 MB	256 MB
1,000,000	1280 MB	768 MB	256 MB
2,000,000	2048 MB	1536 MB	256 MB
3,000,000	2560 MB	2048 MB	256 MB
4,000,000	3328 MB	2816 MB	256 MB
5,000,000	3840 MB	3328 MB	256 MB
10,000,000	6912 MB	6400 MB	256 MB
15,000,000	9984 MB	9472 MB	256 MB
20,000,000	13312 MB	12800 MB	256 MB

Table 5-7 *SM Process Memory Setting Versus Cache Size: without Quota Manager*

Cache Size	SM Process Memory Setting
100,000	256 MB
500,000	512 MB
1,000,000	768 MB
2,000,000	1280 MB
3,000,000	1792 MB
4,000,000	2048 MB
5,000,000	2560 MB
10,000,000	5120 MB
15,000,000	7680 MB
20,000,000	10240 MB

**Caution**

The SM process RAM in the table is calculated for:

40 SCE connections per SM—For each additional SCE you should add an additional 25 MB for the SM process memory setting.

20 PRPC (SM API/CNR LEG) connections to the SM—For each additional connection you should add an additional 25 MB for the SM process memory setting.

If you use the virtual-links ability of the service control solution you should add an additional 60 MB to the Perm Size setting for each additional 100,000 subscribers.

**Note**

For Linux installations, there are further limitations:

The maximum number of subscribers is two million.

The maximum value for the SM process memory settings is 1.8 GB.

The combined size of the TimesTen data-stores setting should not exceed 2 GB.

Description of the table columns:

- **Maximum Number of Subscribers**—The maximum number of subscribers that the SM has to support.
- **Cache Size**—The number of subscriber record references the SM process maintains. The default value is 100000 records.
- **SM Process Memory Setting**—The required memory configuration for the SM process itself. For additional information about the SM process memory configuration, see [Configuring the SM Process Memory Settings, page 5-10](#).
- The configuration required for TimesTen to run correctly. For additional information, see [Step 3Configure the shared memory settings., page 5-14](#).

If the previous tables do not list the maximum number of subscribers that you require, use the settings specified for the next higher value of Maximum Number of Subscribers. For example, for 1,200,000 subscribers, use the values specified for 2,000,000 subscribers.

The following tables list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is enabled.

Table 5-8 *Memory Configuration Parameters Versus Number of Subscribers: with Quota Manager*

Maximum Number of Subscribers	(TimesTen Memory Settings) Shared Memory	(TimesTen Memory Settings) PermSize	(TimesTen Memory Settings) TempSize
500,000	1280 MB	768 MB	256 MB
1,000,000	1792 MB	1280 MB	256 MB
2,000,000	3072 MB	2560 MB	256 MB
3,000,000	4096 MB	3584 MB	256 MB
4,000,000	5376 MB	4864 MB	256 MB
5,000,000	6400 MB	5888 MB	256 MB
10,000,000	12032 MB	11520 MB	256 MB
15,000,000	17664 MB	17152 MB	256 MB
20,000,000	23552 MB	23040 MB	256 MB

Table 5-9 SM Process Memory Setting Versus Cache Size: with Quota Manager

Cache Size	SM Process Memory Setting
100,000	512 MB
500,000	512 MB
1,000,000	768 MB
2,000,000	1280 MB
3,000,000	1792 MB
4,000,000	2048 MB
5,000,000	2560 MB
10,000,000	5120 MB
15,000,000	7680 MB
20,000,000	10240 MB

**Caution**

The SM process RAM in the table is calculated for:

20 SCE connections per SM—For each additional SCE you should add an additional 50 MB for the SM process memory setting.

20 PRPC (SM API/CNR LEG) connections to the SM—For each additional connection you should add an additional 25 MB for the SM process memory setting.

If you use the virtual-links ability of the service control solution you should add an additional 60 MB to the Perm Size setting for each additional 100,000 subscribers.

**Note**

For Linux installations, there are further limitations:

The maximum number of subscribers is two million.

The maximum value for the SM process memory settings is 1.8 GB.

The combined size of the TimesTen data-stores setting should not exceed 2 GB.

Step 3

Configure the shared memory settings.

TimesTen requires that certain changes be made in the system kernel configuration file (`/etc/system` in Solaris and `/etc/sysctl.conf` in Linux). These changes increase the shared memory and semaphore resources on the Solaris machine from their defaults. For additional information regarding these changes, refer to the TimesTen documentation.

**Note**

It is recommended that you review the `/etc/system` or the `/etc/sysctl.conf` file before running the `tt-sysconf.sh` script, because the script overwrites the current file settings with the values listed in the "Making the changes manually" procedure. If you want to keep some or all of the current file settings, edit the system configuration file and perform the changes manually.

TimesTen requires that certain changes be made in the operating system kernel configuration file:

- For Solaris, modify file `/etc/system`.
- For Linux, modify file `/etc/sysctl.conf`.

These changes increase the shared memory and semaphore resources on the machine from their defaults.



Note

It is recommended that you review the system configuration file before running the `tt-sysconf.sh` script, because the script overwrites the current file settings with the values listed in the “Making the changes manually” procedure. If you want to keep some or all of the current file settings, edit the configuration file by performing the changes manually.

- Make the changes automatically or manually.
 - To make the required changes automatically, run the `tt-sysconf.sh` script.

The root user must invoke this script file, without arguments, as follows:

```
# tt-sysconf.sh
```

- To make the required changes manually:



Note

Editing the configuration file manually is required when you require support for more than 100,000 subscribers in the SM. Your system's sizing requirements only affect the shared memory size. To determine the correct configuration values for your system, see the tables in [Step 2 Determine the system memory settings, page 5-11](#).

- For Solaris, make the required changes manually by adding the following lines to the `/etc/system` file and configuring the shared memory size:

```
*---- Begin settings for TimesTen
set semsys:seminfo_semmni = 20
set semsys:seminfo_semmnl = 100
set semsys:seminfo_semmns = 2000
set semsys:seminfo_semmnu = 2000
set shmsys:shminfo_shmmax = 0x20000000
*---- End of settings for TimesTen
```

- For Linux, make the required changes manually by adding the following lines to the `/etc/sysctl.conf` file and configuring the shared memory size:

```
*---- Begin settings for TimesTen
kernel.shmmax = 536870912
kernel.sem = "SEMMSL_250 SEMMNS_32000 SEMOPM_100 SEMMNI_100
*---- End of settings for TimesTen
```

Step 4 Edit the `install-def.cfg` file.



Note

This step is optional when performing the SM installation. However, it is recommended to edit the file if one of the parameter values should not be set to the default value.

The `install-def.cfg` file contains several parameters that can be preconfigured before installation/upgrade of the SM. These parameters are copied by the install/upgrade routine to the relevant SM configuration files. By default, all of the parameters are commented out and the default values are used.

The file contains the following parameters:

- `max_subscribers_num`
Resides in the **[SM Definitions]** section. Defines the maximum number of subscribers the SM supports. You can set the maximum number of subscribers using this parameter or by setting the **max_number_of_subscribers** parameter in **p3sm.cfg** configuration file. See [Data Repository Section, page A-19](#).

There is a limit to the maximum number of subscribers that can be stored in the SM database. The limit is 20 million subscribers for Solaris and two million subscribers for Linux.
The SM default configuration supports a maximum of 200,000 subscribers.
- `sm_memory_size`
Resides in the **[SM Definitions]** section. Defines the amount of memory allocated for the SM process in MB. You can set the parameter here or edit `PCUBE_SM_MEM_SIZE` in the **sm.sh** file that resides under the `~pcube` folder.
- `database_perm_size`
Resides in the **[Database Definitions]** section. Defines the `PermSize` allocated for the database in MB. You can set the parameter here or edit the `PermSize` parameter in the `/var/TimesTen/sys.odbc.ini` file.
- `database_temp_size`
Resides in the **[Database Definitions]** section. Defines the `TempSize` allocated for the database in MB. You can set the parameter here or edit the `TempSize` parameter in the `/var/TimesTen/sys.odbc.ini` file.

Step 5 Execute the **install-sm.sh** script



Note

The **install-sm.sh** script is customizable.



Note

It is not possible to run the script if the `/etc/motd` file exists. The file should be moved *or* removed prior to running the **install-sm.sh** script.

- a. From your workstation shell prompt, move to the directory to where the distribution file was extracted and run the **install-sm.sh** script:

```
# install-sm.sh [ command options]
```

The following table lists the command options:

Table 5-10 Options for *install-sm.sh*

Options	Description
-d	Specifies the install directory for ~pcube . This directory must <i>not</i> be an existing directory. This directory must be specified as a full pathname beginning with "/". The default is /opt/pcube .
-o	Specifies the existing home directory of user pcube as the install directory. Note The options -d and -o are mutually exclusive.
-v	Specifies the directory for data storage. This directory must <i>not</i> be an existing directory. This directory must be on a partition with at least 1 GB of free space. This directory must be specified as a full pathname beginning with "/". The default is InstallDirectory/var .
-h	Shows this message.

The script performs the following steps:

- Checks for validity of arguments and sufficient disk space.
- Adds (or verifies the existence of) a user **pcube** and a group **pcube** .
- Populates the **pcube** home directory with the SM and CLU directory structure.
- Invokes the JRE installation script with **pcube** home as the target directory. The JRE installation does not affect any existing Java installations.
- Invokes the TimesTen installation script with **pcube** home as the target directory.
- Creates the SM DSN for TimesTen with **pcube** home as the target directory. It is possible to install the SM DSN for TimesTen in a specified directory by using the -v option.
- Creates startup and shutdown scripts in **/etc**.
- Creates the shell preamble **~pcube/sm.sh** , which contains environment variables that depend on the actual folder in which the SM was installed.

Examples for the `install-sm.sh` Script

These examples demonstrate how to use the `install-sm.sh` script to install the SM.

Installing the SM and CLU: Example

This example installs the SM and CLU to a directory named `/usr/local/pcube` using the default data storage directory.

```
# install-sm.sh -d /usr/local/pcube
```

Installing the SM and CLU to a Default Directory: Example

This example installs the SM and CLU to the default directory of the user `pcube`.

```
# install-sm.sh -o
```

Step 6 Set the password for the `pcube` user

After the installation script has completed successfully, set the password for the `pcube` user by running the `# passwd pcube` command.



Note It is important to remember the password you have selected.

Step 7 Reboot the computer.

It is necessary to reboot the computer to complete the installation.

Step 8 Install the SCA BB package and LEG components.

Depending on the integration type, you might need to install the SCA BB package on the SM or install Login Event Generator (LEG) modules.

To perform the installation, use the `p3inst` command-line utility. For example:

```
>p3inst --install --file=eng31.pqi
```

For additional information, see [Installing an Application, page 5-21](#).

Step 9 Add a user for PRPC authentication.

It is necessary to add a user for PRPC authentication because SCA BB requires a username and password when connecting to the SM.

To add a user for PRPC authentication, use the `p3rpc` command-line utility. For example:

```
>p3rpc --set-user --username=username--password=password
```

For cluster installations, use the `--remote` option, after both devices are installed, as shown in the following example:

```
>p3rpc --set-user --username=username--password=password--remote=OTHER_SM_IP[:port]
```

For troubleshooting the installation, see [Troubleshooting, page D-1](#).

Verifying the Installation

To verify that the installation was successful, run a CLU utility, such as the **p3sm** command, to display general information about the SM.

Step 1 From your workstation shell prompt, change to the **~pcube/sm/server/bin** directory.

Step 2 Run the **p3sm** command.

The following **p3sm** command displays the current status of the SM.

```
>p3sm --sm-status
```



Note

Wait a few minutes after the installation before running this command to allow the SM to become operational.

The output of this command should indicate that the SM is running.

In case of errors during installation, the command will output a description of these errors.

Configuring the Subscriber Manager

After installing the SM, you can configure the SM to your specific needs. In particular, you should address the following parameters at this point:

- **topology**—Cluster or standalone
- **introduction_mode**—Pull or push
- **support_ip_ranges**—Whether IP-ranges should be used in the installed setup

To configure the SM, edit the **p3sm.cfg** configuration file using any standard text editor. The configuration file is described in detail in the Configuration and Management module and in the Configuration File Options module. After you finish editing the **p3sm.cfg** configuration file, use the **p3sm** utility to update the SM with the new settings:

Step 1 From your workstation shell prompt, run the **p3sm** command.

The following **p3sm** command loads the configuration file and updates the SM configuration accordingly.

```
>p3sm --load-config
```

How to Perform Additional Installation Procedures

The following procedures complement the ones described in [Installing the Subscriber Manager, page 5-11](#) :

- [Installing an SM Cluster, page 5-20](#) —Should be used if installing two SM nodes for the first time.
- [Installing SM Cluster Agents, page 5-20](#) —Must be installed when in a High Availability setup where Veritas Cluster Server (VCS) is used.
- [Installing an SM Cluster, page 5-20](#)
- [Installing SM Cluster Agents, page 5-20](#)

Installing an SM Cluster

The installation of an SM cluster is very similar to installing the SM on two machines.

-
- Step 1** Install the Veritas Cluster Server software on both machines.
- Step 2** Install the SM on both machines.
For further information, see [Installing the Subscriber Manager, page 5-11](#).
- Step 3** Configure the SM topology parameter to cluster.
For further information, see [Configuring the Subscriber Manager, page 5-19](#).
- Step 4** Configure the replication scheme.
It is necessary to configure the replication scheme for the data-store replication to the redundant machine by running the following CLU:
`p3db --set-rep-scheme`
- Step 5** Install the SM VCS agents.
For further information, see [Installing the Subscriber Manager, page 5-11](#).
- Step 6** Configure the VCS.
For further information, see the [Veritas Cluster Server, page E-1](#) module.
-

Installing SM Cluster Agents

The installation distribution file contains a set of customized Veritas Cluster Agents for supporting monitoring and controlling of SM-related resources in cluster topology. You must install the cluster agents under the VCS **bin** directory.



Note

It is not possible to run the script if the `/etc/motd` file exists. The file should be moved *or* removed prior to running the `install-vcs-agents.sh` script.

-
- Step 1** From your workstation shell prompt, run the `install-vcs-agents.sh` script.

```
# install-vcs-agents.sh [command-options]
```

The following table lists the command options.

Table 5-11 Options for *install-vcs-agents.sh*

Options	Description
-d	Specifies the installation directory for the agents, which must be the bin directory of the VCS. This directory must be an existing directory. This directory must be specified as a full pathname that begins with '/'. Default: /opt/VRTSvcs/bin
-h	Prints a help message and exits.

The script performs the following steps:

- Checks that the installation directory exists.
- Extracts the agent distribution file to the specified directory.
- Copies the VCS default-script-agent-executable from the installation directory to all agent directories.

Installing an Application

An application can be installed on the SM in order to customize the components. You can also upgrade an existing application to a new version, or return to a previous version (rollback) of an application. Use the **p3inst** utility to install or uninstall an application (PQI file).



Note

You must run the **p3inst** utility as user **pcube**. The script is located in the **~pcube/sm/server/bin** directory.

For additional details of how to install a specific application such as SCA BB, refer to the application installation guide.

Step 1 From your workstation shell prompt, run the **p3inst** CLU.

The following is the command syntax for the **p3inst** CLU:

```
>p3inst operation filename[installtion/upgrade parameters]
```

The following table lists the **p3inst** operations.

Table 5-12 *p3inst* Operations

Option	Description
--install	Installs the specified application PQI file to the SM. It may be necessary to specify arguments for the installation procedure in the command line.
--uninstall	Uninstalls the specified application from the SM.

Table 5-12 p3inst Operations (continued)

Option	Description
<code>--upgrade</code>	Upgrades the specified application. It may be necessary to specify arguments for the upgrade procedure in the command line.
<code>--rollback</code>	Returns the specified application to the previous version.
<code>--describe</code>	Displays the contents of the specified application file.
<code>--show-last</code>	Lists the last installed PQI file

Configuration Examples for Installing an Application

Installing the Specified Installation to the Device: Example

This example shows how to install the specified installation file to the device.

```
>p3inst --install --file=eng31.pqi
```

Uninstalling the Specified Installation from the Device: Example

This example shows how to uninstall the specified installation file from the device.

```
>p3inst --uninstall --file=oldInstallation.pqi
```

How to Upgrade the Subscriber Manager

The Subscriber Manager supports several types of upgrade procedures, according to the SM version that was previously installed and the requirement (or lack of requirement) for fail-over in the new installation.

There are three types of upgrade procedure:

Data Duplication Procedure

The data duplication procedure enables the user to duplicate or copy the entire database from one machine to the other, and then keep the databases synchronized by running the replication agent at the end. Some of the upgrade procedures described in the previous sections use this procedure.

For details of the procedure, see [Database Duplication Recovery, page 3-6](#).

Upgrading from a Standalone Setup

This procedure applies to the SM version 2.2 and up. This upgrade procedure requires service down-time.



Note

For the upgrade procedure from a standalone setup to a cluster setup, see [Upgrading from a Standalone Setup to a Cluster Setup, page 5-26](#).

Configuring the Required Memory Settings

To prepare the SM for the upgrade, configure the system kernel configuration file on the SM according to the procedure described in [Step 3Configure the shared memory settings., page 5-14.](#)

Step 1 Extract the distribution files.

Before you can upgrade the SM, you must first load and extract the distribution files on the installed machine or in a directory that is mounted to the installed machine.

- a. Download the distribution files from the Cisco web site.
- b. Use FTP to load the distribution files to the SM.
- c. Unzip the files using the **gunzip** command.

```
gunzip SM_dist_<version>_B<build number>.tar.gz
```

- d. Extract the tar the file using the **tar** command.

```
tar -xvf SM_dist_<version>_B<build number>.tar
```

Step 2 Disable state exchange.

If upgrading from version 2.x, disable the state exchange between the SM and the SCE platform by editing the SM configuration file (**p3sm.cfg**) and set **save_subscriber_state=false** , then load the configuration file using the following command:

```
>p3sm --load-config
```



Note You must use this CLU as user **pcube** .

Step 3 Edit the **install-def.cfg** file.

Edit the **install-def.cfg** configuration file and set the **PermSize** and **TempSize** parameters according to the recommendations described in [Step 3Configure the shared memory settings., page 5-14.](#) For further information, see [Step 4Edit the install-def.cfg file., page 5-15.](#)

Step 4 Run the **upgrade-sm.sh** script.

In order to upgrade from non-cluster setups, the Subscriber Manager distribution provides an upgrade script that implements an upgrade from previous versions. The upgrade procedure script preserves the subscriber database and the entire SM configuration, including network elements, domains, and application-specific components.



Note For Solaris: Previous versions of the SM on Solaris used a 32-bit or 64-bit Java Virtual Machine (JVM) and database. The SM is currently installed with a 64-bit JVM and database. There is no choice as to whether to upgrade to 64-bit.



Note For Linux: Upgrades on Linux systems are only from SM 2.5.x and 3.x releases. The Linux platform is used only with a 32-bit JVM and database.

**Note**

It is not possible to run the script if the `/etc/motd` file exists. The file should be moved *or* removed prior to running the `upgrade-sm.sh` script.

- a. From your workstation shell prompt, run the `upgrade-sm.sh` script.

```
# upgrade-sm.sh [command-options]
```

Table 5-13 Options for `upgrade-sm.sh`

Options	Description
-h	Shows this message.

The script performs the following steps:

- Detects existing SM version.
- Detects new SM version.
- Verifies that Java is installed on the machine.
- Verifies that the user `pcube` exists.
- Verifies that an SM of version 2.2 or later is present on the system.
- Stops the current SM (if running).
- Backs up existing contents of the subscriber database to an external file.
- Removes the TimesTen database.
- Backs up SM configuration files.
- Installs the updated versions of SM and TimesTen.
- Invokes a separate program for upgrading the SM and database configuration files.
- Restores the backed up contents of the subscriber database.
- Starts the upgraded SM.

**Note**

To complete the upgrade process of the SM, you are required to follow the upgrade process instructions of your application and LEGs as described in the specific user guides. In general, you must run the `p3inst` CLU to upgrade or re-install your application or LEG PQI files.

Upgrading the SM: Example

This example upgrades the SM, keeps the current database, and does not pause the upgrade for PQI installation.

```
# upgrade-sm.sh
```

**Note**

An SM reboot is not required after the upgrade procedure.

Step 5 Add a user for PRPC authentication.

If upgrading from a version of the SM prior to 3.0.5, it is necessary to add a user for PRPC authentication because SCA BB requires a username and password when connecting to the SM.

To add a user for PRPC authentication, use the **p3rpc** CLU. For example:

```
>p3rpc --set-user--username=username--password=password
```

Step 6 Upgrade the application and LEGs.

Perform the specific upgrade instructions of your application or LEGs. For additional information, see [Installing an Application, page 5-21](#).

Step 7 Remove obsolete state information.

If upgrading from version 2.x, remove any obsolete subscriber state information, by running the SM CLU as **pcube** user:

```
>p3subsdb --clear-all-states
```

Step 8 Remove obsolete subscriber properties (Method A)

If upgrading from version 2.x, remove any obsolete subscriber properties.



Note All CLU commands must be run as user **pcube** .

- a. Export any existing subscribers to a csv file.

```
>p3subsdb --export -o csv-file
```

- b. Clear the subscriber database.

```
>p3subsdb --clear-all
```

- c. Remove any obsolete properties from the csv-file.

See [Table 5-13](#) for a list of properties to be removed.

- d. Import the subscribers from the revised file.

```
>p3subsdb --import -f csv-file
```

Step 9 Remove obsolete subscriber properties (Method B)

If upgrading from version 2.x, remove any obsolete subscriber properties.



Note All CLU commands must be run as user **pcube** .

- a. Remove the obsolete properties from the SM database by running the **p3subsdb** command.

```
>p3subsdb --remove-property --property=prop
```

The obsolete properties to be removed are listed in [Table 5-13](#).

- b. Resynchronize all SCEs.

```
>p3sm --resync-all
```

Table 5-14 *Obsolete Properties to be Removed*

QP Tunable	Applicable to Version
QpLimit[1]–QpLimit[16]	Version 2.5.5 or higher
QpSet[1]–QpSet[16]	Version 2.5.5 or higher
QpAdd	Versions of 2.5 prior to version 2.5.5 Versions of 2.1 prior to version 2.1.7
QpDelta[1]–QpDelta[16]	Versions of 2.5 prior to version 2.5.5 Versions of 2.1 prior to version 2.1.7

Step 10 Configure the SCE platforms.

If using a cascade SCE setup, configure the cascade SCE pair in the **p3sm.cfg** file as described in [SCE.XXX Section, page A-17](#).

Upgrading from a Standalone Setup to a Cluster Setup

This section describes the basic procedure for upgrading from a standalone setup to a cluster setup. This procedure applies for the SM from version 2.2 and up. This upgrade procedure requires service down-time.



Note

This procedure attempts to minimize the SM downtime as much as possible. Therefore, if subscriber service is not an issue, use instead the procedure for installing a new machine and upgrading a new machine.

In the following procedure, SM-A is the original SM machine running SM version 2.2 and later, and SM-B is the new SM machine being added for redundancy.

Step 1 Install the VCS on both machines.

Step 2 Install SM-B.

To install SM-B, follow the procedure described in [Installing the Subscriber Manager, page 5-11](#).

Step 3 Upgrade SM-A.

To upgrade SM-A, follow the procedure described in [Upgrading from a Standalone Setup, page 5-22](#).



Note

From this step until the upgrade procedure is completed, there is no SM to handle subscribers.

Step 4 Replicate the SM configuration from SM-A to SM-B.

Copy the **p3sm.cfg** configuration file manually from SM-A to SM-B. To load the configuration file, see [Reloading the SM Configuration \(p3sm\), page 4-14](#).

- Step 5** Duplicate the subscriber database.
The data duplication procedure is described in [Data Duplication Procedure, page 5-22](#).
Configure the replication scheme for the data store replication to the redundant machine.



Note This CLU must run on both machines, and as user **pcube** .

```
>p3db --set-rep-scheme
```

- Step 6** Create a cluster.
- Configure SM-A and SM-B to support a cluster.
 - Make SM-B standby.
Use the CLU command **p3cluster --standby**.
 - Ensure that SM-A is active.
Use the CLU command **p3cluster --active**.
 - Configure the VCS.
 - Run the VCS on the setup.

- Step 7** Configure the LEG applications to send logins to the cluster virtual IP.
-

How to Upgrade Cluster Setups

- [Upgrading from a Cluster Setup Version 3.x, page 5-27](#)
- [Upgrading from a Cluster Setup Version 2.x, page 5-31](#)

Upgrading from a Cluster Setup Version 3.x

This section describes the basic procedure for upgrading from a cluster setup to a cluster setup, from SM version 3.0 and up.



Note This procedure does not have a service down time.

The upgrade procedure when upgrading from a cluster setup involves three high level steps:

- Perform the upgrade procedure on the standby machine.
- Perform a manual failover on the SM that was upgraded.
- Perform the upgrade procedure on the SM that became standby after performing the failover.

Step 1 Configure the system kernel configuration file on both machines.

Before starting the upgrade procedure, it is necessary to configure the system kernel configuration file on both machines.

- a. Configure the system kernel configuration file on the *standby* SM.

The configuration procedure is described in [Step 3 Configure the shared memory settings.](#), page 5-14.

- b. Reboot the *standby* SM.
- c. Manually trigger a failover using the Veritas cluster manager and wait until the standby SM becomes active and the active SM becomes standby.

Run the following VCS CLU command from `/opt/VRTSvcs/bin` :

```
# hagrps -switch service group name to System
```

- d. Repeat steps a and b on the new *standby* SM.

Step 2 Extract the distribution files.

Before you can upgrade the SM, you must first load and extract the distribution files on the installed machine or in a directory that is mounted to the installed machine.

- a. Download the distribution files from the Cisco web site.
- b. Use FTP to load the distribution files to the SM.
- c. Unzip the files using the **gunzip** command.

```
gunzip SM_dist_<version>_B<build number>.tar.gz
```

- d. Extract the tar the file using the **tar** command.

```
tar -xvf SM_dist_<version>_B<build number>.tar
```

Step 3 Stop VCS monitoring.

- a. Log in as the *root* user.
- b. Stop the VCS monitoring of the SM.

