Cisco Service Control Subscriber Manager User Guide

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Cisco Systems, Inc.
www.cisco.com

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# CONTENTS

**About this Guide** xiii
- Introduction xiii
- Document Revision History xiv
- Organization xv
- Related Documentation xvi
- Conventions xvi
- Obtaining Documentation and Submitting a Service Request xviii

## CHAPTER 1

**Cisco Service Control Overview** 1-1
- Introduction 1-1
- Cisco Service Control Solution 1-2
  - Service Control for Broadband Service Providers 1-2
- Cisco Service Control Capabilities 1-2
- Cisco SCE Platform Description 1-3
- Management and Collection 1-4
  - Network Management 1-5
  - Subscriber Management 1-5
  - Service Configuration Management 1-6
  - Data Collection 1-6

## CHAPTER 2

**Cisco Service Control Subscriber Manager Overview** 2-1
- Introduction 2-1
- Information About the Cisco Service Control Subscriber Manager 2-1
- Subscribers in the Cisco Service Control Solution 2-2
- Information About Managing Subscribers 2-2
  - Flow of Subscriber Information 2-3
  - Number of Subscribers in the Cisco Service Control Subscriber Manager 2-4
  - Subscriber Manager Database 2-5
  - Subscriber ID 2-6
- Information About Managing VPNs 2-6
  - Management of VPN with VLAN Network IDs 2-6
  - Management of VPN with MPLS/VPN Network IDs 2-7
  - Management of Subscribers with IP over VPN 2-7
CHAPTER 3
Subscriber Manager Failover 3-1
Introduction 3-1
Information About Subscriber Manager Fail-Over 3-1
Overview 3-1
Normal Operation 3-2
Fail-Over Topology 3-3
Fail-Over Operation 3-4
How to Recover from Fail-Over 3-5
Machine Reboot 3-5
Replacing the Server 3-5
Database Duplication Recovery 3-6
Database Duplication Recovery Management 3-7

CHAPTER 4
Installation and Upgrading 4-1
Introduction 4-1
Installing, Upgrading, and Uninstalling the Subscriber Manager 4-1
Installation Overview 4-2
Contents of the Distribution Files 4-3
Documentation 4-6
System Requirements 4-7
Installation Procedures 4-10
Information About System Changes Made by Installation Scripts 4-10
Information About Advanced System Memory Configuration 4-11
Installing the Subscriber Manager 4-13
Prerequisites 4-13
Installation Procedure 4-13
Verifying the Installation 4-20
Configuring the Subscriber Manager 4-21
Performing Additional Installation Procedures 4-21
Installing a Subscriber Manager Cluster 4-21
Installing Subscriber Manager Cluster Agents 4-22
Upgrading the Subscriber Manager 4-23
Data Duplication Procedure 4-23
Automatic Upgrade of Subscribers with VLAN Mappings 4-23
Automatic Upgrade of RADIUS Listener 4-23
Upgrading a Standalone Setup 4-24
Upgrading from a Standalone Setup to a Cluster Setup 4-27
Upgrading Cluster Setups 4-29
Upgrading from a Cluster Setup Version 3.x 4-29
Upgrading from a Cluster Setup Version 2.x to Version 3.0 or 3.1 4-35
Additional Upgrade Procedures 4-38
Database Performance Recommendations 4-39
Downgrading Subscriber Manager 4-40
Uninstalling Subscriber Manager 4-40
Uninstalling VCS Agents 4-41

Chapter 5

Configuration and Management 5-1
Introduction 5-1
Subscriber Manager Configuration and Management Methods 5-1
Configuration Files 5-1
Command-Line Utilities 5-3
Establishing a Subscriber Management Solution 5-3
Configuring the Subscriber Management Solution 5-4
Prerequisites 5-4

System Configuration Examples 5-8
  Automatic Introduction of Subscribers, with Push Mode and Fail-Over of SCE Platforms 5-9
  Manual Introduction of Subscribers with Pull Mode 5-11
  Subscriber Manager Fail-over Configuration (General) 5-13

Using the Command-Line Utilities 5-13
  Informative Output 5-14
  Parsing CLU Operations and Options 5-14
  Reloading the Subscriber Manager Configuration (p3sm) 5-15
  Managing the Subscriber Manager (p3sm) 5-16
  Examples for Managing the Subscriber Manager 5-16
  Managing Subscribers, Mappings, and Properties 5-16
  Using the p3subs Utility for Managing Subscribers, Mappings, and Properties 5-16
  Managing Subscribers, Mappings, and Properties—Examples 5-17

Managing VPN Entities 5-18
  Managing VPN Entities—Examples 5-18

Managing the Subscriber Database 5-19
  Managing the Subscriber Database—Examples 5-19

Viewing and Connecting Network Elements 5-19

Viewing Subscriber Domains 5-20

Managing the Cable Support Module (p3cable) 5-20
  Managing the Cable Support Module 5-20
  Managing the Cable Support Module—Examples 5-20

Viewing Information of the PRPC Interface Server (p3rpc) 5-21
  Examples for Viewing Information of the PRPC Interface Server 5-21

Managing a Cluster of Two Subscriber Manager Nodes (p3cluster) 5-21
  Examples for Managing a Cluster of Two Subscriber Manager Nodes 5-22

Managing the User Log (p3log) 5-22
  Examples for Managing the User Log 5-22

Viewing Statistics of the RADIUS Listener (p3radius) 5-22

Utilities 5-22
  Running a Batch File (p3batch) 5-22
  Running a Batch File—Examples 5-23
  Printing General Help About CLU Commands (p3clu) 5-23
  Database Operations 5-23

Appendix A

Configuration File Options A-1
  Introduction A-1
  Information About the Configuration File Options A-1
## Contents

**Configuration File Sections**  A-2
- Subscriber Manager General Section  A-2
- Subscriber Manager High Availability Setup Section  A-4
- Subscriber Manager-LEG Failure Handling Section  A-4
- LEG-Domains Association Section  A-5
- Domain.XXX Section  A-6
- Default Domains Configuration Section  A-7
- Auto Logout Section  A-7
- Inactive Subscriber Removal Section  A-9
- Radius Listener Section  A-10
- Radius.NAS.XXX Section  A-10
- Radius.Subscriber Attributes Section  A-11
- Radius.Subscriber ID Section  A-12
- Radius.Property.Package Section  A-13
- RPC.Server Section  A-14
- MPLS-VPN Section  A-15
- SCE.XXX Section  A-15
- FTP Section  A-16
- HTTP Tech-IF Section  A-16
- RDR Server Section  A-17
- Cable Adapter Section  A-17
- Data Repository Section  A-18
- CM.XXX Section  A-20

## APPENDIX B

### Command-Line Utilities  B-1

**Introduction**  B-1

**Command-Line Utilities**  B-1

**CLU Commands**  B-2
- Informative Output  B-3
- Parsing CLU Operations and Options  B-3
- The p3batch Utility  B-4
- The p3cable Utility  B-5
- The p3clu Utility  B-6
- The p3cluster Utility  B-6
- The p3db Utility  B-7
- The p3domains Utility  B-8
- The p3ftp Utility  B-9
- The p3http Utility  B-10
- The p3inst Utility  B-10
CPE as a Subscriber in a Cable Environment  C-1

Introduction  C-1
Cable Support Module  C-1
Cable Modem and CPE in the Subscriber Manager  C-2
Static and Dynamic Cable Modems  C-2

Troubleshooting  D-1

Introduction  D-1
Using the Troubleshooting  D-1
General Errors  D-2
SM Not Running  D-2
SM in Failure Mode  D-2
Subscriber Manager User Log Messages  D-3
General  D-3
HTML Adaptor  D-3
FTP Server  D-3
Domain Messages  D-4
SCE Messages  D-4
<table>
<thead>
<tr>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cisco Service Control Subscriber Manager User Guide</strong></td>
<td>OL-30588-01</td>
</tr>
<tr>
<td><strong>Subscriber Manager-SCE Synchronization Messages</strong></td>
<td>D-5</td>
</tr>
<tr>
<td><strong>Auto-Logout Messages</strong></td>
<td>D-5</td>
</tr>
<tr>
<td><strong>Inactive Subscribers Removal Messages</strong></td>
<td>D-5</td>
</tr>
<tr>
<td><strong>PRPC Messages</strong></td>
<td>D-5</td>
</tr>
<tr>
<td><strong>Subscriber Messages</strong></td>
<td>D-6</td>
</tr>
<tr>
<td><strong>Cable-Related Messages</strong></td>
<td>D-7</td>
</tr>
<tr>
<td><strong>High-Availability Messages</strong></td>
<td>D-7</td>
</tr>
<tr>
<td><strong>Configuration File Messages</strong></td>
<td>D-7</td>
</tr>
<tr>
<td><strong>Quota Manager Messages</strong></td>
<td>D-8</td>
</tr>
<tr>
<td><strong>RDR Formatter Messages</strong></td>
<td>D-9</td>
</tr>
<tr>
<td><strong>Lease Query LEG Messages</strong></td>
<td>D-10</td>
</tr>
<tr>
<td><strong>SOAP LEG Messages</strong></td>
<td>D-11</td>
</tr>
<tr>
<td><strong>VLM Messages</strong></td>
<td>D-11</td>
</tr>
<tr>
<td><strong>RADIUS Listener LEG Messages</strong></td>
<td>D-11</td>
</tr>
<tr>
<td><strong>BGP LEG Messages</strong></td>
<td>D-11</td>
</tr>
<tr>
<td><strong>General Setup Errors</strong></td>
<td>D-12</td>
</tr>
<tr>
<td><strong>Cannot Run this Script—/etc/motd File Exists</strong></td>
<td>D-12</td>
</tr>
<tr>
<td><strong>install-sm.sh Script—User is not Root</strong></td>
<td>D-12</td>
</tr>
<tr>
<td><strong>install-sm.sh Script—User pcube Exists</strong></td>
<td>D-13</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Setup Errors</strong></td>
<td>D-13</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>D-13</td>
</tr>
<tr>
<td><strong>System (Kernel) Configuration File</strong></td>
<td>D-14</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration File sys.odbc.ini</strong></td>
<td>D-14</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration File—pcube/.odbc.ini</strong></td>
<td>D-15</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database DSN Configuration—Cannot Find Requested DSN</strong></td>
<td>D-15</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database DSN Configuration—Data Source Name Not Found</strong></td>
<td>D-15</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Settings—Cannot Connect to Data Source</strong></td>
<td>D-16</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error—Not Enough Memory</strong></td>
<td>D-17</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error—Incorrect Memory Definitions</strong></td>
<td>D-17</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error—Cannot Create Semaphores</strong></td>
<td>D-18</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error—Cannot Read Data Store File</strong></td>
<td>D-19</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error—Data Store Space Exhausted</strong></td>
<td>D-19</td>
</tr>
<tr>
<td><strong>Subscriber Manager Database Configuration Error on Uninstall—Failed to Uninstall SM Database</strong></td>
<td>D-20</td>
</tr>
<tr>
<td><strong>Network Management Command Line Utility (p3net) Errors</strong></td>
<td>D-21</td>
</tr>
<tr>
<td><strong>First Connection—Operation Timed Out</strong></td>
<td>D-21</td>
</tr>
<tr>
<td><strong>Status Error—Connection Down</strong></td>
<td>D-21</td>
</tr>
<tr>
<td><strong>Status Error—Subscriber Management Down</strong></td>
<td>D-22</td>
</tr>
<tr>
<td><strong>Subscriber Database Command Line Utility (p3subsdb) Errors</strong></td>
<td>D-23</td>
</tr>
<tr>
<td><strong>CSV File Validation Error</strong></td>
<td>D-23</td>
</tr>
</tbody>
</table>
Clear-all Error in Cluster Mode D-24
Subscriber Database is Not Replicated on Standby Server D-25
Cable Support Command Line Utility (p3cable) Errors D-27
CSV File Import Error D-27
Configuration Errors D-28
Network Management Errors D-28
Domain Errors D-29
PRPC Errors D-30
RADIUS Listener Errors D-30
Common Validation Errors D-30
Cisco Service Control Quota Manager Error Messages D-32
RDR Formatter Errors D-32

APPENDIX E

Veritas Cluster Server E-1
Introduction E-1
Veritas Cluster Servers E-2
  Veritas Cluster Server System Requirements E-2
  Veritas Cluster Server Nodes on Remote Sites E-3
Replication Configuration Guidelines E-3
  Replication Scheme Setup E-3
  Replication Network Configuration E-3
  Veritas Cluster Server Configuration Guidelines E-5
Configuring Subscriber Manager Cluster Resources E-6
  Adding Clusters E-6
  Adding Service Groups E-7
  Setting Auto-start E-8
Adding Subscriber Manager Cluster Resources E-11
  Adding Resources—General Guidelines E-11
  Adding Network NICs E-12
  Adding Network VIPs E-14
  Adding Subscriber Manager Resources E-15
  Adding Subscriber Manager Database Daemon Resources E-16
  Adding Subscriber Manager Database Replication Agent Resources E-17
Sample main.cf File E-18
Useful Operations E-20
  Logging into the Cluster E-20
  Saving the Configuration E-20
  Closing the Configuration E-20
  Importing Types E-21
Contents

Linking the Resources  E-23
Verifying that the Service Group is Online  E-24
SNMP Support  E-25
   Configuring NotifierMngr  E-25
   Adding NotifierMngr Resource  E-25
   Configuring the NotifierMngr Attributes  E-26
Configuring the SnmpConsole Attribute  E-28
   Linking to IPMultiNIC  E-28
   Viewing Traps  E-28
Examples  E-29
About this Guide

Revised: January 16, 2014

Introduction

This guide provides instructions for installing and configuring several software components:

- Cisco Service Control Subscriber Manager application
- Subscriber Manager database
- Configuration file

The guide also includes instructions for managing the system with the Command-Line Utilities (CLU).

The guide is intended for system and network administrators who install and configure the Cisco Service Control Subscriber Manager application and for operators who tend to the daily operation of the Cisco Service Control Subscriber Manager.

To use the information in this guide optimally, you should be familiar with related Cisco products:

- Service Control Management Suite
- Cisco Service Control Engine (Cisco SCE) 1000, Cisco SCE 2000, and Cisco SCE 8000 platforms
- Components related to the Cisco SCE
## Document Revision History

The following Document Revision History table records the changes made to this document.

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<td>Release 4.1.x January 16, 2014</td>
<td>The following sections are updated:</td>
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<td>• “Subscriber Manager Database” section on page 2-5.</td>
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<td>Release 4.1.x December 23, 2013</td>
<td>First version of this document (new for the Release 4.1.x train).</td>
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<td>• “Installing the Subscriber Manager” section on page 4-13.</td>
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</tbody>
</table>
# Table of Contents

## Chapter 1, “Cisco Service Control Overview.”

Chapter 1, “Cisco Service Control Overview.”

Presents an overview of the Cisco Service Control Solution and the Cisco SCE platform.

## Chapter 2, “Cisco Service Control Subscriber Manager Overview.”

Chapter 2, “Cisco Service Control Subscriber Manager Overview.”

Describes the subscriber manager solution, subscriber control, and management of the Cisco Service Control Subscriber Manager application.

## Chapter 3, “Subscriber Manager Failover.”

Chapter 3, “Subscriber Manager Failover.”

Describes using the Cisco Service Control Subscriber Manager with clusters and redundancy.

## Chapter 4, “Installation and Upgrading.”

Chapter 4, “Installation and Upgrading.”

Describes Cisco Service Control Subscriber Manager installation and upgrade procedures.

## Chapter 5, “Configuration and Management.”

Chapter 5, “Configuration and Management.”

Describes Cisco Service Control Subscriber Manager configuration and management procedures and how to use the Command-Line Utilities (CLU).

## Appendix A, “Configuration File Options.”

Appendix A “Configuration File Options.”

Describes the Cisco Service Control Subscriber Manager configuration file and all configurable parameters.

## Appendix B, “Command-Line Utilities.”

Appendix B “Command-Line Utilities.”

Describes the Command-Line Utilities (CLU) for managing the Cisco Service Control Subscriber Manager application.

## Appendix C, “CPE as a Subscriber in a Cable Environment.”

Appendix C “CPE as a Subscriber in a Cable Environment.”

Describes a cable environment in which the Customer Premise Equipment (CPE) performs as the subscriber in a Cisco Service Control solution.

## Appendix D, “Troubleshooting.”

Appendix D “Troubleshooting.”

Describes Cisco Service Control Subscriber Manager application error messages, probable causes, and solutions.

## Appendix E, “Veritas Cluster Server.”

Appendix E “Veritas Cluster Server.”

Provides guidelines for a Veritas Cluster Server configuration in an Cisco Service Control Subscriber Manager cluster installation.
Related Documentation

The *Cisco Service Control Subscriber Manager User Guide* is related to the following Cisco documentation:

- *Cisco Service Control Application for Broadband User Guide*
- *Cisco Service Control Management Suite Quota Manager User Guide*
- *Cisco SCE 1000 2xGBE Installation and Configuration Guide*
- *Cisco SCE 2000 4xGBE Installation and Configuration Guide*
- *Cisco SCE 8000 Installation and Configuration Guide*
- *Cisco SCMS SM LEGs User Guide*

Conventions

This document uses the following conventions.

**Table 3 Document Conventions**

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<td><strong>bold</strong> font</td>
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<td>An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.</td>
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**Note**

Means *reader take note.*

**Tip**

Means *the following information will help you solve a problem.*
Caution  Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

Timesaver  Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Warning  Means *reader be warned*. In this situation, you might perform an action 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:


Subscribe to 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.
Cisco Service Control Overview

Published: December 23, 2013

Introduction

This chapter provides an overview of the Cisco Service Control solution, concepts and capabilities. The chapter describes the Cisco Service Control Engine (Cisco SCE) platform and the Cisco applications that are combined to form the Cisco service control solution. The chapter includes the following sections:

- Cisco Service Control Solution, page 1-2
- Cisco Service Control Capabilities, page 1-2
- Cisco SCE Platform Description, page 1-3
- Management and Collection, page 1-4
Cisco Service Control Solution

The Cisco service control solution enables service providers to classify, analyze, and control Internet and IP traffic.

Service Control for Broadband Service Providers

The Cisco Service Control Application for Broadband adds a layer of service intelligence and control to existing networks. It enables service providers to perform the following actions:

- Report and analyze network traffic per subscriber or for an aggregation of subscribers for capacity planning
- Provide tiered application services and guarantee application service level agreements (SLAs)
- Implement different service levels for different types of customers, content, or applications
- Identify network abusers who violate the acceptable use policy (AUP)
- Identify and manage peer-to-peer traffic, NNTP (news) traffic, and junk e-mail abusers
- Enforce the AUP
- Integrate Service Control solutions with existing network elements, business support systems (BSS), and operational support systems (OSS)

Cisco Service Control Capabilities

At the core of the Cisco service control solution is the network hardware device, which is the Service Control Engine. The SCE supports combinations of the following applications to create service control solutions:

- Subscriber and application awareness—Real-time analysis and control of network use down to the individual subscriber level.
  - Subscriber awareness—Enforces the appropriate status and policy for each subscriber that transmits traffic through the SCE platform.
    The SCE achieves subscriber awareness by integrating with management repositories such as DHCP or a RADIUS server, or by sniffing RADIUS or DHCP traffic.
  - Application awareness—Traffic analysis up to the application protocol layer (Layer 7).
    For protocols that are implemented with bundled flows (such as FTP, which uses Control and Data flows), the SCE distinguishes the different flows and can manage them separately.
- Application-layer, stateful, real-time traffic control—The SCE performs advanced control functions including granular bandwidth metering and shaping, quota management, and redirection. It also performs application-layer, stateful, real-time traffic processing.
- Programmability—Service providers can use the Cisco Service Monitoring Language (SML) to modify the SCE so that it can process additional protocols and services. The service provider can upgrade a network, modify applications, and extend services.
- Back-office integration—The SCE provides a set of open APIs that enable the service provider to integrate applications with third-party systems, provisioning systems, subscriber repositories, billing systems, and OSS systems.
- Scalable high-performance service engines—The SCE performs all operations at wire speed.
Cisco SCE Platform Description

The Cisco SCE family of programmable network devices performs application-layer stateful-flow inspection of IP traffic, and controls the traffic according to configurable rules. The Cisco SCE platform is a network device that uses ASIC components and reduced instruction set computer (RISC) processors. Cisco SCE does more than count packets. It gets into the contents of network traffic. The Cisco SCE provides programmable, stateful inspection of bidirectional traffic flows. The Cisco SCE maps flows to individual users. Cisco SCE platform performs real-time classification of network traffic. The classification enables the Cisco SCE to control traffic and to shape bandwidth in the following ways:

- Layer 7 stateful wire-speed packet inspection and classification
- Support for more than 600 protocols and applications:
  - General—HTTP, HTTPS, FTP, Telnet, Network News Transfer Protocol (NNTP), Simple Mail Transfer Protocol (SMTP), Post Office Protocol 3 (POP3), Internet Message Access Protocol (IMAP), Wireless Application Protocol (WAP), and others
  - Peer-to-Peer file sharing—FastTrack-KazaA, Gnutella, BitTorrent, Winny, Hotline, eDonkey, DirectConnect, Piolet, and others
  - Peer-to-Peer VoIP—Skype, Skinny, DingoTel, and others
  - Streaming and Multimedia—Real Time Streaming Protocol (RTSP), Session Initiation Protocol (SIP), HTTP streaming, Real Time Protocol (RTP) and Real Time Control Protocol (RTCP), and others
- Programmable system core for flexible reporting and bandwidth control
- Transparent network and BSS and OSS integration into existing networks
- Subscriber awareness that associates traffic and usage with specific customers
Figure 1-1 illustrates a common deployment of a Cisco SCE platform in a network.