Use the following VCS CLU command from `/opt/VRTSvcs/bin` to stop VCS monitoring:

```
#!/hastop -local
```

Step 4 Edit the `install-def.cfg` file.

Edit the `install-def.cfg` configuration file and set the `PermSize` and `TempSize` parameters according to the recommendations described in [Step 3 Configure the shared memory settings.](#), page 5-14. For further information, see [Step 4 Edit the install-def.cfg file.](#), page 5-15.

Step 5 Run the `cluster-upgrade.sh` script.

In order to upgrade from cluster setup to cluster setup, Subscriber Manager version 3.1.0 provides an upgrade script to perform an upgrade from previous versions. The upgrade procedure script preserves the subscriber database and the entire SM configuration, including network elements, domains, and application-specific components.

**Note**

For Solaris: Previous versions of the SM on Solaris used a 32-bit or 64-bit Java Virtual Machine (JVM) and database. From SM version 3.0.3, the SM is installed with a 64-bit JVM and database. There is no choice as to whether to upgrade to 64-bit.

**Note**

For Linux: Upgrades on Linux systems are only from SM 2.5.x and 3.x releases. The Linux platform is used only with a 32-bit JVM and database.

- a. From your workstation shell prompt, run the **cluster-upgrade.sh** script.

```
# cluster-upgrade.sh [command-options]
```

The following table lists the command options.

Table 5-15 Options for **cluster-upgrade.sh**

Options	Description
-h	Shows this message.
-1	Use this option when activating the script on the first machine.
-2	Use this option when activating the script on the second machine.

The script performs the following steps:

- Detects existing SM version.
- Detects new SM version.
- Verifies that Java is installed on the machine.
- Verifies that the user **pcube** exists.
- Verifies that an SM of version 2.2 or later is present on the system.
- Verifies the values configured in the **install-def.cfg** (if any exist).
- Stops the current SM (if running).
- Backs up existing contents of the subscriber database to an external file.
- Removes the TimesTen database.
- Backs up SM configuration files.
- Installs the updated versions of SM and TimesTen.
- Invokes a separate program for upgrading the SM and database configuration files.
- Restores the backed up contents of the subscriber database. When activated on the second machine, the script copies the contents of the database from the currently active SM since the currently active SM contains the most up-to-date data.

**Note**

To complete the upgrade process of the SM, you are required to follow the upgrade process instructions of your application and LEGs as described in the specific user guides. In general, you must run the **p3inst** CLU to upgrade or re-install your application or LEG PQI files.

Examples for Running the cluster-upgrade.sh Script

Upgrading the First SM: Example

This example upgrades the first SM, keeps the current database, and does not pause the upgrade for PQI installation.

```
# cluster-upgrade.sh -1
```



Note

An SM reboot is not required after the upgrade procedure.

Upgrading the Second SM: Example

This example upgrades the second SM, keeps the current database, and does not pause the upgrade for PQI installation.

```
# cluster-upgrade.sh -2
```



Caution

Do not start the SM after running **cluster-upgrade.sh**.

Step 6 Start database replication between the two machines.

From the shell prompt, run the following command:

```
>p3db --rep-start
```

Step 7 Verify that changed data has been replicated.

Wait until all the data that was changed while the upgrade script was running has been replicated:

- On the active SM add a dummy subscriber using the **p3subs** CLU:

```
>p3subs --add -s dummySub
```



Note

When upgrading the second SM add a subscriber with a name other than **dummySub** since it was added during the upgrade of the first SM due to the replication.

- On the standby SM run the **verify-subscriber.sh** script to verify the subscriber was replicated:

```
#!/verify-subscriber.sh dummySub
```



Note

The **verify-subscriber.sh** script should be run as the *root* user.

Step 8 Restart VCS monitoring.

Run the following VCS CLU command from **/opt/VRTSvcs/bin** :

```
#!/hastart
```

VCS monitoring will start the SM process automatically in the Initialization state.

Use the **p3cluster** CLU in order to set the SM to standby state:

```
>p3cluster --standby
```



Note

The SM boot time after the upgrade will be longer than usual due to the extra time taken to initialize the database indexes.

- Step 9** Upgrade the application and LEGs.
Perform the specific upgrade instructions of your application or LEGs. For additional information, see [Installing an Application, page 5-21](#).
- Step 10** Manually trigger a failover.
Manually trigger a failover using the Veritas cluster manager and wait until the standby SM becomes active and the active SM becomes standby.
Run the following VCS CLU command from `/opt/VRTSvcs/bin` :
- ```
hagrps -switch service group name-to System
```
- For further information about the **hagrps** CLU refer to your Veritas Cluster Server documentation.
- Step 11** Manually update the replication scheme.  
On the new *active* SM run the following CLU:
- ```
p3db --rep-stop p3db --drop-rep-scheme p3db --set-rep-scheme
```
- Step 12** Repeat the upgrade procedure on the standby SM.
After performing the manual failover (see [Step 10 Manually trigger a failover., page 5-31](#)), the standby SM on which you perform the upgrade procedure becomes the active SM. The previous active SM becomes the new standby SM.
To upgrade the second SM, repeat the procedure from [Step 2 Extract the distribution files., page 5-28](#) to [Step 9 Upgrade the application and LEGs., page 5-31](#).
- Step 13** Add a user for PRPC authentication.
If upgrading from a version of the SM prior to 3.0.5, it is necessary to add a user for PRPC authentication because SCA BB requires a username and password when connecting to the SM.
To add a user for PRPC authentication, use the **p3rpc** CLU. For example:
- ```
>p3rpc --set-user--username=username--password=password--remote=OTHER_SM_IP[:port]
```
- Step 14** Configure the SCE platforms  
If using a cascade SCE setup, configure the cascade SCE pair in the **p3sm.cfg** file as described in the [SCE.XXX Section, page A-17](#).
- Step 15** Remove the dummy subscribers  
After successfully upgrading both SMs it is recommended to remove the dummy subscribers that were added in order to verify the replication during the upgrade.  
On the new *active* SM run the following CLU:
- ```
>p3subs --remove -subscriber= first dummy subscriber name>p3subs --remove -subscriber= second dummy subscriber name
```

Upgrading from a Cluster Setup Version 2.x

This section describes the basic procedure for upgrading from a cluster setup to a cluster setup, from SM versions 2.x.



Note

This procedure has a service down time.

The upgrade procedure when upgrading from a cluster setup involves three high level steps:

1. Perform the upgrade procedure on the standby machine.
2. Perform a manual failover on the SM that was upgraded.
3. Perform the upgrade procedure on the SM that became standby after performing the failover.

Step 1 Configure the system kernel configuration file on both machines.

Before starting the upgrade procedure, it is necessary to configure the system kernel configuration file on both machines.

- a. Configure the system kernel configuration file on the *standby* SM.
The configuration procedure is described in [Step 3 Configure the shared memory settings., page 5-14.](#)
- b. Reboot the *standby* SM.
- c. Manually trigger a failover using the Veritas cluster manager and wait until the standby SM becomes active and the active SM becomes standby.

Run the following VCS CLU command from `/opt/VRTSvcs/bin` :

```
# hagrps -switch service group name to System
```

- d. Repeat steps a and b on the new *standby* SM.

Step 2 Extract the distribution files.

Before you can upgrade the SM, you must first load and extract the distribution files on the installed machine or in a directory that is mounted to the installed machine.

- a. Download the distribution files from the Cisco web site.
- b. Use FTP to load the distribution files to the SM.
- c. Unzip the files using the **gunzip** command.

```
gunzip SM_dist_<version>_B<build number>.tar.gz
```

- d. Extract the tar file using the **tar** command.

```
tar -xvf SM_dist_<version>_B<build number>.tar
```

Step 3 Uninstall the VCS agents and stop VCS monitoring.

- a. Log in as the *root* user.
- b. Uninstall the VCS agents.
Uninstalling the VCS agents is described in [Uninstalling VCS Agents, page 5-37.](#) The resource names to use are *PcubeSm*, *OnOnlyProcess*, and *TimesTenRep*.

- c. Stop the VCS monitoring of the SM.

Use the following VCS CLU command from `/opt/VRTSvcs/bin` to stop VCS monitoring:

```
#./hastop -local
```


- Step 4** Disable state exchange.
- Disable the state exchange between the SM and the SCE platform by editing the SM configuration file (**p3sm.cfg**) and set **save_subscriber_state=false** , then load the configuration file using the following command:



Note You must use this CLU as user **pcube** .

```
>p3sm --load-config
```

- Step 5** Drop the old replication scheme.
- Use the following CLU:



Note You must use this CLU as user **pcube** .

```
>p3sm --drop-rep-scheme
```

- Step 6** Edit the **install-def.cfg** file.
- Edit the install-def-cfg configuration file and set the PermSize and TempSize parameters according to the recommendations described in [Step 3Configure the shared memory settings., page 5-14](#). For further information, see [Step 4Edit the install-def.cfg file., page 5-15](#).

- Step 7** Run the upgrade-sm.sh script.
- For further information, see [Step 4Run the upgrade-sm.sh script., page 5-23](#).

- Step 8** Upgrade the application and LEGs.
- Perform the specific upgrade instructions of your application or LEGs. For additional information, see [Installing an Application, page 5-21](#).

- Step 9** Configure the replication scheme.
- Configure the replication scheme for the datastore replication to the redundant machine using the following CLU:



Note You must use this CLU as user **pcube** .

```
>p3sm --set-rep-scheme
```

- Step 10** Install the VCS agents and configure and restart VCS monitoring
- a. Install the SM VCS agents.
Installing the SM VCS agents is described in [Installing SM Cluster Agents, page 5-20](#).
 - b. Configure the VCS.
Configuration of the VCS is described in [Veritas Cluster Server, page E-1](#).
 - c. Restart VCS monitoring.
Run the following VCS CLU command from **/opt/VRTSvcs/bin** :

```
#!/hastart
```

Step 11 Remove obsolete state information.

Remove any obsolete subscriber state information, by running the SM CLU as **pcube** user:

```
>p3subsdB --clear-all-states
```

Step 12 Remove obsolete subscriber properties (Method A)

Remove any obsolete subscriber properties.



Note All CLU commands must be run as user **pcube** .

a. Export any existing subscribers to a csv file.

```
>p3subsdB --export -ocsv-file
```

b. Clear the subscriber database.

```
>p3subsdB --clear-all
```

c. Remove any obsolete properties from the csv-file.

See [Table 5-13](#) for a list of properties to be removed.

d. Import the subscribers from the revised file.

```
>p3subsdB --import -fcsv-file
```

Step 13 Remove obsolete subscriber properties (Method B)

If upgrading from version 2.x, remove any obsolete subscriber properties.



Note All CLU commands must be run as user **pcube** .

a. Remove the obsolete properties from the SM database by running the **p3subsdB** command.

```
>p3subsdB --remove-property --property=prop
```

The obsolete properties to be removed are listed in [Table 5-13](#).

b. Resynchronize all SCEs.

```
>p3sm --resync-all
```

Step 14 Manually trigger a failover

Manually trigger a failover using the Veritas cluster manager and wait until the standby SM becomes active and the active SM becomes standby.

Run the following VCS CLU command from **/opt/VRTSvcs/bin** :

```
# hagrps -switch service group nameto System
```

Step 15 Repeat the upgrade procedure on the standby SM.

After performing the manual failover (see [Step 14 Manually trigger a failover, page 5-34](#)), the standby SM on which you perform the upgrade procedure becomes the active SM. The previous active SM becomes the new standby SM.

To upgrade the second SM, repeat the procedure from [Step 2 Extract the distribution files., page 5-32](#) to [Step 12 Remove obsolete subscriber properties \(Method A\), page 5-34](#).

Step 16 Add a user for PRPC authentication.

It is necessary to add a user for PRPC authentication because SCA BB requires a username and password when connecting to the SM.

To add a user for PRPC authentication, use the **p3rpc** CLU. For example:

```
>p3rpc --set-user--username=username--password=password--remote=OTHER_SM_IP[:port]
```

Step 17 Configure the SCE platforms

If using a cascade SCE setup, configure the cascade SCE pair in the **p3sm.cfg** file as described in the [SCE.XXX Section, page A-17](#).

Additional Upgrade Procedures

Upgrading SubscriberID Maximum Length to 64 Characters

In version 3.0.5, the length of the SubscriberID was increased to 64 characters. For new installations the maximum length of the SubscriberID is 64 characters. However, when upgrading from earlier versions, the length is not increased automatically.

Step 1 Export the subscriber database using the **p3subsdb** CLU.

```
>p3subsdb --export --output=output file name
```

Step 2 Destroy the database using the **p3db** CLU.

```
>p3db --destroy-rep-db
```

Step 3 Restart the SM.

```
>p3sm --restart
```

Step 4 Import the subscribers back into the database using the **p3subsdb** CLU.

```
>p3subsdb --import --file=file name from Step 1
```



Note

This procedure requires system downtime because the SM database is destroyed. Moreover, after the restart, all the SCEs will automatically lose all the subscriber information and it will be restored only after the subscribers are imported back into the SM database.

How to Uninstall the Subscriber Manager

- [Uninstalling the Subscriber Manager, page 5-36](#)
- [Uninstalling VCS Agents, page 5-37](#)

Uninstalling the Subscriber Manager

- [uninstall-sm.sh Script, page 5-36](#)

uninstall-sm.sh Script

To execute the **uninstall-sm.sh** script, from your workstation shell prompt, enter the following command:

```
# uninstall-sm.sh [command-options]
```

The following table lists the command options:

Table 5-16 Options for **uninstall-sm.sh** Script

Options	Description
-n	Do not remove SM database.
-h	Shows the help message

The script performs the following steps:

- Stops the SM.
- Stops the replication agent (in cluster setups) if the **-n** flag is not used.
- Destroys the data-stores if the **-n** flag is not used.
- Uninstalls the TimesTen database.
- Removes the SM directories and boot files.
- Removes the Java that was installed as part of the SM installation.

-
- Step 1** If using a cluster setup, stop the VCS monitoring of the SM.
Stop the VCS monitoring by running the following VCS CLU command from **/opt/VRTSvcs/bin** :
- ```
#./hastop -local
```
- Step 2** Run the **uninstall-sm.sh** script from the distribution root directory.  
**#./uninstall-sm.sh**
- For further information, see [uninstall-sm.sh Script, page 5-36](#)
- Step 3** If using a cluster setup, remove the Veritas Cluster agents.  
Removal of the Veritas Cluster agents is described in [Uninstalling VCS Agents, page 5-37](#).  
Remove the following resource names: OnOnlyProcess, SubscriberManager, and TimesTenRep.
- Step 4** Remove the **pcube** user, by running the **userdel** command.  
**# userdel -r pcube**



**Note** If you chose to keep TimesTen installed, do not remove the **pcube** user.

## Uninstalling VCS Agents

Repeat the following procedure for each Veritas Cluster agent that you wish to remove.

- Step 1** Remove the VCS agents by using the Veritas Cluster Manager or by using the **hares** CLU.

The VCS agents can be removed using the Veritas Cluster Manager or the following CLU: (The resource names in your system might have different names, use **hares -list** to see the existing resource names).

```
hares -delete TimesTenDaemon # hares -delete SM # hares -delete ReplicationAgent
```

- Step 2** Remove the VCS resource types by using the **hatype** CLU.

The type names in your system might have different names, use **hatype -list** to see the existing type names.

```
hatype -delete OnOnlyProcess # hatype -delete SubscriberManager # hatype -delete TimesTenRep
```

- Step 3** Delete the VCS agent from the disk.

Use the following command to delete the VCS agent:

```
rm -rf /opt/VRTSvcs/bin/OnOnlyProcess # rm -rf /opt/VRTSvcs/bin/SubscriberManager # rm -rf /opt/VRTSvcs/bin/TimesTenRep
```





# APPENDIX **A**

## Configuration File Options

---

This module describes in detail all the parameters that can be configured by using the Subscriber Manager (SM) configuration file. The shorter description of SM configuration given in [Configuration and Management, page 4-1](#) is more oriented toward the routine configuration tasks that can be performed online using the CLU.

### Information About the Configuration File Options

The SM can be configured only by using its configuration file (the CLU is used for displaying, not configuring). The SM has one configuration file, **p3sm.cfg**, which is located under `~pcube/sm/server/root/config/`. To change any configuration parameter, edit the configuration file using a standard text editor, and then use the CLU to reload it (see [Reloading the SM Configuration \(p3sm\)](#), page 4-14).

You can use the **p3sm.cfg** configuration file for setting parameters for the following:

- SM configuration
- Radius Listener configuration
- Redundancy (cluster/standalone) configuration
- Domain configuration
- SCE configuration
- Cable adapter configuration
- PRPC port configuration
- FTP port configuration
- HTTP port configuration
- Database configuration

## Description of the Configuration File Options

The following sections correspond to the sections of the SM configuration file, **p3sm.cfg**.

For an explanation of the terms and concepts used in these sections, see [How to Configure a Subscriber Management Solution](#), page 4-3.

- [SM General Section](#), page A-3
- [SM High Availability Setup Section](#), page A-4
- [SM-LEG Failure Handling Section](#), page A-5
- [LEG-Domains Association Section](#), page A-6
- [Domain.XXX Section](#), page A-7
- [Default Domains Configuration Section](#), page A-8
- [Auto Logout Section](#), page A-9
- [Inactive Subscriber Removal Section](#), page A-10
- [Radius Listener Section](#), page A-11
- [Radius.NAS.XXX Section](#), page A-12
- [Radius.Subscriber ID Section](#), page A-13
- [Radius.Property.Package Section](#), page A-14
- [RPC.Server Section](#), page A-16
- [MPLS-VPN Section](#), page A-16
- [SCE.XXX Section](#), page A-17
- [FTP Section](#), page A-17
- [HTTP Tech-IF Section](#), page A-18
- [RDR Server Section](#), page A-18
- [Cable Adapter Section](#), page A-19
- [Data Repository Section](#), page A-19



## SM General Section

The **[SM General]** section contains the following parameters:

- `introduction_mode`

Defines whether the SM introduces the subscribers to the SCE devices immediately after a login operation (Push mode), or only when the SCE requests the subscriber specifically (Pull mode).

Possible values for this parameter are **push** and **pull**. The default value is **push**.

The following is an example of assigning a value to this parameter:

```
introduction_mode=push
```

- `application_subscriber_lock`

Defines whether to lock subscriber-related operations (login, logout, etc.) at the application level. Set this flag to **true** only if several LEG applications can update simultaneously the same parameters of a subscriber.

Possible values for this parameter are **true** and **false**. The default value is **true**.

The following is an example of assigning a value to this parameter:

```
application_subscriber_lock=true
```

- `force_subscriber_on_one_sce`

Defines whether the SM supports the solution when a Cisco 7600/6500 Router is used for load-balancing among several SCE platforms. In this solution when one SCE platform fails, subscriber traffic is redistributed to a different SCE platform. The SM must remove subscribers from the failed SCE platform and send the relevant subscriber information to the new SCE platform. This parameter is relevant only in the pull introduction mode.

Possible values for this parameter are **true** and **false**. The default value is **false**.



---

**Note** Changing this value requires a restart of the SM process.

---

- The following is an example of assigning a value to this parameter:

```
force_subscriber_on_one_sce=false
```

- `logon_logging_enabled`

Defines whether to enable the logging of subscriber logon events.



---

**Note** Setting this flag to **true** might cause performance degradation.

---

Possible values for this parameter are **true** and **false**. The default value is **false**.

The following is an example of assigning a value to this parameter:

```
logon_logging_enabled=false
```

- `subscriber_id_case_sensitivity`

Optional parameter that defines whether subscriber IDs are case sensitive or not. When this flag is set to **no**, all subscriber IDs in the subscriber database are set to be lower case. For example, 'JohnSmith' is converted to 'johnsmith'.

**Note**

Setting this flag to **no** when the subscriber database is not empty is not allowed. An error message will be shown and the configuration will not be loaded. To overcome this limitation, you can do the following:

1. Export the subscriber database to an external file
2. Clear the subscriber database
3. Change the configuration by setting the flag to **no** and load the new configuration
4. Import the subscriber database from the external file

Possible values for this parameter are **yes** and **no**. The default value is **yes**.

The following is an example of assigning a value to this parameter:

```
subscriber_id_case_sensitivity=yes
```

## SM High Availability Setup Section

The [SM High Availability Setup] section contains the following parameter:

- topology

Defines in what kind of topology the SM should work. Possible values for this parameter are **standalone** and **cluster**. The default value is **standalone**.

The following is an example of assigning a value to this parameter:

```
topology=standalone
```

## SM-LEG Failure Handling Section

The [SM-LEG Failure Handling] section contains parameters that affect the discovery of an SM-LEG connection failure event and the actions taken by SM upon a connection failure event. A network problem or a severe failure (such as reboot) of the SM or the LEG can cause an SM-LEG connection failure event.

The [SM-LEG Failure Handling] section contains the following parameters:

- `clear_all_mappings`

Defines the behavior of the SM in case of LEG-SM connection failure. This parameter is relevant only for cases where the SM and LEG are running on *different* machines.



---

**Note** This parameter defines a behavior that is similar for all LEG applications connected to the SM.

---

If this parameter is set to **true** and a SM-LEG connection failure occurs that is not recovered within the defined **timeout**, the mappings of all subscribers in the domains defined in the [LEG-Domains Association Section, page A-6](#) for the LEG that was disconnected will be removed.



---

**Note** **Important** : If you set the `clear_all_mappings` parameter to **true**, you must also set the `LEG-Domains Association` parameter to clear the mappings in the SM if an SM-LEG connection failure occurs.

---

Possible values for this parameter are **true** and **false**. The default value is **false**.

The following is an example of assigning a value to this parameter:

```
clear_all_mappings=false
```

- `timeout`

Defines the time in seconds from a SM-LEG connection failure until clearing the mappings in the SM database.



---

**Note** It takes several seconds for the SM to detect an SM-LEG connection failure. You must add this time to the value of the **timeout** parameter when calculating how long it will take the SM to react in case of an SM-LEG connection failure. For example, if **timeout** is set to 80, it will take 80 seconds **from the failure detection time** until the SM clears the subscribers database.

---

The default value for this parameter is 60 (seconds).

The following is an example of assigning a value to this parameter:

```
timeout=60
```

## LEG-Domains Association Section

The [LEG Domains Association] section defines the domains for which the mapping of all subscribers that belong to them will be cleared on SM-LEG connection failure. This section is relevant only if the `clear_all_mappings` parameter has been set in the [SM-LEG Failure Handling Section, page A-5](#).



### Note

Even though you set the **LEG-Domains Association** parameter, you must also set the `clear_all_mappings` parameter to **true** to actually clear the mappings in the SM if an SM-LEG connection failure occurs.

This section contains a list of LEG-Domain associations, each item in a separate line. Each LEG-Domain association is specified as shown for the following parameter:

- `<LEG name>=domain_name1[,domain_name2,...]`

Defines the domains whose subscriber mapping will be cleared on an SM-LEG connection failure. The key is the **<LEG name>**.

To determine which value or values to use for the **<LEG name>** key, consult the documentation of the LEG that you use. The **<LEG name>** is usually divided into two parts: **<hostname>.<common suffix>**. The first part is a general LEG identifier. The second part is extracted from the machine on which the LEG is running. Alternatively, you can use the CLU command **p3rpc --show-client-names**.

A **<LEG name>** of " \*" specifies all LEGs. The (comma-separated) values are the domains ( **domain\_name** ) to be cleared in the event of a network link failure (connection failure) between the specified LEG and the SM. A value of "\*" for the **domain\_name** specifies all subscriber domains in the system.



### Note

The LEG name is *case sensitive* .

By default, there are no LEG domain mappings.

The following is an example of assigning values to this parameter:

```
10.1.12.76.NB.SM-API.J=home_users
10.1.12.77.B.SM-API.C=office_users
```

The following is an example of specifying all subscriber domains:

```
10.1.12.31.CNR.LEG=*
```

The following is an example of specifying all LEGs and all subscriber domains:

```
=
```

## Domain.XXX Section

Each **[Domain.XXX]** section specifies one domain, where *XXX* represents the domain name.

This section contains the following parameters:

- `elements=logical_name1[,logical_name2,...]`

Specifies the name or names of the SCE platforms that are part of the domain.



---

**Note** Each name must be the *exact* "XXX" name (case sensitive) that appears in the [SCE.XXX Section, page A-17](#).

---

The following is an example of assigning a value to this parameter:

```
elements=se0,se1
```

- `aliases=alias_name1[,alias_name2,...]`

Defines domain aliases. When subscriber information is received from the LEG with one of the aliases (for example, *alias1*), the information is distributed to the domain that matches this alias (for example, *domain\_name1*). A typical alias could be a network access device IP address, where, for example, each string in the values can be the IP address of a NAS or a CMTS.



---

**Note** Each alias can appear in only one domain section.

---

By default, there are no domain aliases.

The following is an example of assigning a value to this parameter:

```
aliases=10.10.88.99,10.10.88.98
```

- `property.name1=value1[,property.name2=value2,...]`

Defines the default policy properties values for a domain. Unless the LEG/API overrides these defaults when it logs in the subscriber to the SM, the subscriber policy is set according to the default policy properties values of its domain.

The policy format is a comma-separated list of **property\_name=property\_value**, where each property value is an integer.



---

**Note** To learn more about policy specification, see the *Cisco Service Control Application for Broadband (SCA BB) User Guide*.

---

- The following is an example of assigning a value to this parameter:

```
property.packageId=1
```

## Default Domains Configuration Section

The **[Default Domains Configuration]** section defines the default policy for the domain. It is used for those domain properties that were not defined in the domain policy configuration (see [Domain.XXX Section, page A-7](#)), and for properties of domains for which no policy whatsoever was defined.

This section contains the following parameter:

- property.name1=value1[,property.name2=value2,...]

Defines the default policy properties values for all domains. Unless the LEG/API overrides these defaults when it logs in the subscriber to the SM, or unless they are overwritten by the default policy property values of the subscriber domain, the subscriber policy is set according to the global default policy property values defined in this section.

The policy format is a comma-separated list of **property\_name=property\_value**.



---

**Note** To learn more about policy specification, see the *Cisco Service Control Application for Broadband (SCA BB) User Guide*.

---

The following is an example of assigning a value to this parameter:

```
property.packageId=1
```

## Auto Logout Section

The [**Auto Logout**] section defines the parameters for the Auto Logout feature, which is relevant mainly for cable environments. This feature is relevant to automatic integrations where the LEG/API cannot provide logout indications. In such a case, you can turn on the automatic logout mechanism, which instructs the SM to log out a subscriber automatically after a certain period of time. Note that a login event for a subscriber resets the subscriber logout timer.

**Note**

*Not using the Auto Logout feature in the scenario described above (a provisioning system that can provide subscriber login events to the SM but cannot provide subscriber logout events) might result in exhausting the SCE resources, because subscribers are logged in but are never logged out.*

This section contains the following parameters:

- `auto_logout_interval`

Configures the interval value, in seconds, of the SM auto-logout mechanism. Every interval, the SM checks for which subscriber IP addresses the lease time has expired, and begins to automatically remove these IP addresses from the system.

Lease time is the timeout defined by the LEG during the login operation per each IP address. All subscriber login events will start a timer of lease-time seconds. When the timer expires and the grace period (see below) has also expired, the subscriber IP addresses are removed, causing the subscriber to be removed from the SCE platform database. Any login event by the subscriber with an existing IP address during the timer countdown period resets the timer, causing it to restart.

Setting the interval value to zero (0) disables the SM auto-logout mechanism.

Setting the interval to a value greater than zero enables the SM auto-logout mechanism.

**Note**

The interval should be smaller, but of the order of the lease time used in the system. It is recommended that during a lease time the auto-logout task will run several times.

The default value for this parameter is 0 (seconds), meaning the auto-logout mechanism is disabled.

The following is an example of assigning a value to this parameter:

```
auto_logout_interval=600
```

The following is an example of deactivating the Auto Logout feature:

```
auto_logout_interval=0
```

- `grace_period`

Defines the grace period, in seconds, for each subscriber. After a subscriber auto-logout timeout has expired, the subscriber IP address is logged out automatically after the grace period has also expired.

The default value for this parameter is 10 (seconds).

The following is an example of assigning a value to this parameter:

```
grace_period=10
```

- `max_rate`

Defines the maximum rate (logouts per second) that the auto-logout task is allowed to perform logouts from the system. This limit spreads out the load of the logout operations over time, reducing the performance impact on other operations.

Calculate the value for this parameter to spread the logouts over at least half of the **auto\_logout\_interval** time. The default value is 50.

The following is an example of assigning a value to this parameter:

```
max_rate=50
```




---

**Note** Use the lowest rate possible to reduce the influence of the auto-logout process on other operations. However, as a guideline, calculate the value so that the auto-logout process takes about half of the **auto\_logout\_interval** and be similar to the maximum login rate to the SM.

---

## Inactive Subscriber Removal Section

The [**Inactive Subscriber Removal**] section defines the parameters for the Inactive Subscriber Removal feature. This feature facilitates the removal of subscribers who have been logged out of the SM and are not mapped to any network-Id for a configurable time period. Effective use of this mechanism can keep the size of the SM database relatively small and close to the number of active subscribers.

A task runs intermittently to remove the inactive subscribers. The time interval between running of the task is defined automatically based on the configured inactivity time.




---

**Note** This feature is applicable only to subscribers that were logged in or out using an IP address/range. It can also be used to remove subscribers that have unsubscribed from a customer network that has no mechanism for removing such subscribers.

---

This section contains the following parameters:

- **start**  
 Defines whether or not to remove inactive subscribers.  
 Possible values for this parameter are **yes**, **no**, **true**, or **false**.  
 The default value is **no**.
- **inactivity\_timeout**  
 Defines the time period after which subscribers will be removed from the SM database if they have not been assigned any network-Id.  
 Possible values for this parameter are "**X minutes**", "**X hours**", "**X days**", or "**X weeks**" where X is a decimal number. The allowed range is a minute to a year.  
 The default value is **1 hour**.
- **max\_removal\_rate**  
 Defines the maximum number of subscribers that the removal task can remove per second.  
 Possible values for this parameter are integer numbers between 1 and 1000.  
 The default value is **10**.
- **log\_removals**  
 Defines whether to write user-log messages for each subscriber record removal.  
 Possible values for this parameter are **true** or **false**.  
 The default value is **true**.



## Radius Listener Section

Use the [**Radius Listener**] section for integrating with the RADIUS Listener LEG.

**Note**

For additional RADIUS Listener configuration information, see the *Cisco SCMS SM RADIUS Listener LEG Reference Guide*.

This section contains the following parameters:

- **start**

Defines whether the SM should run the RADIUS Listener at startup.

Possible values for this parameter are **yes** and **no**. The default value is **no**.

The following is an example of assigning a value to this parameter:

```
start=no
```

- **accounting\_port**

Defines the RADIUS Listener's accounting port number.

The default value is 1813.

The following is an example of assigning a value to this parameter:

```
accounting_port=1813
```

- **ip**

(Optional) Defines the IP address to where the RADIUS Listener should bind. Use this parameter in cluster setups or when the machine local-host IP is not the IP to where the RADIUS messages are sent.

By default, this parameter is not set.

The following is an example of assigning a value to this parameter:

```
ip=192.56.21.200
```

## Radius.NAS.XXX Section

Each [**Radius.NAS.XXX**] section specifies a single Network Access System (NAS), where XXX represents the NAS name.

**Note**

---

The RADIUS Listener LEG refers to all of its RADIUS clients as NAS devices, even though they might be RADIUS servers.

---

This section contains the following parameters:

- **domain**  
Specifies the Cisco Service Control subscriber domain name.  
The following is an example of assigning a value to this parameter:  
`domain=my_domain`
- **IP\_address**  
Specifies the IP address in dotted notation (xxx.xxx.xxx.xxx).  
The following is an example of assigning a value to this parameter:  
`IP_address= 1.1.1.1`
- **NAS\_identifier**  
Specifies the name of the NAS that exists in the **NAS-ID** attribute. For information about the use of this parameter, see the *Cisco SCMS SM RADIUS Listener LEG Reference Guide* .  
The following is an example of assigning a value to this parameter:  
`NAS_identifier=RedHat37`
- **secret**  
Specifies a secret key defined in the NAS for this connection.  
The following is an example of assigning a value to this parameter:  
`secret=mysecret`

## Radius.Subscriber ID Section

The [**Radius.Subscriber ID**] section defines the RADIUS attribute on which to base the subscriber ID association. Default association is based on the **User-Name** attribute.



### Note

This section is commented out in the configuration file. If you want to base subscriber ID association on an attribute other than **User-Name**, you should uncomment this section.

This section contains the following parameters:

- **radius\_attribute**

Specifies the RADIUS protocol attribute number. For multiple attributes use commas between the attribute numbers or use the following format for Vendor Specific Attributes (VSA): **26(vendor-id;sub-attribute)**.

The default value for this parameter is **1**.

The following is an example of assigning a value to this parameter:

```
radius_attribute=26(10415;1)
```

- **radius\_attribute\_type**

Specifies the RADIUS attribute type.

Possible values for this parameter are **integer** and **string**. The default value is **integer**.

The following is an example of assigning a value to this parameter:

```
radius_attribute_type=string
```

- **radius\_attribute\_separator**

Defines the character that should be used when concatenating several attributes. This parameter has no default value.

- **strip\_type**

Defines how to manipulate the RADIUS attribute value. If multiple attributes are defined for the **radius\_attribute** parameter, the same number of comma separated values must exist for this parameter.

There are three possible values for the **strip\_type** parameter:

- **remove\_suffix**—Strip the suffix from the attribute beginning from a certain character (defined by the **strip\_character** parameter).
- **remove\_prefix**—Remove the prefix of the attribute ending at a certain character (defined by the **strip\_character** parameter).
- **dont\_strip**—Leave the attribute value as is (default).

The following is an example of assigning a value to this parameter:

```
strip_type=dont_strip
```

- `strip_character`

Defines how to manipulate the RADIUS attribute value. If multiple attributes are defined for the **radius\_attribute** parameter, the same number of comma separated values must exist for this parameter.

The following is an example of assigning a value to this parameter:

```
strip_character=@
```

## Radius.Property.Package Section

The [**Radius.Property.Package**] section defines the RADIUS attribute from which a subscriber package is retrieved.



### Note

---

The configuration described in this section is optional.

---

This section contains the following parameters:

- `radius_attribute`

Specifies the RADIUS protocol attribute number. Use the value of **26** for Vendor Specific Attributes (VSA).

The following is an example of assigning a value to this parameter:

```
radius_attribute=26
```

Use the following two parameters only if the association is based on the vendor specific attribute (VSA).

- `radius_attribute_vendor_id`

This parameter defines the vendor ID number for the subscriber ID classification.

This parameter has no default value.

- `radius_sub_attribute`

This parameter defines the sub attribute within the vendor specific attribute that is used for subscriber ID classification.

This parameter has no default value.

- `radius_attribute_type`

Specifies the RADIUS attribute type.

Possible values for this parameter are **integer** and **string**. The default value is **integer**.

The following is an example of assigning a value to this parameter:

```
radius_attribute_type=integer
```

- `strip_type`

Defines how to manipulate the RADIUS attribute value.

There are three possible values for the **strip\_type** parameter:

- **remove\_suffix**—Strip the suffix from the attribute beginning from a certain character (defined by the **strip\_character** parameter).
- **remove\_prefix**—Remove the prefix of the attribute ending at a certain character (defined by the **strip\_character** parameter).
- **dont\_strip**—Leave the attribute value as is (default).

The following is an example of assigning a value to this parameter:

```
strip_type=dont_strip
```

- `strip_character`

Defines how to manipulate the RADIUS attribute value.

The following is an example of assigning a value to this parameter:

```
strip_character=@
```

- `use_default`

Defines whether to use a default value if the attribute was not found.

Possible values for this parameter are **true** and **false**.

The default value is **true**.

- `default`

Defines the default value to use if the attribute was not found.

There is no default value.



---

**Note** This parameter must be set if the **use\_default** parameter is set to **true**.

---

- `mapping_table`

Defines a conversion table between the result of the attribute manipulation (e.g. after stripping), and the property value. The conversion is mandatory if the **radius\_attribute\_type** is string. The format of the `mapping_table` is **<attribute-value>=<property-value>**.

There is no default value.

## RPC.Server Section

The **[RPC.Server]** section represents the PRPC server configuration.

This section contains the following parameters:

- port

Defines the PRPC server port. The default is 14374.

The following is an example of assigning a value to this parameter:

```
port=14374
```

- security\_level

Defines whether the PRPC server forces authentication on all connections (**full**), authenticates connections that support authentication while still accepting connections that do not (**semi**), or not to enforce authentication (**none**). When clients attempt to connect to the SM, they are authenticated if configured correctly.

Possible values for this parameter are **full**, **semi**, and **none**. The default value is **semi**.



---

**Note**

Starting from version 3.0.5 SCA BB Console supports authentication with the SM PRPC Server; therefore, it can be used in conjunction with all **security\_level** values.

---



---

**Note**

From version 3.0.5, the SM Java API, SM C/C++ API, and CNR LEG do not support authentication with the SM PRPC Server; therefore, if installed, the security level cannot be configured to **full**.

---

The following is an example of assigning a value to this parameter:

```
security_level=semi
```

## MPLS-VPN Section

The **[MPLS-VPN]** section contains configuration parameters that are relevant to MPLS/VPN installations. See the *Cisco SCMS SM MPLS/VPN BGP LEG Reference Guide* for a description of Subscriber Management in MPLS/VPN networks.

This section contains the following parameters:

- vpn\_id

Defines the BGP attribute to use to identify the VPN subscribers.

Possible values for this parameter are **RD** or **RT**. The default value is **RT**.

The following is an example of assigning a value to this parameter:

```
vpn_id=RD
```

- log\_all

Defines the logging level of the BGP LEG.

Possible values for this parameter are **true** or **false**. The default value is **false**. If set to **true** the SM logs all BGP packets that were received by it and is useful during the integration and testing phase.

The following is an example of assigning a value to this parameter:

```
log_all=false
```

## SCE.XXX Section

Each [SCE.XXX] section represents a single SCE platform, where XXX represents the SCE logical name.

This section contains the following parameters:

- ip

Defines the IP address of a standalone SCE device or the two IP addresses of a cascade SCE pair.

The following is an example of assigning a value to this parameter:

```
ip=11.12.13.1
```

The following is an example of assigning a value to this parameter for a cascade SCE pair:

```
ip=11.12.13.1,11.12.13.2
```



---

**Note** For a cascade SCE pair, the SM adds two SCEs to the SM with the names XXX\_cascade1 and XXX\_cascade2. Therefore, the names \_cascade1 and \_cascade2 are reserved suffixes for the SCE names.

---

- port

Defines the port through which to connect to the SCE platform. The default is 14374.

The following is an example of assigning a value to this parameter:

```
port=14374
```

## FTP Section

The SM manages an internal FTP server for various purposes.

The [FTP] section contains the following parameters:

- start

Defines whether the SM should run the FTP server at startup.

Possible values are **yes** and **no**. The default is **no**.

The following is an example of assigning a value to this parameter:

```
start=yes
```

- port

Defines the FTP server port. The default is 21000.

The following is an example of assigning a value to this parameter:

```
port=21000
```

The following parameters define the TCP ports range when the FTP server works in passive mode:

- #first\_passive\_port = 21001
- #last\_passive\_port = 21100



---

**Note** Uncomment these parameters when working with the FTP server via a firewall.

---

## HTTP Tech-IF Section

The SM manages an internal HTTP adapter server that is a technician interface.

The [**HTTP Tech-IF**] section contains the following parameters:

- start

Defines whether the SM should run the HTTP server at startup.



---

**Note** This is a technician interface and normally should not be used.

---

Possible values are **yes** and **no**. The default is **no**.

The following is an example of assigning a value to this parameter:

```
start=yes
```

- port

Defines the HTTP server port. The default is 8082.

The following is an example of assigning a value to this parameter:

```
port=8082
```

## RDR Server Section

The SM manages an internal RDR server that is used to receive RDR messages from the SCE.

The [**RDR Server**] section contains the following parameters:

- start

Defines whether the SM should run the RDR server at startup.



---

**Note** This interface should be used when installing the SCE-Sniffer LEGs on the SM.

---

Possible values are **yes** and **no**. The default is **no**.

The following is an example of assigning a value to this parameter:

```
start=yes
```

- port

Defines the RDR server port. The default is 33001.

The following is an example of assigning a value to this parameter:

```
port=33001
```

- max\_connections

Defines the maximum number of connections accepted by the server. The default is 10.

The following is an example of assigning a value to this parameter:

```
max_connections=10
```



## Cable Adapter Section

The SM manages a Cable Adapter, a special cable support module that is a translator between the cable world (DHCP events) and the SM. For additional information, see [CPE as Subscriber in Cable Environment, page C-1](#).

The [**Cable Adapter**] section contains the following parameter:

- `allow_dynamic_CM`

Defines whether to allow logins from cable modems (CM) that are not in the SM database.

Possible values are **yes** and **no**. The default is **no**.

The following is an example of assigning a value to this parameter:

```
allow_dynamic_CM=no
```

## Data Repository Section

The [**Data Repository**] section defines the SM operation with the TimesTen In-Memory Database.



### Note

---

Some of the parameters in this section are discarded on regular configuration loading, and resetting them requires restarting the SM.

---

The [**Data Repository**] section contains the following parameters:

- `support_ip_ranges`

Defines whether the SM supports IP-Ranges. Disabling this support provides better performance.



---

**Note** Resetting this parameter requires restarting the SM. This parameter is discarded on regular configuration loading (using CLU).

---

Possible values are **yes** and **no**. The default is **no**.

The following is an example of assigning a value to this parameter:

```
support_ip_ranges=yes
```

- `checkpoint_interval_in_seconds`

Defines the interval, in seconds, for calling the TimesTen checkpoints. Reducing the value affects performance, increasing the value increases vulnerability to power-down.

The default value is 60 (seconds).

The following is an example of assigning a value to this parameter:

```
checkpoint_interval_in_seconds=60
```

- `max_range_size`

Determines the maximum IP range size used in the system.

This parameter is used for improving performance of the SM in Pull mode when the Data Repository section is configured with `support_ip_ranges=yes`.




---

**Note** Defining this parameter with too low a value may cause incorrect operation in handling pull requests.

---

The default value is 256.

The following is an example of assigning a value to this parameter:

```
max_range_size=256
max_number_of_subscribers
```

Determines the maximum number of subscribers the database supports. The limit is 20 million subscribers for Solaris and two million subscribers for Linux.




---

**Note** You cannot decrease the value for this parameter without destroying the replicated datastore.

---




---

**Note** Changing this parameter requires a restart of the SM process.

---




---

**Note** To achieve better database performance, it is recommended (when possible) to destroy the subscriber database after changing this parameter and then to rebuild the database.

---

The default value is 200000.

The following is an example of assigning a value to this parameter:

```
max_number_of_subscribers=1000000
```

- `cache_size`

Determines the subscriber cache size. The cache is used to optimize the database transactions. It should be set to the number of active subscribers that are updated at a high frequency by the management systems.




---

**Note** Changing this parameter requires a restart of the SM process.

---

The default value is 100000.

The following is an example of assigning a value to this parameter:

```
cache_size=1600000
```

- `max_number_of_vpns`

Determines the maximum number of VPNs supported by the SM. This parameter is used to create database indices and to determine database table sizes.



---

**Note** You cannot decrease the value for this parameter without destroying the replicated datastore.

---



---

**Note** Changing this parameter requires a restart of the SM process.

---

The default value is 2048.

The following is an example of assigning a value to this parameter:

```
max_number_of_vpns=3000
```

- `vpn_cache_size`

Determines the VPN cache size. The cache is used to optimize the database transactions. It should be set to the number of active VPNs that are updated at a high frequency by the management systems.



---

**Note** Changing this parameter requires a restart of the SM process.

---

The default value is 2048.

The following is an example of assigning a value to this parameter:

```
vpn_cache_size=3000
```





## APPENDIX **B**

# Command-Line Utilities

---

This module describes the Command-Line Utilities (CLU) that is distributed with the Subscriber Manager (SM) application.

## Information About the Command-Line Utilities

The SM provides a set of Command-Line Utilities (CLU). The CLU is designed mainly for viewing SM operations and statistics, and subscriber management, therefore only subscriber-related CLU changes are persistent. The CLU is used for configuration only indirectly, in that it loads the edited configuration file to the SM.

This module describes in detail all the CLU commands, their operations and options. The shorter description of the CLU commands given in the [Configuration and Management, page 4-1](#) module is more oriented toward the performance of routine management and configuration tasks.

CLU commands are executable only when the user is logged in to the machine using the **pcube** account, which is always installed (see [Installation and Upgrading, page 5-1](#) ). In general, the CLU runs as a separate process to the configured entity and communicates with it via a predefined communication port and interface. Therefore, the configured entity must keep a certain communication port open at all times, at least locally on the configured machine.

## Description of the CLU Commands

This section describes in detail the Command-Line Utilities commands, their operations and options.

- [Informative Output, page B-2](#)
- [Parsing CLU Operations and Options, page B-3](#)
- [Information About the p3batch Utility, page B-4](#)
- [Information About the p3cable Utility, page B-5](#)
- [Information About the p3clu Utility, page B-6](#)
- [Information About the p3cluster Utility, page B-7](#)
- [Information About the p3db Utility, page B-8](#)
- [Information About the p3domains Utility, page B-9](#)
- [Information About the p3ftp Utility, page B-10](#)
- [Information About the p3http Utility, page B-11](#)
- [Information About the p3inst Utility, page B-12](#)
- [Information About the p3log Utility, page B-14](#)
- [Information About the p3net Utility, page B-15](#)
- [Information About the p3radius Utility, page B-17](#)
- [Information About the p3rpc Utility, page B-17](#)
- [Information About the p3sm Utility, page B-19](#)
- [Information About the p3subs Utility, page B-24](#)
- [Information About the p3subsdb Utility, page B-28](#)
- [Information About the p3vpn Utility, page B-32](#)

### Informative Output

All CLU commands support the following operations for informative output:

| Operation              | Description                                                |
|------------------------|------------------------------------------------------------|
| <code>--help</code>    | Prints the help for the specified CLU command, then exits. |
| <code>--version</code> | Prints the SM program version number, then exits.          |

## Parsing CLU Operations and Options

Place in quotation marks a command operation or option containing any of the following characters:

- A space character
- A separation sign (comma “,”; ampersand “&”; colon “:”)
- An escape character (backslash “\”)
- Parenthesis (“(” or “)”)
- An exclamation mark (“!”)
- The comparison operators (“<” or “>”)

A command operation or option that contains any of the following characters must have that character preceded by an escape character:

- An equal sign (=)
- A quotation mark (“ or ”)
- An escape character (backslash “\”)
- An exclamation mark (“!”)
- The "\$" character

The following table shows several examples of the above rules:

| Operation/option contains the character | Example of how operation/option should be written                                                   |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------|
| Space character                         | <code>--property="file name"</code>                                                                 |
| Escape character (backslash “\”)        | <code>--property="good\\bad"</code>                                                                 |
| Equal sign (=)                          | <code>--property="x=y"</code>                                                                       |
| Quotation marks (“ or ”)                | <code>--name="\"myQuotedName\""</code><br>(in the above example, inner quotation marks are escaped) |
| <b>Separation characters</b>            |                                                                                                     |
| comma (,)                               | <code>--names="x,y"</code>                                                                          |
| ampersand (&)                           | <code>--names="x&amp;y"</code>                                                                      |
| colon (:)                               | <code>--names="myHost:myDomain"</code>                                                              |

One-letter abbreviations are available for some of the operations and options. For example, **-d** is an abbreviation for **--domain**. Note that only one hyphen (-), not two, precedes the letter for an abbreviation, and that if the operation or option takes a parameter, there is a space and not an equal sign before the parameter.

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Example of using full name        | <code>--domain=subscribers</code> |
| Example of using abbreviated name | <code>-d subscribers</code>       |

## Information About the p3batch Utility

- [p3batch Utility, page B-4](#)
- [Examples of using the p3batch Utility, page B-4](#)

### p3batch Utility

The **p3batch** utility enables you to run many operations on a single connection with the SM. You can use any text editor to create a batch file that contains a series of CLU commands, one command per line (terminated by a new-line sign). Use the **p3batch** utility to run this file and execute the commands, where empty lines are skipped.

All batch file command line operations use the same connection option. The **p3batch** utility ignores any connection options in the script file commands. While processing the operations in the batch file, a progress indicator is displayed. The command format is:

```
p3batch [FILE-OPTION] [ERROR-OPTION]
```

The following tables list the **p3batch** options.

**Table B-1** p3batch File Options

| File Operation            | Abbreviation    | Description                                                                 | Notes                              |
|---------------------------|-----------------|-----------------------------------------------------------------------------|------------------------------------|
| <code>--file =FILE</code> | <code>-f</code> | Runs a batch file, where FILE specifies the CLU script (batch) file to run. | A progress indicator is displayed. |

**Table B-2** P3batch Error Options

| Error Option               | Description                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--skip-errors</code> | Specifies that the batch operation should <i>not</i> halt if an error occurs.<br><br>If this flag is not used, the batch operation <i>will</i> halt if an error occurs. |

### Examples of using the p3batch Utility

- To run a batch file that will halt if an error occurs.  
`p3batch --file=mainBatchFile.txt`
- To run a batch file that will not halt if an error occurs.  
`p3batch --file=mainBatchFile.txt --skip-errors`



## Information About the p3cable Utility

- [p3cable Utility, page B-5](#)
- [Examples of using the p3cable Utility, page B-6](#)

### p3cable Utility

In a cable environment, the CPE is modeled as the subscriber, and inherits its policy and domain from the cable modem (CM) through which it connects to the network. Each cable modem is linked with one or more CPEs. For background information about special characteristics of the cable environment, see [CPE as Subscriber in Cable Environment, page C-1](#).

You can use the **p3cable** utility commands to import cable modem information from a CSV file to the SM and to export the cable modem information from the SM to a CSV file. You can also use this utility to clear the repository of all cable modems, and to show whether to allow or deny the login of CPEs that belong to unfamiliar cable modems; i.e., cable modems that do not exist in the SM database. However, to specify whether to allow or deny such a login, use the [Cable Adapter Section, page A-19](#) of the configuration file **p3sm.cfg**.

The command format is:

```
p3cable OPERATION[FILE-OPTIONS]
```

The following tables list the **p3cable** operations and options.

**Table B-3** *p3cable Operations*

| Operation                        | Description                                                                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--import-cm</code>         | Imports cable modems from a CSV file. The filename that is to be imported is specified using the format <code>--file=import-filename</code> .<br>The results go to a results file. |
| <code>--export-cm</code>         | Exports cable modems to a CSV file. The filename that is to be exported is specified using the format <code>--output=export-filename</code> .<br>The results go to a results file. |
| <code>--clear-all-cm</code>      | Clears the repository of all cable modems.                                                                                                                                         |
| <code>--show-dynamic-mode</code> | Shows whether to allow or deny the login of CPEs that belong to unfamiliar cable modems; i.e., cable modems that do not exist in the SM database.                                  |

**Table B-4** *P3cable Options*

| File Option                 | Abbreviation         | Description                                     |
|-----------------------------|----------------------|-------------------------------------------------|
| <code>--file =FILE</code>   | <code>-f FILE</code> | Specifies the CSV FILE to import from.          |
| <code>--output =FILE</code> | <code>-o FILE</code> | Specifies the subscriber CSV FILE to export to. |

**Examples of using the p3cable Utility**

- To import cable modem information from the specified csv file:

```
p3cable --import-cm -f CMFile.csv
```

- To export cable modem information to the specified csv file:

```
p3cable --export-cm --outfile=myCMFile.csv
```

- To clear the repository of all cable modems:

```
p3cable --clear-all-cm
```

- To display whether the login of CPEs that belong to unfamiliar cable modems (cable modems that do not exist in SM database) is allowed or denied:

```
p3cable --show-dynamic-mode
```

**Information About the p3clu Utility**

- [p3clu Utility, page B-6](#)
- [Example of using the p3clu Utility, page B-6](#)

**p3clu Utility**

The **p3clu** utility prints a list of all supported CLU utilities and options.

The command format is:

```
p3clu OPERATION
```

The following table lists the **p3clu** operations.