Management and Collection

The Cisco service control solution includes the following management components, which manage all aspects of the solution:

- Network management
- Subscriber management
- Service Control management

These management components comply with common management standards and integrate with existing OSS infrastructure (Figure 1-2).
Network Management

The Cisco service control solution provides network Fault, Configuration, Accounting, Performance, Security (FCAPS) Management.

Two interfaces provide network management:

- Command-line interface (CLI)—Accessible through the Console port or through a Telnet connection, a service provider uses the CLI to perform configuration and security functions.
- SNMP—Provides fault management (through SNMP traps) and performance-monitoring functionality.

Subscriber Management

The Cisco Service Control Application for Broadband (SCA BB) enforces policies on different subscribers and tracks usage for individual subscribers. The service provider can use the Cisco Service Control Subscriber Manager as middleware software to bridge between OSS and SCE platforms. The Cisco SCE stores subscriber information in the subscriber manager database, which can be distributed between multiple platforms to suit subscriber placement.

The subscriber manager accomplishes subscriber awareness by mapping network IDs to subscriber IDs. It can obtain subscriber information by using modules that integrate with AAA devices, such as RADIUS or DHCP servers.

The Cisco Service Control Subscriber Manager can obtain subscriber information two ways:

- Push Mode—The Cisco Service Control Subscriber Manager pushes subscriber information to the SCE platform automatically when a subscriber logs on.
- Pull Mode—The Cisco Service Control Subscriber Manager sends subscriber information to the Cisco SCE platform in response to a query from the Cisco SCE platform.
Service Configuration Management

Service configuration management enables a service provider to configure the general service definitions of a service control application. The service provider creates a service configuration file that contains settings for traffic classification, accounting and reporting, and control. The service provider then applies the file to an Cisco SCE platform. The Cisco SCE provides a GUI and a set of APIs that enable a service provider to automate the creation and editing of configuration files.

The SCA BB application provides tools that enable the service provider to automate the distribution of these configuration files to Cisco SCE platforms.

Data Collection

The Cisco SCE collects data in the following way:

1. All analysis and data processing functions of the Cisco SCE platform result in the generation of Raw Data Records (RDRs), which the Cisco SCE platform forwards using a TCP-based protocol (RDR-Protocol).
2. The Cisco Service Control Collection Manager processes the RDRs.
3. The Cisco Service Control Collection Manager software receives RDRs from one or more Cisco SCE platforms. It collects these records and processes them in one of its adapters. Each adapter performs a specific action on the RDR.

RDRs contain a variety of information and statistics, depending on the configuration of the system. RDRs are associated with one of three categories:

- Transaction RDRs—Records generated for each transaction, where a transaction is a single event detected in network traffic. The identification of a transaction depends on the particular application and protocol.
- Subscriber Usage RDRs—Records generated per subscriber, which describe the traffic that a subscriber generated during a defined interval.
- Link RDRs—Records generated per link, which describe the traffic carried on the link during a defined interval.
Introduction

This chapter describes the Cisco Service Control Subscriber Manager solution and the Cisco Service Control Subscriber Manager application. This chapter contains the following topics:

- Information About the Cisco Service Control Subscriber Manager, page 2-1
- Subscribers in the Cisco Service Control Solution, page 2-2
- Information About Managing Subscribers, page 2-2
- Information About Subscriber Manager Fundamentals, page 2-9
- Subscriber Manager Management, page 2-15
- Subscriber Manager Fail-Over, page 2-15

Information About the Cisco Service Control Subscriber Manager

The Cisco Service Control Subscriber Manager is middleware that provides subscriber information to one or multiple Cisco Service Control Engine (Cisco SCE) platforms. The Cisco Service Control Subscriber Manager process subscriber information two ways:

- Pre-stores subscriber data
- Serves as a stateful bridge between an authentication, authorization, and accounting (AAA) system or provisioning system and Cisco SCE platforms

The SCE platforms process subscriber-aware functions, subscriber reporting, and policy enforcement. Some Cisco Service Control solutions can also operate without subscriber awareness:

- Subscriber-less—The Cisco SCE process control-level and link-level analysis functions.
- Anonymous subscriber—The Cisco SCE dynamically creates “anonymous” subscribers per IP address. The Cisco SCE can process user-defined IP address ranges to differentiate between anonymous subscriber policies.
Subscribers in the Cisco Service Control Solution

In the Cisco Service Control Solution, the SCE manages a subscriber on the access, or downstream, side of the topology. The core of the network is on the other side of the SCE. The SCE applies accounting and policies to a subscriber individually on the access side.

Information About Managing Subscribers

The Cisco Service Control Subscriber Manager addresses the following issues pertaining to dynamic subscriber awareness:

- **Mapping**—The Cisco SCE encounters flows with network IDs (IP addresses) that change dynamically. The Cisco SCE dynamically maps the network IDs to the subscriber IDs. The Subscriber Manager database contains the network IDs that map to the subscriber IDs. Maintaining the network IDs is the primary function of the Subscriber Manager.

  Cisco SCE subscriber mapping supports private IP addresses within a VPN in addition to pure IP addresses. See the “Information About Managing VPNs” section on page 2-6 for more information.

- **Policy**—The Cisco Service Control Subscriber Manager serves as a repository of policy information for each subscriber. A service provider can preconfigure policy information in the Subscriber Manager, or dynamically provision when it receives the mapping information.

- **Capacity**—The Cisco SCE might be required to process more subscribers than it can concurrently manage. In this case, the Subscriber Manager serves as an external repository for subscriber information, while only the online or active subscribers are introduced to the Cisco SCE.

- **Location**—The Subscriber Manager sends subscriber information only to the relevant Cisco SCE platforms, when such functionality is required. A service provider can manage the distribution of subscriber information by using the domain mechanism or the Pull mode (see the “Pull Mode” section on page 2-10).

The Cisco Service Control Subscriber Manager database (see the “Subscriber Manager Database” section on page 2-5) can function two ways:

- As the only source for subscriber information when the Cisco Service Control Subscriber Manager works in standalone mode.
As a cache of subscriber information when the Cisco Service Control Subscriber Manager serves as a bridge between a group of Cisco SCE devices and the customer AAA and Operational Support Systems (OSS).

This section contains the following sub-sections:

- **Flow of Subscriber Information**, page 2-3
- **Number of Subscribers in the Cisco Service Control Subscriber Manager**, page 2-4
- **Subscriber Manager Database**, page 2-5
- **Subscriber ID**, page 2-6
- **Information About Managing VPNs**, page 2-6

## Flow of Subscriber Information

Figure 2-1 shows the flow of subscriber information through the Subscriber Manager.

![Figure 2-1 Flow of Subscriber Information](image)

The flow occurs as follows:

- Subscriber information enters the Cisco Service Control Subscriber Manager in one of two ways:
  - Automatically when the subscriber goes online—A service provider can use the Subscriber Manager Application Programming Interface (API) to integrate a Login Event Generator (LEG) with an AAA system (such as DHCP Server, RADIUS, or Network Access System [NAS]). The LEG identifies a subscriber login event and sends it to the Subscriber Manager.
Number of Subscribers in the Cisco Service Control Subscriber Manager

A service provider can divide subscribers into the following logical types:

- **Offline subscriber**—A subscriber that currently does not have any IP address 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 are idle, that is, connected to the service provider but not generating any IP traffic.

- **Active subscriber**—An online subscriber that is generating IP traffic (for example, by browsing the Internet or downloading a file).

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

A service provider can deploy SCEs in four scenarios:

- **The total number of subscribers can be statically stored in a single SCE platform.**
  
  This is the simplest, most reliable scenario. It might not require the use of the Subscriber Manager.

- **The total number of subscribers exceeds the capacity of the SCE platform. However, the number of online subscribers predicted at any time can be stored statically in the SCE platform.**
  
  In this case, Subscriber Manager should be in Push mode. See the “Push Mode” section on page 2-10.

- **The number of online subscribers exceeds the capacity of the SCE platform. However, the number of active subscribers predicted at any one time can be stored statically in the SCE platform.**
  
  The Subscriber Manager must be used in Pull mode. See “Pull Mode” section on page 2-10.

- **The number of active subscribers predicted at any one time exceeds the capacity of the SCE platform.**
In this case, the service provider must install multiple SCE devices to divide the subscribers among the SCE platforms. If the system is divided into domains (see “Subscriber Domains” section on page 2-13.) The service provider can use Push mode to enable the Subscriber Manager to know in advance the SCE platform to which a particular subscriber should be sent. Otherwise, Pull mode is required.

For specific scenarios in which the service provider should deploy the Subscriber Manager with multiple servers and/or SCE platforms, see the “System Configuration Examples” section on page 5-8.

**Note**
The SCE 2000 platform can store 200,000 subscribers, the SCE 8000 platform can store 1,000,000 subscribers.

---

**Subscriber Manager Database**

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

A subscriber record stored in the Subscriber Manager Database consists of the following components:

- **Subscriber name (key)**—A string that identifies the subscriber in the Subscriber Manager. 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 Subscriber Manager converts the name to lower case when it updates or queries the database.
- **Domain (secondary key)**—A string that specifies which group of SCE devices processes the 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 a 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 process the network traffic of this subscriber.

A service provider can access the subscribers by using one of two indexes:

- **Subscriber name**
- **Subscriber name + domain**

**Note**
We recommend that you do not open any connection to the Cisco Service Control Subscriber Manager Database directly, other than the Subscriber Manager process. Opening other connections impacts the Subscriber Manager process such as, uninstall, if the opened connection is not closed properly.

**Note**
In cluster redundancy topology, the active machine database replicates the subscriber data to the standby machine database. For additional information, see Chapter 3, “Subscriber Manager Failover.”
Subscriber ID

The Subscriber ID is a string representing a subscriber that is a unique identifier for each subscriber. For example, the Subscriber ID might represent a subscriber name or a cable modem MAC address.

The format rule for a Subscriber ID specifies that the ID can contain up to 64 printable characters. The ID is represented in ASCII code between 32 and 126 (inclusive), except for 34 ("), 39 ('), and 96 (\). The space character is allowed if it is not the last character (a trailing space) in the name.

For example:

```java
String subID1="xyz";
String subID2="xyz@abcdef.com";
String subID3="00-B0-D0-86-BB-F7";
```

Information About Managing VPNs

A VPN is a named entity that a service provider can add to the Subscriber Manager and contains VPN mappings. A VPN can 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 Subscriber Manager 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 Subscriber Manager supports sending VPN information only to the relevant SCE platforms, if this is required. This is implemented using the domain mechanism. The domain of a subscriber within a VPN must be identical to the domain of the VPN.

  VPN entities are supported only when the Subscriber Manager is configured to work in “Push Mode.”

  - Management of VPN with VLAN Network IDs, page 2-6
  - Management of VPN with MPLS/VPN Network IDs, page 2-7
  - Management of Subscribers with IP over VPN, page 2-7

Management of VPN with VLAN Network IDs

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

- **Statically**—Using the Subscriber Manager 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 Subscriber Manager, the Subscriber Manager 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 Subscriber Manager using their static information (that is the PE IP address, and the RT/RD values). This step is performed using the Subscriber Manager CLU.

  The notation used for the MPLS/VPN mappings is RT/RD@PE-IP. For example, 1000:1@10.10.10.10 represents a VPN with RT/RD 1000:1 of the PE router for which the loopback IP address is 10.10.10.10.

- **Dynamically**—The BGP LEG is then responsible for adding the dynamic VPN information (that is, 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 Subscriber Manager 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 Subscriber Manager only to correctly correlate the VPN entity to the downstream labels.

Management of Subscribers with IP over VPN

A subscriber can possess 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 (customer edge as subscriber mode).

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

- **Statically**—Using the Subscriber Manager CLU

- **Dynamically**—Using the RADIUS listener, or the Subscriber Manager API

Subscribers with communities over VPN are used to manage the traffic of a specific customer edge router of an MPLS/VPN network. The BGP community field is used to correlate the IP routes with the customer edge 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 Subscriber Manager:

- VPN—vpn1 with mappings 1000:1@10.10.10.10

  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 Subscriber Manager 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 possess an IP@VPN network ID and a community@VPN network ID at the same time.
Information About Subscriber Manager Fundamentals

This section consists of these topics:

- Subscriber Manager API, page 2-9
- Subscriber Manager Login Event Generators, page 2-9
- Information About Subscriber Introduction Modes, page 2-9
- SCE Subscriber Synchronization, page 2-12
- SCE Quarantine, page 2-12
- Working with Cascade SCE Setups, page 2-13
- Subscriber Domains, page 2-13
- Information About Communication Failures, page 2-14
- Subscriber Manager Cluster, page 2-14

Subscriber Manager API

Use the Subscriber Manager API for:

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

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

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

Subscriber Manager Login Event Generators

A service provider can use the Subscriber Manager API to create Subscriber Manager Login Event Generators (LEGs). LEGs generate subscriber-record update messages (such as login/logout) and send them to the Subscriber Manager. A service provider usually installs LEGs with AAA/OSS platforms, or with provisioning systems. LEGs 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 might be implemented. LEGs can set up subscribers or alter any of the fields of an existing subscriber record.

A service provider can connect multiple LEGs to a single Subscriber Manager. Alternatively, a single LEG can generate events for multiple domains.

Information About Subscriber Introduction Modes

As illustrated in Figure 2-1, the Subscriber Manager 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 Subscriber Manager system.  

For information detailing the configuration of the subscriber integration modes, see the “Subscriber Manager General Section” section on page A-2.

• Push Mode, page 2-10
• Pull Mode, page 2-10

**Push Mode**

In the Push mode, immediately after adding or changing a subscriber record, the Subscriber Manager distributes, or *pushes*, this information to the relevant Cisco SCE platforms, as determined by the subscriber domain. When the subscriber starts transmitting traffic through the Cisco SCE platform, the Cisco SCE has the required subscriber information.

In the Push mode with IPv6 subscribers, the Subscriber Manager updates the Cisco SCE with the 64-bit IPv6 prefix as subscriber mappings.

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

**Note**  
Use the Push mode only if all the online subscribers associated with a domain can be loaded simultaneously into all the Cisco 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 Subscriber Manager.

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

Pull mode has the following disadvantages:

• Increased communication in the Subscriber Manager-SCE link
• Increased load on the Subscriber Manager, 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 Subscriber Manager. You must configure anonymous groups in the SCE for the set of IP ranges that should be requested from the Subscriber Manager. See the SCE User Guide for more details on anonymous subscriber groups.

**Note**  
You must use Pull mode when all online subscribers that are associated with a domain exceed the capacity of the SCE platforms in the domain. The number of active subscribers can still be loaded into the SCE platforms in the domain.

In the Pull mode with IPv6 subscribers, the IPv6 prefix information is learned using the Framed-IPv6-Prefix RADIUS attribute from the traffic via Cisco SCE. The details are updated in the Cisco Service Control Subscriber Manager database. When a flow from the corresponding user is detected in a Cisco SCE, a pull request is sent with the subscriber IP address to the Subscriber Manager.
The Cisco Service Control Subscriber Manager then checks for the IP Prefix that matches the IP address. If a match is found, the Cisco Service Control Subscriber Manager provisions the subscriber and prefix details to Cisco SCE. When another flow from a different IP is detected within the same prefix, Cisco SCE matches it to the right subscriber without contacting Cisco Service Control Subscriber Manager. Since the Framed-IPv6-Prefix is a RADIUS attribute, if you remove the AAA/RADIUS server, you must remove this attribute as well.

Table 2-1 summarizes the differences between the Push mode and Pull mode.

<table>
<thead>
<tr>
<th>Aspect of Use</th>
<th>Push Mode</th>
<th>Pull Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>When to use</td>
<td>For simple provisioning of subscriber information in the SCE platform</td>
<td>For real-time, on-demand subscriber information retrieval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use in large-scale deployments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• When there is no way of knowing from the IP assignment process which</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SCE platform will serve a particular subscriber</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• When the required number of logged-in subscribers is greater than the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>number of concurrently active subscribers that the SCE platform can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>manage</td>
</tr>
<tr>
<td>Functional flow at access time</td>
<td>• Subscriber network login or access</td>
<td>• Subscriber network login or access</td>
</tr>
<tr>
<td></td>
<td>• From subscriber information to LEG to Subscriber Manager</td>
<td>• From subscriber information to LEG to Subscriber Manager (maintained in</td>
</tr>
<tr>
<td></td>
<td>• From Subscriber Manager to the relevant SCE platforms</td>
<td>the Subscriber Manager database)</td>
</tr>
<tr>
<td>Subscriber information at the</td>
<td>SCE platform always has current subscriber information:</td>
<td>• When the subscriber starts producing traffic that traverses the SCE</td>
</tr>
<tr>
<td>SCE platform</td>
<td>• Immediate policy enforcement</td>
<td>platform, SCE platform asks for the subscriber information</td>
</tr>
<tr>
<td></td>
<td>• Real-time system architecture</td>
<td>• From Subscriber Manager (Subscriber Manager database) to SCE platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Dual-Stack Subscribers**

For subscribers with IPv4 and IPv6 addresses assigned, the LEGs learn the IP mapping through one or multiple iterations. A subscriber may have IPv6 prefix and IPv4 address mappings at the same time. So the IPv4 and IPv6 mappings might reach the Subscriber Manager from one LEG or from different LEGs.

**Dual-Stack Push Mode**

Subscriber mappings are pushed to Cisco SCE for IPv4 and IPv6 separately in different login events.

**Dual-Stack Pull Mode**

When a pull request is sent, the Cisco Service Control Subscriber Manager responds to Cisco SCE on the basis on the requested mapping type. The Pull request is sent separately for IPv4 and IPv6 for a dual-stack subscriber.

**SCE Subscriber Synchronization**

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

- When the Subscriber Manager reconnects to the SCE platform and the standby SCE within the cascade pair is not synchronized.
- If specifically requested by user. See “The `p3net` Utility” section on page B-12.

**SCE Quarantine**

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

When the SCE is quarantined, the Subscriber Manager 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 Subscriber Manager version 3.1.0, the Subscriber Manager manages cascaded SCEs as a cascade pair and not as two separate SCEs. The Subscriber Manager uses the ability of the SCE to duplicate the subscriber data between the SCEs by updating only the active SCE.

The Subscriber Manager connects to both SCEs but sends log in operations only to the active SCE. Similarly, the Subscriber Manager performs subscriber synchronization only with the active SCE.

The standby SCE learns about the subscribers from the active SCE, which allows stateful failover. The Subscriber Manager identifies a fail-over event and synchronizes the SCE that became active so that it will receive the most up-to-date subscriber information.

Subscriber Domains

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

The deployment of domains enables a single Subscriber Manager to manage several separate network sections, and to better control the transfer of subscriber information 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 an individual subscriber at a particular time.