**Table B-5** *p3clu Operations*

| Operation | Description                                  |
|-----------|----------------------------------------------|
| --help    | Prints the currently supported CLU commands. |

**Example of using the p3clu Utility**

- To display a listing of all supported CLU utilities and operations:

```
p3clu --help
```

## Information About the p3cluster Utility

- [p3cluster Utility, page B-7](#)
- [Example of using the p3cluster Utility, page B-7](#)

### p3cluster Utility

The **p3cluster** utility displays the redundancy state of a cluster of two SM nodes and its components. This utility also supports operations that alter the redundancy state of the SM. These operations are used by the SM Cluster Agent and for administrative tasks.

The command format is:

```
p3cluster OPERATION
```

The following table lists the **p3cluster** operations.

**Table B-6** p3cluster Operations

| Operation              | Description                                                  |
|------------------------|--------------------------------------------------------------|
| <code>--show</code>    | Displays the redundancy status of the SM and its components. |
| <code>--active</code>  | Make the SM become the active SM in the cluster.             |
| <code>--standby</code> | Make the SM become the standby SM in the cluster.            |

### Example of using the p3cluster Utility

- To display the redundancy status of the SM and its components:

```
p3cluster --show
```

## Information About the p3db Utility

- [p3dbUtility, page B-8](#)
- [Examples of using the p3db Utility, page B-9](#)

### p3dbUtility

The **p3db** utility manages and monitors the TimesTen database. The CLU exposes capabilities of some of the TimesTen CLUs with respect to specific needs of the SM.

The command format is:

```
p3db OPERATION[OPTIONS]
```

The following tables list the **p3db** operations and options.



#### Note

Use caution when activating commands that can affect the database. If used incorrectly, these commands can possibly damage the database.

**Table B-7** *p3db Operations*

| Operation                         | Description                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--rep-status</code>         | Displays status of the replication agent.                                                                                                                                                                                                                                                                                                                          |
| <code>--rep-start</code>          | Starts the replication agent.<br><b>Note</b> Use only for database recovery.                                                                                                                                                                                                                                                                                       |
| <code>--rep-stop</code>           | Starts the replication agent. <b>Note:</b> Use only for database recovery. Stops the replication agent. <b>Note:</b> Use only for database recovery.<br><b>Note</b> Use only for database recovery.                                                                                                                                                                |
| <code>--status</code>             | Displays the database status.                                                                                                                                                                                                                                                                                                                                      |
| <code>--destroy-rep-db</code>     | Destroys the replicated data-store.                                                                                                                                                                                                                                                                                                                                |
| <code>--destroy-local-db</code>   | Destroys the local data-store.                                                                                                                                                                                                                                                                                                                                     |
| <code>--duplicate</code>          | Copies the data-store from the <i>remote</i> machine to the <i>local</i> machine.<br><b>Note</b> This option is applicable only for a <i>cluster setup</i> . For additional information, see <a href="#">Data Duplication Procedure, page 5-22</a> .                                                                                                               |
| <code>--keep-in-mem [SECS]</code> | Indicates to the database daemon how many seconds to keep the database in the memory, after the last connection to the database is down. Use this option with large databases to reduce the SM restart time.<br><b>Note</b> To prevent limitations in performing a database destroy, do not use values above a few minutes (that is, above a few hundred seconds). |

**Table B-8** *p3db Options*

| Option                                | Description                   |
|---------------------------------------|-------------------------------|
| <code>--local=LOCAL_HOSTNAME</code>   | Specifies the local machine.  |
| <code>--remote=REMOTE_HOSTNAME</code> | Specifies the remote machine. |

**Examples of using the p3db Utility**

- To display the status of the replication agent:

```
p3db --rep-status
```

**Information About the p3domains Utility**

- [p3domains Utility, page B-9](#)
- [Examples of using the p3domains Utility, page B-9](#)

**p3domains Utility**

The **p3domains** utility displays the subscriber domains. When a system has more than one SCE platform, you can configure the platforms into groups or domains. A subscriber domain is one or more SCE platforms that share a specified group of subscribers. You must add the SCE platform to the network and create the domain before you can add an SCE platform to a domain.

The command format is:

```
p3domains OPERATION[OPTIONS]
```

The following tables list the **p3domains** operations and options.

**Table B-9** *p3domains Operations*

| Operation               | Description                                            |
|-------------------------|--------------------------------------------------------|
| <code>--show-all</code> | Displays all configured domains.                       |
| <code>--show</code>     | Displays a domain and its associated network elements. |

**Table B-10** *p3domains Domain/Network Element (NE) Options*

| Domain/NE Option              | Abbreviation           | Description                    | Notes                                              |
|-------------------------------|------------------------|--------------------------------|----------------------------------------------------|
| <code>--domain =DOMAIN</code> | <code>-d DOMAIN</code> | DOMAIN specifies logical name. | <b>none</b> cannot be used, it is a reserved word. |

**Examples of using the p3domains Utility**

- To display all configured domains:

```
p3domains --show-all
```

- To display the specified domain and its associated network elements:

```
p3domains --show --domain=myDomain
```

## Information About the p3ftp Utility

- [p3ftp Utility, page B-10](#)
- [Examples of using the p3ftp Utility, page B-10](#)

### p3ftp Utility

The **p3ftp** utility monitors the SM internal FTP server.

The command format is:

```
p3ftp OPERATION
```

The following table lists the **p3ftp** operations and options.

**Table B-11** p3ftp Operations

| Operation           | Description                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--show</code> | Displays the port number the FTP server listens to, the passive FTP port range the server uses, the current number of open sessions, the maximum number of sessions supported, and the state (ONLINE/OFFLINE) of the FTP server. |

### Examples of using the p3ftp Utility

- To display the port number that the FTP server listens to, the passive FTP port range that the server uses, the current number of open sessions, the maximum number of sessions supported, and the state (ONLINE/OFFLINE) of the FTP server.

```
p3ftp --show
```

## Information About the p3http Utility

- [p3http Utility, page B-11](#)
- [Examples of using the p3http Utility, page B-11](#)

### p3http Utility

The **p3http** utility monitors the HTTP adapter server.



#### Note

The HTTP adapter server is a technician interface and normally should not be used.

The command format is:

```
p3http OPERATION
```

The following table lists the **p3http** operations:

**Table B-12** *p3http Operations*

| Operation           | Description                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------|
| <code>--show</code> | Displays the port number that the server listens to, the state of the server, and the current number of open sessions. |

### Examples of using the p3http Utility

- To display the port number to which the server listens, the state of the server, and the current number of open sessions:

```
p3http --show
```

## Information About the p3inst Utility

- [p3inst Utility, page B-12](#)
- [Examples of using the p3inst Utility, page B-13](#)

### p3inst Utility

The **p3inst** utility installs or uninstalls an application ( pqi file).



#### Note

Before using p3inst to install an application pqi file, read the application installation instructions that came with the application you are using.

The command format is:

```
p3inst OPERATION[FILE-OPTION] [ARGUMENT-OPTION]
```

The following tables list the **p3inst** operations and options.

**Table B-13** p3inst Operations

| Operation          | Abbreviation | Description                                                                                                                                                                                | Notes              |
|--------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>--install</b>   | <b>-i</b>    | Installs the specified application pqi file to the SM.<br><br>It may be necessary to specify arguments for the installation procedure in the command line. Requires a file option.         | Progress indicator |
| <b>--uninstall</b> |              | Uninstalls the specified application pqi file from the SM. Requires a file option.                                                                                                         | Progress indicator |
| <b>--upgrade</b>   |              | Upgrades an existing application using the specified application pqi file. It may be necessary to specify arguments for the upgrade procedure in the command line. Requires a file option. | Progress indicator |
| <b>--rollback</b>  |              | Returns the specified application to the previous version. Rollback is the opposite of an upgrade operation: it reverses the upgrade.                                                      | Progress indicator |



**Table B-13** *p3inst Operations (continued)*

| Operation                | Abbreviation    | Description                                                   | Notes |
|--------------------------|-----------------|---------------------------------------------------------------|-------|
| <code>--describe</code>  | <code>-d</code> | Displays the contents of the specified application pqi file.  |       |
| <code>--show-last</code> |                 | Lists the details of the last installed application pqi file. |       |

**Table B-14** *p3inst File Options*

| File Option                         | Abbreviation                   | Description                                                                                                       |
|-------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <code>--file =FILE[;FILE...]</code> | <code>-f FILE[;FILE...]</code> | Specifies one or more installation FILES to use. If there is more than one FILE, semicolons should separate them. |

**Table B-15** *p3inst Argument Options*

| Argument Option                    | Description                                                             |
|------------------------------------|-------------------------------------------------------------------------|
| <code>--arg =ARG1[,ARG2...]</code> | Specifies one or more arguments for the install and upgrade procedures. |

**Examples of using the p3inst Utility**

- To install the specified installation file:
 

```
p3inst --install --file=myInstallation.pqi
```
- To uninstall the specified installation file:
 

```
p3inst --uninstall -f oldInstallation.pqi
```
- To upgrade an existing application using the specified application pqi file:
 

```
p3inst --upgrade --file=newInstallation.pqi
```
- To upgrade an existing application using the specified application pqi file, using arguments in the command line:
 

```
p3inst --upgrade -f newInstallation.pqi
```
- To return the specified application to the previous version:
 

```
p3inst --rollback
```
- To display the contents of the specified application pqi file:
 

```
p3inst --describe --file=myInstallation.pqi
```
- To list the details of the last installed application pqi file:
 

```
p3inst --show-last
```

## Information About the p3log Utility

- [p3log Utility, page B-14](#)
- [Examples of using the p3log Utility, page B-14](#)

### p3log Utility

The **p3log** utility configures and manages the SM user log. The user log contains all user-related events and errors. Use the user log to view the history of the system events and errors.

The command format is:

```
p3log OPERATION[FILE-OPTION]
```

The following tables list the **p3log** operations and options.

**Table B-16** p3log Operations

| Operation              | Description                            | Notes              |
|------------------------|----------------------------------------|--------------------|
| <code>--extract</code> | Retrieves the user log from the agent. | Progress indicator |
| <code>--reset</code>   | Clears the user log.                   |                    |

**Table B-17** p3log File Option

| File Option                 | Abbreviation         | Description                                                  |
|-----------------------------|----------------------|--------------------------------------------------------------|
| <code>--output =FILE</code> | <code>-o FILE</code> | Specifies to where the SM user log file should be extracted. |

### Examples of using the p3log Utility

- To extract the SM user log to the specified file:

```
p3log --extract -o aug20.log
```

- To clear the SM user log:

```
p3log --reset
```

## Information About the p3net Utility

- [p3net Utility, page B-15](#)
- [Examples of using the p3net Utility, page B-15](#)

### p3net Utility

The **p3net** utility shows the connection status of network elements and tries to reconnect disconnected elements.

The command format is:

```
p3net OPERATION[NETWORK-ELEMENT-OPTION]
```

The following tables list the **p3net** operations and options.

**Table B-18** *p3net Operations*

| Operation               | Description                                              |
|-------------------------|----------------------------------------------------------|
| <code>--show-all</code> | Shows all the configured network elements.               |
| <code>--show</code>     | Shows the element connection status/general information. |
| <code>--connect</code>  | Tries to connect a disconnected element.                 |

**Table B-19** *p3net Network Element Options*

| Network Element Option       | Abbreviation         | Description                                                                                                  |
|------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------|
| <code>--ne-name =NAME</code> | <code>-n NAME</code> | Specifies the logical NAME for the network element.                                                          |
| <code>--detail</code>        |                      | (Optional) Used with the <code>--show-all</code> operation for displaying additional information as a table. |

### Examples of using the p3net Utility

- To connect a disconnected element to the network:

```
p3net --connect -n mainNE
```

- To display the names of all configured network elements:

```
p3net --show-all
Network Element name list:
=====
sceRome
sceLondon
```

- sceRome is a cascade setup containing two SCEs. This is displayed as a single entry in the list.

- To display all configured network elements details (as a table):

```
p3net --show-all
--detail=====
| Name | Host | Conn- | Subscriber | Domain |
| | Status| Management | | |
=====
| sceRome | 1.2.3.4* | up | active | subscribers | sceRome
| 1.2.3.5 | up | active | subscribers | sceLondon | 1.2.3.6
| up | active | domain1
```

- sceRome is a cascade setup containing two SCEs. This is displayed as two entries with the same name where '\*' represents the currently active SCE.

**Note**

The SM does not synchronize the standby SCE; therefore, the **Subscriber Management** field on the standby SCE might appear as **not-active** if the SCE was never active.

- To display the connection status of the specified network element:

```
p3net --show --ne-name=mainNE
Network Element Information:
=====
Name: mainNE
Host: 1.1.1.1
Ip: 1.1.1.1
Port: 14374
Status: Connection ready
Type: SCE2000
Domain: subscribers
Subscriber Management: Active
Redundancy Status: Standalone
Quarantine Status: ok
```

- To display the connection status of cascaded SCEs, use the SCE name that appears in the configuration file:

```
p3net --show -n test
Network Element Information:
=====
Name: test
Host: 1.1.1.1
Ip: 1.1.1.1
Port: 14374
Status: Connection ready
Type: SCE2000
Domain: subscribers
Subscriber Management: Active
Redundancy Status: Active
Quarantine Status: ok
Network Element Information:
=====
Name: test
Host: 2.2.2.2
Ip: 2.2.2.2
Port: 14374
Status: Connection ready
Type: SCE2000
Domain: subscribers
Subscriber Management: Not-Active
Redundancy Status: Standby
Quarantine Status: ok
```

## Information About the p3radius Utility

The **p3radius** utility displays the statistics of the RADIUS Listener LEG. For information about this CLU, see the *Cisco SCMS SM RADIUS Listener LEG Reference Guide*.

## Information About the p3rpc Utility

- [p3rpc Utility, page B-17](#)
- [Examples of using the p3rpc Utility, page B-18](#)

### p3rpc Utility

The **p3rpc** utility displays the information of the proprietary Cisco RPC (Remote Procedure Call) server interface to the SM. It also authenticates users.

The command format is:

```
p3rpc OPERATION[OPTIONS]
```

The following tables list the **p3rpc** operations and options.

**Table B-20** *p3rpc Operations*

| Operation                        | Description                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--show</code>              | Displays the port number to which the PRPC server listens, the maximum number of connections, the current number of active connections, and the host IP to which the server listens. |
| <code>--show-client-names</code> | Displays the names of the connected clients. Can be used for extracting the LEG_NAME key, see <a href="#">LEG-Domains Association Section, page A-6</a> .                            |
| <code>--show-statistics</code>   | Displays the PRPC server statistics. They contain information about the number of current PRPC sessions and statistics for PRPC server actions such as invocations and errors.       |
| <code>--reset-statistics</code>  | Clears the PRPC server statistics.                                                                                                                                                   |
| <code>--set-user</code>          | Adds or updates the username and password.                                                                                                                                           |
| <code>--validate-password</code> | Validates the username and password.                                                                                                                                                 |
| <code>--delete-user</code>       | Deletes a user configuration.                                                                                                                                                        |
| <code>--show-users</code>        | Displays all configured users.                                                                                                                                                       |

Table B-21 *p3rpc User Options*

| User Option                            | Abbreviation    | Description                                                                                                                                           |
|----------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--username =USER-NAME</code>     | <code>-u</code> | Specifies the name of the user. Used with <code>--set-user</code> , <code>--validate-password</code> , and <code>--delete-user</code> operations.     |
| <code>--password =USER-PASSWORD</code> | <code>-p</code> | Specifies the password of the user. Used with <code>--set-user</code> , <code>--validate-password</code> , and <code>--delete-user</code> operations. |

Table B-22 *p3rpc Miscellaneous Options*

| Option                           | Abbreviation    | Description                                                                                                                                                                                                                                                                                                        |
|----------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--remote =IP[:port]</code> | <code>-r</code> | (Optional) Used with <code>--set-user</code> , <code>--validate-password</code> , and <code>--delete-user</code> for users operations on the remote SM in High Availability setups.<br><br>The port option should be used if the PRPC Server port on the remote SM machine differs from the default value (14374). |

**Examples of using the p3rpc Utility**

- To display the port number to which the PRPC server listens, the maximum number of connections, the current number of active connections, the host IP to which the server listens, and the name of the configuration file used by the server:

```
p3rpc --show
```

- To display the statistics of the PRPC server:

```
p3rpc --show-statistics
```

- To clear the statistics of the PRPC server:

```
p3rpc --reset-statistics
```

- To show all the users configured at the PRPC server:

```
p3rpc --show-users
```

## Information About the p3sm Utility

- [p3sm Utility, page B-19](#)
- [Examples of using the p3sm Utility, page B-22](#)

### p3sm Utility

The **p3sm** utility performs general configuration and management of the SM.

The command format is:

```
p3sm OPERATION[OPTIONS]
```

The following tables list the **p3sm** operations and options.

**Table B-23** *p3sm Operations*

| Operation                     | Description                                                                                                                            | Notes              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <code>--show</code>           | Displays the current SM configuration and statistics.                                                                                  |                    |
| <code>--load-config</code>    | Reloads the SM configuration file.<br>If the <b>-f</b> option is not used, file <b>p3sm.cfg</b> is loaded.                             |                    |
| <code>--resync</code>         | Resynchronizes subscribers of specified SCE with the SM database.<br>The SCE is specified using the option <b>--ne-name=SCE_NAME</b> . | Progress indicator |
| <code>--resync-all</code>     | Resynchronizes all subscribers of all SCEs with the SM database.                                                                       | Progress indicator |
| <code>--start [--wait]</code> | Starts the server. The option <b>--wait</b> causes the CLU to return only after the SM is up.                                          | Default: started   |

Table B-23 p3sm Operations (continued)

| Operation                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Notes |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <code>--stop</code>                 | <p>Stops the server.</p> <p><b>Note</b> When using fail-over, a simple shut-down of the SM does <i>not</i> work, the Veritas Cluster Server identifies that the SM is down and attempts to restart it. The correct procedure is:</p> <ol style="list-style-type: none"> <li>1. Perform the manual fail-over. See <a href="#">Subscriber Manager Fail-Over, page 3-1</a>.</li> <li>2. Use the Veritas Cluster Manager Application to stop the monitoring (probing) of the SM.</li> <li>3. Use the SM CLU ( <code>p3sm --stop</code>) to stop the SM</li> </ol> |       |
| <code>--restart [--wait]</code>     | Stops the server operation and then restarts it. The option <code>--wait</code> causes the CLU to return only after the SM is up.                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
| <code>--sm-version</code>           | Displays the currently installed SM version.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| <code>--sm-status [--detail]</code> | Displays the SM operational status: whether the SM is running or not, and whether it is Active or Standby. If errors have occurred, it also displays their summary. To receive a detailed description, use the option <code>--detail</code> .                                                                                                                                                                                                                                                                                                                 |       |
| <code>--extract-support-file</code> | <p>Retrieves the support file from the agent.</p> <p>This command extracts the SM support information to a defined file, which is defined using the option <code>--output=FILE</code>. SM support information should be extracted and sent to Cisco customer support with each support request.</p>                                                                                                                                                                                                                                                           |       |
| <code>--reset-sm-status</code>      | Clears errors and warnings that were displayed to the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |



Table B-23 p3sm Operations (continued)

| Operation                        | Description                                                                                                                                                | Notes |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <code>--logging</code> [=on/off] | Enables/disables the logging of user logon to the UserLog.<br><b>Note</b> Enabling this flag may affect performance.                                       |       |
| <code>--show-stats</code>        | Displays statistics information regarding logon operations and inactive subscriber removal operations. The rate results are updated once every 10 seconds. |       |
| <code>--reset-stats</code>       | Resets the statistics information.                                                                                                                         |       |

Table B-24 p3sm File Options

| File Option                 | Abbreviation         | Description                                                                      |
|-----------------------------|----------------------|----------------------------------------------------------------------------------|
| <code>--output</code> =FILE | <code>-o</code> FILE | Where to extract the support information file, relative to the SM root directory |
| <code>--file</code> =FILE   | <code>-f</code> FILE | File to load the configuration from, relative to the SM configuration directory. |

Table B-25 p3sm Miscellaneous Options

| File Option                      | Abbreviation    | Description                                                                                                       |
|----------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|
| <code>--ignore-warnings</code>   | <code>-i</code> | Ignore configuration validation warnings while loading the configuration file.                                    |
| <code>--remote</code> =IP[:port] | <code>-r</code> | Used with <code>--load-config</code> to load the local configuration file to both the local SM and the remote SM. |
| <code>--detail</code>            |                 | Displays a detailed view of the SM status.                                                                        |
| <code>--wait</code>              |                 | Used with <code>--start</code> or <code>--restart</code> to signal the CLU to return only when the SM is up.      |

**Examples of using the p3sm Utility**

- To start the server:

```
p3sm --start
```

- To stop the server:

```
p3sm --stop
```

**Note**

When using fail-over, a simple shut-down of the SM does *not* work, the Veritas Cluster Server identifies that the SM is down and attempts to restart it. The correct procedure is:

1. Perform the manual fail-over. See [Subscriber Manager Fail-Over, page 3-1](#).
  2. Use the Veritas Cluster Manager Application to stop the monitoring (probing) of the SM.
  3. Use the SM CLU ( **p3sm --stop**) to stop the SM
- To display the SM configuration:

```
>p3sm --show
Subscriber Management Module Information:
=====
Persistency in SCE (static): false
Auto-resync at SCE reconnect: true
Save subscriber state on logout: false
Pull mode is on: false
LEG block mode is on: false
Logon logging is on: false
Statistics:
Number of logins: 1872423
Number of logouts: 1824239
Number of auto-logout: 0
Number of pull requests: 0
LEG-SM link failure:
Clear all subscribers mappings: false
Timeout: 60
Up time: 4 hours 16 minutes 44 seconds
Inactive Subscribers Removal:
Is Enabled: false
Inactivity timeout: 1 hours
Max removal rate: 10 subscribers per second
Task interval: 10 minutes
Last run time: Was never run
Automatic Logout (lease-time support):
Is Enabled: false
Max logout rate: 50 IP addresses per second
Task interval: disabled
Grace period: 10 seconds
Last run time: Was never run
Command terminated successfully
```

- To resynchronize the subscribers of the specified SCE with the SM database:

```
p3sm --resync --ne-name=my_SCE_100
```

- To stop the server operation and then restart it:

```
p3sm --restart
```

- To reload the SM configuration file, p3sm.cfg:

```
p3sm --load-config
```

- To display the SM operational status (active or inactive):

```
>p3sm --sm-status SM is running.
SM operational state is Active
Command terminated successfully
```

- To extract the SM support information to the specified file:

```
p3sm --extract-support-file --output=support.zip
```

- To display statistics information regarding logon operations and inactive subscriber removal:

```
>p3sm --show-stats
Subscriber Management Statistics Information:
=====
```

|                          |         |
|--------------------------|---------|
| Number of logins:        | 1872423 |
| Login rate:              | 10.34   |
| Number of logouts:       | 1824239 |
| Logout rate:             | 10.67   |
| Number of auto-logout:   | 0       |
| Auto-logout rate:        | 0       |
| Number of pull requests: | 0       |
| Pull requests rate:      | 0       |

```
Inactive Subscriber Removal Information:
=====
```

|                                         |       |
|-----------------------------------------|-------|
| Number of inactive subscribers removed: | 56732 |
| Inactive subscribers removal rate:      | 9.98  |

```
Command terminated successfully
```

## Information About the p3subs Utility

- [p3subs Utility, page B-24](#)
- [Examples of using the p3subs Utility, page B-26](#)

### p3subs Utility

The **p3subs** utility manipulates individual subscriber information in the SM database. The subscriber properties that are supported by the SCA BB Console are packageId, upVlinkId, and downVlinkId. For a description of the subscriber properties, see the *Cisco Service Control Application for Broadband User Guide*.

The command format is:

```
p3subs OPERATION[SUBSCRIBER-OPTIONS]
```

The following tables list the **p3subs** operations and options.

**Table B-26** p3subs Operations

| Operation                        | Description                                                                                                                                                                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>--add</b>                     | Adds/updates a subscriber. The operation fails if the subscriber exists, unless the <b>--overwrite</b> option is used.                                                                                                                                                                                                               |
| <b>--set</b>                     | Adds/updates mappings and/or properties for the specified subscriber.<br><br>A new mapping overwrites all existing mappings, unless the <b>--additive-mapping</b> option is used.<br><br>A property is overwritten only when a new value is assigned to it, but not when a <i>different</i> property has a new value assigned to it. |
| <b>--show</b>                    | Displays information for the specified subscriber.                                                                                                                                                                                                                                                                                   |
| <b>--remove</b>                  | Removes the specified subscriber.                                                                                                                                                                                                                                                                                                    |
| <b>--show-all-mappings</b>       | Displays all the mappings for the specified subscriber.                                                                                                                                                                                                                                                                              |
| <b>--remove-mappings</b>         | Removes the specified mapping of the specified subscriber.                                                                                                                                                                                                                                                                           |
| <b>--remove-all-mappings</b>     | Removes all the mappings of the specified subscriber.                                                                                                                                                                                                                                                                                |
| <b>--show-property</b>           | Displays the value of the specified property of the specified subscriber.                                                                                                                                                                                                                                                            |
| <b>--show-all-properties</b>     | Displays the values of all the properties of the specified subscriber.                                                                                                                                                                                                                                                               |
| <b>--show-all-property-names</b> | Displays all the property names and descriptions.                                                                                                                                                                                                                                                                                    |
| <b>--reset-property</b>          | Resets the specified property of the specified subscriber to its default value.                                                                                                                                                                                                                                                      |

Table B-26 p3subs Operations (continued)

| Operation                        | Description                                                                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--remove-properties</code> | Removes all properties and custom properties from the subscriber record.                                                                                                                |
| <code>--clear-state</code>       | Clears applicative state of specified subscriber. This command clears <i>only</i> the backup copy at the SM; it does <i>not</i> clear the applicative state record in the SCE platform. |

Table B-27 p3subs Subscriber Options

| Subscriber Option                                                  | Abbreviation         | Description                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--overwrite</code>                                           |                      | Used in add operations to replace the existing subscriber configuration, instead of failing.                                                                                                                                                                                                                                                                                                                                       |
| <code>--subscriber =NAME</code>                                    | <code>-s NAME</code> | Performs operation using specified subscriber NAME.                                                                                                                                                                                                                                                                                                                                                                                |
| <code>--additive-mappings</code>                                   |                      | Adds the new mapping(s) to any existing ones. (Without this option, any existing mappings are overwritten.)                                                                                                                                                                                                                                                                                                                        |
| <code>--ip</code><br><code>=IP1[/RANGE] [, ...] [@VPN-NAME]</code> |                      | Performs the operation using specified IP mapping(s). IP is in dotted notation.<br><br>"/RANGE" is used for specifying several consecutive mappings, by specifying the number of consecutive set bits in the mask. For example, <b>1.1.1.0/30</b> means <b>1.1.1.0</b> to <b>1.1.1.3</b> , or <b>1.1.1.0</b> with mask <b>255.255.255.252</b> .<br><br>"@VPN-NAME" is used to specify a tunneled IP address or the range of a VPN. |
| <code>--vpn =VPN-NAMES-LIST</code>                                 |                      | Performs the operation using all the tunneled IP addresses of a VPN (full-range).<br><br>This has the same meaning as <b>--ip=0.0.0.0/0@VPN-NAME</b> .                                                                                                                                                                                                                                                                             |
| <code>--community</code><br><code>=AS:value@VPN-NAME[, ...]</code> |                      | Performs the operation using the community field of a VPN.                                                                                                                                                                                                                                                                                                                                                                         |

Table B-27 p3subs Subscriber Options (continued)

| Subscriber Option                                                 | Abbreviation                                   | Description                                                                                                                                                                |
|-------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--property</code><br><code>=KEY1[=VAL1][;...]</code>        | <code>-p</code> <code>KEY1[=VAL1][;...]</code> | Performs operation using the specified KEY=VAL property/properties. These properties are defined by the application and influence the subscriber service in the SCE.       |
| <code>--custom-property</code><br><code>=KEY1[=VAL1][;...]</code> |                                                | Performs operation using the specified KEY=VAL custom property/properties. These properties are user defined and have no influence on the service the subscriber receives. |
| <code>--domain</code> <code>=DOMAIN</code>                        | <code>-d</code> <code>DOMAIN</code>            | Performs operation on specified DOMAIN. If DOMAIN is <b>none</b> , the operation refers to subscribers who have no domain specified.                                       |

#### Examples of using the p3subs Utility

- To add a subscriber with the specified IP address:  
`p3subs --add --subscriber=jerry --ip=96.142.12.7`
- To overwrite subscriber information (because the subscriber **jerry** already exists, this operation would fail, but the **overwrite** option allows the IP address to be overwritten):  
`p3subs --add --subscriber=jerry --ip=96.128.128.42 --overwrite`
- To set a property value for the specified subscriber:  
`p3subs --set --subscriber=jerry --property=packageId=1`
- To add new mappings for the specified subscriber; any existing ones are overwritten:  
`p3subs --set --subscriber=jerry --ip=96.142.12.8`
- To add new mappings to the existing ones for the specified subscriber:  
`p3subs --set --subscriber=jerry --ip=96.142.12.0/24 --additive-mappings`
- To add tunneled IP addresses of a VPN, existing mappings are overwritten:  
`p3subs --set --subscriber=jerry --ip=10.1.1.0/24@myVpn`
- To add all tunneled IP addresses of a VPN, existing mappings are overwritten:  
`p3subs --set --subscriber=jerry --vpn=myVpn`
- To add community of a VPN, existing mappings are overwritten:  
`p3subs --set --subscriber=jerry --community=1:10@myVpn`
- To display information for the specified subscriber:  
`p3subs --show --subscriber=jerry`

- To remove the specified subscriber:  
`p3subs --remove --subscriber=jerry`
- To display all the mappings for the specified subscriber:  
`p3subs --show-all-mappings --subscriber=jerry`
- To remove the specified mappings for the specified subscriber:  
`p3subs --remove-mappings --subscriber=jerry --ip=96.142.12.7,96.128.128.42`
- To remove a range of consecutive mappings for the specified subscriber:  
`p3subs --remove-mappings --subscriber=jerry --ip=1.1.1.0/30`
- To remove all the mappings for the specified subscriber:  
`p3subs --remove-all-mappings --subscriber=jerry`
- To display the value of the specified property for the specified subscriber:  
`p3subs --show-property --subscriber=jerry --property=reporting`
- To display the values of all the properties for the specified subscriber:  
`p3subs --show-all-properties --subscriber=jerry`
- To display all the property names and descriptions:  
`p3subs --show-all-property-names`
- To reset specified property of specified subscriber to its default value:  
`p3subs --reset-property --subscriber=jerry --property=rdr.transaction.generate`
- To clear the applicative state of the specified subscriber. This command clears only the backup copy at the SM, it does **not** clear the applicative state record in the SCE platform:  
`p3subs --clear-state --subscriber=jerry`

## Information About the p3subsdb Utility

- [p3subsdb Utility, page B-28](#)
- [Subscriber CSV File Format used by SCA BB Console for import/export, page B-30](#)
- [Examples of using the p3subsdb Utility, page B-30](#)

### p3subsdb Utility

The **p3subsdb** utility manages the subscriber database and performs operations on groups of subscribers.

The command format is:

```
p3subsdb OPERATION[OPTIONS] [FILE-OPTIONS]
```

The following tables list the **p3subsdb** operations and options.

**Table B-28** *p3subsdb Operations*

| Operation                   | Description                                                                                                                                                                                                                                                                                                                                                                                                       | Notes              |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <code>--clear-all</code>    | Removes all subscriber records from the SM database.                                                                                                                                                                                                                                                                                                                                                              | Progress indicator |
| <code>--clear-domain</code> | Removes all subscriber records from the specified domain.                                                                                                                                                                                                                                                                                                                                                         | Progress indicator |
| <code>--show-num</code>     | Displays number of subscribers in database for the specified domain.                                                                                                                                                                                                                                                                                                                                              |                    |
| <code>--show-all</code>     | Lists all the subscriber names.                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| <code>--show-domain</code>  | Lists all the subscriber names in the specified domain.                                                                                                                                                                                                                                                                                                                                                           |                    |
| <code>--import</code>       | Imports subscribers to the database from a specified CSV file. See <a href="#">Subscriber CSV File Format used by SCA BB Console for import/export, page B-30</a> .<br><br>The filename that is to be imported is specified using the format “ <code>--file=import-filename</code> ”.<br><br>The results go to a result file, <b>import-results.txt</b> , which is created in the same directory as the CSV file. | Progress indicator |



Table B-28 *p3subsdB Operations (continued)*

| Operation                       | Description                                                                                                                                                                                                                                                                                                                                                                                                         | Notes              |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <code>--export</code>           | Exports subscribers from the database to a specified CSV file. See <a href="#">Subscriber CSV File Format used by SCA BB Console for import/export</a> , page B-30.<br><br>The filename that is to be exported is specified using the format “ <code>--output=export-filename</code> ”.<br><br>The results go to a result file, <b>export-results.txt</b> , which is created in the same directory as the CSV file. | Progress indicator |
| <code>--clear-all-states</code> | Clears the state of all subscribers in the SM database.                                                                                                                                                                                                                                                                                                                                                             |                    |
| <code>--remove-property</code>  | Removes a specified property from all subscribers in the system.<br><br><b>Note</b> After running this command you should re-synchronize all SCE devices.                                                                                                                                                                                                                                                           |                    |
| <code>--remove-all-ip</code>    | Removes all the IP addresses of all subscribers.                                                                                                                                                                                                                                                                                                                                                                    |                    |

Table B-29 *p3subsdB Options*

| Option                        | Abbreviation           | Description                                                                                                                                      |
|-------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--prefix =NAME</code>   |                        | Used in the export operation for filtering the export.                                                                                           |
| <code>--property =PROP</code> |                        | Used in removing of property PROP from all of the subscribers.                                                                                   |
| <code>--domain =DOMAIN</code> | <code>-d DOMAIN</code> | Performs the operation on the specified DOMAIN. If DOMAIN is <b>none</b> , the operation refers to the subscribers who have no domain specified. |

**Table B-30** *p3subsdb File Options*

| File Option                 | Abbreviation         | Description                                        |
|-----------------------------|----------------------|----------------------------------------------------|
| <code>--file =FILE</code>   | <code>-f FILE</code> | Specifies the subscriber CSV FILES to import from. |
| <code>--output =FILE</code> | <code>-o FILE</code> | Specifies the subscriber CSV FILE to export to.    |

**Subscriber CSV File Format used by SCA BB Console for import/export**

Lines in subscriber CSV files have the following fixed format:

```
subscriber-id,domain,mappings,package-id,upstream Virtual Link id,downstream Virtual Link id
```

If no domain is specified, the default domain (subscribers) is assigned.

The following is an example CSV file for use with the SM CLU:

```
JerryS,subscribers,80.179.152.159,0,0,0
ElainB,,194.90.12.2,3,12,1
```

For a full description of the subscriber properties see the *Cisco Service Control Application for Broadband User Guide*.

**Examples of using the p3subsdb Utility**

- To import subscribers from a specified CSV file:  
`p3subsdb --import --file=mySubscriberFile.csv`
- To export subscribers to a specified CSV file:  
`p3subsdb --export -o mySubscriberFile.csv`
- To export subscribers to a specified CSV file, using filtering options:  
`p3subsdb --export --prefix=a --output=mySubscriberFile.csv`
- To export subscribers to a specified CSV file, using filtering options:  
`p3subsdb --export --prefix=a -o a.csv`
- To remove all subscriber records from the SM database:  
`p3subsdb --clear-all`
- To remove all subscriber records from the specified domain:  
`p3subsdb --clear-domain --domain=myDomain`
- To list all the subscribers: `p3subsdb --show-all` To list all subscribers in a specified domain:  
`p3subsdb --show-domain --domain=myDomain`
- To show the number of subscribers in a specified domain:  
`p3subsdb --show-num --domain=myDomain`
- To list all subscribers who have no domain specified:  
`p3subsdb --show-domain --domain=none`

- To clear the state of all subscribers in the SM database:  
`p3subsdB --clear-all-state`
- To remove a property from all subscriber records:  
`p3subsdB --remove-property --property=monitor`

## Information About the p3vpn Utility

- [p3vpn Utility, page B-32](#)
- [VPN CSV File Format for import/export, page B-33](#)
- [Examples of using the p3vpn Utility, page B-34](#)

### p3vpn Utility

The **p3vpn** utility manages the VPN entities in the SM.

The command format is:

```
p3vpn OPERATION[OPTIONS] [FILE-OPTIONS]
```

The following tables list the **p3vpn** operations and options.

**Table B-31** *p3vpn Operations*

| Operation                    | Description                                                                                                                                                                                                                                                                                                                          |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>--add</b>                 | Adds a VPN to the SM. The operation fails if the VPN exists.                                                                                                                                                                                                                                                                         |
| <b>--set</b>                 | Updates a VPN in the SM. A new mapping overwrites all existing mappings, unless the <b>--additive-mapping</b> option is used.                                                                                                                                                                                                        |
| <b>--remove</b>              | Removes the specified VPN.                                                                                                                                                                                                                                                                                                           |
| <b>--remove-mappings</b>     | Removes the specified mappings of the specified VPN.                                                                                                                                                                                                                                                                                 |
| <b>--remove-all-mappings</b> | Removes all mappings of the specified VPN.                                                                                                                                                                                                                                                                                           |
| <b>--show</b>                | Displays information for the specified VPN.                                                                                                                                                                                                                                                                                          |
| <b>--show-subs</b>           | Displays all the subscribers that belong to the specified VPN.                                                                                                                                                                                                                                                                       |
| <b>--show-all</b>            | Displays all VPN names.                                                                                                                                                                                                                                                                                                              |
| <b>--show-all-mappings</b>   | Displays all the mappings for the specified VPN.                                                                                                                                                                                                                                                                                     |
| <b>--show-num</b>            | Displays the total number of VPNs.                                                                                                                                                                                                                                                                                                   |
| <b>--import</b>              | Imports VPNs from a CSV file. See <a href="#">VPN CSV File Format for import/export, page B-33</a> .<br>The filename that is to be imported is specified using the format " <b>--file=import-filename</b> ".<br>The results go to a result file, <b>import-results.txt</b> , which is created in the same directory as the CSV file. |
| <b>--export</b>              | Export VPNs to a CSV file. See <a href="#">VPN CSV File Format for import/export, page B-33</a> .<br>The filename that is to be exported is specified using the format " <b>--output=export-filename</b> ".<br>The results go to a result file, <b>export-results.txt</b> , which is created in the same directory as the CSV file.  |

Table B-31 p3vpn Operations (continued)

| Operation                          | Description                                                                                                                                                                                                                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--remove</code>              | Remove the VPNs specified by a CSV file.<br>The filename that contains the VPNs to be removed is specified using the format “ <code>--file=remove-filename</code> ”.<br>The results go to a result file, <b>remove-results.txt</b> , which is created in the same directory as the CSV file. |
| <code>--remove-all-vlan</code>     | Removes all the VLAN-ids of all VPNs.                                                                                                                                                                                                                                                        |
| <code>--remove-all-mpls-vpn</code> | Removes all the MPLS/VPN mappings of all VPNs.                                                                                                                                                                                                                                               |

Table B-32 p3vpn File Options

| File Option                 | Abbreviation         | Description                                                                                                                                                                                                                               |
|-----------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--file =FILE</code>   | <code>-f FILE</code> | Specifies the CSV FILE from which to import or remove VPNs.                                                                                                                                                                               |
| <code>--output =FILE</code> | <code>-o FILE</code> | Specifies the CSV FILE to which the VPNs are exported.                                                                                                                                                                                    |
| <code>--force</code>        |                      | Used together with <b>--remove-vpn</b> or <b>--remove-all</b> to perform the removal operation even if subscribers contain tunneled mappings of the removed VPN. The subscribers tunneled mappings of the removed VPN are removed as well |

**Note**

When working with VLAN mapping types, the SCE must be configured using the following CLI:

```
SCE2000#>configure
SCE2000 (config)#>in li 0
SCE2000 (config if)#>VLAN symmetric classify
```

**VPN CSV File Format for import/export**

Lines in VPN CSV files have the following fixed format:

```
vpn-id, domain, mappings
```

If no domain is specified, the default domain (subscribers) is assigned.

The following is an example CSV file for use with the SM CLU:

```
MPLS-VPN, subscribers, 1:1000@1.1.1.1
VLAN-VPN, subscribers, 10
```

**Examples of using the p3vpn Utility**

- To add a VPN with the specified VLAN:  
`p3vpn --add -vpn=myVpn --vlan-id=10`
- To add new mappings for the specified VPN; any existing ones are overwritten:  
`p3vpn --set --vpn=myVpn --vlan-id=11`
- To add new mappings to the existing ones for the specified subscriber:  
`p3vpn --set --vpn=myVpn --vlan-id=12 --additive-mappings`
- To add a VPN with the specified MPLS/VPN mappings:  
`p3vpn --add --vpn=myVpn --mpls-vpn=1:100@96.142.12.7`
- To display information for the specified VPN:  
`p3vpn --show --vpn=myVpn`
- To remove the specified VPN:  
`p3vpn --remove --vpn=myVpn`
- To display all the mappings for the specified VPN:  
`p3vpn --show-all-mappings --vpn=myVpn`
- To remove the specified mappings for the specified VPN:  
`p3vpn --remove-mappings --vpn=myVPN --vlan-id=10`
- To remove all the mappings for the specified subscriber:  
`p3vpn --remove-all-mappings --vpn=myVpn`



## APPENDIX **C**

# CPE as Subscriber in Cable Environment

---

This module deals with the special case when the Customer Premise Equipment (CPE) is considered as the subscriber in the Cisco Service Control Solution for a cable environment.

The cable market presents special issues in terms of subscribers, in addition to the normal subscriber management issues that exist in other markets, such as DSL and Wireless.



### Note

---

This module is *not* relevant for the more common case where the cable modem with all the CPEs behind it is considered the subscriber.

---

## Information About the CPE as a Subscriber in a Cable Environment

- [Cable Support Module, page C-1](#)
- [CM and CPE in the SM, page C-2](#)
- [Static and Dynamic CMs, page C-3](#)

## Cable Support Module

The Subscriber Manager (SM) includes a special cable support module ( **p3cable** ) for dealing with the special case where the CPE is considered as a subscriber in a cable environment. The cable support module functions as a translator between the cable world (DHCP events) and the Cisco SM, for this special case. It provides an API on top of the basic SM API functionality. This API is accessible using the Java/C/C++ APIs by calling the **cableLogin** and **cableLogout** methods.

To ensure the correct behavior of the cable support module, certain configuration steps are necessary, such as the correct domain configuration and the static/dynamic CM configuration.

The cable support module, which translates between the SM and the DHCP events in the cable world, performs the following functions:

- Associates between CPEs and CMs
- Makes CPEs inherit application policy from their CM
- Allows/denies the introduction of CPEs whose CM is unfamiliar to the SM

For additional information regarding the functions of the cable support module, see [Information About the p3cable Utility, page B-5](#).

The cable support module uses the hardware (MAC) addresses of the CM as its subscriber name. The subscriber name of the CPE is the hardware address of its CM followed by the hardware address of the CPE.

## CM and CPE in the SM

In the special case when CPEs are considered as subscribers, cable modems are not delegated to the SCE in any way, and are not considered as subscribers in the Cisco Service Control Solution. However, for ease of integration and for the sake of simplicity, CMs are saved as subscribers in the SM only (but are *never* introduced to the SCE).

Cable modem SM subscribers are saved in special hidden subscriber domains called CM domains . These CM domains do not contain any SCE and are created automatically upon an insertion of a CM. For a CPE in a given subscriber domain, its CM will reside in a CM domain having the same name as the CPE domain but with the prefix **CM\_**.

Because CM domains are hidden, they cannot be configured by the configuration file. However, it is possible to run subscriber-related commands ( **p3subs** and **p3subsdb** ) on these domains.

A CM subscriber name has the following form: <CM MAC>(the MAC of the CM as sent in the DHCP protocol).

A CPE subscriber name (for such a CM) has the following form: <CM MAC>\_\_<CPE MAC>(the MAC of the CM, followed by **two** underscore signs, followed by the MAC of the CPE).

The **p3cable** command imports and exports cable modems, similar to importing and exporting subscribers, except that it is unnecessary to import the CM with an IP address.

When importing cable modems, the **full** CM domain name ( **CM\_** plus the domain name of its CPEs) *must* be provided.

### Example:

In the configuration of this example, the SM has a domain called DomainA. We want CPEs arriving from CMTS with IP 1.2.3.4 to reach this domain; therefore, we have configured 1.2.3.4 as an alias of DomainA.

During operation, because of a DHCP request-response, the DHCP LEG event sends a login event of a cable modem with MAC 0X0Y0Z from CMTS 1.2.3.4.

In the login event, the alias sent was 1.2.3.4 (the alias of domain DomainA), so the cable modem subscriber will be entered into domain CM\_DomainA with the name 0X0Y0Z.

When a login event of its CPE with MAC 0A0B0C is sent with the same alias (as the CPE that arrived from the same CMTS), the CPE subscriber will be entered into domain DomainA with the name 0X0Y0Z\_\_0A0B0C.



## Static and Dynamic CMs

Login and logout events of CPEs whose CM does not exist in the subscriber database will be ignored, since no subscriber will be created in the SM and aggregated to the SCE. This CPE traffic will be treated as default subscriber.

The SM supports two modes of integrating with cable modems. Editing and loading the p3sm.cfg configuration file controls these modes. (Configuring dynamic CM support is described in [Configuration File Options, page A-1](#). Use the CLU **p3cable** to view the current status.

- **Deny dynamic CM** —In this mode, login/logout events of cable modems that were **not** imported using the **p3cable** command will be ignored. Consequently, the CPE traffic of these CMs will be treated as default subscriber.
- **Allow Dynamic CM** —In this mode, login/logout events of cable modems that were **not** imported using the **p3cable** command will result in automatic addition of the cable modem to the subscriber database. These cable modems will receive the application tuneables that were defined in the domain tunable template section of the configuration file. For a description of application tuneables, see the *Cisco Service Control Application for Broadband User Guide* .





# APPENDIX **D**

## Troubleshooting

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This module describes how to troubleshoot the SM installation and daily operation.

- [Using the Troubleshooting, page D-1](#)
- [General Errors, page D-1](#)
- [General Setup Errors, page D-2](#)
- [TimesTen Database Setup Errors, page D-5](#)
- [Network Management Command Line Utility \(p3net\) Errors, page D-13](#)
- [Subscriber Database Command Line Utility \(p3subsdb\) Errors, page D-15](#)
- [Cable Support Command Line Utility \(p3cable\) Errors, page D-16](#)
- [Configuration Errors, page D-17](#)

## Using the Troubleshooting

Each entry in this module consists of an error message, probable cause(s), and solution. Note that the same error message may appear in more than one section of this module.

When an unexpected error occurs during the system's installation or daily operation, search for the error message throughout this module (the message may appear in more than one place). When you find the error message, read the section below the message and try the recommended solution. If the message appears more than once, try to correct the most probable cause first.

## General Errors

- [SM Not Running, page D-2](#)
- [SM in Failure Mode, page D-2](#)

## SM Not Running

|                 |                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <b>p3sm --sm-status</b> ):<br><br>> <b>p3sm --sm-status</b> Could not connect to SM. |
| Probable cause: | The SM server has not been started.                                                                                                                       |
| Solution:       | Use the following command to start/restart the SM server:<br><br>> <b>p3sm --start</b>                                                                    |

## SM in Failure Mode

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <b>p3sm --sm-status</b> ):<br><br>> <b>p3sm --sm-status</b> SM is running.<br>SM operational state is Failure<br>Command terminated successfully                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Probable cause: | The SM server restarted three times in 30 minutes due to an internal error.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Solution:       | This error can happen only in a cluster setup. Check the pcube user log and the Veritas Cluster Server log for the reason for the failure that caused the reboots. Act according to the problem in the logs.<br><br>Additional operations that can be taken are: <ul style="list-style-type: none"> <li>• Use the following command to extract a support file:<br/><br/>&gt;<b>p3sm --extract-support-file -f ../support.zip</b></li> <li>• Send the support file to Cisco's customer support</li> <li>• Use the following command to start/restart the SM server and get out of the Failure state:<br/><br/>&gt;<b>p3sm --restart</b></li> </ul> |

## General Setup Errors

- [Cannot Run this Script--/etc/motd File Exists, page D-3](#)
- [install-sm.sh Script--User is not Root, page D-3](#)
- [install-sm.sh Script--User pcube Exists, page D-4](#)
- [install-tt.sh Script, page D-4](#)
- [install-dsn.sh Script, page D-4](#)

## Cannot Run this Script—/etc/motd File Exists

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears when running one of the installation/upgrade scripts:</p> <pre>&gt;./&lt;script-name&gt; &lt;script-name&gt;: Cannot run this script - /etc/motd file exists &lt;script-name&gt;: Please remove the file or move it to another location &lt;script-name&gt;: and run the script again</pre> <p>This error applies to the following scripts:</p> <ul style="list-style-type: none"> <li>• install-sm.sh</li> <li>• upgrade-sm.sh</li> <li>• cluster-upgrade.sh</li> <li>• install-vcs-agents.sh</li> </ul> |
| Probable cause: | The <b>/etc/motd</b> file exists or has a size greater than 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Solution:       | Remove the file or move it to another location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## install-sm.sh Script—User is not Root

|                 |                                                                                                                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>./install-sm.sh</b>):</p> <pre>&gt;./install-sm.shinstall-sm.sh: Starting SM installation sequence install-sm.sh: Error - this script must be run by root - exiting.</pre> |
| Probable cause: | You started the installation sequence as <b>user</b> and not as <b>superuser</b> .                                                                                                                                                                    |
| Solution:       | Run the <b>install-sm.sh</b> script as <b>superuser</b> .                                                                                                                                                                                             |

## install-sm.sh Script—User pcube Exists

|                 |                                                                                                                                                                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <code>./install-sm.sh</code> ):<br><br><pre># ./install-sm.shinstall-sm.sh: Starting SM installation sequence install-sm.sh: Error - pcube user exists and has home /export/home/pcube, not /opt/pcube - remove it or use -o - exiting. #</pre> |
| Probable cause: | Your machine already has the user <b>pcube</b> .                                                                                                                                                                                                                                                                     |
| Solution:       | Run the installation using the <code>-o</code> option (overwrite), as follows:<br><br><pre># ./install-sm.sh -o</pre>                                                                                                                                                                                                |

## install-tt.sh Script



### Note

A minimum of 1.5 GB of free hard disk space is required to install the TimesTen database.

|                 |                                                                                                                                                                                                                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <code>install-tt.sh/export/home/pcube/lib/tt</code> ):<br><br><pre>&gt;install-tt.sh /export/home/pcube/lib/ttinstall-tt.sh: Starting TimesTen P-Cube installation sequence install-tt.sh: Error - This script must be run by root - exiting.</pre> |
| Probable cause: | You started the installation sequence as <b>user</b> and not as <b>superuser</b> .                                                                                                                                                                                                                                       |
| Solution:       | Run the <code>install-tt.sh</code> script as <b>superuser</b> .<br><br>Note that the TimesTen directory name given, <code>/lib/tt/</code> , <b>must</b> be relative to the (pcube) user directory. For example, if the user directory is pcube, install TimesTen in <code>/export/home/pcube/lib/tt/</code> .            |

## install-dsn.sh Script

Note that the TimesTen directory name given, `/var/tt/` , must be relative to the (pcube) user directory. For example, if the user directory is pcube, install TimesTen in `/export/home/pcube/var/tt/`.

# TimesTen Database Setup Errors

- [Introduction, page D-5](#)
- [TimesTen DSN Configuration—Cannot Find Requested DSN, page D-6](#)
- [TimesTen DSN Configuration—Data Source Name Not Found, page D-7](#)
- [TimesTen Database Settings—Cannot Connect to Data Source, page D-8](#)
- [TimesTen Configuration Error—Not Enough Memory, page D-9](#)
- [TimesTen Configuration Error—Incorrect Memory Definitions, page D-10](#)
- [TimesTen Configuration Error—Cannot Create Semaphores, page D-11](#)
- [TimesTen Configuration Error—Cannot Read Data Store File, page D-12](#)
- [TimesTen Configuration Error—Data Store Space Exhausted, page D-13](#)

## Introduction

The TimesTen configuration consists of several configuration files. This section explains the purpose and scope of each of these files. When troubleshooting the TimesTen, you will be requested to edit these configuration files and reboot the machine or restart the SM. In most cases, the defaults applied by the SM installation procedure are satisfactory.