Domains are managed differently in the Push and Pull modes:

- In Push mode, all subscribers in a subscriber domain are sent to all SCEs in the domain. The primary reason to place a number of SCE platforms in a single domain is for redundancy.
- In Pull mode, the pull requests are processed only for subscribers in the domain of the pulling SCE platform. In Pull mode, a single domain usually covers all subscribers.
- From Subscriber Manager version 3.1.0, a service provider can move subscribers between domains in a process known as automatic domain roaming. After receiving an update that an existing subscriber has switched domains, the Subscriber Manager does the following:
  - 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 releases of Subscriber Manager.

By default, a system is configured with one subscriber domain called subscribers. When you add an SCE platform to the Subscriber Manager, the SCE is automatically added to this default domain, unless otherwise specified. Subscribers are also associated with the default subscriber domain, unless otherwise specified. To associate a subscriber with a different domain, first define the domain in the configuration file. Then explicitly specify the domain when adding the subscriber to the Subscriber Manager. To associate an SCE platform with a nondefault subscriber domain, edit and reload the configuration file. For more information, see Chapter 5, “Configuration and Management.”
Information About Communication Failures

A communication failure might occur either on the LEG-Subscriber Manager communication link or on the Subscriber Manager-SCE communication link. A communication failure might occur due to a network failure or because the SCE, Subscriber Manager, or LEG has failed. High availability and recovery from a Subscriber Manager failure are discussed in the “Subscriber Manager Cluster” section on page 2-14.

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

- Communication failure detection—Timeout after which a communication failure is announced.
- Communication failure handling—Action to take when communication on the link fails.
- Communication failure recovery—Action to take when communication on the link resumes.

Failure Detection Mechanism

One of two mechanisms detects a communication failure:

- Monitor the TCP socket connection state. All peers monitor.
- Use a keepalive mechanism at the PRPC protocol level.

Failure Handling Mechanism

There are two configuration options for managing communication failures:

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

Erasing the mappings in the database is useful when you want to avoid incorrect mappings of subscribers to IP addresses. Issue a request to clear all mappings upon failure.

Failure Recovery Mechanism

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

Subscriber Manager Cluster

The Subscriber Manager supports high availability with Veritas Cluster Server (VCS) technology. 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, which minimizes data loss in case the active Subscriber Manager fails. When the active machine fails, the standby machine discovers the failure and becomes active. For additional information, see Chapter 3, “Subscriber Manager Failover.”
Quota Management

The Quota Manager is a component of the Subscriber Manager, which enables Service Control solution providers to manage subscriber quota. The Quota Manager controls Service Control Application for Broadband (SCA BB) quota functionality, and acts as an entry-level quota policy repository. For complete details, see the Cisco Service Control Management Suite Quota Manager User Guide.

Virtual Link Management

The Virtual Link Manager (VLM) is a component of the Subscriber Manager, which enables Service Control solution providers to monitor and control individual subscriber links separately. The VLM enables providers to create a single policy that contains the tier differentiated packages. Part of creating a policy includes establishing a number of virtual links and then assigning subscribers to the virtual links. For complete details, see the Cisco Service Control for Managing Remote Cable MSO Links Solution Guide.

Subscriber Manager Management

Subscriber Manager management includes configuration, fault management, logging management, and performance management.

Configure the Subscriber Manager using the following components:

- Configuration file (p3sm.cfg)—Sets 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 Subscriber Manager.

For a detailed description of the configuration file, see Appendix A, “Configuration File Options.”

- Command-Line Utilities (CLU)—Enables subscriber management and monitoring of the Subscriber Manager. CLU commands are shell tools that you can use to manage subscribers, install or update applications, retrieve the user log, and load an updated configuration file.

For a complete description of the Command Line Utilities, see Appendix B, “Command-Line Utilities.”

You can invoke the CLU through a Telnet or Secure Shell (SSH) session to the platform that hosts the Subscriber Manager.

Examine the Subscriber Manager user log files for logging, fault, and performance management. The log file contains information about system events, failures, and periodic system performance reports.

Subscriber Manager Fail-Over

You can configure the Subscriber Manager to operate singly or in a cluster. Operating in a cluster topology provides features such as fail-over and high availability. For complete details, see Chapter 3, “Subscriber Manager Failover.”
Chapter 3

Subscriber Manager Failover

Published: December 23, 2013

Introduction

This chapter describes using the Subscriber Manager with clusters for redundancy.

The Subscriber Manager is part of the Cisco Service Control Application for Broadband (SCA BB) solution that is deployed in tier-one service provider environments. Subscriber Manager supports a fail-over mode. Fail-over mode minimizes system downtime that is caused by Subscriber Manager failure. (See the “Information About Subscriber Manager Fail-Over” section on page 3-1.)

This section describes using a cluster of two Subscriber Manager nodes in fail-over 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, page 3-1
- How to Recover from Fail-Over, page 3-5

Information About Subscriber Manager Fail-Over

This section consists of these topics:

- Overview, page 3-1
- 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 Subscriber Manager is based on the Veritas cluster technology. The cluster includes two machines, each running Subscriber Manager database and Veritas software. The Veritas Cluster Server (VCS) software consolidates the Subscriber Managers, which constitutes a single entity by providing a single virtual IP address for the entire cluster.
Chapter 3 Subscriber Manager Failover

Normal Operation

The cluster software distinguishes an active and a standby machine. The active machine owns the virtual IP address and all network connections. 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 login event generators (LEGs) lose their connection with the failed Subscriber Manager. The LEGs reconnect to the activated (backup) Subscriber Manager and retransmit their uncommitted messages. The activated Subscriber Manager connects to the SCE platforms and performs an SCE resynchronization.

The Subscriber Manager database replication agent constantly replicates the Subscriber Manager database from the active node to the standby node. This enables a fast fail-over from one Subscriber Manager to another because the subscriber data in the activated machine is always valid. The two Subscriber Manager nodes do not communicate except to pass 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 Subscriber Manager and the Subscriber Manager database daemon and replication agent.

As part of the cluster operation, the Subscriber Manager database daemon and replication agents are operating regardless of the fail-over state. The Subscriber Manager Veritas agent monitors the daemon and the replication agent process. If one of them fails, a fail-over occurs.

Note

The Subscriber Manager software configuration on both the active and the standby machines must be identical. Apply the same configuration files to both machines.

Normal Operation

The two Subscriber Manager nodes operate in hot-standby mode. In this mode, the active node receives and processes all the Subscriber Manager events. The standby node waits and is ready to go into operation on fail-over. To enable seamless fail-over and to minimize the fail-over time, the two Subscriber Manager nodes operate without an external storage device.

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

- Performs all Subscriber Manager 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 Subscriber Manager and the Subscriber Manager database software are running:

- The Subscriber Manager is fully configured. (It is applied with the same configuration files as the active node but does not interfere with the active node’s operation.)
- The Subscriber Manager connects to the Subscriber Manager database but does not connect to the LEG and SCE devices.
- The Subscriber Manager database software operates as a replication client for the subscriber database, receiving and applying updates from the Subscriber Manager database software on the active node.
Fail-Over Topology

Figure 3-1 depicts a Subscriber Manager cluster configuration in a topology with a redundant AAA server and two SCE 2000 platforms that are cascaded for redundancy.

**Figure 3-1** Subscriber Manager Cluster Configuration for Fail-Over Topology

The Subscriber Manager fail-over topology includes two Subscriber Manager nodes connected in a cluster topology.

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

Each node in the cluster has a minimum of six Ethernet NICs deployed as follows:

- 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 Subscriber Manager)

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

If the primary NIC of the public network fails, a failover occurs to the secondary NIC on the same node, keeping the same IP addresses (VIP1), with no failover of the cluster. If the primary NIC of the replication or heartbeat network fails, a failover occurs to the secondary NIC on the same node, keeping the same IP addresses (VIP2 and VIP3), with no failover of the cluster.

Figure 3-2 illustrates the regular and virtual IP addresses used in a cluster configuration:
Fail-Over Operation

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

The active Subscriber Manager performs all the normal Subscriber Manager functions. 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 Subscriber Manager server acts as a hot-standby machine, so that it is ready to take over (become activated) in minimal fail-over time.

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

- Subscriber Manager application failure, including failure of the Subscriber Manager database.
- Failure of the Subscriber Manager database daemon of the Subscriber Manager database 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.

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

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

- The activated Subscriber Manager takes over the IP resources of the virtual IP mechanism.
- The LEGs reconnect to the activated Subscriber Manager.
- The activated Subscriber Manager creates IP connections with the SCEs and resynchronizes with them.
- The activated Subscriber Manager starts processing information that is sent from the 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, such as intra-node ports link-failure, recover automatically when the link revives. Others failures might need manual intervention.

Recovery might occur when a Subscriber Manager that experienced a failure recovers or after it is replaced (if needed). The recovery procedure is intended to take the cluster back to a fully functional mode. When the recovery procedure concludes, the behavior is the same as it was after installation.

A failed Subscriber Manager server is recovered manually or automatically, according to the type of failure that occurred. The following sections describe the recovery procedures:

- Machine Reboot, page 3-5
- Replacing the Server, page 3-5
- Database Duplication Recovery, page 3-6
- Database Duplication Recovery Management, page 3-7

### Machine Reboot

Recovery from a machine reboot is a fully automatic recovery process, whereby the failed Subscriber Manager server reboots. After reestablishing a connection with the other server and synchronizing the databases, the cluster of the two Subscriber Manager servers is ready again for fail-over operation.

*Note* The steps in this procedure are automatic.

**Step 1** The reboot process runs 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 Subscriber Manager database replication process is started from the point before the reboot. The Subscriber Manager in the recovered server is ready after the database recovery process runs and the Subscriber Manager moves from INIT state to standby state.

### Replacing the Server

You must replace the server when the machine suffers an unrecoverable physical failure. You must install a new machine with a fresh Subscriber Manager, Subscriber Manager database, and VCS.
Replacing the server is a manual recovery procedure. You must physically replace the failed Subscriber Manager server. After you connect the new Subscriber Manager server to the network, configure it, and synchronize the two databases, the cluster of two Subscriber Manager servers is once again capable of 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 Subscriber Manager database duplication operation.  
See the “Database Duplication Recovery” section on page 3-6.

**Step 5**  
Start the VCS operation on the recovered node.

**Step 6**  
Connect the network ports.  
The Subscriber Manager in the recovered server is ready after the database recovery process completes and the Subscriber Manager moves from INIT state to standby state.

---

**Database Duplication Recovery**

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

**Step 1**  
Stop the cluster server (VCS) monitoring of the resources.  
Enter the VCS CLU `hastop -local` command to stop the VCS.

**Step 2**  
Stop the Subscriber Manager so that it will not be affected by clearing the database.  
Enter the CLU command `p3sm --stop`.

**Step 3**  
Stop the replication agent.  
Enter the CLU command `p3db --rep-stop`.

**Step 4**  
Destroy the database.  
Enter the CLU command `p3db --destroy-rep-db`.

**Step 5**  
Duplicate the remote database on the local machine.  
Enter the CLU command `p3db --duplicate`.

**Step 6**  
Start the cluster server monitoring of the resources.  
Enter the VCS CLU `hastart` command, which automatically starts the replication process and the Subscriber Manager.
Database Duplication Recovery Management

Configure the two Subscriber Manager servers by using Command-Line Utilities and a configuration file (see the “Configuring the Subscriber Management Solution” section on page 5-4). Perform the configuration for the active Subscriber Manager and then manually replicate the configuration for the standby Subscriber Manager.

Step 1  Establish an FTP connection between the active and standby machines.
Step 2  Copy the configuration files.

Copy all the configuration files from the 
~pcube/sm/server/root/config/ folder on the active node to the standby node. Apply the Subscriber Manager configuration file by using the CLU command p3sm

--load-config.
Step 3  Copy the database-related configuration files to the required location.

If you changed the database-related configuration files, copy the files to /etc/system (for Solaris) or to /etc/sysctl.conf (for Linux), and sys.odbc.ini from the active node to the standby node.

Note  If you perform this step, you must reboot the standby node.

Note  If the database is located in different directories in the two nodes, the sys.odbc.ini files in the nodes are not identical and the actual parameter changed in the file must be copied.

Step 4  Configure and administer the Veritas Cluster Server by using Veritas tools.

Notifications are enabled through SNMP traps that the Veritas Cluster Server provides. The Veritas Cluster Server supports SNMP traps such as the following:

  • Fatal failure detected (local or remote)
  • Secondary node starts fail-over procedure
  • Secondary node is operational (end of fail-over)
Introduction

This chapter describes how to install, upgrade, and uninstall the Cisco Service Control Management Suite Subscriber Manager.

Installing, Upgrading, and Uninstalling the Subscriber Manager

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

- Installing the Subscriber Manager, page 4-2
- Installing the Subscriber Manager, page 4-13
- Verifying the Installation, page 4-20
- Configuring the Subscriber Manager, page 4-21
- Performing Additional Installation Procedures, page 4-21
- Upgrading the Subscriber Manager, page 4-23
- Database Performance Recommendations, page 4-39
- Downgrading Subscriber Manager, page 4-40
- Uninstalling Subscriber Manager, page 4-40
Installing the Subscriber Manager

Subscriber Manager installation is an automated process. Cisco provides an installation script that is located at the root of the Subscriber Manager distribution files.

Note
If you are installing Subscriber Manager on the Solaris operating system, you must modify the file /etc/system. You can modify the file manually or by using an automated utility.

Note
If you are installing Subscriber Manager on the Linux operating system, first disable SELinux before attempting the installation. After you disable SELinux, you must modify the file /etc/sysctl.conf. You can modify the file manually or by using an automated utility. For the most recent information about SELinux, see the RedHat website.

Installation Overview

The installation procedure installs the following components:

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

The installation procedure also performs the following operations:

- Sets up a pcube user and group
- Adds startup and shutdown scripts
- Configures the system for Subscriber Manager database (performed manually or by using a script)
- Replicates scheme setting, which is accomplished by running a CLU (relevant only for cluster setups).
When the installation and configuration processes is completed, you can use the Subscriber Manager to introduce subscribers to the system.

Note
Login Event Generators and the Cisco SCA BB application are now installed by default on the Subscriber Manager.

Contents of the Distribution Files
The SCMS Subscriber Manager components are supplied in three distribution files:
- Subscriber Manager for Solaris
- Subscriber Manager for Linux
- Login Event Generators (LEGs)

Each distribution file is provided as a tar file, which is compressed by gzip and has the extension .tar.gz.

Table 4-1 lists the contents of the Subscriber Manager distribution files for Solaris and Linux.
## Table 4-1 Contents of Subscriber Manager Distribution Files

<table>
<thead>
<tr>
<th>Path</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIST_ROOT</td>
<td>—</td>
<td>Cross-platform files</td>
</tr>
<tr>
<td></td>
<td>dhcp_forwarder.tar.gz</td>
<td>DHCP Forwarder distribution</td>
</tr>
<tr>
<td></td>
<td>hooks.sh</td>
<td>User-defined function for upgrade</td>
</tr>
<tr>
<td></td>
<td>install</td>
<td>Typical installation procedure description</td>
</tr>
<tr>
<td></td>
<td>install-forwarder.sh</td>
<td>Installation script for the DHCP Forwarder used in conjunction with DHCP Lease Query LEG</td>
</tr>
<tr>
<td></td>
<td>install-sm.sh</td>
<td>Subscriber Manager installation script</td>
</tr>
<tr>
<td></td>
<td>install-vcs-agents.sh</td>
<td>VCS agents installation script</td>
</tr>
<tr>
<td></td>
<td>linux-def.sh</td>
<td>Linux-specific definitions (only in the Linux distribution file)</td>
</tr>
<tr>
<td></td>
<td>solaris-def.sh</td>
<td>Solaris-specific definitions (only in the Solaris distribution file)</td>
</tr>
<tr>
<td>MANIFEST</td>
<td>—</td>
<td>CD information</td>
</tr>
<tr>
<td></td>
<td>p3sm.sh</td>
<td>Startup and shutdown script</td>
</tr>
<tr>
<td></td>
<td>Prerequisites</td>
<td>System minimal requirements list</td>
</tr>
<tr>
<td></td>
<td>sm-common.sh</td>
<td>General installation script</td>
</tr>
<tr>
<td></td>
<td>sm-dist.tar.gz</td>
<td>Subscriber Manager distribution</td>
</tr>
<tr>
<td></td>
<td>tt-sysconf.sh</td>
<td>Subscriber Manager database system kernel configuration script</td>
</tr>
<tr>
<td></td>
<td>uninstall-sm.sh</td>
<td>Subscriber Manager uninstall script</td>
</tr>
<tr>
<td></td>
<td>upgrade-sm.sh</td>
<td>Subscriber Manager upgrade script</td>
</tr>
<tr>
<td></td>
<td>sm-db-conf.sh</td>
<td>Subscriber Manager database system memory configuration. Use this to configure PermSize and TempSize.</td>
</tr>
<tr>
<td></td>
<td>vcs-agents-dist.tar.gz</td>
<td>VCS agents distribution.</td>
</tr>
<tr>
<td></td>
<td>install-def.cfg</td>
<td>Contains definitions for several Subscriber Manager parameters that can be configured before Subscriber Manager installation or upgrade.</td>
</tr>
<tr>
<td></td>
<td>verify-subscriber.sh</td>
<td>Script to verify whether a subscriber exists without running the Subscriber Manager. Used when performing a cluster upgrade.</td>
</tr>
<tr>
<td></td>
<td>cluster-upgrade.sh</td>
<td>Upgrade script for cluster installations.</td>
</tr>
<tr>
<td>DIST_ROOT/Java/</td>
<td>—</td>
<td>Java Runtime Environment files.</td>
</tr>
<tr>
<td></td>
<td>jre1.7.0_17-linux64.tar.gz</td>
<td>JRE for Linux 64-bit (only in the Linux 64-bit distribution file).</td>
</tr>
<tr>
<td></td>
<td>jre1.7.0_17-solaris.tar.gz</td>
<td>JRE for Solaris</td>
</tr>
<tr>
<td></td>
<td>LICENSE</td>
<td>JRE license.</td>
</tr>
</tbody>
</table>
### Table 4-1  Contents of Subscriber Manager Distribution Files (continued)

<table>
<thead>
<tr>
<th>Path</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIST_ROOT/TimesTen/</td>
<td>—</td>
<td>Subscriber Manager database files</td>
</tr>
<tr>
<td></td>
<td>pqb_resp_uninst.txt</td>
<td>Response file for Subscriber Manager database uninstall</td>
</tr>
<tr>
<td></td>
<td>pqb-odbc-ini.txt</td>
<td>Open DataBase Connectivity (ODBC) definitions</td>
</tr>
<tr>
<td></td>
<td>pqb-response70.txt</td>
<td>Response file for Subscriber Manager database installation. When you install the database as part of Cisco Service Control Subscriber Manager installation, the installation process gets a response from this file for installing the SM Database in silent mode. No manual changes are required.</td>
</tr>
<tr>
<td></td>
<td>pqb-sys-odbc-ini.txt</td>
<td>Open DataBase Connectivity (ODBC) definitions</td>
</tr>
<tr>
<td></td>
<td>timesten70520.linux86-64.tar.gz</td>
<td>Subscriber Manager database for Linux (only in the Linux 64-bit distribution file)</td>
</tr>
<tr>
<td></td>
<td>timesten70500.sparc64.tar.Z</td>
<td>Subscriber Manager database for Solaris 64-bit (only in the Solaris distribution file)</td>
</tr>
<tr>
<td>DIST_ROOT/scripts</td>
<td>.bash_profile</td>
<td>User profile for bash</td>
</tr>
<tr>
<td></td>
<td>.cshrc</td>
<td>User profile for C-Shell</td>
</tr>
<tr>
<td></td>
<td>scmsmm.sh</td>
<td>User profile utility file for bash</td>
</tr>
<tr>
<td></td>
<td>scmsmm.csh</td>
<td>User profile utility file for C-Shell</td>
</tr>
<tr>
<td></td>
<td>dropRep.sql</td>
<td>SQL file used during the upgrade procedure</td>
</tr>
<tr>
<td></td>
<td>install-dsn.sh</td>
<td>Subscriber Manager database DSN configuration script</td>
</tr>
<tr>
<td></td>
<td>installjava.sh</td>
<td>JRE installation script</td>
</tr>
<tr>
<td></td>
<td>install-ht.sh</td>
<td>Subscriber Manager database installation script</td>
</tr>
<tr>
<td></td>
<td>get_name.sql</td>
<td>SQL file used during the upgrade procedure</td>
</tr>
<tr>
<td></td>
<td>p3db</td>
<td>Utility file used by the installation/upgrade procedures</td>
</tr>
<tr>
<td></td>
<td>deleteLastPqiInfo.sql</td>
<td>SQL file used during the upgrade procedure</td>
</tr>
<tr>
<td></td>
<td>clu-common</td>
<td>Utility file used by the installation and upgrade procedures</td>
</tr>
<tr>
<td></td>
<td>upgrade.jar</td>
<td>Utility for upgrade procedures</td>
</tr>
</tbody>
</table>
Table 4-2 lists the contents of the LEG distribution file.