### Note

Changing the TimesTen configuration files should be done with **extreme care**, and it is best to **consult Cisco technical support** prior to making any changes. See [Obtaining Documentation and Submitting a Service Request, page -xvii](#) for more information.

- [System \(Kernel\) Configuration File, page D-5](#)
- [Configuration File /var/TimesTen/sys.odbc.ini, page D-6](#)
- [Configuration File ~pcube/.odbc.ini, page D-6](#)

## System (Kernel) Configuration File

The kernel configuration file is a system configuration file, which affects system-wide configuration parameters:

- For Solaris, it is file **/etc/system**.
- For RedHat, it is file **/etc/sysctl.conf**.

The Subscriber Manager installation procedure configures this file to add extra semaphores and shared memory to the system. After editing this file, you have to reboot the machine for the changes to take effect.

If you are running other applications that require changes in this file's semaphore and shared memory values, **take care** that the TimesTen configuration does not override the other application's configuration, or vice versa. You should consult with the Cisco technical support for the proper values to use for the file configuration parameters.

## Configuration File /var/TimesTen/sys.odbc.ini

The file `/var/TimesTen/sys.odbc.ini` is a TimesTen configuration file that configures system DSNs. Any user on the machine on which the system DSN is defined can use this file. The SM DSNs are system DSNs that are named **PCube\_SM\_Repository** and **PCube\_SM\_Local\_Repository**, and which have the following system DSN configuration parameters:

- **LogFileSize**—The size of the TimesTen log file, in megabytes.
- **PermSize**—The size of the permanent memory region for the data store, in megabytes. You may increase **PermSize** but not decrease it.

The data stored in the permanent memory region includes tables and indexes that make up a TimesTen data store. The permanent data partition is written to the disk periodically.

- **TempSize**—The size of the memory allocated to the temporary region, in megabytes.

Temporary data includes locks, cursors, compiled commands, and other structures needed for command execution and query evaluation. The temporary data partition is created when a data store is loaded into memory and is destroyed when the data store is unloaded.



### Note

For additional information, see [The following tables list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is disabled., page 5-11](#) or [The following tables list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is enabled., page 5-13](#).

- **SMPOptLevel**—Optimizes the database operation on multi-processor machines. If the machine is a multi-processor platform, set parameter **SMPOptLevel** to 1 (default is 0).

## Configuration File ~pcube/.odbc.ini

The file `~pcube/.odbc.ini` is a TimesTen configuration file that configures user DSNs.

## TimesTen DSN Configuration—Cannot Find Requested DSN

|                 |                                                                                                                                                                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <b>p3sm --sm-status</b> ):<br><br><pre>&gt;p3sm --sm-status SM is running. SM operational state is XXX Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 CLIENT]Cannot find the requested DSN (PCube_SM_Repository_CS) in ODBCINI</pre> |
| Probable cause: | The TimesTen Client DSN is not configured correctly in file <code>~pcube/.odbc.ini</code> .                                                                                                                                                                                                                                        |
| Solution:       | Ensure that file <code>~pcube/.odbc.ini</code> contains the following:<br><br><pre>[ODBC Data Sources] PCube_SM_Repository_CS=TimesTen 5.0 Client Driver</pre>                                                                                                                                                                     |



## TimesTen DSN Configuration—Data Source Name Not Found

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-statusSM is running. SM operational state is XXX Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 ODBC Driver]Data source name not found and no default driver specified</pre>                                                                                            |
| Probable cause: | <p>The TimesTen Client DSN is not configured correctly in file <b>~pcube/odbc.ini</b>.</p>                                                                                                                                                                                                                                                                                                                                |
| Solution:       | <p>Ensure that file <b>~pcube/odbc.ini</b> contains the following:</p> <pre>[PCube_SM_Repository_CS] TTC_SERVER_DSN=PCube_SM_Repository</pre> <p>Ensure that file <b>/var/TimesTen/sys.odbc.ini</b> contains the following:</p> <pre>[ODBC Data Sources] PCube_SM_Repository=TimesTen 5.0 Driver [PCube_SM_Repository] Driver=__TTDIR__/TimesTen/pcubesm22/lib/lib tten.so DataStore=__VARDIR__/pcube_SM_Repository</pre> |

## TimesTen Database Settings—Cannot Connect to Data Source

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-status SM is running. SM operational state is XXX Error - Times-Ten DB is not set up correctly: [TimesTen][TimesTen 5.0.35 CLIENT]Unable to connect to data source (DSN: pcube_SM_Repository_CS; Network Address: X.X.X.X; Port Number: XXX): This operation has Timed Out. Try increasing your ODBC timeout attribute or check to make sure the target TimesTen Server is running</pre>                                                                                                                                                                                                                                                                                                                                                                                       |
| Probable cause: | <p>The following causes are possible:</p> <ul style="list-style-type: none"> <li>• The address of the Server DS is incorrect.</li> <li>• The port of the Server DS is incorrect.</li> <li>• TimesTen is not active.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Solution:       | <p>The Service Control solutions for the above causes are:</p> <ul style="list-style-type: none"> <li>• (The address of the Server DS is incorrect.) Ensure that file <b>~pcube/.odbc.ini</b> contains the following: <ul style="list-style-type: none"> <li>• <code>TTC_SERVER=127.0.0.1</code></li> </ul> </li> <li>• (The port of the Server DS is incorrect.) On a default installation, ensure that file <b>~pcube/.odbc.ini</b> does <i>not</i> contain "TTC_SERVER_PORT".<br/><br/>On a non-default installation, ensure that file <b>~pcube/.odbc.ini</b> <i>does</i> contain "TTC_SERVER_PORT=Non-default-port".</li> <li>• (TimesTen is not active.) Run the following command: <pre>~pcube/lib/tt/TimesTen/pcubesm22/bin/tts tatus</pre> <p>If TimesTen is not working, re-install TimesTen.</p> </li> </ul> <p>If the above solutions do not work, please refer to the TimesTen manual.</p> |

## TimesTen Configuration Error—Not Enough Memory

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-statusSM is running. SM operational state is XXX Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 ODBC Driver][TimesTen]TT0836: Cannot create data store shared-memory segment, error 1455 -- file "db.c", lineno 6289, procedure "sDbConnect() "</pre>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Probable cause: | There is not enough memory for creating TimesTen's in-memory database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Solution:       | <p>Do <b>all</b> of the following:</p> <ul style="list-style-type: none"> <li>• Ensure that the Unix machine has at least 1024 MB of memory installed.</li> <li>• Ensure that the configured memory size parameters ( <b>PermSize</b> and <b>TempSize</b> ) specified in file <b>/var/TimesTen/sys.odbc.ini</b> are less than the total amount of memory installed in the machine.</li> <li>• For Solaris, ensure that the maximum shared memory (parameter <b>shmsys:shminfo_shmmax</b> ) specified in file <b>/etc/system</b> is less than the total amount of memory installed in the machine.</li> <li>• For Red Hat, ensure that the maximum shared memory (parameter <b>kernel.shmmax</b> ) specified in file <b>/etc/sysctl.conf</b> is less than the total amount of memory installed in the Linux Machine.</li> </ul> |

## TimesTen Configuration Error—Incorrect Memory Definitions

|                 |                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-status SM is running. SM operational state is XXX. Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 ODBC Driver]Overflow in converting data store or log file size from megabytes to bytes, or in converting log buffer size from kilobytes to bytes</pre> |
| Probable cause: | The memory definitions of DSN are incorrect.                                                                                                                                                                                                                                                                                                                                                               |
| Solution:       | <p>Ensure that the configured permanent memory size and log file size (parameters <b>PermSize</b> and <b>LogSize</b>) are less than the total amount of memory and of disk space specified in file <b>/var/TimesTen/sys.odbc.ini</b>.</p>                                                                                                                                                                  |

## TimesTen Configuration Error—Cannot Create Semaphores

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-status SM is running. SM operational state is XXX Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 ODBC Driver][TimesTen]TT0925: Cannot create data store semaphores (Invalid argument) - file "db.c", lineno 5124, procedure "sbdbCreate()", sqlState: 08001, errorCode: 925</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Probable cause: | <p>TimesTen was unable to create the data store semaphores that are defined in the kernel configuration file (Solaris: <b>/etc/system</b> for Solaris; for Red Hat: <b>/etc/sysctl.conf</b> for Red Hat).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Solution:       | <p>Do <b>all</b> of the following:</p> <ul style="list-style-type: none"> <li>• Ensure that the machine has at least 1024 MB of memory installed.</li> <li>• Reboot the machine after the first time that TimesTen is installed.</li> <li>• Verify the contents of the system (kernel) configuration file: <ul style="list-style-type: none"> <li>– For Solaris, ensure that file <b>/etc/system</b> contains the following:</li> </ul> </li> <li>• <pre>semsys:seminfo_semmni = 20 semsys:seminfo_semmsl = 100 semsys:seminfo_semmns = 2000 semsys:seminfo_semmnu = 2000</pre> <ul style="list-style-type: none"> <li>– For Red Hat, ensure that file <b>/etc/sysctl.conf</b> contains the following:</li> </ul> </li> <li>• <pre>*---- Begin settings for TimesTen kernel.sem = "SEMMSL_250 SEMMNS_32000 SEMOPM_100 SEMMNI_100 *---- End of settings for TimesTen</pre> </li> </ul> |

## TimesTen Configuration Error—Cannot Read Data Store File

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3sm --sm-status</b>):</p> <pre>&gt;p3sm --sm-status SM is running. SM operational state is XXX. Error - Times-Ten DB is not setup correctly: [TimesTen][TimesTen 5.0.35 ODBC Driver][TimesTen]TT0845: Cannot read data store file. OS-detected error: Error 0 -- file "db.c", lineno 6320, procedure "sDbConnect()"</pre>                                                                                                                           |
| Probable cause: | <p>TimesTen was unable to read the data store file, probably due to an error during the installation. This error occurs when installing a TimesTen application on top of an existing TimesTen, without having first uninstalled the old TimesTen database.</p>                                                                                                                                                                                                                                                                  |
| Solution:       | <p>Do the following:</p> <ol style="list-style-type: none"> <li>1. Remove the database, by using the SM <b>p3db</b> CLU with the following commands: <pre>&gt;p3db -destroy-rep-db &gt;p3db -destroy-local-db</pre> </li> <li>2. Uninstall TimesTen with the following commands: <pre>&gt;su Password: # ~pcube/lib/tt/TimesTen4.5/32/bin/setup. sh -uninstall</pre> </li> <li>3. Re-install TimesTen, either by running the SM <b>install-tt.sh</b> script or by using the installation files supplied by TimesTen.</li> </ol> |

## TimesTen Configuration Error—Data Store Space Exhausted

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears in the SM log (while using the SM APIs):</p> <pre>java.io.IOException: Failure in putting subscriber 45977166__00:50:bf:97:c1:b2 : [TimesTen][TimesTen 5.0.35 ODBC Driver][TimesTen]TT0802: Data store space exhausted -- file "blk.c", lineno 1571, procedure "sbBlkAlloc"</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Probable cause: | <p>The TimesTen database has already reached its maximum capacity, which caused the operation of adding a new subscriber to the database to fail.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Solution:       | <p>Usually, doing just one of the following is sufficient:</p> <ul style="list-style-type: none"> <li>• Reduce the number of the subscribers handled by the SM (of course, this solution is not always possible).</li> <li>• Configure the system to support a larger number of subscribers. Note that this solution may require editing one or more of the TimesTen configuration files discussed in <a href="#">Introduction, page D-5</a> as well as rebooting the machine.</li> <li>• Move the SM to a more powerful machine; this could be a faster CPU (or more CPUs), a larger disk, more RAM, etc.</li> </ul> <p>For help and guidance in implementing the last two solutions, please contact Cisco Technical Support. See <a href="#">Obtaining Documentation and Submitting a Service Request, page -xvii</a>.</p> |

## Network Management Command Line Utility (p3net) Errors

- [First Connection—Operation Timed Out, page D-14](#)
- [Status Error—Connection Down, page D-14](#)
- [Status Error—Subscriber Management Down, page D-15](#)

## First Connection—Operation Timed Out

|                 |                                                                                                                                                                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <b>p3net --connect</b> ):<br><br><pre>&gt;p3net --connect --ne-name=YYYY Error - failed to connect to element 'YYYY' Operation timed out: connect</pre>                   |
| Probable cause: | The following causes are possible: <ul style="list-style-type: none"> <li>• The IP address is incorrect.</li> <li>• The element YYYY is down.</li> </ul>                                                                                       |
| Solution:       | The Service Control solutions for the above causes are: <ul style="list-style-type: none"> <li>• Ensure that the IP address is correct.</li> <li>• Ensure that the element YYYY is online and is connected via its management port.</li> </ul> |

## Status Error—Connection Down

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | The following sequence of output appears (in response to the command <b>p3net --show-ne</b> ):<br><br><pre>&gt;p3net --show --ne-name=se0 Network Element Information: ===== Name:          YYY Description:   testing element Host:          X.X.X.X Ip:            X.X.X.X Port:          14374 Status:        Connection down (Failure in connecting to agent on host, Connection refused: connect) Type:          SCE1000 Domain: smartNET.policy.unitTestSubscribers Subscriber Management: Not Active</pre> |
| Probable cause: | The following causes are possible: <ul style="list-style-type: none"> <li>• The IP address is incorrect.</li> <li>• The element YYYY is down.</li> </ul>                                                                                                                                                                                                                                                                                                                                                          |
| Solution:       | The Service Control solutions for the above causes are: <ul style="list-style-type: none"> <li>• Ensure that the IP address is correct.</li> <li>• Ensure that the element YYYY is online and is connected via its management port.</li> <li>• Ensure that the PRPC adapter is online on the port that the status indicates.</li> </ul>                                                                                                                                                                           |



## Status Error—Subscriber Management Down

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3net --show-ne</b>):</p> <pre>&gt;p3net --show --ne-name=se0 Network Element Information: ===== Name:          YYY Description:   testing element Host:          X.X.X.X Ip:            X.X.X.X Port:          14374 Status:        Connection ready Type:          SCE1000 Domain: smartNET.policy.unitTestSubscribers Subscriber Management: Not Active</pre> |
| Probable cause: | <p>The Subscriber Management field indicates whether the SM successfully performed SM-SCE subscriber synchronization. If the value of the field is <b>Not Active</b>, it is possible that the SM failed to synchronize the SCE.</p>                                                                                                                                                                                                         |
| Solution:       | <p>One possible solution is to force SM-SCE resynchronization by using the CLU command <b>p3sm --resync</b>.</p>                                                                                                                                                                                                                                                                                                                            |

## Subscriber Database Command Line Utility (p3subsdB) Errors

- [CSV File Validation Error, page D-16](#)

## CSV File Validation Error

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to the command <b>p3subsdb --import</b>):</p> <pre>&gt;p3subsdb --import --file=/export/home/pcube/XXX.csv Error - Failed to validate the file XXX.csv See import-results.txt for detailed errors description. &gt;cat import-results.txt x.csv:1: expected 2 items but got 4 items. 1 subscribers, 1 errors. NO APPLICATION INSTALLED, MAKE SURE TO INSTALL PQI BEFORE IMPORTING CM WITH TUNEABLES.</pre>                          |
| Probable cause: | <p>You tried to import a four-field csv file to the SM, but no application (SCA BB) was installed.</p> <p>For example, the following csv file for a SCA BB application contains four fields:</p> <pre># CSV line format: subscriber-id, domain, mappings, package-id JerryS,subscribers,80.179.152.159,0 ElainB,subscribers,194.90.12.2,3</pre> <p>However, the default definition file that defines csv file parsing rules contains only two fields: <b>name</b> and <b>ip mapping</b>.</p> |
| Solution:       | <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• Install an application (SCA BB) on the SM (for details, see the <i>Cisco Service Control Application for Broadband User Guide</i> ).</li> <li>• Import a csv file that has just two fields.</li> </ul>                                                                                                                                                                                                              |

## Cable Support Command Line Utility (p3cable) Errors

- [CSV File Import Error, page D-17](#)

## CSV File Import Error

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | <p>The following sequence of output appears (in response to command <b>p3cable --import-cm</b>):</p> <pre>&gt;p3cable --import-cm --file=/export/home/pcube/XXX.csv Importing cable modems ... 0% Importing cable modems ... 100% Error - Errors during import from 'H:\work\Mng\dev\install\ems\bin\win32\x.csv': Imported 1 CM(s). 1 Error(s). See cm-import-results.txt for detailed errors description. &gt;cat cm-import-results.txt x.csv:1: expected 2 items but got 4 items. 1 cable modem(s); 1 error(s). NO APPLICATION INSTALLED, MAKE SURE TO INSTALL PQI BEFORE IMPORTING CM WITH TUNEABLES.</pre> |
| Probable cause: | <p>You tried to import a four-field csv file to the SM, but no application (SCA BB) was installed.</p> <p>For example, the following csv file for a SCA BB application contains four fields:</p> <pre># CSV line format: subscriber-id, domain, mappings, package-id JerryS,subscribers,80.179.152.159,0 ElainB,subscribers,194.90.12.2,3</pre> <p>However, the default definition file that defines csv file parsing rules contains only two fields: <b>name</b> and <b>ip mapping</b>.</p>                                                                                                                    |
| Solution:       | <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• Install an application (SCA BB) on the SM (for details, see the <i>Cisco Service Control Application for Broadband User Guide</i>).</li> <li>• Import a csv file that has just two fields.</li> </ul>                                                                                                                                                                                                                                                                                                                                  |

## Configuration Errors

- [Network Management Errors, page D-18](#)
- [Domain Errors, page D-19](#)
- [PRPC Errors, page D-20](#)
- [RADIUS Listener Errors, page D-21](#)
- [Common Validation Errors, page D-21](#)

## Network Management Errors

|                    |                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------|
| Error message (1): | Error section <section name>: cannot contain white spaces.                                                          |
| Probable cause:    | [SCE.XXX] section cannot contain white spaces (SCE name cannot contain white space).                                |
| Solution:          | Remove the white spaces.                                                                                            |
|                    |                                                                                                                     |
| Error message (2): | Error in section <section name>: host <ip address>already exists in section <section name>                          |
| Probable cause:    | Configuration cannot contain two SCEs with the same IP address.                                                     |
| Solution:          | Change the IP address of one of the SCEs.                                                                           |
|                    |                                                                                                                     |
| Error message (3): | Unknown NE <name>found in domain <domain name>section: it does not have [SCE.<name>] section                        |
| Probable cause:    | The section <domain name>includes, under the elements property, an SCE that is not defined in an [SCE.XXX] section. |
| Solution:          | Add the missing [SCE.XXX] section to the file.                                                                      |
|                    |                                                                                                                     |
| Error message (4): | Duplicate NE <name>found in domain <domain name>section: it already appears in <domain name >domain section.        |
| Probable cause:    | Same SCE cannot belong to more than one domain.                                                                     |
| Solution:          | Remove the SCE from all but one of the domains.                                                                     |

## Domain Errors

|                    |                                                                                                                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message (1): | Error in section <section name>: cannot contain white spaces.                                                                                                                                       |
| Probable cause:    | [ <b>Domain.XXX</b> ] section cannot contain white spaces (Domain name cannot contain white space).                                                                                                 |
| Solution:          | Remove the white spaces.                                                                                                                                                                            |
|                    |                                                                                                                                                                                                     |
| Error message (2): | Error <alias name>value - alias name should not start with 'CM_'.                                                                                                                                   |
| Probable cause:    | The alias name cannot start with CM_ because this is the prefix of hidden domain generated by the SM when working with CMs (see <a href="#">CPE as Subscriber in Cable Environment, page C-1</a> ). |
| Solution:          | Use a different prefix for the alias.                                                                                                                                                               |
|                    |                                                                                                                                                                                                     |
| Error message (3): | Alias <alias name>already exists in [<domain name>] section                                                                                                                                         |
| Probable cause:    | Each alias can appear in only one [ <b>Domain.XXX</b> ] section.                                                                                                                                    |
| Solution:          | Alias mentioned in the error message should be removed from all but one [ <b>Domain.XXX</b> ] section.                                                                                              |
|                    |                                                                                                                                                                                                     |
| Error message (4): | Unknown domain <domain name>found in [LEG-Domains Association]. It does not appear as a section.                                                                                                    |
| Probable cause:    | Domain mentioned in given section does not have a [ <b>Domain.XXX</b> ] section.                                                                                                                    |
| Solution:          | Domain mentioned in error message should be given a [ <b>Domain.XXX</b> ] section.                                                                                                                  |
|                    |                                                                                                                                                                                                     |
| Error message (5): | Invalid non-integer value: <value>for property '<property name>' in section [section name].                                                                                                         |
| Probable cause:    | Properties in [ <b>Domain.XXX</b> ] sections do not have integer values.                                                                                                                            |
| Solution:          | Properties mentioned in error message should be given integer values.                                                                                                                               |

|                    |                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------|
| Error message (6): | Error in section <domain name>: Property - <name>not found: <list of application properties>                        |
| Probable cause:    | Property defined in [ <b>Domain.XXX</b> ] section is not found in properties list defined by installed application. |
| Solution:          | Delete the properties mentioned in the error message (or define them in the installed application).                 |

|                    |                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message (7): | New configuration was not applied due to the following warnings:<br>Warning - Cannot remove domain <domain name>with <num of SCEs>SCEs. Note that all subscribers will be removed from domain db. Please use '--ignore-warnings' option to complete the operation.                                                                                  |
| Probable cause:    | This is actually a warning: its purpose is to warn that the user removed from the <b>p3sm.cfg</b> file a domain that contained SCEs (which probably contained subscribers, etc.), and that the user will lose all subscriber data relevant for that domain. This warning appears only after the CLU command <b>p3sm --load-config</b> is activated. |
| Solution:          | To avoid this warning, use the <b>--ignore-warnings</b> option.                                                                                                                                                                                                                                                                                     |

## PRPC Errors

|                 |                                                                                                                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message:  | New configuration was not applied due to the following warnings:<br>Warning - PRPC configuration was changed. Note: Reloading may take up to 5 seconds. Please use '--ignore-warnings' option to complete the operation. |
| Probable cause: | This is actually a warning: it is displayed after the CLU command <b>p3sm --load-config</b> is activated when the PRPC configuration in the <b>p3sm.cfg</b> file has been changed.                                       |
| Solution:       | Use the <b>--ignore-warnings</b> option to complete the operation.                                                                                                                                                       |

## RADIUS Listener Errors

|                 |                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------|
| Error message:  | Duplicate NAS identifier <nasID>found in section [NAS name] : already exists in <other NAS name> |
| Probable cause: | <nasID>is not unique.                                                                            |
| Solution:       | Change one of the <nasID>so that both are unique.                                                |

## Common Validation Errors

The following configuration errors are relevant for all sections/parameters of the p3sm.cfg file.

|                    |                                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Error message (1): | Unknown property <property name>found in section [<section name>] in configuration file <file name>.                                            |
| Probable cause:    | Property written in the <b>p3sm.cfg</b> file is unknown to the SM. Maybe the name is misspelled or the property belongs in a different section. |
| Solution:          | Ensure that the name is spelled correctly and that the property resides in the correct section.                                                 |

|                    |                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------|
| Error message (2): | Unknown section [<section name>] found in configuration file {2}.                                   |
| Probable cause:    | The section written in the <b>p3sm.cfg</b> file is unknown to the SM. Maybe the name is misspelled. |
| Solution:          | Ensure that the section name is spelled correctly.                                                  |

|                    |                                                                                                               |
|--------------------|---------------------------------------------------------------------------------------------------------------|
| Error message (3): | Error value <value>for property <property name>in section [<section name>]. Optional values: [<values range>] |
| Probable cause:    | Value of the property is invalid. The <values range>field contains the valid values.                          |
| Solution:          | Specify any valid value for the property.                                                                     |

|                    |                                                                        |
|--------------------|------------------------------------------------------------------------|
| Error message (4): | Missing mandatory property <property name>in section [<section name>]. |
|--------------------|------------------------------------------------------------------------|

|                    |                                                                                                                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Probable cause:    | The property <b>&lt;property name&gt;</b> is <b>mandatory</b> and must appear in the section <b>&lt;section name&gt;</b> .                                                                                        |
| Solution:          | Set a value for the requested property in the specified section.                                                                                                                                                  |
| Error message (5): | Error value <code>&lt;property value&gt;</code> for property <code>&lt;property name&gt;</code> in <code>[&lt;section name&gt;]</code> section. Valid format:<br><code>[0..255].[0..255].[0..255].[0..255]</code> |
| Probable cause:    | The value is an invalid IP address.                                                                                                                                                                               |
| Solution:          | Specify a valid IP address.                                                                                                                                                                                       |
| Error message (6): | Error empty value for <code>&lt;property name&gt;</code> property in <code>[&lt;section name&gt;]</code> section - must have at least one character                                                               |
| Probable cause:    | Value of the <b>&lt;property name&gt;</b> is empty; for example, <b>prop=</b>                                                                                                                                     |
| Solution:          | Specify a non-empty value for the property.                                                                                                                                                                       |
| Error message (7): | Section <code>&lt;section name&gt;</code> added when already exists                                                                                                                                               |
| Probable cause:    | The section with <b>&lt;section name&gt;</b> appears more than once. This error is most likely to occur for the <b>[SCE.XXX]</b> and <b>[Domain.XXX]</b> sections.                                                |
| Solution:          | Use the specified section name only once.                                                                                                                                                                         |





## Veritas Cluster Server

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This module provides basic guidelines for the Veritas Cluster Server (hereafter VCS) configuration in an SM cluster installation. It assumes basic knowledge of the VCS environment; it does not replace the VCS user guide. This module does not cover installation of the cluster or of the SM cluster agents.

This module lists the software and hardware system requirements for the VCS. It also gives a systematic explanation on how to configure the SM cluster using the VCS configuration tools. Most of the examples are taken from the use of the Java Veritas Manager GUI, although the operations can also be done via the Veritas command-line utilities.