<table>
<thead>
<tr>
<th>Path</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIST_ROOT</td>
<td>—</td>
<td>Cross-platform files</td>
</tr>
<tr>
<td>MANIFEST</td>
<td></td>
<td>Distribution information</td>
</tr>
<tr>
<td>DIST_ROOT/bgp_leg</td>
<td>—</td>
<td>Border Gateway Protocol (BGP) LEG files</td>
</tr>
<tr>
<td>bgp_leg.tar.gz</td>
<td></td>
<td>BGP LEG distribution</td>
</tr>
<tr>
<td>Install</td>
<td></td>
<td>LEG installation procedure description</td>
</tr>
<tr>
<td>install-bgp-leg.sh</td>
<td></td>
<td>BGP LEG installation script</td>
</tr>
<tr>
<td>linux-def.sh</td>
<td></td>
<td>Linux-specific definitions</td>
</tr>
<tr>
<td>sm-common.sh</td>
<td></td>
<td>General installation script</td>
</tr>
<tr>
<td>solaris-def.sh</td>
<td></td>
<td>Solaris-specific definitions</td>
</tr>
<tr>
<td>DIST_ROOT/cnr_leg</td>
<td>—</td>
<td>Cisco Network Register (CNR) LEG files</td>
</tr>
<tr>
<td>cnr-leg-dist.tar.gz</td>
<td></td>
<td>CNR LEG distribution</td>
</tr>
<tr>
<td>Install</td>
<td></td>
<td>LEG installation procedure definitions</td>
</tr>
<tr>
<td>DIST_ROOT/sce_api</td>
<td>—</td>
<td>SCE Subscriber API files</td>
</tr>
<tr>
<td>Readme</td>
<td></td>
<td>API setup procedure description</td>
</tr>
<tr>
<td>sce-java-api-dist.tar.gz</td>
<td></td>
<td>API distribution</td>
</tr>
<tr>
<td>DIST_ROOT/sm_api</td>
<td>—</td>
<td>Subscriber Manager API files</td>
</tr>
<tr>
<td>Readme</td>
<td></td>
<td>API setup procedure description</td>
</tr>
<tr>
<td>sm-c-api-dist.tar.gz</td>
<td></td>
<td>C API distribution</td>
</tr>
<tr>
<td>sm-java-api-dist.tar.gz</td>
<td></td>
<td>Java API distribution</td>
</tr>
</tbody>
</table>

**Documentation**

The Subscriber Manager installation distribution file contains the following documents:

- **Manifest**—Contains the version and build numbers for all components that are included in the distribution files
- **Install**—The SCMS Subscriber Manager installation procedures
- **Prerequisites**—Minimal system requirements for installation of the Subscriber Manager
System Requirements

You can install the Subscriber Manager on the following platforms:

- Sun SPARC machine (64-bit) running 64-bit versions of Solaris 10 Update 9 with a 64-bit version of the Java Virtual Machine. See Table 4-3 and Table 4-4.
- Intel machine (64-bit) running 64-bit versions of Red Hat Enterprise Linux 5.5 and later or Red Hat Enterprise Linux 6.x. See Table 4-3 and Table 4-5.

Note For IPv6 support, Solaris or 64-bit Red Hat Linux is required.

- Intel-based machine (64-bit) running 64-bit versions of CentOS with a 64-bit version of the Java Virtual Machine. See Table 4-3 and Table 4-6.
- VMware ESX 4i or 5i running as Guest OS on a 32-bit or 64-bit Intel-based machine.
- Cisco Unified Computing System (UCS) server model R210-2121605 with a Intel(R) Xeon(R) X5570 2.93-GHz CPU with eight Cores (minimum memory 4 GB).

Caution

The Subscriber Manager must run on its own machine. You cannot run it on the same machine as the Collection Manager.

The machine should conform to the system requirements listed in Table 4-3, Table 4-4, and Table 4-5.

Note

The specifications listed in Table 4-3 are minimal. Ensure that the minimal specifications are met to guarantee performance and capacity requirements.

<table>
<thead>
<tr>
<th>Table 4-3 Minimal System Hardware Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>CPU</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>RAM</td>
</tr>
<tr>
<td>Free Disk Space</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Network Interface</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>CD-ROM drive</td>
</tr>
</tbody>
</table>
For the hardware and software system requirements for the Veritas Cluster Server, see Appendix E, “Veritas Cluster Server.”

**Table 4-4 Solaris System Software Requirements**

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Solaris 5.10 Update 9 is supported.</td>
</tr>
<tr>
<td></td>
<td>Solaris Core Installation</td>
</tr>
<tr>
<td>System Packages</td>
<td>Mandatory:</td>
</tr>
<tr>
<td></td>
<td>• SUNWbash—GNU Bourne-Again shell (bash)</td>
</tr>
<tr>
<td></td>
<td>• SUNWgzip—GNU Zip (gzip) compression utility</td>
</tr>
<tr>
<td></td>
<td>• SUNWzip—Info-Zip (zip) compression utility</td>
</tr>
<tr>
<td></td>
<td>• SUNWlibC—Sun Workshop Compilers Bundled libC</td>
</tr>
<tr>
<td></td>
<td>• SUNWlibCx—Sun WorkShop Bundled 64-bit libC (not required for Solaris 10)</td>
</tr>
<tr>
<td></td>
<td>• sudo (superuser do) package</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
</tr>
<tr>
<td></td>
<td>• SUNWadmap—system administration applications</td>
</tr>
<tr>
<td></td>
<td>• SUNWadmc—system administration core libraries</td>
</tr>
</tbody>
</table>

Note: Apply the latest patches from SUN. You can download the latest patches from the SUN patches website.
## Table 4-5  Red Hat System Software Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux AS/ES 5.5 and later, or 6.x; only 64-bit version is supported.</td>
</tr>
<tr>
<td></td>
<td>Red Hat Core Installation</td>
</tr>
<tr>
<td>System Packages</td>
<td>Mandatory:</td>
</tr>
<tr>
<td></td>
<td>• GNU Bourne-Again shell (bash-2.05b-29.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• GNU Data Compression Program (gzip-1.3.3-9.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• File compression and packaging utility (zip-2.3-16.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• Standard C++ libraries for Red Hat Linux 6.2 backward compatibility (compat-gcc-7.3-2.96.122.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• sudo (superuser do) package</td>
</tr>
<tr>
<td></td>
<td>For integrating with the C API:</td>
</tr>
<tr>
<td></td>
<td>• GNU cc and gcc C compilers (gcc-3.2.3-20.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• C++ support for the GNU gcc compiler (gcc-3.2.3-20.i386.rpm)</td>
</tr>
</tbody>
</table>

### Note
Use the latest version from Red Hat.

## Table 4-6  CentOS System Software Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>CentOS 64-bit version is supported.</td>
</tr>
<tr>
<td>System Packages</td>
<td>Mandatory:</td>
</tr>
<tr>
<td></td>
<td>• GNU Bourne-Again shell (bash-2.05b-29.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• GNU Data Compression Program (gzip-1.3.3-9.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• File compression and packaging utility (zip-2.3-16.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• Standard C++ libraries for Red Hat Linux 6.2 backward compatibility (compat-gcc-7.3-2.96.122.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• sudo (superuser do) package</td>
</tr>
<tr>
<td></td>
<td>For integrating with the C API:</td>
</tr>
<tr>
<td></td>
<td>• GNU cc and gcc C compilers (gcc-3.2.3-20.i386.rpm)</td>
</tr>
<tr>
<td></td>
<td>• C++ support for the GNU gcc compiler (gcc-3.2.3-20.i386.rpm)</td>
</tr>
</tbody>
</table>

### Note
Use the latest version from CentOS.
Installation Procedures

You can perform all installations by executing an installation script located at the root of the Subscriber Manager distribution file. In most cases, the Subscriber Manager installation script is the only script you need to complete the installation.

The installation script displays messages that describe the steps that are being performed. These messages are also sent to the system log for future reference. See the “Logging Script Messages” section on page 4-10 for more information about the system log messages.

If you try to install the Subscriber Manager on a machine on which the Subscriber Manager is currently running, or to a directory in which the Subscriber Manager is already installed (even if not running), the operation will fail. You will be asked to upgrade the Subscriber Manager. See the “Upgrading the Subscriber Manager” section on page 4-23.

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

Note

While installing the Subscriber Manager, the user file-creation mode mask (umask) for the root user must be 002/022. If you change the umask, the Subscriber Manager Database might not work.

For the installation procedure for the standalone topology, see the “Installing the Subscriber Manager” section on page 4-13.

For the installation procedure for the cluster topology, see the “Installing a Subscriber Manager Cluster” section on page 4-21.

Information About System Changes Made by Installation Scripts

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

- Logging Script Messages, page 4-10
- pcube User and Group, page 4-10
- Startup and Shutdown Scripts, page 4-11
- Bash and C-Shell Profiles for the User pcube, page 4-11

Logging Script Messages

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

- For Solaris—The installation scripts log all 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 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

The installation creates a user named pcube (unless it already exists) with its own group. This user owns all installed Subscriber Manager 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.

Pcube user language is set as English (en_US) regardless of the user language settings.
Startup and Shutdown Scripts

The Subscriber Manager starts on boot to run level 2, and stops when it leaves this run level (for example, when the machine is shut down).

The installer script 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/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/rc3.d/S92p3sm ->/etc/init.d/p3sm`
  - `lrwxrwxrwx   1 root   other   /etc/rc5.d/S92p3sm ->/etc/init.d/p3sm`
  - `lrwxrwxrwx   1 root   other   /etc/rc6.d/K44p3sm ->/etc/init.d/p3sm`

The Subscriber Manager database installer creates similar startup and shutdown scripts.

Bash and C-Shell Profiles for the User pcube

You control the Subscriber Manager by 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.

You can perform this operation manually or by copying the contents of these profile scripts (`scmssm * files`) from the Subscriber Manager distribution under `DIST_ROOT/scripts/`.

Information About Advanced System Memory Configuration

- Configuring `sys.odbc.ini`, page 4-11
- Configuring the Subscriber Manager Process Memory Settings, page 4-12

Configuring `sys.odbc.ini`

Some installations you might need to modify Subscriber Manager database parameters so that the database will run as desired. However, do not make any changes if the default values suit your requirements.
**Setting the database size**

If your system needs to support more than 100,000 subscribers, set the values of the `PermSize` and `TempSize` parameters in the `[Pcube_SM_Repository]` section in the `sys.odbc.ini` file. To configure the `TempSize` and `PermSize`, use `sm-db-conf.sh` script.

See Step 2—“Determine the system memory settings” in the “Installing the Subscriber Manager” section on page 4-13.

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 Subscriber Manager Process Memory Settings**

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

```
PCUBE_SM_MEM_SIZE=512
```

**Note**

If the `PCUBE_SM_MEM_SIZE` environment variable does not exist, you must add this line to the `sm.sh` file.

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

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

To determine the correct memory values for your installation, see Step 2—“Determine the system memory settings” in the “Installing the Subscriber Manager” section on page 4-13.
Installing the Subscriber Manager

This section describes how to install the Subscriber Manager.

**Note**

In a high availability setup (see the “Subscriber Manager Cluster” section on page 2-14), you must install the Subscriber Manager Cluster VCS agents. (See the “Installing Subscriber Manager Cluster Agents” section on page 4-22.)

**Prerequisites**

Ensure that the disk space requirements listed in the “System Requirements” section on page 4-7 are satisfied.

**Installation Procedure**

**Step 1**  Extract the distribution files.

Before you can install the Subscriber Manager, 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 website.
- b. Use FTP to load the distribution files to the Subscriber Manager.
- 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. Determine the system memory settings with the Quota Manager or without the Quota Manager.

Table 4-7 and Table 4-8 list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is disabled.

**Note**

For IPv6, a 15% of additional memory is required for the PermSize, the Temp Size, and the SM shared memory. This is applicable irrespective of whether the quota manager is enabled or not.

---

**Table 4-7 Memory Configuration Parameters Versus Number of Subscribers—without Quota Manager**

<table>
<thead>
<tr>
<th>Maximum Number of Subscribers</th>
<th>(Subscriber Manager database Memory Settings) Shared Memory</th>
<th>(Subscriber Manager database Memory Settings) PermSize</th>
<th>(Subscriber Manager database Memory Settings) TempSize</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>512 MB</td>
<td>200 MB</td>
<td>100 MB</td>
</tr>
<tr>
<td>500,000</td>
<td>1024 MB</td>
<td>512 MB</td>
<td>256 MB</td>
</tr>
</tbody>
</table>
Installing the Subscriber Manager

Note

The maximum number of Cisco SCEs is 200.

The Subscriber Manager process RAM in the table is calculated according to the following requirements:

- 40 SCE connections per Subscriber Manager—For each additional SCE, you should add an additional 25 MB for the Subscriber Manager process memory setting.
- 20 PRPC (Subscriber Manager API/CNR LEG) connections to the Subscriber Manager—For each additional connection, you should add an additional 25 MB for the Subscriber Manager process memory setting.
- If you use the virtual-links capability of the service control solution, you should add an additional 60 MB to the Perm Size setting for each additional 100,000 subscribers.

<table>
<thead>
<tr>
<th>Cache Size</th>
<th>Subscriber Manager Process Memory Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>256 MB</td>
</tr>
<tr>
<td>500,000</td>
<td>512 MB</td>
</tr>
<tr>
<td>1,000,000</td>
<td>768 MB</td>
</tr>
<tr>
<td>2,000,000</td>
<td>1280 MB</td>
</tr>
<tr>
<td>3,000,000</td>
<td>1792 MB</td>
</tr>
<tr>
<td>4,000,000</td>
<td>2048 MB</td>
</tr>
<tr>
<td>5,000,000</td>
<td>2560 MB</td>
</tr>
<tr>
<td>10,000,000</td>
<td>5120 MB</td>
</tr>
<tr>
<td>15,000,000</td>
<td>7680 MB</td>
</tr>
<tr>
<td>20,000,000</td>
<td>10,240 MB</td>
</tr>
</tbody>
</table>

**Table 4-7 Memory Configuration Parameters Versus Number of Subscribers—without Quota Manager (continued)**

<table>
<thead>
<tr>
<th>Maximum Number of Subscribers</th>
<th>(Subscriber Manager database Memory Settings) Shared Memory</th>
<th>(Subscriber Manager database Memory Settings) PermSize</th>
<th>(Subscriber Manager database Memory Settings) TempSize</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000,000</td>
<td>1280 MB</td>
<td>768 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>2,000,000</td>
<td>2048 MB</td>
<td>1536 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>3,000,000</td>
<td>2560 MB</td>
<td>2048 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>4,000,000</td>
<td>3328 MB</td>
<td>2816 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>5,000,000</td>
<td>3840 MB</td>
<td>3328 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>10,000,000</td>
<td>6912 MB</td>
<td>6400 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>15,000,000</td>
<td>9984 MB</td>
<td>9472 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>20,000,000</td>
<td>13,312 MB</td>
<td>12,800 MB</td>
<td>256 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cache Size</th>
<th>Subscriber Manager Process Memory Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>256 MB</td>
</tr>
<tr>
<td>500,000</td>
<td>512 MB</td>
</tr>
<tr>
<td>1,000,000</td>
<td>768 MB</td>
</tr>
<tr>
<td>2,000,000</td>
<td>1280 MB</td>
</tr>
<tr>
<td>3,000,000</td>
<td>1792 MB</td>
</tr>
<tr>
<td>4,000,000</td>
<td>2048 MB</td>
</tr>
<tr>
<td>5,000,000</td>
<td>2560 MB</td>
</tr>
<tr>
<td>10,000,000</td>
<td>5120 MB</td>
</tr>
<tr>
<td>15,000,000</td>
<td>7680 MB</td>
</tr>
<tr>
<td>20,000,000</td>
<td>10,240 MB</td>
</tr>
</tbody>
</table>
The table columns include these contents:

- **Maximum Number of Subscribers**—The maximum number of subscribers that the Subscriber Manager has to support.
- **Cache Size**—The number of subscriber record references that the Subscriber Manager process maintains. The default value is 100,000 records.

**Note** You can increase the default cache size to improve performance; however, this does require additional memory. The default settings are suitable for most installations.

- **Subscriber Manager Process Memory Setting**—The required memory configuration for the Subscriber Manager process. For additional information about the Subscriber Manager process memory configuration, see Table 4-9.
- **The configuration required for Subscriber Manager database to run correctly. For additional information, see Step 3—“Configure the shared memory settings” in the “Installation Procedure” section.**

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.

If the login rate is above 4000 subscribers per second through a LEG without VSA, increase the Cisco Service Control Subscriber Manager shared memory by 30 percent and the Cisco Service Control Subscriber Manager process memory by 128 MB from the existing memory configuration.

Additionally, memory settings must be configured based on the number VSA attributes configured and whether or not quota is configured as shown in Table 4-9 and the following example.

**Table 4-9 Memory Configuration Parameters Versus Number of VSA Attributes: Without and With Quota Manager Enabled**

<table>
<thead>
<tr>
<th>Number of VSA Attributes</th>
<th>Without Quota Manager Enabled</th>
<th>With Quota Manager Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2.5 * X</td>
<td>3.0 * X</td>
</tr>
<tr>
<td>10</td>
<td>3.5 * X</td>
<td>4.0 * X</td>
</tr>
<tr>
<td>15</td>
<td>4.5 * X</td>
<td>5.0 * X</td>
</tr>
<tr>
<td>20</td>
<td>5.5 * X</td>
<td>6.0 * X</td>
</tr>
</tbody>
</table>

Example:

To configure SM with 1M subscribers, 20 attributes, and without Quota Manager enabled, use the following values:

(Subscriber Manager database Memory Settings) Shared Memory = 7040 (1280 * 5.5 )

(Subscriber Manager database Memory Settings) PermSize = 4224 (768 * 5.5)

SM Process Memory Setting = 4224 (768 * 5.5)

Table 4-10 and Table 4-11 list the recommended memory configuration values based on the number of supported subscribers. The settings apply when the Quota Manager is enabled.

**Note** If you enable Cisco Service Control Quota Manager RDR feature, increase the Subscriber Manager process memory by 300 MB from the existing memory configuration.
Table 4-10  Memory Configuration Parameters Versus Number of Subscribers—with Quota Manager

<table>
<thead>
<tr>
<th>Maximum Number of Subscribers</th>
<th>(Subscriber Manager database Memory Settings) Shared Memory</th>
<th>(Subscriber Manager database Memory Settings) PermSize</th>
<th>(Subscriber Manager database Memory Settings) TempSize</th>
</tr>
</thead>
<tbody>
<tr>
<td>500,000</td>
<td>1280 MB</td>
<td>768 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>1,000,000</td>
<td>1792 MB</td>
<td>1280 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>2,000,000</td>
<td>3072 MB</td>
<td>2560 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>3,000,000</td>
<td>4096 MB</td>
<td>3584 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>4,000,000</td>
<td>5376 MB</td>
<td>4864 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>5,000,000</td>
<td>6400 MB</td>
<td>5888 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>10,000,000</td>
<td>12,032 MB</td>
<td>11,520 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>15,000,000</td>
<td>17,664 MB</td>
<td>17,152 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>20,000,000</td>
<td>23,552 MB</td>
<td>23,040 MB</td>
<td>256 MB</td>
</tr>
</tbody>
</table>

Table 4-11  Subscriber Manager Process Memory Setting Versus Cache Size—with Quota Manager

<table>
<thead>
<tr>
<th>Cache Size</th>
<th>Subscriber Manager Process Memory Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>512 MB</td>
</tr>
<tr>
<td>500,000</td>
<td>512 MB</td>
</tr>
<tr>
<td>1,000,000</td>
<td>768 MB</td>
</tr>
<tr>
<td>2,000,000</td>
<td>1280 MB</td>
</tr>
<tr>
<td>3,000,000</td>
<td>1792 MB</td>
</tr>
<tr>
<td>4,000,000</td>
<td>2048 MB</td>
</tr>
<tr>
<td>5,000,000</td>
<td>2560 MB</td>
</tr>
<tr>
<td>10,000,000</td>
<td>5120 MB</td>
</tr>
<tr>
<td>15,000,000</td>
<td>7680 MB</td>
</tr>
<tr>
<td>20,000,000</td>
<td>10,240 MB</td>
</tr>
</tbody>
</table>

Note: The maximum number of Cisco SCEs is 200.
Installing the Subscriber Manager

The Subscriber Manager process RAM in the table is calculated according to the following requirements:

- **20 SCE connections per Subscriber Manager**—For each additional SCE, you should add an additional 50 MB for the Subscriber Manager process memory setting.

- **20 PRPC (Subscriber Manager API/CNR LEG) connections to the Subscriber Manager**—For each additional connection, you should add an additional 25 MB for the Subscriber Manager 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.

**Step 3** Configure the shared memory settings.

Subscriber Manager database requires you to make certain changes 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 Subscriber Manager machine from their defaults. For additional information regarding these changes, refer to the Subscriber Manager database documentation.

**Note** 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 configuration file manually.

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

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

To make the required changes manually, perform the following actions:

**Note** If you require support for more than 100,000 subscribers in the Subscriber Manager, you must edit the configuration file manually. Your system 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” in the “Installation Procedure” section.

- For Solaris, add the following lines to the `/etc/system` file and configure the shared memory size:

  ```bash
  *---- Begin settings for SM Database
  set semsys:seminfo_semmni = 20
  set semsys:seminfo_semmss = 2000
  set semsys:seminfo_semmnu = 2000
  set shmsys:shminfo_shmmax = 0x20000000
  *---- End of settings for SM Database
  ```

- For Linux, add the following lines to the `/etc/sysctl.conf` file and configure the shared memory size:
Installing the Subscriber Manager

*---- Begin settings for SM Database
    kernel.shmmax = 536870912
    kernel.sem = 250 32000 100 100
*---- End of settings for SM Database

Step 4

Edit the install-def.cfg file.

Note

This step is optional when performing the Subscriber Manager installation. However, edit the file if one of the parameter values should be set to a value other than the default value.

The install-def.cfg file contains several parameters that you can configure before installation/upgrade of the Subscriber Manager. These parameters are copied by the install/upgrade routine to the relevant Subscriber Manager 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 [Subscriber Manager Definitions] section. Defines the maximum number of subscribers that the Subscriber Manager supports. You can set the maximum number of subscribers by setting this parameter or by setting the max_number_of_subscribers parameter in p3sm.cfg configuration file. See the “Data Repository Section” section on page A-18.
  There is a limit to the maximum number of subscribers that can be stored in the Subscriber Manager database. The limits are:
  - Linux (64 bit)—20 million subscribers.
  - Solaris—20 million subscribers.
  The Subscriber Manager default configuration supports a maximum of 200,000 subscribers.

- sm_memory_size
  Resides in the [Subscriber Manager Definitions] section. Defines the amount of memory allocated for the Subscriber Manager process in MB. You can set this parameter here or edit the parameter 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 this parameter or edit the PermSize parameter by using the sm-db-conf.sh script.

- database_temp_size
  Resides in the [Database Definitions] section. Defines the TempSize allocated for the database in MB. You can set this parameter or edit the TempSize parameter by using the sm-db-conf.sh script.

Step 5

Execute the install-sm.sh script.

Note

You can customize the install-sm.sh script.

Note

You cannot run the script if the /etc/motd file exists. Move or removed the file prior to running the install-sm.sh script.

From your machine shell prompt, change to the directory into which the distribution file was extracted and run the install-sm.sh script:
Installing the Subscriber Manager

# install-sm.sh [command options]

Table 4-12 lists the command options.

Table 4-12 Options for install-sm.sh

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-d</td>
<td>Specifies the install directory for ~pcube. This directory must not be an existing directory. This directory must be specified as a complete path name beginning with “/”. The default is /opt/pcube.</td>
</tr>
<tr>
<td>-o</td>
<td>Specifies the existing home directory of user pcube as the install directory. Note The options -d and -o are mutually exclusive.</td>
</tr>
<tr>
<td>-v</td>
<td>Specifies the directory for data storage. This directory must not 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 complete path name beginning with “/”. The default is InstallDirectory/var.</td>
</tr>
<tr>
<td>-h</td>
<td>Shows this message.</td>
</tr>
</tbody>
</table>

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 Subscriber Manager 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 Subscriber Manager database installation script with pcube home as the target directory.
- Creates the Subscriber Manager DSN for Subscriber Manager database with pcube home as the target directory. It is possible to install the Subscriber Manager DSN for Subscriber Manager database 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 Subscriber Manager was installed.

Examples for the install-sm.sh Script

These examples demonstrate how to use the install-sm.sh script to install the Subscriber Manager.

- Installing the Subscriber Manager and CLU, page 4-20
- Installing the Subscriber Manager and CLU to a Default Directory, page 4-20
Installing the Subscriber Manager and CLU

This following command installs the Subscriber Manager and CLU to a directory named /usr/local/pcube using the default data storage directory.

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

Installing the Subscriber Manager and CLU to a Default Directory

This section describes how to install the Subscriber Manager and CLU to default directory.

**Step 1**
The following command installs the Subscriber Manager and CLU to the default directory of the user pcube.

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

**Step 2**
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 that you selected.

**Step 3**
Reboot the computer.

You must reboot the computer to complete the installation.

**Step 4**
(Optional) Install the MPLS/VPN BGP LEG.

For more information, see the *Cisco SCMS SM LEGs User Guide*.

**Step 5**
Add a user for PRPC authentication.

You must add a user for PRPC authentication because SCA BB requires a username and password when connecting to the Subscriber Manager.

To add a user for PRPC authentication, use the `p3rpc` command-line utility as in the following example:

```
-bash-3.1$ p3rpc --set-user --username=username --password=password
```

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

```
-bash-3.1$ p3rpc --set-user --username=username --password=password
   --remote=OTHER_SM_IP[:port]
```

For troubleshooting during installation, see Appendix D, “Troubleshooting.”

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 Subscriber Manager.

**Step 1**
From your machine 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 Subscriber Manager:

```bash
-bash-3.1$ p3sm --sm-status
```

**Note**
Wait a few minutes after the installation before running this command to allow the Subscriber Manager to become operational.

The output of this command should indicate that the Subscriber Manager is running.
In case of errors during installation, the command will output a description of these errors.

### Configuring the Subscriber Manager

After installing the Subscriber Manager, you can configure the Subscriber Manager to meet 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 Subscriber Manager, edit the `p3sm.cfg` configuration file by using any standard text editor. The configuration file is described in detail in Chapter 5, “Configuration and Management” and in Appendix A, “Configuration File Options.” After you finish editing the `p3sm.cfg` configuration file, use the `p3sm` utility to update the Subscriber Manager with the new settings:

From your machine shell prompt, run the `p3sm` command.

The following `p3sm` command loads the configuration file and updates the Subscriber Manager configuration accordingly:

```bash
-bash-3.1$ p3sm --load-config
```

### Performing Additional Installation Procedures

The following procedures complement the ones described in the “Installing the Subscriber Manager” section on page 4-13:

- **Installing a Subscriber Manager Cluster**, page 4-21—For installing two Subscriber Manager nodes for the first time.
- **Installing Subscriber Manager Cluster Agents**, page 4-22—For installing a High Availability setup using Veritas Cluster Server (VCS).

### Installing a Subscriber Manager Cluster

Installing a Subscriber Manager cluster is similar to installing the Subscriber Manager on two machines.

**Step 1**
Install the Veritas Cluster Server software on both machines.

**Step 2**
Install the Subscriber Manager on both machines.
Performing Additional Installation Procedures

Step 3 Configure the Subscriber Manager topology parameter to cluster.
For more information, see the “Configuring the Subscriber Manager” section on page 4-21.

Step 4 Configure the replication scheme.
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 Subscriber Manager VCS agents.
For more information, see the “Installing the Subscriber Manager” section on page 4-13.

Step 6 Configure the VCS.
For more information, see Appendix E, “Veritas Cluster Server.”

Installing Subscriber Manager Cluster Agents

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

**Note**
You cannot run the script if the `/etc/motd` file exists. Move or remove the file prior to running the `install-vcs-agents.sh` script.

From your machine shell prompt, run the `install-vcs-agents.sh` script.

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

Table 4-13 lists the command options.

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-d</code></td>
<td>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 complete path name that begins with <code>/</code>. Default: <code>/opt/VRTSvcs/bin</code></td>
</tr>
<tr>
<td><code>-h</code></td>
<td>Prints a help message and exits.</td>
</tr>
</tbody>
</table>

The script performs the following actions:
- Checks that the installation directory exists.
- Extracts the agent distribution file to the specified directory.
Upgrading the Subscriber Manager

The Subscriber Manager supports several types of upgrade procedures. The upgrade procedures depend upon the Subscriber Manager 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:

- Upgrading a Standalone Setup, page 4-24
- Upgrading from a Standalone Setup to a Cluster Setup, page 4-27
- Upgrading Cluster Setups, page 4-29

**Note**

While upgrading the Subscriber Manager, the user file-creation mode mask (umask) for the root user must be 002/022. If you change the umask, the Subscriber Manager Database might not work.

Data Duplication Procedure

The data duplication procedure enables you to duplicate or copy the entire database from one machine to the other. Then synchronize the databases 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 the “Database Duplication Recovery” section on page 3-6.

Automatic Upgrade of Subscribers with VLAN Mappings

**Note**

The following information is related to upgrading from releases earlier than Release 3.1.5.

The 3.1.5 release of the Subscriber Manager introduced a new managed entity—VPN. This new entity means that VLAN mappings are no longer related to a subscriber but to a VPN. During the upgrade procedure, the Subscriber Manager automatically creates a VPN with the VLAN-ID of the subscriber. The procedure also associates a subscriber with the full-range IP mapping in the new VPN.

For example, subscriber 'sub1' with VLAN-ID=15 results in the creation of VPN 15 with VLAN-ID=15 and subscriber 'sub1' with the mapping 0.0.0.0/0@VLAN-ID.

Automatic Upgrade of RADIUS Listener

**Note**

The following information is related to upgrading from releases earlier than Release 3.1.5.

The Subscriber Manager Release 3.1.5 introduced new manipulation abilities to the RADIUS Listener. During the upgrade procedure, the Subscriber Manager modifies the RADIUS sections in the configuration file according to the following rules:
• The `radius_attribute` and `radius_attribute_type` properties are moved to a new section.

• A new field property is added to replace the `radius_attribute` and `radius_attribute_type` properties.

• The `strip_type=remove_suffix` property is replaced with `field_manipulation.<field name>=(.*)<strip_character >.*.`

• The `strip_type=remove_prefix` property is replaced with `field_manipulation.<field name>=(.*).<strip_character >.*.`

• The `use_default` property and default value are replaced with `mapping_table.^$=<default>`.

• The `radius_attribute_vendor_id` and `radius_sub_attribute` properties are replaced with the format `radius_attribute(radius_attribute_vendor_id; radius_sub_attribute)`.

---

**Upgrading a Standalone Setup**

*Note*  
To upgrade from Version 2.x to Version 3.6, you must first upgrade to Version 3.0 or 3.1. To upgrade from Version 3.5.5 to Version 3.7.0, you must first upgrade to Version 3.6.0 and then to 3.7.0. You can upgrade directly from Version 3.6.5 to Version 3.7.0. You can also directly upgrade to Version 4.0.0 from Version 3.7.2. You can directly upgrade from Version 3.8.5 for 4.1.x.

The following upgrade procedure is supported only by Release 3.x software versions. To upgrade the Subscriber Manager from a Release 2.x software version, you must first upgrade the Subscriber Manager environment to a Release 3.1.x software version and then perform an additional upgrade to Release 3.6.0.

For more information about how to upgrade from a Release 2.x software version to a Release 3.1.x software version, refer to the Release 3.1.x manuals.

This procedure applies to the Subscriber Manager 3.0.x and later. This upgrade procedure requires service downtime.

*Note*  
For the upgrade procedure from a standalone setup to a cluster setup, see the “Upgrading from a Standalone Setup to a Cluster Setup” section on page 4-27.

---

**Configuring the Required Memory Settings**

To prepare the Subscriber Manager for the upgrade, configure the system kernel configuration file on the Subscriber Manager according to the procedure described in Step 3—“Configure the shared memory settings” in the “Installation Procedure” section.

**Step 1**

Extract the distribution files.

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

a. Download the distribution files from the Cisco website.

b. Use FTP to load the distribution files to the Subscriber Manager.

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.
Step 2
Disable state exchange.

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

```
-bash-3.1$ p3sm --load-config
```

**Note**
You must use this CLI 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 3—“Configure the shared memory settings” in the “Installation Procedure” section. For more information, see Step 4—“Edit the install-def.cfg file” in the “Installation Procedure” section.

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

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 Subscriber Manager configuration, including network elements, domains, and application-specific components.

**Note**
For the Solaris operating system, previous versions of the Subscriber Manager used a 32-bit or 64-bit Java Virtual Machine (JVM) and database. The Subscriber Manager is currently installed with a 64-bit JVM and database. You must upgrade 64-bit machine.

**Note**
Linux operating system upgrades are only from Subscriber Manager 2.5.x and 3.x releases. The Linux platform supports 64-bit JVM and databases.