The SM supports Veritas Cluster Server version 3.5 and 4.1 on Solaris machines and Veritas Cluster Server version 2.2 and 4.1 on Red-Hat Linux machines.

Veritas Software was acquired by Symantec. Currently, the cluster solution is still called the Veritas Cluster Server.

- [Information About Veritas Cluster Servers, page E-1](#)
- [How to Configure the SM Cluster Resources, page E-5](#)
- [How to Add SM Cluster Resources, page E-8](#)
- [Useful Operations, page E-15](#)
- [Linking the Resources, page E-19](#)
- [Verifying that the Service Group is Online, page E-20](#)
- [SNMP Support, page E-20](#)
- [How to Configure the SnmpConsole Attribute, page E-23](#)

## Information About Veritas Cluster Servers

- [Veritas Cluster Server System Requirements, page E-2](#)
- [Veritas Cluster Server Nodes on Remote Sites, page E-2](#)
- [Replication Configuration Guidelines, page E-3](#)

## Veritas Cluster Server System Requirements

For your convenience, the following Veritas Cluster Server System Requirements have been taken from the Veritas site:

<http://www.veritas.com>

- Supported Platforms:
  - Sun Solaris 8, 9, 10
  - Red Hat Linux 3.0, 4.0
- Networking:
  - Public Network: 10 MB/100 MB/Gigabit Ethernet
  - Private Network: 10 MB/100 MB/Gigabit Ethernet
- Ethernet Controllers:
  - Requires at least three independent Ethernet connections per system
- Memory:
  - Each VERITAS Cluster Server system requires at least 128 MB of RAM (256 MB of RAM is recommended)
- Supported Server Hardware:
  - Please refer to <http://support.veritas.com> or contact your VERITAS sales representative for the latest list of certified server hardware.
    - Sun Solaris 8, 9, 10
    - Red Hat Linux 2.1, 3.0, 4.0
- Supported Storage Hardware:
  - Please refer to <http://support.veritas.com> or contact your VERITAS sales representative for the latest list of certified storage hardware.
    - Sun
    - Red Hat Linux

## Veritas Cluster Server Nodes on Remote Sites

The heartbeat links use the Low Latency Transport (LLT) Ethernet/dlpi protocol. It uses Ethernet broadcasts and must be on the same broadcast network. A separate layer-2 switch per heartbeat link is supported. The distance limitation is based on performance. A number of factors govern cluster distance. The primary factors for LLT are network connectivity and latency. Direct L2 low latency connections must be provided for LLT with a maximum round-trip time of 500 milliseconds. Large campus clusters or metropolitan area clusters must be very carefully designed to provide two completely separate paths for heartbeat to prevent a single fiber optic or fiber bundle failure from removing the heartbeat links.

Although the database replication network uses IP as its transport, it must have two separate connection paths between the nodes that provide at least 10Mbps for the subscriber data replication.

When planning an SM Cluster setup where the nodes are at a distance from each other, please consult the Veritas support.

## Replication Configuration Guidelines

- [Replication Scheme Setup, page E-3](#)
- [Replication Network Configuration, page E-3](#)
- [Veritas Cluster Server Configuration Guidelines, page E-5](#)

### Replication Scheme Setup

After the replication network has been setup (as described in the [Replication Network Configuration, page E-3](#) section), the replication scheme needs to be set to the database. Setting the replication scheme is performed using the **p3db** CLU:

```
>p3db --set-rep-scheme
```

This operation configures the database to send every subscriber-data update to the peer machine.

If the setup operation fails because there might be an existing replication scheme already set, run the following CLU to drop the previous replication scheme and then set the new scheme:

```
>p3db --drop-rep-scheme
```

By configuring and running the VCS agent of the replication agent or by running the **p3db --rep-start** CLU, the replication agent starts its work.

### Replication Network Configuration

The configuration of the replication private network between the two SMs of the cluster must be carefully planned. This section discusses some of the guidelines for performing the configuration.

The TimesTen replication agent uses hostnames to implement fail-over between the two replication NICs. The agent uses the first IP address of the hostname supplied to the agent to connect to the other agent. If the connection fails and cannot be reconstructed on the first IP, the replication agent tries the next IP addresses assigned to this hostname, and so on.

Editing the `/etc/hosts` file to assign hostnames to IP addresses.

You **must** use the predefined hostnames `SM_REP1` and `SM_REP2` as the hostnames for replication.

**Note**

---

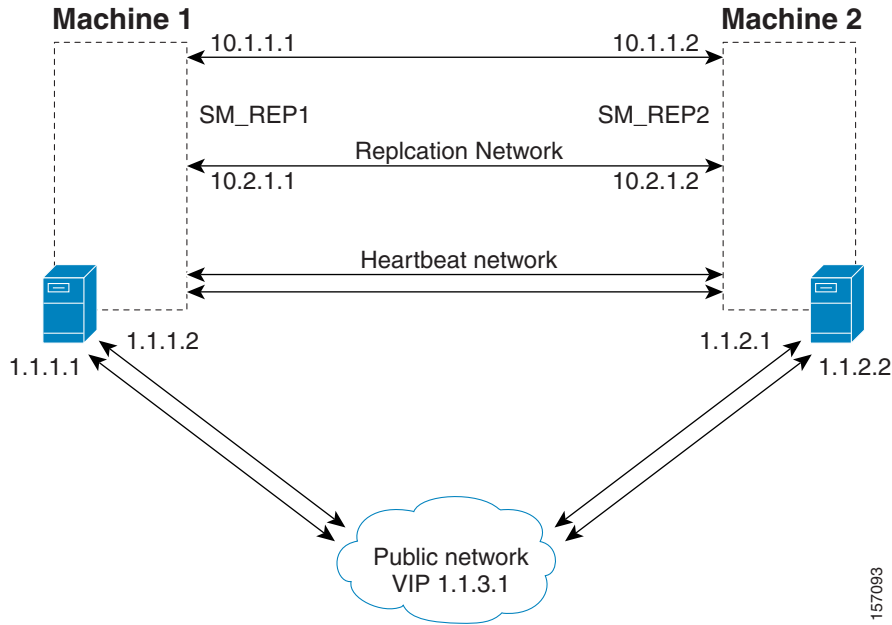
Verify in the OS configuration files that the `/etc/hosts` file is used before using a name server.

---

**Example:**

The following figure shows an example of a replication network.

**Figure E-1 Veritas Network Replication Configuration**



To configure the replication network shown by the above figure, do the following:

- Configure the IP addresses of each of the replication NICs, each one in a different network. In this example, the IP addresses of the Machine1 replication NICs are 10.1.1.1 and 10.2.1.1.
- Assign a hostname *SM\_REP1* to both of the local replication NIC IP addresses. In this example, the hostname *SM\_REP1* is assigned to the IP addresses of the replication NICs on Machine1. In the */etc/hosts* file, be sure to also assign the local hostname (Machine1) to the local replication NICs. Ensure that there are no empty lines between the lines containing the local hostname.
- Assign a hostname *SM\_REP2* to both of the remote replication NIC IP addresses. In this example, the hostname *SM\_REP2* is assigned to the IP addresses of the replication NICs of Machine2
- The */etc/hosts* file on Machine1 should appear as follows:

```
127.0.0.1 localhost
1.1.1.1 Machine1 loghost
10.1.1.1 Machine1 SM_REP1 REP_1_NIC_1
10.2.1.1 Machine1 SM_REP1 REP_1_NIC_2
10.1.1.2 SM_REP2 REP_2_NIC_1
10.2.1.2 SM_REP2 REP_2_NIC_2
```

- The */etc/hosts* file on Machine2 should appear as follows:

```
127.0.0.1 localhost
1.1.2.1 Machine2 loghost
10.1.1.2 Machine2 SM_REP2 REP_2_NIC_1
10.2.1.2 Machine2 SM_REP2 REP_2_NIC_2
10.1.1.1 SM_REP1 REP_1_NIC_1
10.2.1.1 SM_REP1 REP_1_NIC_2
```



**Note**

Make sure the system uses the */etc/hosts* file before it performs DNS or any other name service operation.

## Veritas Cluster Server Configuration Guidelines

The following procedures assume that the following operations were performed before starting the VCS configuration:

- Installation of the VCS on both machines. As part of this installation:
  - Each machine was given a hostname, which is used as the *system* name for the VCS configuration.
  - The machines are configured to recognize each other's hostname.
- An IP address was allocated for the cluster (hereafter, *the cluster's IP*).
- The SM and the TimesTen database were installed on both machines.
- The SM VCS agents were installed on each machine.
- The VCS manager Java console was installed on the administrator PC.

Note that in an SM cluster, two SM machines are connected to each other in a fully redundant way. The connection uses four cables: two for the VCS heartbeat mechanism, and two for the TimesTen database replication mechanism. Each machine is connected to the network via one of two redundant NICs. To access the cluster, you should use the *cluster IP address*, which is a virtual IP managed by the VCS. For management operations, you should use the local IP address of each machine.

## How to Configure the SM Cluster Resources

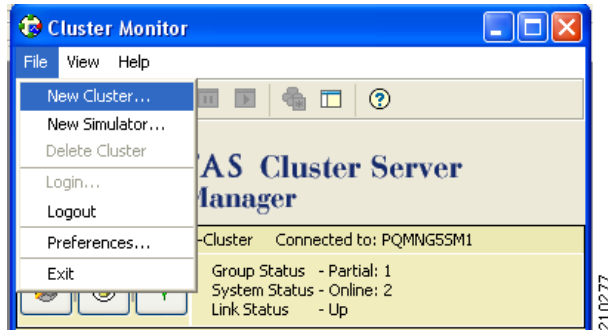
To configure the VCS with the SM cluster resources, perform the procedures described in the following sections.

- [Adding Clusters, page E-6](#)
- [Adding Service Groups, page E-7](#)
- [Setting Auto-start, page E-8](#)

## Adding Clusters

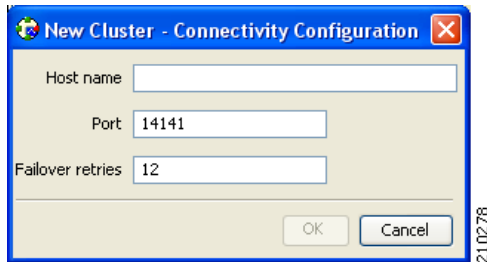
- Step 1** Open the VCS cluster manager Java console by choosing **Start >Programs >Veritas Cluster Manager >Cluster Manager (Java console)**.
- Step 2** Add a new cluster by choosing **File >New Cluster**

**Figure E-2 Cluster Monitor: New Cluster**



- Step 3** Configure the cluster

**Figure E-3 Adding a Cluster**



- Cluster Alias—cluster name
- Host Name—one of the machine's IP addresses or hostname.

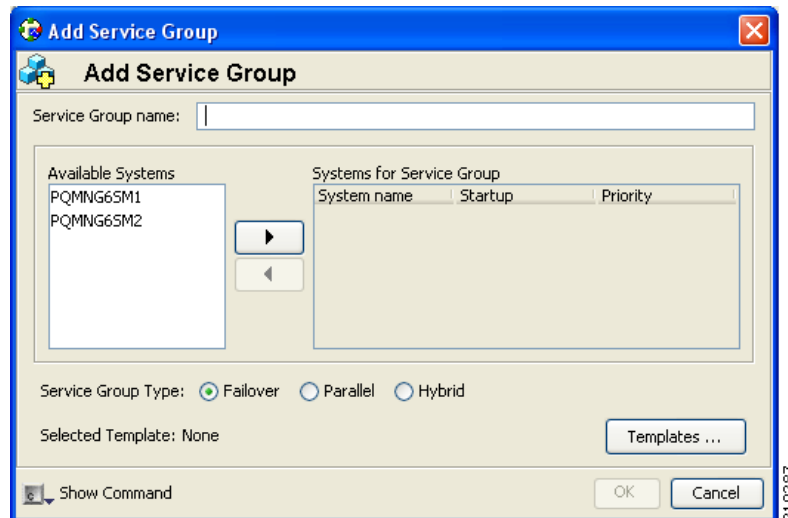
- Step 4** Log in to the cluster.

## Adding Service Groups

- Step 1** In the cluster explorer, from the service group tab, right-click the cluster, and choose **Add Service Group**.

The Add Service Group window appears.

**Figure E-4** Adding a Service Group



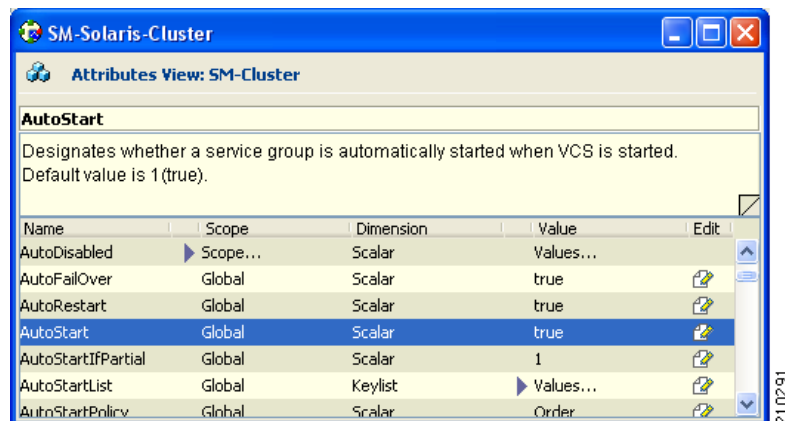
- Step 2** Enter a name for the service group.
- Step 3** Add the two machines as part of the service group and define their priority in the cluster.
- Step 4** Click **OK**.

## Setting Auto-start

This section describes how to set the auto-start parameters that define which machine will start after a boot of both nodes. If these parameters are not set, then at boot of both nodes the cluster will stay offline.

- 
- Step 1** From the service group display, click **Show All Attributes**.
- Step 2** Make sure that both nodes are defined in the AutoStartList.

**Figure E-5** AutoStart List



- Step 3** Specify which node will start by defining the **AutoStartPolicy** parameter.
- Step 4** Make sure that the AutoStart parameter is set to **true** (if **false**, both nodes will come up as standby).
- 

## How to Add SM Cluster Resources

This section describes how to add the various SM cluster resources.

- [Adding Resources - General Guidelines, page E-9](#)
- [Adding Network NICs, page E-10](#)
- [Adding Network VIPs, page E-12](#)
- [Adding SM Resources, page E-13](#)
- [Adding TimesTen Daemon Resources, page E-14](#)
- [Adding TimesTen Replication Agent Resources, page E-15](#)



## Adding Resources - General Guidelines

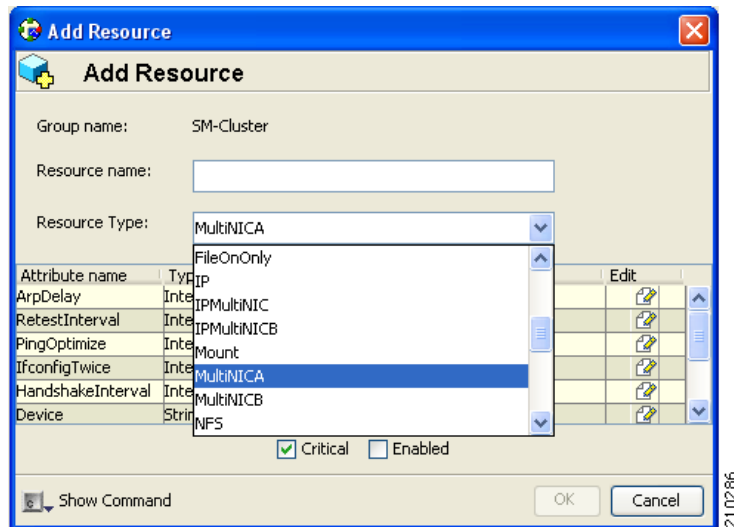
- Step 1** From the right-click menu of the service group, click **Add Resource**.

**Figure E-6** Adding Resources - General Guidelines



The Add Resource screen appears.

**Figure E-7** Adding Multi NICA Resource: Select MultiNICA



- Step 2** On the Add Resource screen, from the Resource Type drop-down list choose the resource type and give the resource a name.
- Step 3** Configure any required attributes.
- Step 4** When you are finished, click **OK**.

## Adding Network NICs

- Step 1** Decide which two network interfaces to use for the network connection.
- Step 2** Add a MultiNICA resource called *Network-NICs* to the service group.
- Step 3** Define the Device and NetMask parameters.
- Device—Write the names of the Network NICs in the KEY column and their corresponding IP addresses in the VALUE column.

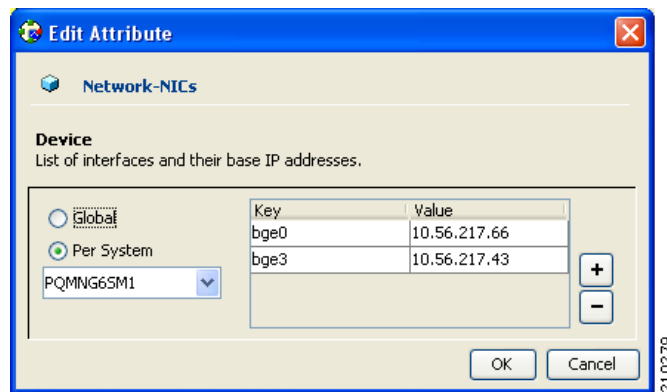


**Note**

Use the LOCAL option and configure each machine separately, because the IP addresses are different in each machine.

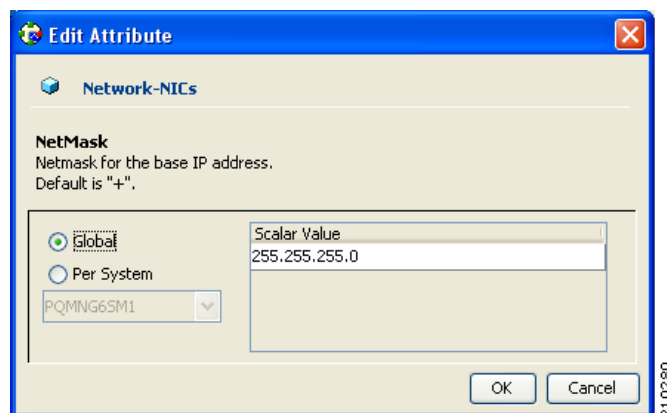
- In the following example, **bge0** and **bge3** are the network NICs.

**Figure E-8** Adding Network NIC: Device Attribute



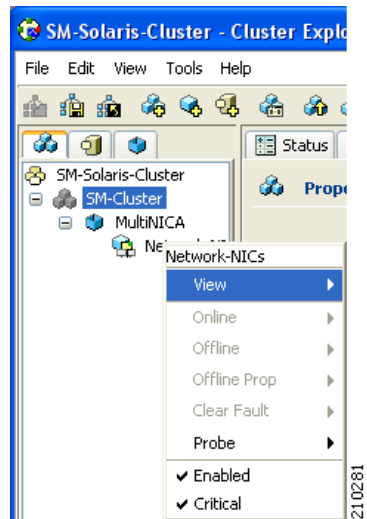
- NetMask—Assign a relevant network mask. For example, 255.255.255.255 can be defined as a network mask.

**Figure E-9** Adding Network NIC: NetMask Attribute



**Step 4** Click the **Enabled** and **Critical** attributes of the resource.

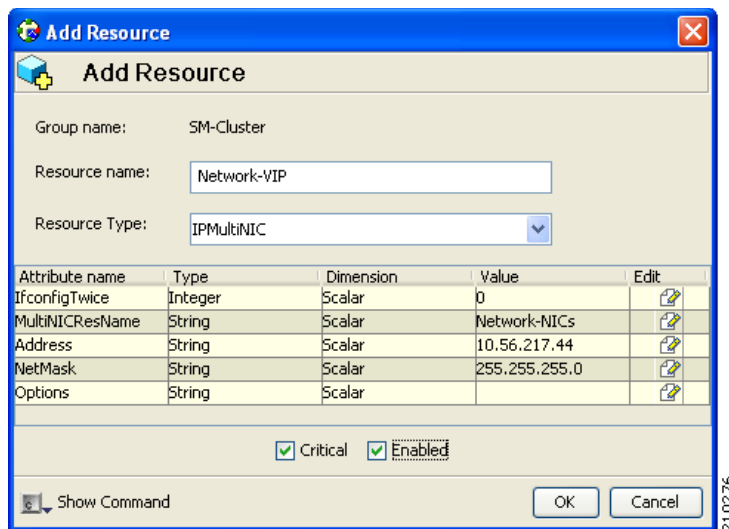
**Figure E-10** Adding Network NIC: Setting Attributes



## Adding Network VIPs

- Step 1** Decide on the IP address of the cluster.
- Step 2** Add an IPMultiNIC resource called *Network-VIP* to the service group.
- Step 3** Define the Address, Net-mask, and MultiNICAResName parameters.
- Address—Type the Cluster IP address.
  - Net-mask—Type the network-mask you want to use for this IP.
  - MultiNICAResName—Type *Network-NICs* to specify the relevant NICs.

**Figure E-11** Adding Network VIP Resource

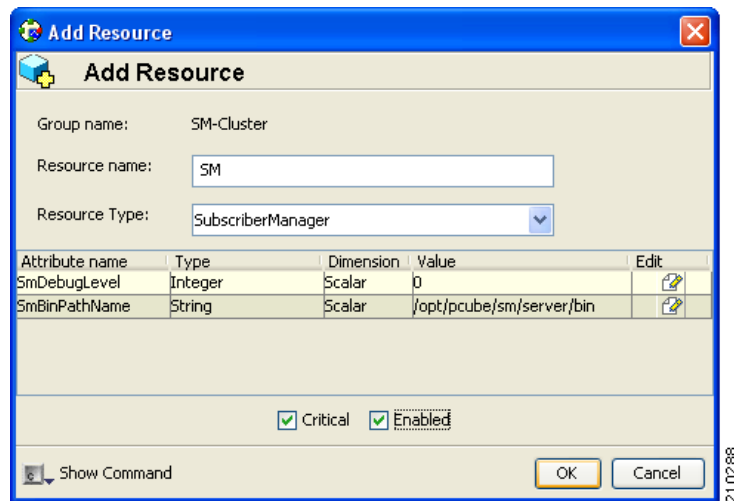


- Step 4** Check the **Enabled** and **Critical** check boxes.  
See [Figure E-10](#)

## Adding SM Resources

- Step 1** Import the SubscriberManager agent's type from file `/opt/VRTSvcs/bin/SubscriberManager/SubscriberManager.cf`.
- Step 2** Add a SubscriberManager resource called *SM* to the service group.
- Step 3** Define the `SmBinPathName` and `SmDebugLevel` parameters.
- `SmBinPathName`—Type the path to the bin directory under the SM installation directory; for example, `/opt/pcube/sm/server/bin/`.
  - `SmDebugLevel`—Type a number between 1 and 4 to view debug messages, type 0 to disable debug messages.

**Figure E-12** Adding SM Resource



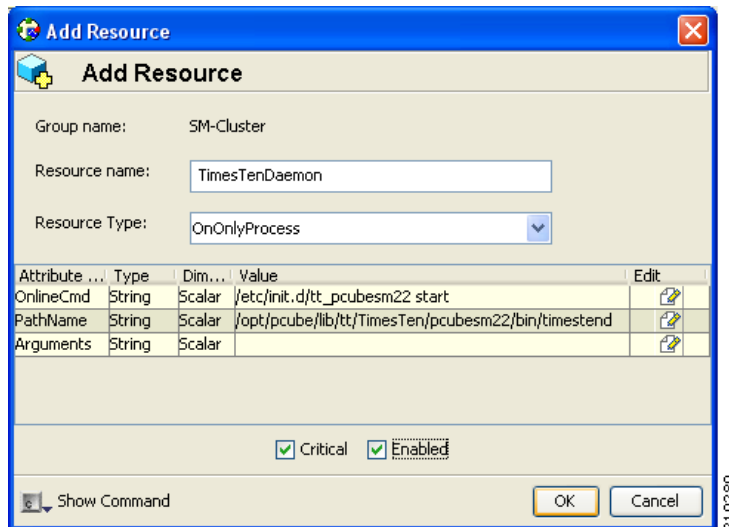
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## Adding TimesTen Daemon Resources

- Step 1** Import the OnOnlyProcess agent's type from file `/opt/VRTSvcs/bin/OnOnlyProcess/OnOnlyProcess.cf`.
- Step 2** Add an OnOnlyProcess resource called *TimesTenDaemon* to the service group.
- Step 3** Define the OnlineCmd, PathName, and Arguments parameters.
- OnlineCmd—Type the TimesTen Daemon start command: `/etc/init.d/tt_pcubesm22 start`.
  - PathName—Type the TimesTen Daemon process path; for example, `/opt/pcube/lib/tt/TimesTen/pcubesm22/bin/timestend`.
  - Arguments—To view the arguments, run the following command of the machine:  

```
ps -eaf | grep timestend
```
  - For example, the arguments can be: `-initfd 13`

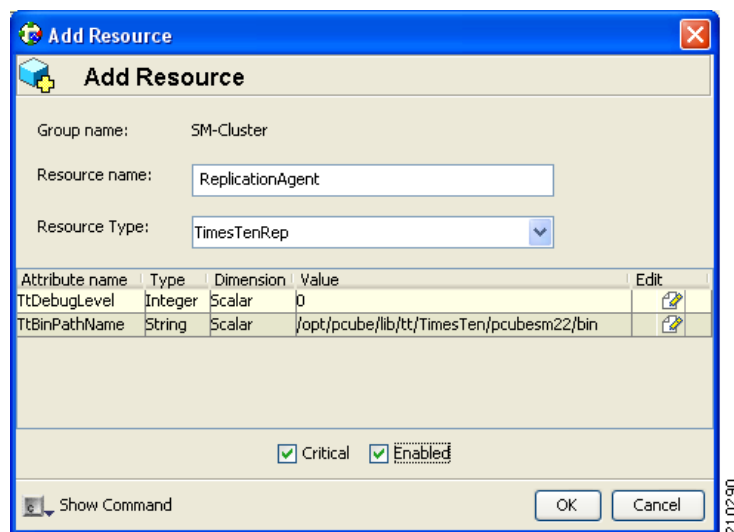
**Figure E-13** Adding TimesTenDaemon Resource



## Adding TimesTen Replication Agent Resources

- Step 1** Import the TimesTenRep agent's type from file `/opt/VRTSvcs/bin/TimesTenRep/TimesTenRep.cf`.
- Step 2** Add a TimesTenRep resource called `ReplicationAgent` to the service group.
- Step 3** Define the `TtBinPathName` and `TtDebugLevel` parameters.
- `TtBinPathName`—Type the TimesTen bin directory path; for example, `/opt/pcube/lib/tt/TimesTen/pcubesm22/bin`.
  - `TtDebugLevel`—Type a number in the range of 1-4 for viewing debug messages; enter 0 for disabling the debug messages.