**Note**
You cannot 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 machine shell prompt, run the `upgrade-sm.sh` script.
    # upgrade-sm.sh [command-options]
```

**Table 4-14**  Options for `upgrade-sm.sh`

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h</td>
<td>Shows the upgrade message.</td>
</tr>
</tbody>
</table>

The script performs the following steps:

**Step 1**
Detects existing Subscriber Manager version.

**Step 2**
Detects new Subscriber Manager version.
Step 3 Verifies that Java is installed on the machine.
Step 4 Verifies that the user pcube exists.
Step 5 Verifies that a Subscriber Manager of version 3.0.x or later is present on the system.
Step 6 Stops the current Subscriber Manager (if running).
Step 7 Backs up existing contents of the subscriber database to an external file.
Step 8 Removes the Subscriber Manager database.
Step 9 Backs up Subscriber Manager configuration files.
Step 10 Installs the updated versions of Subscriber Manager and Subscriber Manager database.
Step 11 Invokes a separate program for upgrading the Subscriber Manager and database configuration files.
Step 12 Restores the backed up contents of the subscriber database.
Step 13 Starts the upgraded Subscriber Manager.

Upgrading the Subscriber Manager

This section describes how to upgrade the Subscriber Manager.

Step 1 The following example command upgrades the Subscriber Manager and keeps the current database:
# upgrade-sm.sh

Note You are not required to reboot the Subscriber Manager after the upgrade procedure.

Step 2 Add a user for PRPC authentication.
If upgrading from a version of the Subscriber Manager prior to 3.0.5, you must add a user for PRPC authentication because SCA BB requires a username and password when connecting to the Subscriber Manager.
To add a user for PRPC authentication, use the p3rpc CLU as in the example:
-bash-3.1$ p3rpc --set-user --username=username --password=password

Step 3 Remove obsolete state information.
If upgrading from version 2.x, remove any obsolete subscriber state information, by running the Subscriber Manager CLU as pcube user:
-bash-3.1$ p3subsdb --clear-all-states

Step 4 Remove obsolete subscriber properties (Method A)
If upgrading from version 2.x, remove any obsolete subscriber properties.

Note You must run all CLU commands as user pcube.

a. Export any existing subscribers to a CSV file.
   -bash-3.1$ p3subsdb --export -o csv-file
b. Clear the subscriber database.
-bash-3.1$ p3subsdb --clear-all

c. Remove any obsolete properties from the csv-file.
   
   See Table 4-15 for a list of the properties to remove.

d. Import the subscribers from the revised file.
   
   -bash-3.1$ p3subsdb --import -f csv-file

**Step 5**

Remove obsolete subscriber properties (Method B)

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

---

**Note**

You must run all CLU commands as user **pcube**.

a. Remove the obsolete properties from the Subscriber Manager database by running the **p3subsdb** command.

   -bash-3.1$ p3subsdb --remove-property --property=prop

   The obsolete properties to remove are listed in Table 4-15.

b. Resynchronize all SCEs.

   -bash-3.1$ p3sm --resync–all

---

**Table 4-15  **

**Obsolete Properties to Remove**

<table>
<thead>
<tr>
<th>QP Tunable</th>
<th>Applicable to Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>QpLimit[1]–QpLimit[16]</td>
<td>Version 2.5.5 or higher</td>
</tr>
<tr>
<td>QpSet[1]–QpSet[16]</td>
<td>Version 2.5.5 or higher</td>
</tr>
<tr>
<td>QpAdd</td>
<td>Versions of 2.5 prior to version 2.5.5</td>
</tr>
<tr>
<td></td>
<td>Versions of 2.1 prior to version 2.1.7</td>
</tr>
<tr>
<td>QpDelta[1]–QpDelta[16]</td>
<td>Versions of 2.5 prior to version 2.5.5</td>
</tr>
<tr>
<td></td>
<td>Versions of 2.1 prior to version 2.1.7</td>
</tr>
</tbody>
</table>

---

**Step 6**

Configure the SCE platforms.

If you are running a cascade SCE topology, configure the cascade SCE pair in the **p3sm.cfg** file as described in the “SCE.XXX Section” section on page A-15.

---

**Upgrading from a Standalone Setup to a Cluster Setup**

---

**Note**

To upgrade from Version 3.5.5 to Version 3.7.0, you must first upgrade to Version 3.6.0 and then to 3.7.0. You can upgrade directly from Version 3.6.5 to Version 3.7.0. You can also directly upgrade from Version 3.7.2 to Version 4.0.0. You can directly upgrade from Version 3.8.5 for 4.1.x.
The following upgrade procedure is supported only from Release 3.x software versions. To upgrade Subscriber Manager from a Release 2.x software version, you must first upgrade the Subscriber Manager environment to a Release 3.1.x software version and then perform an additional upgrade to Release 3.6.0. From Version 3.6.0, you can upgrade to Version 3.7.0.

For more information about how to upgrade from Release 2.x software to Release 3.1.x software, the Release 3.1.x manuals. For details on how to upgrade to Version 3.6.0, see the Subscriber Manager 3.6.x manuals.

This section describes the procedure for upgrading from a standalone setup to a cluster setup. This procedure applies to the Subscriber Manager from version 3.0.x and later. This upgrade procedure requires service downtime.

Note
This procedure attempts to minimize the Subscriber Manager downtime. Therefore, if subscriber service is not an issue, use the procedure for installing and upgrading a new machine.

In the following procedure, Subscriber Manager-A is the original Subscriber Manager machine running Subscriber Manager version 3.0.x or later. Subscriber Manager-B is the new Subscriber Manager machine that is added for redundancy.

---

Step 1
Install the VCS on both machines.

Step 2
Install Subscriber Manager-B.
To install Subscriber Manager-B, follow the procedure described in the “Installing the Subscriber Manager” section on page 4-13.

Step 3
Upgrade Subscriber Manager-A.
To upgrade Subscriber Manager-A, follow the procedure described in the “Upgrading a Standalone Setup” section on page 4-24.

Note
From this step until the upgrade procedure is completed, no Subscriber Manager is available to manage subscribers.

Step 4
Replicate the Subscriber Manager configuration from Subscriber Manager-A to Subscriber Manager-B (copy all the configuration files from the folder ~pcube/sm/server/root/config).
Copy the p3sm.cfg configuration file from Subscriber Manager-A to Subscriber Manager-B. To load the configuration file, see the “Reloading the Subscriber Manager Configuration (p3sm)” section on page 5-15.

Step 5
Duplicate the subscriber database.
The data duplication procedure is described in the “Data Duplication Procedure” section on page 4-23.
Configure the replication scheme for the data store replication to the redundant machine.

Note
You must run this CLU on both machines as user pcube.

- bash-3.1$ p3db --set-rep-scheme

Step 6
Create a cluster.
a. Configure Subscriber Manager-A and Subscriber Manager-B to support a cluster.
b. Make Subscriber Manager-B standby.
Use the CLU command `p3cluster --standby`.

c. Ensure that Subscriber Manager-A is active.

Use the CLU command `p3cluster --active`.

d. Configure the VCS.

e. Run the VCS on the setup.

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

**Step 8** To test your environment, complete the following procedure:

a. Create a subscriber on the active machine.

   ```shell
   p3subs --add -s testCluster1
   ```

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

c. Run the following VCS CLU command from /opt/VRTSvcs/bin.

   ```shell
   # hagrp -switch service group name to System
   ```

d. Verify that testCluster1 exists in the new active machine.

   ```shell
   --p3subsdb --show-all
   ```

e. Create a subscriber on the new active machine.

   ```shell
   p3subs --add -s testCluster2
   ```

f. Verify that testCluster1 exists in the new active machine.

   ```shell
   --p3subsdb --show-all
   ```

---

**Upgrading Cluster Setups**

- Upgrading from a Cluster Setup Version 3.x, page 4-29
- Upgrading from a Cluster Setup Version 2.x to Version 3.0 or 3.1, page 4-35

**Upgrading from a Cluster Setup Version 3.x**

This section describes the procedure for upgrading from a cluster setup to a cluster setup without a service downtime. This section contains the following subsections:

- Before You Start, page 4-29
- Upgrading a Cluster Setup, page 4-31

**Before You Start**

- You can upgrade directly from Cisco SCMS Subscriber Manager (SM) Version 3.6.5 to SM Version 3.7.0. However, to upgrade from SM Version 3.5.5 or earlier to SM Version 3.7.0, you must first upgrade to SM Version 3.6.0 and then to SM Version 3.7.0. To upgrade from SM Version 2.x to SM Version 3.6, you must first upgrade to SM Version 3.0 or SM Version 3.1.
- Identify the devices in the cluster setup.
• Understand the Java Virtual Machine (JVM) used by the Cisco SCMS Subscriber Manager on your operating system:
  – Versions prior to 3.7.x of the Cisco SCMS Subscriber Manager on Solaris used a 32-bit or 64-bit JVM and database. From Subscriber Manager Version 3.0.3, the Subscriber Manager is installed with a 64-bit JVM and database. There is no choice as to whether to upgrade to 64-bit JVM.
  – The Linux platform is used only with a 32-bit JVM and database.
• Understand how to download and extract the distribution files. For details, see the “Downloading and Extracting the Distribution Files” section on page 4-30.
• Understand the scripts used while upgrading a cluster setup. For details, see the “Understanding the Scripts Used During Upgrade” section on page 4-30.

**Downloading and Extracting the Distribution Files**

Before you upgrade the Subscriber Manager, you must download and extract the distribution files on the installed machine or in a directory that is mounted to the installed machine.

**Step 1** Download the distribution files from Cisco.com.

**Step 2** Use an FTP to load the distribution files to the Subscriber Manager.

**Step 3** Unzip the files by using the `gunzip` command:

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

**Step 4** Extract the tar file using the `tar` command:

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

**Understanding the Scripts Used During Upgrade**

During the process of upgrading a cluster, you might use the following scripts:

• cluster-upgrade.sh. For details, see the “Understanding the cluster-upgrade.sh script” section on page 4-30.
• install-vcs-agents.sh. For details, see the “Understanding the install-vcs-agents.sh script” section on page 4-31.

**Understanding the cluster-upgrade.sh script**

Use this script, which is provided with the Subscriber Manager, to upgrade a cluster setup with earlier versions of Cisco SCMS Subscriber Manager to a cluster setup with the latest version of the Cisco SCMS Subscriber Manager.

The cluster-upgrade.sh script preserves the subscriber database and the entire Subscriber Manager configuration, including network elements, domains, and application-specific components.

The script performs the following actions:

• Detects the current Subscriber Manager version.
• Detects the new version of the Subscriber Manager.
• Verifies whether Java is installed on the machine.
• Verifies whether the user `pcube` exists.
• Verifies whether Subscriber Manager Version 3.x or later is present on the system.
• Verifies the values, if any, configured in `install-def.cfg`. 
- Stops the Subscriber Manager, if it is running.
- Backs up the contents in the subscriber database to an external file.
- Removes the Subscriber Manager database.
- Backs up the Subscriber Manager configuration files.
- Installs the updated version of the Subscriber Manager and the Subscriber Manager Database.
- Invokes a separate program for upgrading the Subscriber Manager and the database configuration files.
- Restores the contents of the subscriber database that were backed up.
- When activated on the second machine, the script copies the contents of the database from the currently active Subscriber Manager; because the currently active Subscriber Manager contains the latest data.

You do not have to start the Subscriber Manager after running the script.

Table 16 lists the command options for the cluster-upgrade.sh script.

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h</td>
<td>Use this option to see the details on how to use the command options.</td>
</tr>
<tr>
<td>-1</td>
<td>Use this option when activating the script on the first machine.</td>
</tr>
<tr>
<td>-2</td>
<td>Use this option when activating the script on the second machine.</td>
</tr>
</tbody>
</table>

Understanding the install-vcs-agents.sh script
For details about the install-vcs-agents.sh script, see the Cisco Service Control Management Suite Subscriber Manager User Guide.

Upgrading a Cluster Setup
To upgrade a cluster setup, complete the following steps:

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Step 1   | Configure the system kernel configuration file on both the machines:
          | a. Configure the system kernel configuration file on the standby Subscriber Manager.
          | b. Reboot the standby SM.
          | c. Manually trigger a failover by using the Veritas Cluster Manager and wait until the standby SM becomes active and the active SM shifts to the standby SM.
          | d. Run the following VCS CLU command from /opt/VRTSvcs/bin:
              | # hagrp -switch service group name to System
          | e. Repeat Step a. and Step b. on the new standby Subscriber Manager. | Before starting the upgrade procedure, configure the system kernel configuration file on both the machines.
          | For details about the system kernel configuration procedure, see the Cisco Service Control Guide to Upgrading to Cisco SCA BB 3.7.x. |
| Step 2   | Extract the distribution files on both the machines. | For details about downloading and extracting the distribution files, see the “Downloading and Extracting the Distribution Files” section on page 4-30. |
### Chapter 4 Installation and Upgrading

#### Upgrading Cluster Setups

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **Step 3** | Stop VCS monitoring on the standby machine:  
   a. Log in as the `root` user.  
   b. Use the following VCS CLU command from `/opt/VRTSvcs/bin` to stop VCS monitoring of the Subscriber Manager:  
     ```bash  
     .//hastop -local  
     ``` | — |
| **Step 4** | Edit the `install-def.cfg` file on both the machines and set the `PermSize` and `TempSize` parameters according to the recommendations described in the *Cisco Service Control Guide to Upgrading to Cisco SCA BB 4.1.x*.  
  For details about the required memory settings, see the *Cisco Service Control Product Installation Guide*. | — |
| **Step 5** | Pause database replication on the active machine:  
   a. On the active machine, change the directory to the location where you extracted the distribution files.  
   b. Run the `p3db --rep-pause` CLU command from the scripts directory.  
   c. Run the `p3db --rep-status` CLU command from the scripts directory and verify that replication is in *pause* state.  
   d. Return to the standby machine.  
  This step is applicable only when upgrading the first Subscriber Manager machine. | — |
| **Step 6** | Run the `cluster-upgrade.sh` script on the standby machine:  
  ```bash  
  # cluster-upgrade.sh [command-options]  
  ```  
  Do not start the SM after running `cluster-upgrade.sh`.  
  For details about the `cluster-upgrade.sh` script, see the “Understanding the Scripts Used During Upgrade” section on page 4-30 | — |
| **Step 7** | Wait until the `cluster-upgrade.sh` script finishes all tasks. | — |
| **Step 8** | Stop the replication and start the SM on the standby machine.  
  The following steps should be performed *only when performing upgrade on the first machine*.  
  a. Stop the SM replication:  
     ```bash  
     # ./p3db --rep-stop  
     ```  
  b. Start the SM:  
     ```bash  
     # ./p3sm --start --wait  
     ```  
  c. Use the `p3sm` CLU command to verify the status of the SM.  
     ```bash  
     -bash-3.1$ p3sm --sm-status  
     ```  
  Because the database schema was changed, there is a need to load the SM for the first time without replicating the changes to the standby machine.  
  The SM boot time after the upgrade will be longer than usual due to the extra time taken to initialize the database indexes.  
  If the SMS-STATUS indicates a failure, *stop the upgrade*. For details on troubleshooting the SM in failure mode, see the *Appendix D, Troubleshooting*.” | — |
| **Step 9** | Run the `install-vcs-agents.sh` script on the standby machine:  
  ```bash  
  # install-vcs-agents.sh [command-options]  
  ``` | — |
### Chapter 4 Installation and Upgrading

#### Upgrading Cluster Setups

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 10</strong></td>
<td><strong>Restart Veritas Cluster Server (VCS) monitoring on the standby machine:</strong>&lt;br&gt; a. Run the following VCS CLU command from /opt/VRTSvcs/bin:&lt;br&gt; <code>bash #/hastart</code>&lt;br&gt; VCS monitoring starts the SM process automatically in the initialization state.&lt;br&gt; b. Use the <code>p3sm</code> CLU command to check whether the SM is up:&lt;br&gt; <code>bash -bash-3.1$ p3sm --sm-status</code>&lt;br&gt; c. Use the <code>p3cluster</code> CLU command to set the SM to the standby state:&lt;br&gt; <code>bash -bash-3.1$ p3cluster --standby</code></td>
<td>The <code>/hastart</code> command starts the replication agent that updates the database schema on the active machine.&lt;br&gt; After this operation is performed, you cannot downgrade to an earlier version.</td>
</tr>
<tr>
<td><strong>Step 11</strong></td>
<td><strong>Continue database replication on the active machine:</strong>&lt;br&gt; a. On the <em>Active</em> machine, change the directory to the location where you extracted the distribution files.&lt;br&gt; b. Run the <code>scripts/p3db --rep-continue</code> CLU command.&lt;br&gt; c. Run the <code>~pcube/sm/server/bin/p3db --rep-status</code> CLU command and verify that replication is in the <em>start</em> state.&lt;br&gt; d. Return to the standby workstation.</td>
<td>This step is applicable only when upgrading the first machine and only if <em>Step 5</em> was performed.</td>
</tr>
<tr>
<td><strong>Step 12</strong></td>
<td><strong>Verify that the changed data has been replicated.</strong>&lt;br&gt; Wait until the replication of all the data that was changed while the upgrade script was running.&lt;br&gt; • On the active Subscriber Manager add a dummy subscriber using the <code>p3subs</code> CLU:&lt;br&gt; <code>bash -bash-3.1$ p3subs --add -s dummySub</code>&lt;br&gt; • On the standby Subscriber Manager, login as <em>root</em> user, and run the <code>p3subs show</code> command:&lt;br&gt; <code>bash # p3subs --show -s dummySub</code></td>
<td>When upgrading the second Subscriber Manager, add a subscriber with a name other than <code>dummySub</code> because you have already added a subscriber with this name while upgrading the first Subscriber Manager.</td>
</tr>
<tr>
<td><strong>Step 13</strong></td>
<td><em>(Optional)</em> Install the MPLS/VPN BGP LEG.</td>
<td>For more information, see the <em>Cisco SCMS SM LEGs User Guide</em>.</td>
</tr>
<tr>
<td><strong>Step 14</strong></td>
<td><strong>Manually trigger a failover using the Veritas Cluster Manager and wait until the standby SM becomes active and the active SM becomes the standby:</strong>&lt;br&gt; Run the following VCS CLU command from /opt/VRTSvcs/bin:&lt;br&gt; <code>bash # hagrp -switch service group name -to System</code></td>
<td>For more information about the <code>hagrp</code> CLU command, refer to your Veritas Cluster Server documentation.&lt;br&gt; After performing the manual failover, the standby SM on which you perform the upgrade procedure becomes the active SM. The previously active SM becomes the new standby SM.</td>
</tr>
<tr>
<td><strong>Step 15</strong></td>
<td><strong>Repeat the upgrade procedure on the standby SM.</strong>&lt;br&gt; To upgrade the second SM, repeat the procedure from <em>Step 2</em>. But, do not perform <em>Step 5</em>, <em>Step 8</em>, and <em>Step 11</em>.</td>
<td>—</td>
</tr>
</tbody>
</table>
Upgrade Cluster Setups

Chapter 4 Installation and Upgrading

Step 16

Upgrade the database replication protocol version:

a. Stop VCS monitoring of the standby SM.
   Use the following VCS CLU command from /opt/VRTSvcs/bin:
   
   ```
   #./hastop -local
   ```

b. Change the replication protocol.
   On the standby SM, run the following CLU command:
   
   ```
   # p3db --upgrade-rep-protocol
   ```

c. Restart VCS monitoring.
   From the /opt/VRTSvcs/bin folder, run the following VCS CLU command:
   
   ```
   #./hastart
   ```
   VCS monitoring starts the SM process automatically in the initialization state.

d. Use the p3cluster CLU command to set the SM to the standby state:

   ```
   -bash-3.1$ p3cluster --standby
   ```

e. Manually trigger a failover using the Veritas Cluster Manager and wait until the standby SM becomes active and the active SM becomes the standby one.

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

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

g. Repeat Step a. to Step f. on the new standby SM.

Perform this operation after both the SMs are upgraded.

Run the commands described in this step as the admin user on both the machines to upgrade the database replication protocol version.

The p3db --upgrade-rep-protocol CLU command performs the following actions:

- Removes the DB security flag
- Stops the SM
- Restarts the DB daemon
- Starts the SM
- Starts SM replication

For more information about the hagrp command, refer to your Veritas Cluster Server documentation.

Step 17

Add a user for PRPC authentication using the p3rpc CLU, for example:

```
-bash-3.1$ p3rpc --set-user --username=username --password=password --remote=OTHER_SM_IP[:port]
```

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

Step 18

Configure the Cisco SCE platforms.

If you have a cascade SCE setup, configure the cascade SCE pair in the p3sm.cfg file. For details, see the “SCE.XXX Section” section on page A-15.

Step 19

Remove the dummy subscribers.
On the new active SM, run the following CLU:

```
-bash-3.1$ p3subs --remove -subscriber=first dummy subscriber name
-bash-3.1$ p3subs --remove -subscriber=second dummy subscriber name
```

After successfully upgrading both the SMs we recommend that you remove the dummy subscribers that were added in order to verify replication during the upgrade.
Upgrading from a Cluster Setup Version 2.x to Version 3.0 or 3.1

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

**Note**

This procedure requires service down time.

The upgrade procedure for upgrading from a cluster setup includes three complex parts:

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

To perform the upgrade on the standby machine, complete the following steps:

**Step 1**

Configure the system kernel configuration file on both machines.

Before starting the upgrade procedure, configure the system kernel configuration file on both machines.

a. Configure the system kernel configuration file on the standby Subscriber Manager.
   
   The configuration procedure is described in Step 3—“Configure the shared memory settings.”

b. Reboot the standby Subscriber Manager.

c. Manually trigger a failover by using the Veritas cluster manager. Wait until the standby Subscriber Manager becomes active and the active Subscriber Manager becomes standby.

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

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

d. Repeat steps a and b on the new standby Subscriber Manager.

**Step 2**

Extract the distribution files.

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

a. Download the distribution files from the Cisco website.

b. Use FTP to load the distribution files to the Subscriber Manager.

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**

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 the “Uninstalling VCS Agents” section on page 4-41. The resource names to use are PcubeSm, OnOnlyProcess, and TimesTenRep.

c. Stop the VCS monitoring of the Subscriber Manager.

Issue the following VCS CLU command from `/opt/VRTSvcs/bin` to stop VCS monitoring:
Disabling state exchange:

Step 4: Disable state exchange.

Disable the state exchange between the Subscriber Manager and the SCE platform by editing the Subscriber Manager configuration file (`p3sm.cfg`) and setting `save Subscriber state=false`. Then, load the configuration file by issuing the following command:

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

**Note**

You must run this CLU as user `pcube`.

```
-bash-3.1$ p3sm --load-config
```

Step 5: Drop the old replication scheme.

Use the following CLU:

```
-bash-3.1$ p3sm --drop-rep-scheme
```

**Note**

You must run this CLU as user `pcube`.

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 3—“Configure the shared memory settings.” For more information, see Step 4—“Edit the `install-def.cfg` file.” Run the `upgrade-sm.sh` script.

For more information, see Step 4—“Run the `upgrade-sm.sh` script.”

Step 7: Upgrade the application and LEGs.

Perform the specific upgrade instructions for your application or LEGs.

Step 8: Configure the replication scheme.

Configure the replication scheme for the data store replication on the redundant machine by using the following CLU:

```
-bash-3.1$ p3sm --set-rep-scheme
```

**Note**

You must run this CLU as user `pcube`.

Step 9: Install the VCS agents and then configure and restart VCS monitoring.

- **a.** Install the Subscriber Manager VCS agents.
  
  Installing the Subscriber Manager VCS agents is described in the “Installing Subscriber Manager Cluster Agents” section on page 4-22.

- **b.** Configure the VCS.
  
  Configuration of the VCS is described in Appendix E, “Veritas Cluster Server.”

- **c.** Restart VCS monitoring.
  
  Run the following VCS CLU command from `/opt/VRTSvcs/bin`:
  ```
  #./hastart
  ```

Step 10: Remove obsolete state information.
Remove any obsolete subscriber state information by running the Subscriber Manager CLU as `pcube` user:

```
-bash-3.1$ p3subsdb --clear-all-states
```

### Step 11
Remove obsolete subscriber properties. (Method A)

Remove any obsolete subscriber properties.

**Note**

You must run all CLU commands as user `pcube`.

1. Export any existing subscribers to a CSV file.
   
   ```
   -bash-3.1$ p3subsdb --export -o csv-file
   ```

2. Clear the subscriber database.
   
   ```
   -bash-3.1$ p3subsdb --clear-all
   ```

3. Remove any obsolete properties from the csv-file.
   
   See Table 4-15 for a list of properties to remove.

4. Import the subscribers from the revised file.
   
   ```
   -bash-3.1$ p3subsdb --import -f csv-file
   ```

### Step 12
Remove obsolete subscriber properties. (Method B)

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

**Note**

You must run all CLU commands as user `pcube`.

1. Remove the obsolete properties from the Subscriber Manager database by running the `p3subsdb` command.
   
   ```
   -bash-3.1$ p3subsdb --remove-property --property=prop
   ```

   The obsolete properties to remove are listed in Table 4-15.

2. Resynchronize all SCEs.
   
   ```
   -bash-3.1$ p3sm --resync-all
   ```

### Step 13
Manually trigger a failover.

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

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

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

### Step 14
Repeat the upgrade procedure on the standby Subscriber Manager.

After performing the manual failover (see Step 13—“Manually trigger a failover.”), the standby Subscriber Manager on which you perform the upgrade procedure becomes the active Subscriber Manager. The previously active Subscriber Manager becomes the new standby Subscriber Manager.

To upgrade the second Subscriber Manager, repeat the procedure from Step 2—“Extract the distribution files” by Step 11—“Remove obsolete subscriber properties.”
### Upgrading Cluster Setups

**Step 15** Add a user for PRPC authentication.

Add a user for PRPC authentication because SCA BB requires a username and password when connecting to the Subscriber Manager.

To add a user for PRPC authentication, run the `p3rpc` CLU as in the following example:

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

**Step 16** Configure the SCE platforms

If you are using a cascade SCE topology, configure the cascade SCE pair in the `p3sm.cfg` file as described in the “SCE.XXX Section” section on page A-15.

---

### 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 by running the `p3subsdb` CLU.

```
-\$ p3subsdb --export --output=filename
```

**Step 2** Destroy the database by running the `p3db` CLU.

```
-\$ p3db --destroy-rep-db
```

**Step 3** Restart the Subscriber Manager.

```
-\$ p3sm --restart
```

**Step 4** Import the subscribers back into the database by running the `p3subsdb` CLU.