**Figure E-14** Adding TimesTen Replication Agent



## Useful Operations


The following sections are useful operations for the management of the VCS.

- [Logging into the Cluster, page E-16](#)
- [Saving the Configuration, page E-16](#)
- [Closing the Configuration, page E-16](#)
- [Importing Types, page E-17](#)

## Logging into the Cluster

After you add a cluster, you are required to log in to the cluster.

---

**Step 1** Click the  icon.

A login window appears.


**Step 2** Log in with the initial user and password.  
The initial user is *admin* , the initial password is *password* .

---

## Saving the Configuration

Before exiting the VCS make sure to save your configuration; otherwise, your configuration will be lost.

---


**Step 1** Click the  icon, or choose **File >Save Configuration**.

---

## Closing the Configuration

Before exiting the VCS, make sure your configuration is closed. Some operations (like rebooting the system) could fail or cause a configuration conflict if performed while the configuration is in read/write mode.

---

**Step 1** Click the  icon, or choose **File >Close Configuration**.

Before exiting the VCS, make sure your configuration is closed. Some operations (like rebooting the system) could fail or cause a configuration conflict if performed while the configuration is in read/write mode.

---



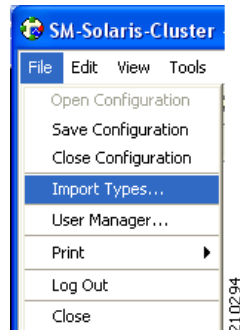
## Importing Types

To configure the SM Veritas agents, you first have to import the type file of these agents.

- Step 1** From the File menu, choose **Import Types**.

A navigation window appears:

**Figure E-15** *Importing Types*

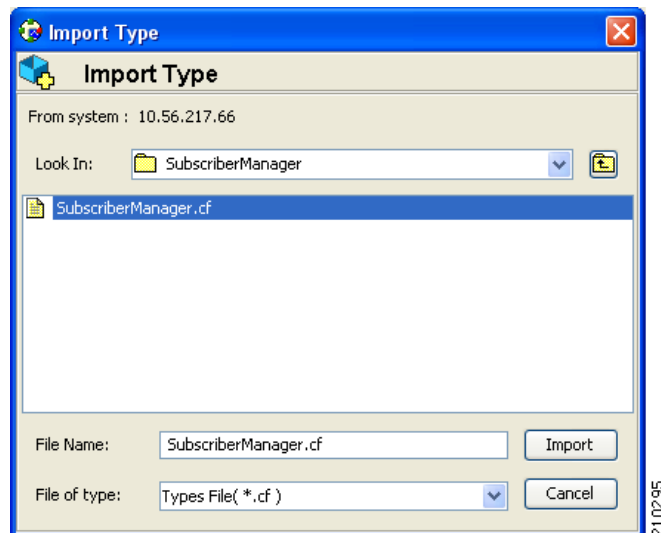


The window allows you to navigate through one of the cluster-system's file system.

- Step 2** Go to the agent directory under `/opt/VRTSvcs/bin/<agent-dir>`.

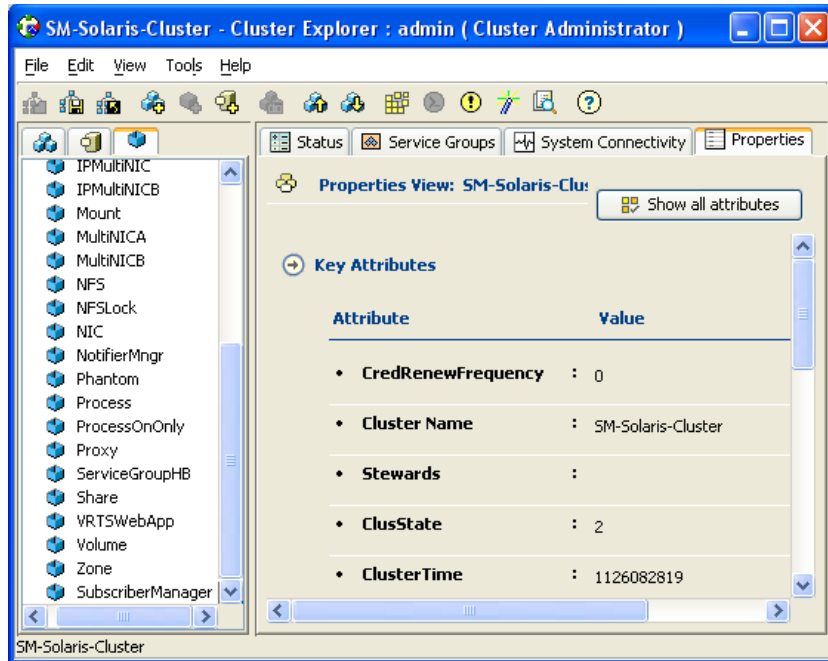
In the agent directory there is a file with a `.cf` extension.

**Figure E-16** *Importing Types: Select File*



- Step 3** Select the file with the **.cf** extension.  
The resource parameters are shown in the following window.

**Figure E-17** Importing Types: Resource Parameters



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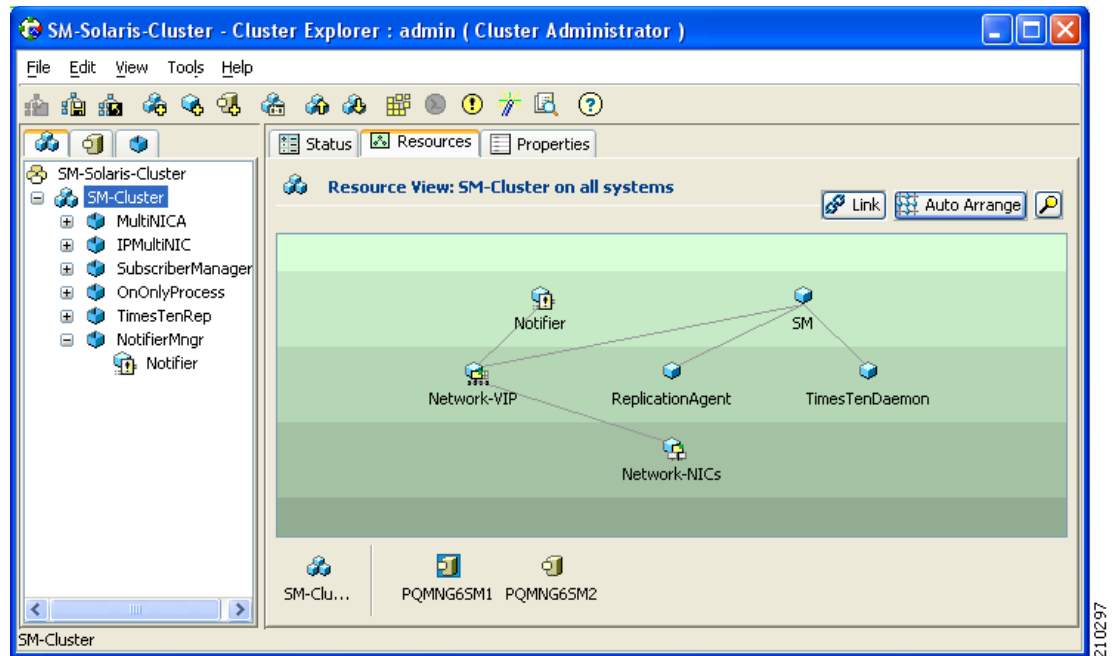
# Linking the Resources

Linking the resources defines the order of becoming online and going offline.

- Step 1** Select the service group and enter the **Resources** tab.
- Step 2** To link two resources, click once on one resource, pull the line to the second resource, and click once over the icon of the second resource.

The final links should look like those in the following figure.

**Figure E-18** *Linked Resources*



# Verifying that the Service Group is Online

**Step 1** Check that all of the resources are online/offline according to the system and the resource type.

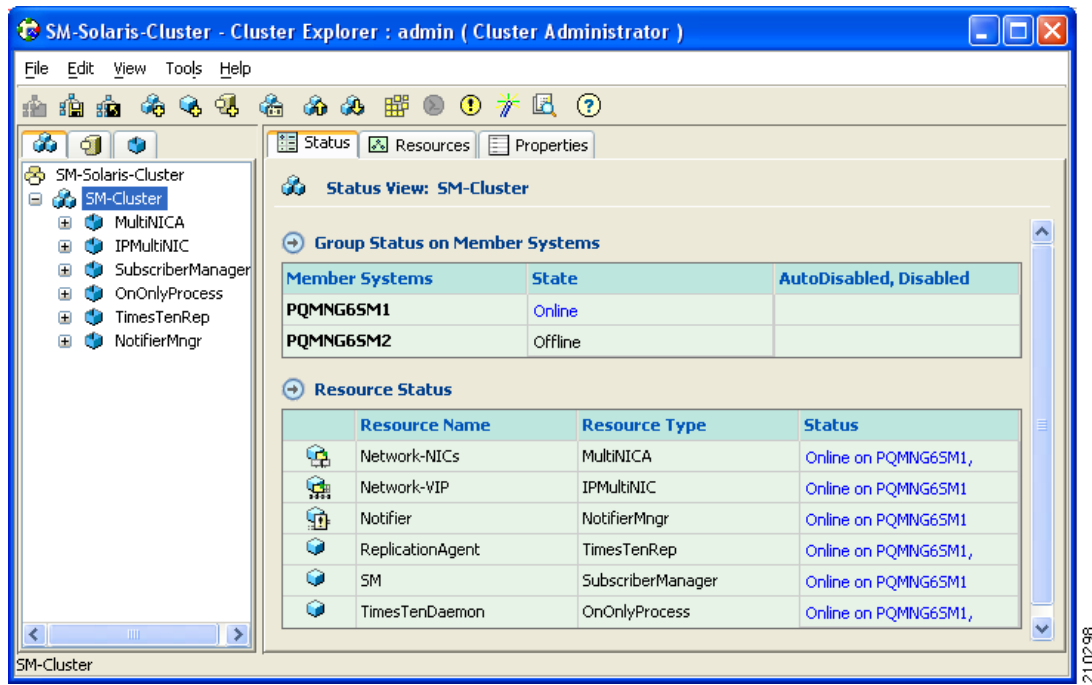


**Note**

The TimesTen Daemon, the NICs, and the TimesTen Replication Agent should all be online on all of the systems.

The state should be similar to the following figure.

**Figure E-19** Verifying Service Group is Online



## SNMP Support

VCS provides a method for notifying the user of important events such as a resource or system fault. For this purpose, VCS supplies a NotifierMngr agent that enables the reception of messages from VCS and the delivery of those messages to SNMP consoles. This section describes configuring NotifierMngr in order to enable SNMP support.

- [Configuring NotifierMngr, page E-21](#)
- [Adding NotifierMngr Resource, page E-21](#)
- [Configuring the NotifierMngr Attributes, page E-22](#)

## Configuring NotifierMngr

Add and configure NotifierMngr using either the command line or the Cluster Manager Java Console.

When started from the command line, Notifier is a process that VCS does not control.

For best results, use the NotifierMngr agent bundled with VCS to configure Notifier as part of a highly available service group, which can then be monitored, brought online, and taken offline.

The following sections describe the configuration process using the Cluster Manager Java Console.

## Adding NotifierMngr Resource

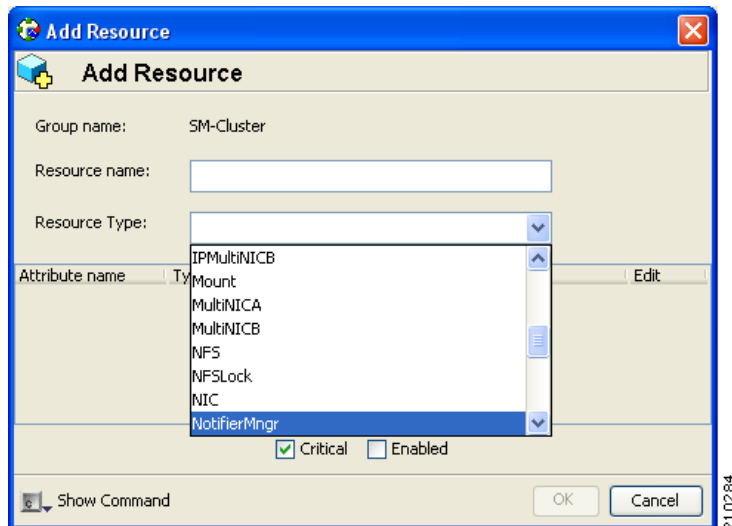
- Step 1** Add a NotifierMngr resource called *Notifier* to the service group.

**Figure E-20** Adding Notifier Manager Resource: Add Resource



The Add Resource screen appears.

**Figure E-21** Adding Notifier Manager Resource: Select NotifierMngr



- Step 2** From the Add Resource screen, choose **NotifierMngr** as the resource type.

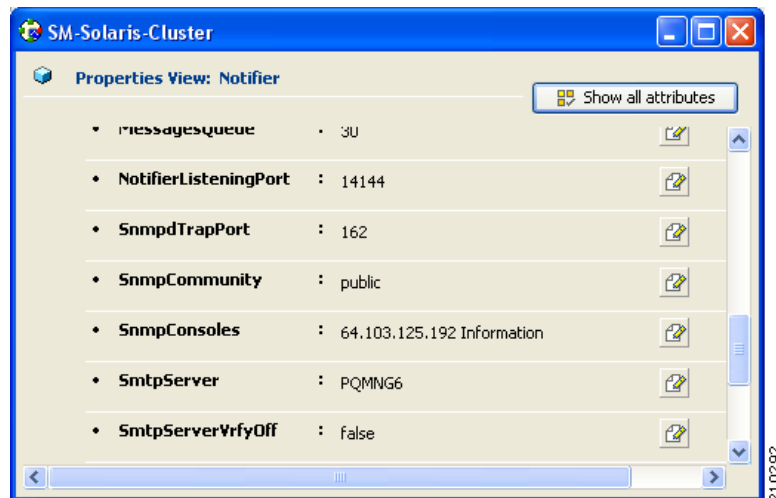
## Configuring the NotifierMngr Attributes

After adding the NotifierMngr resource, configure its attributes.

**Step 1** Select NotifierMngr as the resource type.

The following screen appears.

**Figure E-22** Configuring Notifier Manager Attributes



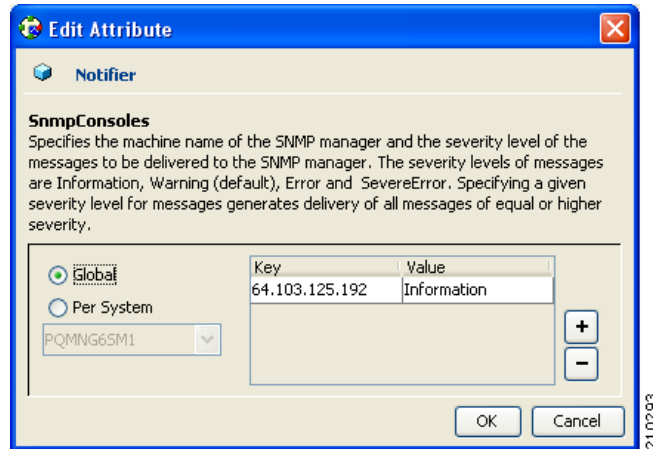
**Step 2** Define the SnmpConsoles, SnmpdTrapPort, and SnmpCommunity parameters.

- SnmpConsoles—Specify the machine name of the SNMP manager and the severity level of messages to be delivered to the SNMP manager. The severity levels of messages are Information, Warning, Error, and SevereError. Specifying a given severity level for messages generates delivery of all messages of equal or higher severity.
- SnmpdTrapPort—Specify the port to which the SNMP traps are sent. The value specified for this attribute is used for all consoles if more than one SNMP console is specified. The default is **162**.
- SnmpCommunity—Specify the community ID (a string scalar) for the SNMP manager. The default is **public**.

# How to Configure the SnmpConsole Attribute

The SnmpConsole attribute specifies the IP addresses to which you want the SNMP traps to be sent. You can specify different trap severity for each IP address:

**Figure E-23** Configuring SNMP Console Attributes



## Linking to IPMultiNIC

### Viewing Traps

After adding and configuring NotifierMgr, it will send traps according to the configured severity to the destinations configured by the SnmpConsole Attribute.

View these traps using SNMP trap viewer/MIB Browser (for example, AdventNet MibBrowser).

For a complete list of traps/severities, please see Chapter 10 of the VERITAS Cluster Server User Guide.

- 
- Step 1** Using the resources viewer, connect the *Notifier* to the *Network-VIP* resource so that it will be online after the VIP.

For more information, see [Figure E-14](#) in Adding TimesTen Replication Agent Resources.

---







## GLOSSARY

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Access Control List (ACL)</b>  | Permits or denies incoming connections on any of the management interfaces. It is an ordered list of entries, each consisting of an IP address and an optional wildcard “mask” defining an IP address range, and a permit/deny field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Active Subscriber</b>          | An online subscriber who is actually generating IP traffic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Anonymous subscriber ID</b>    | <p>The SCE device assigns each unknown subscriber IP address with a temporary subscriber ID until it receives the real Subscriber ID from the Policy Server. This occurs in a Pull Model integration in the Subscriber Manager.</p> <p>For more information on the Pull Model integration, see the <i>Cisco SCMS SCE Subscriber API Programmer Guide</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Anonymous subscriber mode</b>  | A mode of the Service Control solution in which the system monitors traffic and automatically assigns a Service Configuration based on to the individual's IP address used on its subscriber-side. This mode can be used to control a subscriber's traffic anonymously, without integrating the system with an OSS system. In this mode, the subscribers defined in the system are anonymous and are distinguished only by their IP address or VLAN ID.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Automatic integration</b>      | Subscribers are introduced into the SM automatically upon login, by the LEG.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Blocking API</b>               | In a Blocking API, which is the common type, every method returns after its operation has been performed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Cable/Satellite modem</b>      | A data modem that provides Internet access over cable and satellite networks. The modem usually corresponds to a single subscriber of the Internet Service Provider (ISP).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>CLI</b>                        | One of the management interfaces to the SCE platform. It is accessed through a Telnet session or directly via the console port on the front panel of the SCE platform.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Cluster Topology</b>           | <p>The SM is implemented based on the Veritas Cluster Server (VCS) technology. The cluster includes two machines, each of them running SM TimesTen and Veritas software. The Veritas Cluster Server software consolidates the two SM machines and exposes a single entity by providing a single virtual IP address for the entire cluster.</p> <p>The added functionality when operating in a cluster topology provides powerful new features such as fail-over and high availability.</p> <p>The cluster software distinguishes an active and a standby machine. The active machine ‘owns’ the virtual IP address and all network connections, while the standby machine is passive until a fail-over occurs. At fail-over, the IP address is passed from the failing server to the backup server, which becomes activated and re-establishes all network connections.</p> |
| <b>Command-Line Interface</b>     | See CLI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>CPE</b>                        | Any type of equipment that an end-user can connect to the network through a modem. The end-user can connect multiple CPE devices to the Internet through a single modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Customer premise equipment</b> | See CPE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DHCP Forwarder</b>               | An application that acts as a bridge between the DHCP Lease Query LEG and the DHCP servers. The request sent from the LEG is received by the forwarder and is forwarded to the appropriate DHCP server. The replies from the DHCP servers are forwarded to the LEG. The LEG signals the forwarder which server should receive each request.                                                                                       |
| <b>DHCP Lease Query Transaction</b> | The DHCP Lease Query transaction is a DHCP transaction with special message types that enable, among other things, clients to query DHCP servers regarding the owner and the lease-expiration-time of an IP address.<br><br>The DHCP Lease-Query transaction is defined in an Internet Engineering Task Force (IETF) standard. For more information, see the IETF website.                                                        |
| <b>DHCP Sniffer</b>                 | The software logic inside the SCE device that analyzes DHCP traffic and sends the information to the SCE-Sniffer DHCP LEG using the RDR protocol.                                                                                                                                                                                                                                                                                 |
| <b>Domains</b>                      | A group of SCE platforms that share a group of subscribers. The subscriber traffic can pass through any SCE platform in the domain.<br><br>A subscriber and an SCE can belong to only one domain.                                                                                                                                                                                                                                 |
| <b>Fail-over</b>                    | In a fail-over solution, the two Subscriber Manager platforms exchange keep alive messages via the cascade ports. This keep alive mechanism enables fast detection of failures between the Subscriber Manager platforms and fast fail-over to the standby SM platform when required.                                                                                                                                              |
| <b>High Availability</b>            | In a high availability topology, the Subscriber Manager software runs on two machines, designated as the active machine and the standby machine. Subscriber data is continuously replicated from the active to the standby machine, ensuring there is minimal data loss in case of active SM failure. When the active machine fails, the standby machine discovers the failure and becomes active.                                |
| <b>LEG</b>                          | Software components that use the Subscriber Manager API to generate subscriber-record update messages such as login/logout, and send the messages to the SM.<br><br>LEGs are usually installed on AAA/OSS platforms, and serve as translators from events generated by the customer system to Cisco subscriber update events.                                                                                                     |
| <b>Login Event Generator</b>        | <i>See</i> LEG.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Manual integration</b>           | Subscribers are introduced into the SM by importing them in the form of a <i>csv</i> file, or by using the appropriate SM CLU.                                                                                                                                                                                                                                                                                                    |
| <b>NAS</b>                          | A network device that serves as an access point for a remote user. It initiates RADIUS transactions to the RADIUS server to authenticate a remote user.                                                                                                                                                                                                                                                                           |
| <b>Network Access System (NAS)</b>  | <i>See</i> NAS.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Network ID Mappings</b>          | A network identifier that the SCE device can relate to a specific subscriber record. A typical example of a network ID mapping (or simply mapping) is an IP address. Currently, the Cisco Service Control solution supports IP address, IP range, and VLAN mappings.                                                                                                                                                              |
| <b>Non-blocking API</b>             | Non-blocking methods return immediately, even before their operation has been completed. The operation results are either returned to an Observer object (Listener) or not returned at all.<br><br>The non-blocking method is advantageous when the operation is lengthy and involves I/O. Performing the operation in a separate thread allows the caller to continue doing other tasks and improves overall system performance. |
| <b>Pull mode</b>                    | Subscriber information is not distributed automatically. Only when an SCE platform cannot associate the IP traffic with a subscriber, will it request (pull) information from the SM.                                                                                                                                                                                                                                             |

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pull-request</b>                                        | A message sent from an SCE device to the SM/LEG when it identifies a use of a new subscriber IP address in the network. The SM uses the IP address provided in this message to query the database to retrieve the subscriber data of the subscriber associated with this address and to send its data to the SCE.                                                                                                                                                                                                                                                                                                           |
| <b>Push mode</b>                                           | The SM automatically distributes (pushes) subscriber information to the relevant SCE platform immediately after the record is added or changed. Therefore, when the subscriber starts producing traffic through the SCE platform, it is ready with the required subscriber information.                                                                                                                                                                                                                                                                                                                                     |
| <b>Quota</b>                                               | A (subscriber's) limit for a specific metric, such as bandwidth or volume.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>SCE Platform</b>                                        | <p>The Service Control purpose-built hardware service component. This hardware device is capable of performing smart analysis of the packets at wire speed. It monitors the traffic on the line, producing raw data to be provided to the loaded application, which processes the data for functions such as reporting, policy management, subscription management, and implementation of tiered service subscriber aware traffic policies.</p> <p>The SCE platform comes in the following models: SCE 1000 2xGBE, SCE 2000 4xGBE, and SCE 2000 4/8xFE. There may be one or more SCE platforms on the provider network.</p> |
| <b>Service Control Engine platform</b>                     | <i>See</i> SCE platform.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Service Control Management Suite Subscriber Manager</b> | <i>See</i> SM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>SM</b>                                                  | A middleware software component used in cases where dynamic binding of subscriber information and service configurations is required. The SM manages subscriber information and provisions it in real time to multiple SCE platforms. It can store subscriber service configurations information internally, and act as a state-full bridge between the AAA system (for example, RADIUS and DHCP) and the SCE platforms.                                                                                                                                                                                                    |
| <b>Subscriber</b>                                          | The generic term used to refer to the managed entity for which a Service Configuration is enforced, and usage is monitored, by a Service Control solution. A subscriber can be defined as an individual IP address, or ranges of IP addresses or VLANs. The system supports different modes of operations including: subscriber-less mode (all control is performed globally), anonymous subscriber mode, and dynamic and static subscriber-aware modes.                                                                                                                                                                    |
| <b>Subscriber domain</b>                                   | <p>The Subscriber Manager (SM) provides the option of partitioning SCE platforms and subscribers into subscriber domains. A subscriber domain is a group of SCE platforms that share a group of subscribers. Subscriber domains can be configured using the SM configuration file and can be viewed using the SM Command-Line Utility (CLU).</p> <p>It is also possible to configure domain aliases. A domain alias is a synonym for the actual domain name in the SM. Domain aliases are configured in the SM configuration file.</p>                                                                                      |
| <b>Subscriber mappings</b>                                 | The SCE platform requires mappings between the network IDs (IP addresses) of the flows it encounters and the subscriber IDs. The SM database contains the network IDs that map to the subscriber IDs. The SCE network-ID-to-subscriber mappings are constantly updated from the SM database.                                                                                                                                                                                                                                                                                                                                |
| <b>Subscriber package</b>                                  | <p>A policy enforced by Cisco SCMS solutions on each subscriber, which is usually defined by a policy package ID. The various Subscriber Manager Login Event Generator (LEG) component software can handle the package ID in any of the following ways:</p> <p>Sets the package ID according to configurable options of the DHCP initial logon or lease extension transactions</p> <p>Sets the package ID using a constant default value</p> <p>Leave the package ID unset</p>                                                                                                                                              |