```
-\$ p3subsdb --import --file=filename from Step 1
```

**Note**

This procedure requires system downtime because the Subscriber Manager database is deleted. Moreover, after the restart, all the Cisco SCE devices automatically lose all the subscriber information; this information gets restored only after the subscribers are imported back into the Subscriber Manager database.
Database Performance Recommendations

In Cisco SCE Release 3.8.0, a Subscriber Manager database guideline pertaining to the checkpoint-data-source and checkpoint-transaction-logs files is available to prevent disk contention between them. Placing these two files in two separate disks enables faster processing of login and logout events in LEG, and other SM processes. To configure the new feature, follow these steps:

**Step 1** Place the checkpoint-data-source file and the checkpoint-transaction-logs files on two different disks that are different from the one in which SM is installed:


   Add the LogDir parameter if it does not already exist in the sys.odbc.ini file.


   Changing the location of the checkpoint-transaction-logs file and the checkpoint-data-source file will prevent the occurrence of disk contention between these files and allow the transaction log buffer to write to the disk faster.

**Step 2** Increase the size of SM log file from 20 MB to 64 MB by modifying the LogFileSize parameter in the /var/TimesTen/sys.odbc.ini file.

This example shows how to edit the /var/TimesTen/sys.odbc.ini file:

```
[PCube_SM_Repository]
...
DataStore=/checkpoint/PCube_SM_Repository
LogDir=/TimesTenLog
LogFileSize=64
...
[PCube_SM_Local_Repository]
...
DataStore=/checkpoint/PCube_SM_Local_Repository
LogDir=/TimesTenLog
LogFileSize=64
```
Downgrading Subscriber Manager

This section describes the procedure for downgrading the Subscriber Manager to a previous version.

Step 1  Perform the uninstall procedure described in the “Uninstalling Subscriber Manager” section on page 4-40.

Step 2  Perform the installation procedure described in “Installing the Subscriber Manager” section on page 4-13.

Note  The upgrade-sm.sh and cluster-upgrade.sh upgrade scripts do not support Subscriber Manager downgrade.

Uninstalling Subscriber Manager

- Uninstalling Subscriber Manager, page 4-40
- Uninstalling VCS Agents, page 4-41

Uninstalling Subscriber Manager

uninstall-sm.sh Script

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

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

Table 4-17 lists the command options.

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>Do not remove Subscriber Manager database.</td>
</tr>
<tr>
<td>-h</td>
<td>Shows the help message</td>
</tr>
</tbody>
</table>

The script performs the following actions:

- Stops the Subscriber Manager.
- 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 Subscriber Manager database.
- Removes the Subscriber Manager directories and boot files.
- Removes the Java that was installed as part of the Subscriber Manager installation.
Chapter 4 Installation and Upgrading

Uninstalling Subscriber Manager

Step 1 If you are using a cluster topology, stop the VCS monitoring of the Subscriber Manager.
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 more information, see the “uninstall-sm.sh Script” section on page 4-40

Step 3 If you are using a cluster topology, start the VCS monitoring.
Start the VCS monitoring by running the following VCS CLU command from /opt/VRTSvcs/bin:

# ./hastart

Step 4 If you are using a cluster topology, remove the Veritas Cluster agents.
Removal of the Veritas Cluster agents is described in the “Uninstalling VCS Agents” section on page 4-41.
Remove the following resource names: OnOnlyProcess, SubscriberManager, and TimesTenRep.

Step 5 Remove the pcube user by running the userdel command as follows:

# userdel -r pcube

Note If you chose to keep Subscriber Manager database installed, do not remove the pcube user.

Uninstalling VCS Agents

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

Step 1 Remove the VCS agents by using the Veritas Cluster Manager or by using the hares CLU.
You can remove the VCS agents by using the Veritas Cluster Manager or the following CLU:

# hares -delete TimesTenDaemon
# hares -delete SM
# hares -delete ReplicationAgent
# hares -delete Network-NICs
# hares -delete Network-VIP

The resource names in your system might have different names. Issue the command hares -list command to see the existing resource names.

Step 2 Remove the VCS resource types by running the hatype CLU.
The type names in your system might have different names. Issue the command 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.

Issue the following command to delete the VCS agent:

```bash
# rm -rf /opt/VRTSvcs/bin/OnOnlyProcess
# rm -rf /opt/VRTSvcs/bin/SubscriberManager
# rm -rf /opt/VRTSvcs/bin/TimesTenRep
```
CHAPTER 5

Configuration and Management

Published: December 23, 2013

Introduction

This chapter describes how to configure and manage the Subscriber Manager.

- Subscriber Manager Configuration and Management Methods, page 5-1
- Configuring the Subscriber Management Solution, page 5-4
- Using the Command-Line Utilities, page 5-13

Subscriber Manager Configuration and Management Methods

Configure and manage the Subscriber Manager by using configuration files and command-line utilities.

- Configuration Files—Enable configuring the parameters that define the system behavior.
- Command-Line Utilities—Enable viewing subscriber management.

The configuration file and Command-Line Utilities (CLU) enable you to control the Subscriber Manager, which includes subscriber management, database management. The configuration file and CLU also enable you to perform Service Control Engine (SCE) network configuration and management.

Configuration Files

The Subscriber Manager has a set of configuration files, located in ~pcube/sm/server/root/config/.

- p3sm.cfg—Main Subscriber Manager configuration file. For a detailed description of the configuration file parameters, see the Configuration File Options, page A-1.
- p3qm.cfg—Main Quota Manager configuration file. For more information, see the “Configuring the Quota Manager” chapter in the Cisco Service Control Management Suite Quota Manager User Guide.
- vlink.cfg—Virtual Link Manager (VLM) configuration file. For more information, see the “Configuring the Solution” chapter in the Cisco Service Control for Managing Remote Cable MSO Links Solution Guide.
• dhcp_pkg.cfg—Policy configuration file for DHCP integration. This file is used by the Lease Query LEG and the DHCP Sniffer LEG. For more information, see the “Configuring the SCE-Sniffer DHCP LEG” chapter in the Cisco SCMS SM LEGs User Guide.

• dhcpsnif.cfg—The DHCP Sniffer LEG configuration file. For more information, see the “Configuring the SCE-Sniffer DHCP LEG” chapter in the Cisco SCMS SM LEGs User Guide.

• dhcpv6snif.cfg—The DHCPv6 Sniffer LEG configuration file. For more information, see the “Configuring the SCE-Sniffer DHCPv6 LEG” chapter in the Cisco SCMS SM LEGs User Guide.

• leaseq.cfg—DHCP Lease Query LEG configuration file. For more information, see the “Subscriber Manager Integration - Configuration” chapter in the Cisco SCMS SM LEGs User Guide.

• leaseqv6.cfg—DHCPv6 Lease Query LEG configuration file. For more information, see the “Subscriber Manager Integration - Configuration” chapter in the Cisco SCMS SM LEGs User Guide.

• rad_snif.cfg—RADUS Sniffer LEG configuration file. For more information, see the “Configuring the SCE-Sniffer RADIUS LEG” chapter in the Cisco SCMS SM LEGs User Guide.

• soap_leg.cfg and soap_pkg.cfg—SOAP LEG configuration files. For more information, see the “Configuring the SOAP LEG” chapter in the Cisco SCMS SM LEGs User Guide.

• ipdr.cfg—IPDR LEG configuration files. For more information, see the “Configuring the IPDR LEG” chapter in the Cisco SCMS SM LEGs User Guide.

The configuration files and command-line utilities enable you to configure all the parameters that define the behavior of the Subscriber Manager application. (See Appendix B, “Command-Line Utilities.”)

Each configuration file is comprised of sections. A unique name identifies each section. The name of the section appears in square brackets as in the following example:

```
[SM General]
```

Each section contains several parameters. Each parameter is defined as a key=value pair, as in the following example:

```
[SM General]
introduction_mode=push
```

---

**Note**

The equal sign (=) is a key-value separator in the configuration file. To use the equal sign as part of the value, you must insert a backslash (\) before it, as in the following example:

```
[Sample Section]
key=value1=value2
```

The p3sm.cfg configuration file contains the following types of parameters:

• General, systemwide parameters, such as subscriber state saving, persistency, subscriber introduction mode (Pull mode or Push mode), and topology

• Parameters for managing Subscriber Manager-LEG connection failure

• Parameters for managing Subscriber Manager-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 Subscriber Manager operation with the Subscriber Manager database

Usually, you specify the parameters in the configuration file once when setting up the system. The parameters are then valid throughout the lifetime of the system. To modify the configuration file parameters, edit the file using any text editor. Reload the configuration file by using the CLU (see the “Reloading the Subscriber Manager Configuration (p3sm)” section on page 5-15). You can load the configuration file when you start or restart the Subscriber Manager or by explicitly running the CLU command.

The configuration file is designed so that you can use the same configuration file in multiple Subscriber Manager applications of a high availability setup. This enables you to replicate the configuration by copying the file from one machine to another.

**Command-Line Utilities**

The Subscriber Manager provides a set of Command-Line Utilities (CLU), which you can use in addition to the configuration file to configure the parameters that might change during the operation of the Subscriber Manager.

The CLU enables you to configure the Subscriber Manager by using shells that are installed on the machine. You can execute CLU commands are executable only when you are logged in to the machine. You must access the pcube user account, which is always installed (see Chapter 4, “Installation and Upgrading.”) Use the CLU mainly for viewing and for subscriber management.

In high availability setups, you cannot use the CLU to perform subscriber management operations on the standby Subscriber Manager. The standby Subscriber Manager refreshes the database before performing subscriber display operations, so the operation takes longer (than for the active Subscriber Manager). Therefore, you should perform all subscriber operations on the active Subscriber Manager.

This chapter 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 the “Command-Line Utilities” section on page 5-3.

**Establishing a Subscriber Management Solution**

This section describes establishing a Cisco Service Control deployment consisting of several SCE platforms and Subscriber Manager systems in order to prepare the system for subscriber integration.

This section uses the terminology and tools explained in previous chapters. This section also refers to terms and configuration tools described in the SCE 1000 and SCE 2000 User Guides.

• Configuring the Subscriber Management Solution, page 5-4
• System Configuration Examples, page 5-8
Configuring the Subscriber Management Solution

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

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

You can divide every subscriber management solution into such groups. You can apply this procedure 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 Subscriber Manager applications in your network are installed as explained in Chapter 4, “Installation and Upgrading.”
- The Cisco Service Control Application for Broadband (SCA BB) is installed on all SCE platforms in your network. See the Cisco Service Control Application for Broadband User Guide for instructions on installing the Service Control Application on the SCE platforms.

Note: Login Event Generators and the SCA BB application are installed by default on the Subscriber Manager.

- The subscriber integration concept has been determined and an appropriate solution was designed for driving subscriber mappings and policy information into the Subscriber Manager. 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 Subscriber Manager system, based on the number of subscribers that the relevant SCE platforms should be serving.
- The association between SCE platforms and the relevant Subscriber Manager systems has been determined.
- For each Subscriber Manager system, the association between the SCE platforms that it serves and the subscriber domains has been designed.

Step 1: Edit the Subscriber Manager 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 Subscriber Manager.

After the physical installation of an SCE platform (connection to the management network), you must explicitly add it to the Subscriber Manager list, or repository, of existing SCE platforms before the Subscriber Manager will recognize it. Conversely, if you remove an SCE platform from that list, the Subscriber Manager 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:
Chapter 5 Configuration and Management

Configuring the Subscriber Management Solution

- **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 the SCE platform connects. The default is 14374.

To view the SCE platforms, use the `p3net` CLU. See “The `p3net` Utility” section on page B-12.

For more information, see the “SCE.XXX Section” section on page A-15.

a. Configure the SCE.XXX sections to add the SCE Platform to the repository.

b. Load the SCE configuration to the Subscriber Manager using the `p3sm` CLU.

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

c. Verify that the SCE platform was successfully connected.

```bash
p3net --show
```

d. Verify your configuration when you are finished.

```bash
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, 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. Before adding an SCE platform to a domain, you must add the SCE platform to the SCE platform repository.

**Note**

The Subscriber Manager 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:

- **subscriber_ipv6_prefixes=IPv6 Prefix 1, [IPv6 Prefix 2,...]**
  Defines the list of prefixes to be used in the pull lookup operation when an IPv6 pull request notification is received by the Cisco Service Control Subscriber Manager. For more than one prefix, separate the values using a coma (,). Possible value range is from 32 to 64. The default value is 64. Lookup order is always from the higher prefixes to lower prefixes. The changes takes effect only after a Cisco Service Control Subscriber Manager restart.

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

- **aliases=alias_name1[,alias_name2,...]**
  Defines domain aliases. When the subscriber manager receives information 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 is put in this domain.

**Note**

Only one domain 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 Subscriber Manager, 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 “The p3domains Utility” section on page B-8.

For more information, see the “Domain.XXX Section” section on page A-6.

**Step 4**

Configure the Subscriber Manager General section.

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

- `introduction_mode`
  
  Defines whether the Subscriber Manager 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 parameter to true for cases in which several LEG components can update subscribers simultaneously.

- `force_subscriber_on_one_sce`
  
  Defines whether the Subscriber Manager supports the solution in which 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 Subscriber Manager 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.

  **Note**

  When `support_ip_ranges` is set to ‘true,’ set the `force_subscriber_on_one_sce` parameter to ‘false’ or use a different load-balancing scheme on the Cisco 7600/6500.

- `logon_logging_enabled`
  
  Defines whether to enable the logging of subscriber log in events.

To view the Subscriber Manager settings, use the **p3sm** CLU. See “The p3sm Utility” section on page B-17.

  **Note**

  Setting `logon_logging_enabled` to `true` causes performance degradation. For additional information, see the “Subscriber Manager General Section” section on page A-2.

**Step 5**

Configure the Data Repository section.

The Data Repository section defines the Subscriber Manager operation with the Subscriber Manager database In-Memory Database, via the following parameters:

- `support_ipRanges`
Chapter 5 Configuration and Management

Configuring the Subscriber Management Solution

Defines whether the Subscriber Manager supports IP-Ranges.

**Note**
Disabling this support provides better performance.

- `checkpoint_interval_in_seconds`  
  Defines the interval, in seconds, for calling the Subscriber Manager database 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 Subscriber Manager 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 processing pull requests.

For more information, see the “Data Repository Section” section on page A-18.

**Step 6**  
Configure the High Availability section.

The High Availability section defines the type of topology in which the Subscriber Manager should work, via the parameter:

- `topology`  
  Defines the topology type in which the Subscriber Manager will work (cluster or standalone).

For more information, see the “Subscriber Manager High Availability Setup Section” section on page A-4.

**Step 7**  
Import subscribers to the Subscriber Manager from a CSV file.

Perform this step only when you are integrating manually, or when you perform a setup prior to the beginning of the automatic integration.

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

In most cases, when importing csv files, you should use the `p3subsdb --import` CLU command. When integrating with a cable AAA system and working in the CPE as Subscriber mode, importing cable modems requires the `p3cable --import-cm` CLU command. (see Appendix C, “CPE as a Subscriber in a Cable Environment.”)

**Step 8**  
Configure the SCE platforms

Perform this step only when you use the Pull mode to introduce subscribers, or when you perform a special operation on Subscriber Manager-SCE connection failure. Use the SCE platform Command-Line Interface (CLI) to configure several configuration parameters, according to the following explanation.

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 assigned 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 Subscriber Manager. 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. Any subscriber that does not generate traffic during this timeout interval is automatically logged out from the SCE.

- **Subscriber Manager-SCE connection failure**

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

The SCE has several alternatives for managing connection failures:

- 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 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
- Subscriber Manager fail-over scenario
Automatic Introduction of Subscribers, with Push Mode and Fail-Over of SCE Platforms

The example in this section assumes that the following conditions of the system are established:

- 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 Subscriber Manager.
- The Subscriber Manager is operating in Push mode.
- The application that is used includes states that should be preserved such as volume quota states in the Cisco Service Control Application for Broadband (Cisco SCA BB).

Figure 5-1  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 you configure the Subscriber Manager.

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

1. Edit the Subscriber Manager configuration file to add the SCE devices to the SCE device repository and group the SCE devices to domains as depicted in Figure 5-1.
2. Edit the Subscriber Manager configuration file as shown in Table 5-1.
3. Reload the Subscriber Manager configuration file using the p3sm CLU.
4. Import the cable modems to the Subscriber Manager database using the p3cable CLU.

This scenario does not need an SCE platform configuration.
### Table 5-1 Configuration File Parameters for Automatic Integration with Push Mode in a Cable Environment

<table>
<thead>
<tr>
<th>Section and Parameter</th>
<th>Value and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subscriber Manager General</strong></td>
<td></td>
</tr>
<tr>
<td>introduction_mode</td>
<td>push</td>
</tr>
<tr>
<td><strong>High Availability Setup</strong></td>
<td></td>
</tr>
<tr>
<td>topology</td>
<td>standalone</td>
</tr>
<tr>
<td></td>
<td>Set to standalone because the described scenario has just one Subscriber Manager.</td>
</tr>
<tr>
<td><strong>Subscriber Manager-LEG Failure Handling</strong></td>
<td></td>
</tr>
<tr>
<td>timeout</td>
<td>300 seconds (more tolerance might be advisable for Subscriber Manager-LEG failures in actual configurations)</td>
</tr>
<tr>
<td>clear_all_mappings</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>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 a Subscriber Manager-LEG connection failure. Therefore you ought to clean their mappings when the Subscriber Manager and LEG are reconnected.</td>
</tr>
<tr>
<td><strong>LEG-Domain Association</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;LEG name&gt;</td>
<td>Define associations between LEGs and domains. LEG-Domain associations should be defined in order so that all subscriber mappings are cleared on Subscriber Manager-LEG disconnection. If no association is defined, subscriber mappings will not be cleared (the clear_all_mappings value will be ignored).</td>
</tr>
<tr>
<td><strong>Default Domains Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>property</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Configure the policy here if all domains in the system have the same policy.</td>
</tr>
<tr>
<td><strong>Domain.XXX</strong></td>
<td></td>
</tr>
<tr>
<td>aliases</td>
<td>Define aliases to facilitate working in a cable environment. Define aliases if you are working with LEGs that are not aware of system domains. Alternatively, you can define domains with names that match values produced by LEGs.</td>
</tr>
<tr>
<td>property</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Configure the policy here only if you want it to be applied to all subscribers in the domain.</td>
</tr>
<tr>
<td>allow_dynamic_CM</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Set to no to prevent uninstalled cable modems from using the network.</td>
</tr>
<tr>
<td><strong>Auto Logout</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 5-1 Configuration File Parameters for Automatic Integration with Push Mode in a Cable Environment (continued)

<table>
<thead>
<tr>
<th>Section and Parameter</th>
<th>Value and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto_logout_interval</td>
<td>60 minutes</td>
</tr>
<tr>
<td></td>
<td>Assuming that the AAA system cannot provide logout events, activate auto-logout, which is necessary in cable environments. The value you specify should be smaller than the CPE lease time in this cable environment.</td>
</tr>
<tr>
<td>grace_period</td>
<td>10 seconds</td>
</tr>
<tr>
<td></td>
<td>Specify a relatively high value to eliminate mistakes because of management network delays.</td>
</tr>
<tr>
<td>max_rate</td>
<td>100 logouts per second</td>
</tr>
<tr>
<td></td>
<td>Specify a value similar to the max-login rate to the Subscriber Manager.</td>
</tr>
</tbody>
</table>

Manual Introduction of Subscribers with Pull Mode

The example in this section assumes that the following conditions of the system are established:

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

Note

Ensure everything is properly installed before you configure the Subscriber Manager.

Figure 5-2 Topology with Manual Introduction of Subscribers and Pull Mode

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

1. Edit the Subscriber Manager configuration file to add the SCE devices to the SCE device repository and group the SCE devices to domains as depicted in Figure 5-2.
2. Edit the Subscriber Manager configuration file as shown in Table 5-2.

3. Reload the Subscriber Manager configuration file using the `p3sm` CLU.

4. Import the subscribers to the Subscriber Manager database by using the `p3subdb` CLU (required for manual integration; there is no other way to bring subscribers into the Subscriber Manager).

5. Use the SCE platform CLI to configure the system for Pull mode:
   - Subscriber templates—According to the application
   - Anonymous groups—According to the network and subscribers
   - Introduced subscriber aging—According to the network and IP address allocation scheme

### Table 5-2 Configuration File Parameters for Manual Integration with Pull Mode

<table>
<thead>
<tr>
<th>Section and Parameter</th>
<th>Value and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscriber Manager General</td>
<td></td>
</tr>
<tr>
<td><code>introduction_mode</code></td>
<td>Pull</td>
</tr>
<tr>
<td>High Availability Setup</td>
<td></td>
</tr>
<tr>
<td><code>topology</code></td>
<td>Standalone, set to standalone because the described scenario has just one Subscriber Manager.</td>
</tr>
<tr>
<td>Subscriber Manager-LEG Failure Handling</td>
<td></td>
</tr>
<tr>
<td><code>timeout</code></td>
<td>Not applicable—No LEGs are involved in the scenario (use default—60 seconds)</td>
</tr>
<tr>
<td><code>clear_all_mappings</code></td>
<td>Not applicable—No LEGs are involved in the scenario (use default—no action)</td>
</tr>
<tr>
<td>LEG-Domain Association</td>
<td></td>
</tr>
<tr>
<td><code>&lt;LEG name&gt;</code></td>
<td>Not applicable—No LEGs are involved in the scenario (Use default—no mappings)</td>
</tr>
<tr>
<td>Default Domains Configuration</td>
<td></td>
</tr>
<tr>
<td>Default policy (property.XXX)</td>
<td>None</td>
</tr>
<tr>
<td>Configure the policy here if all domains in the system have the same policy.</td>
<td></td>
</tr>
<tr>
<td>Domain.XXX</td>
<td></td>
</tr>
<tr>
<td><code>aliases</code></td>
<td>Not applicable (use default—none)</td>
</tr>
<tr>
<td><code>property.XXX</code></td>
<td>None</td>
</tr>
<tr>
<td>Configure the policy here only if you want it to be applied to all subscribers in the domain.</td>
<td></td>
</tr>
<tr>
<td><code>allow_dynamic_CM</code></td>
<td>Not applicable—valid for cable environment only (use default – no)</td>
</tr>
<tr>
<td>Auto Logout</td>
<td></td>
</tr>
<tr>
<td><code>auto_logout_interval</code></td>
<td>Not applicable (use default—0)</td>
</tr>
<tr>
<td><code>grace_period</code></td>
<td>Not applicable (use default—10)</td>
</tr>
<tr>
<td><code>max_rate</code></td>
<td>Not applicable (use default—50)</td>
</tr>
</tbody>
</table>
Subscriber Manager Fail-over Configuration (General)

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

- The topology parameter in the Subscriber Manager High Availability section of the configuration file should be set to cluster for both Subscriber Manager machines. (See “Subscriber Manager High Availability Setup Section” section on page A-4.)

In addition to that exception, configure Subscriber Manager fail-over normally via the p3sm.cfg configuration file. Manually copy the configuration file from the active Subscriber Manager to the standby Subscriber Manager.

For additional information on configuring the VCS, see Appendix E, “Veritas Cluster Server.”

Using the Command-Line Utilities

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

Note

You can specify some CLU operations and options with abbreviations. For the abbreviations and additional information about the CLU, see Appendix B, “Command-Line Utilities.”

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

- p3batch
- p3cable
- p3clu
- p3cluster
- p3db
- p3dhcpsniff
- p3domains
- p3ftp
- p3http
- p3inst
- p3ipdr
- p3leasequery
- p3log
- p3net
- p3qm
- p3qrdr
- p3radius
- p3radiussniff
- p3rdr
- p3rpc
- p3sm
- p3soap
- p3subs
- p3subssdb
- p3vlink
- p3vpn

This section contains the following topics:

- Informative Output, page 5-14
- Parsing CLU Operations and Options, page 5-14
- Reloading the Subscriber Manager Configuration (p3sm), page 5-15
Informative Output

All CLU commands support the following operations for informative output:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--help</td>
<td>Prints the help for the specified CLU command, then exits.</td>
</tr>
<tr>
<td>--version</td>
<td>Prints the Subscriber Manager program version number, then exits.</td>
</tr>
</tbody>
</table>

Parsing CLU Operations and Options

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

- Space character
- Separation sign (comma “,”; ampersand “&”; colon “;”)
- Escape character (backslash “\”)

You must insert an escape character before any of the following characters in a command operation or option:

- Equal sign (=)
- Quotation mark ("or")
- Escape character (backslash "\")

Table 5-3 presents several examples of the preceding rules.
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.

Table 5-3 Parsing CLU Operations, Options, and Examples

<table>
<thead>
<tr>
<th>Operation/option contains the character</th>
<th>Example of how to write operation/option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space character</td>
<td>--property=&quot;filename&quot;</td>
</tr>
<tr>
<td>Escape character (backslash “\”)</td>
<td>--property=&quot;good\bad&quot;</td>
</tr>
<tr>
<td>Equal sign (=)</td>
<td>--property=&quot;x=y&quot;</td>
</tr>
<tr>
<td>Quotation marks (“or”)</td>
<td>--name=&quot;&quot;myQuotedName&quot;&quot;</td>
</tr>
<tr>
<td>(in the preceding example, inner quotation marks are escaped)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Separation characters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>comma (,)</td>
<td>--names=&quot;x,y&quot;</td>
</tr>
<tr>
<td>ampersand (&amp;)</td>
<td>--names=&quot;x&amp;y&quot;</td>
</tr>
<tr>
<td>colon (: )</td>
<td>--names=&quot;myHost:myDomain&quot;</td>
</tr>
</tbody>
</table>

One-letter abbreviations are useful if you want to specify an expression to be expanded by the UNIX shell, as in the following example:

```
p3subsdb --import –f ~pcube/file.csv
```

~pcube will be expanded by the UNIX shell

**Reloading the Subscriber Manager Configuration (p3sm)**

Use the p3sm utility to configure the Subscriber Manager by reloading the Subscriber Manager 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 Subscriber Manager configuration updated.

The --remote option loads the configuration first to the local Subscriber Manager, and afterward to the remote Subscriber Manager (in High Availability setups).
Managing the Subscriber Manager (p3sm)

Use the `p3sm` utility to manage the Subscriber Manager. The `p3sm` utility enables you to start, stop, and resynchronize the Subscriber Manager.

**Step 1**

From the shell prompt, enter a command of the format `p3sm operation [--ne-name=SCE NAME]`. For a complete list of `p3sm` operations and options, see “The p3sm Utility” section on page B-17.

**Examples for Managing the Subscriber Manager**

- Stopping and Restarting the Server: Example, page 5-16
- Resynchronizing an SCE, page 5-16
- Extracting Support Information, page 5-16

**Stopping and Restarting the Server: Example**

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

```
p3sm --restart
```

**Resynchronizing an SCE**

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

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

**Extracting Support Information**

The following example shows how to extract the Subscriber Manager support information to a file named `support.zip`.

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

Managing Subscribers, Mappings, and Properties

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.

- Using the p3subs Utility for Managing Subscribers, Mappings, and Properties, page 5-16
- Managing Subscribers, Mappings, and Properties—Examples, page 5-17

**Using the p3subs Utility for Managing Subscribers, Mappings, and Properties**

**Step 1**

From the shell prompt run the `p3subs` CLU command.

The command should be in the following general format:
Managing Subscribers, Mappings, and Properties

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=xyz --ip=96.142.12.7
```

Example 2:
The following example shows how to overwrite subscriber information. Because the subscriber named “xyz” already exists, the add operation would fail; however, the overwrite option enables you to overwrite IP address.

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

Managing Mappings

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

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

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. Enter a range to specify several consecutive mappings. For example, the notation 1.1.1.0/30 specifies 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=xyz
```

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 Subscriber Manager. It does not clear the applicative state record in the SCE platform.

```
p3subs --clear-state --subscriber=xyz
```

Managing VPN Entities

Note

VPN and VLAN are not supported for IPv6 subscribers.

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 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 “The p3vpn Utility” section on page B-33.

Managing VPN Entities—Examples

Insertion of a VPN Using a VLAN-ID: Example

The following 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

The following 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

Use the p3subsd utility to manage the Subscriber Manager database. You can import subscriber information for a group of subscribers from a CSV file into the Subscriber Manager database. You can also export subscriber information from the Subscriber Manager 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 complete list of p3subsd operations and options, see “The p3subsd Utility” section on page B-26.

Step 1

From the shell prompt, enter a command of the format p3subsd operation [--domain=domain-name] [filename]

Managing the Subscriber Database—Examples

List all Subscribers: Example

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

p3subsd --show-domain --domain=mainDomain

Importing Subscribers from a CSV File: Example

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

p3subsd --import --file=goldSubscriberFile.csv

Exporting Subscribers to a CSV File: Example

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

p3subsd --export --prefix=a --output=silverSubscriberFile.csv

Viewing and Connecting Network Elements

Use the p3net utility to view the connection status of network elements and to try to reconnect disconnected elements.

For a complete list of p3net operations and options, see “The p3net Utility” section on page B-12.

Step 1

From the shell prompt, enter a command of the format p3net operation [--name=logical-name].

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

p3net --show --name=mainNE
Viewing Subscriber Domains

Use the `p3domains` utility to view the subscriber domains. As explained in the “Cisco Service Control Subscriber Manager Overview” section on page 2-1, subscriber domains are groups of SCE devices that serve the same subscribers.

For a complete list of `p3domains` operations and options, see “The p3domains Utility” section on page B-8.

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

Managing the Cable Support Module (p3cable)

Use the `p3cable` utility to manage the cable support module.

Managing the Cable Support Module

In the cable environment, the Subscriber Manager supports two modes of operation: Cable Modem as Subscriber and CPE as Subscriber, as described in Appendix C, “CPE as a Subscriber in a Cable Environment.”

This section describes 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 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 Appendix C, “CPE as a Subscriber in a Cable Environment.”)

Use the `p3cable` utility commands to import cable modem information from a CSV file to the Subscriber Manager, and to export the cable modem information from the Subscriber Manager 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; that is, cable modems that do not exist in the Subscriber Manager database. However, for specifying whether to allow or deny such a login, use the Cable Adapter section of the `p3sm.cfg` configuration file. (See the “Cable Adapter Section” section on page A-17.)

For a complete list of `p3cable` operations and options, see “The p3cable Utility” section on page B-5.

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

Managing the Cable Support Module—Examples

This section presents examples of tasks for managing a cable support module.
Importing Cable Modems from a CSV File

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

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

Clearing the Repository

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

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

Displaying the Login Status of CPEs

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

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

Viewing Information of the PRPC Interface Server (p3rpc)

Cisco provides a proprietary remote procedure call (PRPC) interface to the Subscriber Manager. Use the `p3rpc` utility to view the configuration and statistics of the PRPC server.

For a complete list of `p3rpc` operations and options, see “The p3rpc Utility” section on page B-16.

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

Examples for Viewing Information of the PRPC Interface Server

The following example displays the statistics of the PRPC server.

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

Managing a Cluster of Two Subscriber Manager Nodes (p3cluster)

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

For a complete list of `p3cluster` operations and options, see “The p3cluster Utility” section on page B-6.

**Step 1** From the shell prompt, enter a command of the format `p3cluster operation`.
Examples for Managing a Cluster of Two Subscriber Manager Nodes

The following example displays the redundancy status of the Subscriber Manager 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 Subscriber Manager user log. You can extract the contents of the user log to a specified file to read and save its contents. You can also clear the user log.

For a complete list of `p3log` operations and options, see “The p3log Utility” section on page B-12.

**Step 1**

From the shell prompt, enter a command of the format `p3log operation`.

Examples for Managing the User Log

The following example shows 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 LEGs User Guide*.

**Step 1**

From the shell prompt, enter a command of the format `p3radius operation`.

Utilities

This section describes the following utilities:

- Running a Batch File (p3batch), page 5-22
- Printing General Help About CLU Commands (p3clu), page 5-23
- Database Operations, page 5-23

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 Subscriber Manager.

For a complete list of `p3batch` operations and options, see “The p3batch Utility” section on page B-4.
Step 1 From the shell prompt, enter a command of the format `p3batch [file-options] [error-options].`

Running a Batch File—Examples

This section presents examples of how to run a batch file.

Running a Batch File (Halt on Error)

The following 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)

The following 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 are listed.

Database Operations

Use the `p3db` utility to manage and monitor the Subscriber Manager database database. The CLU exposes capabilities of some of Subscriber Manager database CLUs for specific needs of the Subscriber Manager.

For a complete list of `p3db` operations and options, see “The p3db Utility” section on page B-7.

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

Examples for Database Operations

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

```
p3db --rep-status
```

<table>
<thead>
<tr>
<th>Peer name</th>
<th>Host name</th>
<th>Port</th>
<th>State</th>
<th>Proto</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCUBE_SM_REPOSITORY</td>
<td>SM_REP1</td>
<td>Auto</td>
<td>Start</td>
<td>11</td>
</tr>
<tr>
<td>Last Msg Sent</td>
<td>Last Msg Recv</td>
<td>Latency</td>
<td>TPS</td>
<td>RecordsPS Logs</td>
</tr>
</tbody>
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<td>Latency</td>
<td>TPS</td>
<td>RecordsPS Logs</td>
</tr>
</tbody>
</table>

---

Cisco Service Control Subscriber Manager User Guide
00:00:02  00:00:00   1.15    2723  5447   1
the subscriber DB is ok
Command terminated successfully
Configuration File Options

Published: December 23, 2013

Introduction

This appendix describes the parameters that you can configure in the Subscriber Manager configuration file. The shorter description of Subscriber Manager configuration provided in Chapter 5, “Configuration and Management” is primarily focused on the routine configuration tasks that can be performed online using the command-line utilities (CLU).

Information About the Configuration File Options

You can configure the Subscriber Manager by using its configuration file only (the CLU is used for displaying, not configuring). The Subscriber Manager has one configuration file, p3sm.cfg, which is located in the directory ~pcube/sm/server/root/config/. To change any configuration parameter, edit the configuration file with a standard text editor, and then use the CLU to reload it (see Reloading the Subscriber Manager Configuration (p3sm), page 5-15).

You can modify the parameters in the p3sm.cfg file to configure the following items:

- Subscriber Manager
- RADIUS Listener configuration
- Redundancy (cluster/standalone)
- Domain
- Service Control Engine (SCE)
- Cable adapter
- Proprietary remote procedure call (PRPC) port
- FTP port
- HTTP port
- Database
- Collection Manager
Configuration File Sections

The Subscriber Manager configuration file `p3sm.cfg` is divided into the following sections.

For definitions of the terms and concepts that appear in the sections of the configuration file, see the “Configuring the Subscriber Management Solution” section on page 5-4.

- Subscriber Manager General Section, page A-2
- Subscriber Manager High Availability Setup Section, page A-4
- Subscriber Manager-LEG Failure Handling Section, page A-4
- LEG-Domains Association Section, page A-5
- Domain.XXX Section, page A-6
- Default Domains Configuration Section, page A-7
- Auto Logout Section, page A-7
- Inactive Subscriber Removal Section, page A-9
- Radius Listener Section, page A-10
- Radius.NAS.XXX Section, page A-10
- Radius.Subscriber Attributes Section, page A-11
- Radius.Subscriber ID Section, page A-12
- Radius.Property.Package Section, page A-13
- RPC.Server Section, page A-14
- MPLS-VPN Section, page A-15
- SCE.XXX Section, page A-15
- FTP Section, page A-16
- HTTP Tech-IF Section, page A-16
- RDR Server Section, page A-17
- Cable Adapter Section, page A-17
- Data Repository Section, page A-18
- CM.XXX Section, page A-20

Subscriber Manager General Section

This section contains the following parameters:

- `introduction_mode`

  Specifies whether the Subscriber Manager 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).

  The valid values for this parameter are `push` and `pull`. The default value is `push`.

  The following example assigns a value to this parameter:

  ```
  introduction_mode=push
  ```
Appendix A Configuration File Options

Configuration File Sections

- **application_subscriber_lock**
  Specifies whether or not to lock subscriber-related operations (login, logout, etc.) at the application level. Set this parameter to `true` only if several LEG applications can simultaneously update the same parameters of a subscriber.

  Valid values for this parameter are `true` and `false`. The default value is `true`.

  The following example assigns a value for this parameter:
  ```
  application_subscriber_lock=true
  ```

- **force_subscriber_on_one_sce**
  Specifies whether or not the Subscriber Manager supports the solution when a Cisco 7600/6500 Router is used for load-balancing among several SCE platforms. In such a solution, when one SCE platform fails, the Subscriber Manager redistributes subscriber traffic to a different SCE platform. The Subscriber Manager 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 mode.

  Valid values for this parameter are `true` and `false`. The default value is `false`.

  **Note**
  To change this value you must restart the Subscriber Manager process.

  The following example assigns a value to this parameter:
  ```
  force_subscriber_on_one_sce=false
  ```

- **logon_logging_enabled**
  Specifies whether or not to enable the logging of subscriber login events.

  **Note**
  Setting this parameter to `true` might cause performance degradation.

  Valid values for this parameter are `true` and `false`. The default value is `false`.

  The following example assigns a value to this parameter:
  ```
  logon_logging_enabled=false
  ```

- **subscriber_id_case_sensitivity**
  This is an optional parameter that specifies whether subscriber IDs are case sensitive or not. If you set this parameter to `no`, all subscriber IDs in the subscriber database are presented in lower-case characters. For example, JohnSmith is converted to johnsmith.

  You are not permitted to set this parameter to `no` if the subscriber database is not empty. If you violate this preclusion, the Subscriber Manager generates an error message and the configuration will not be loaded. You can overcome this limitation in one of the following ways:
  - Export the subscriber database to an external file
  - Clear the subscriber database
  - Change the configuration by setting the parameter to `no` and load the new configuration
  - Import the subscriber database from the external file

  Valid values for this parameter are `yes` and `no`. The default value is `yes`. 
Configuration File Options

Appendix A Configuration File Options

Configuration File Sections

The following example assigns a value to this parameter:

```
subscriber_id_case_sensitivity=yes
```

- **additive_mapping_pull_mode**
  Specifies whether or not to enable single mapping for a subscriber in a Cisco SCE. Possible values are true or false. You can also use yes or no. Setting this parameter to false or no enforces single mapping for subscribers on a Cisco SCE. The default value is true.

  This parameter is applicable only when the Cisco SCE is connected to the Cisco Service Control Subscriber Manager in pull mode.

Subscriber Manager High Availability Setup Section

This section contains the following parameter:

- **topology**
  Specifies the topology type in which the Subscriber Manager will operate. Valid values for this parameter are **standalone** and **cluster**. The default value is **standalone**.

  The following example assigns a value to this parameter:

```
topology=standalone
```

Subscriber Manager-LEG Failure Handling Section

This section contains parameters that affect the discovery of a Subscriber Manager-LEG connection failure event and the actions taken by the Subscriber Manager in response. A network problem or a severe failure (such as reboot) of the Subscriber Manager or the LEG can cause a Subscriber Manager-LEG connection failure event.

This section contains the following parameters:

- **clear_all_mappings**
  Prescribes the behavior of the Subscriber Manager in response to a LEG-Subscriber Manager connection failure. This parameter is relevant only for cases in which the Subscriber Manager and LEG are running on **different** machines.

  **Note**
  This parameter prescribes the same behavior for all LEG applications that are connected to the Subscriber Manager.

  If you set this parameter to **true** and a Subscriber Manager-LEG connection failure occurs (which is not recovered within the defined **timeout**), the mappings of all subscribers are removed in the domains that were defined for the LEG that was disconnected. (See the “LEG-Domains Association Section” section on page A-5.)

  **Caution**
  If you set the **clear_all_mappings** parameter to **true**, you must also set the **LEG-Domains Association** parameter so that the Subscriber Manager clears all mappings if a Subscriber Manager-LEG connection failure occurs.

  Valid values for this parameter are **true** and **false**. The default value is **false**.

  The following example of assigns a value to this parameter:

```
clear_all_mappings=true
```
Appendix A Configuration File Options

Configuration File Sections

clear_all_mappings=false

- timeout
  Specifies the time, in seconds, from a Subscriber Manager-LEG connection failure until the mappings are cleared in the Subscriber Manager database.

Note
It takes several seconds for the Subscriber Manager to detect a Subscriber Manager–LEG connection failure. You must add this time to the value of the timeout parameter to calculate how long it will take the Subscriber Manager to react to a Subscriber Manager–LEG connection failure. For example, if you set timeout to 80, it will take 80 seconds from the failure detection time until the Subscriber Manager clears the subscribers database.

The default value for this parameter is 60 seconds.

The following example assigns a value to this parameter:

```timeout=60```

LEG-Domains Association Section

In the LEG-Domains section of the configuration file, you define the LEG domains in which the Subscriber Manager maps subscribers. The Subscriber Manager clears the mappings in response to a Subscriber Manager-LEG connection failure only if you set the clear_all_mappings parameter. See the Subscriber Manager-LEG Failure Handling Section, page A-4.

Note
In addition to setting the LEG-Domains Association parameter, you must also set the clear_all_mappings parameter to true to enable the Subscriber Manager to clear the mappings in response to a Subscriber Manager-LEG connection failure.

This section presents a list of LEG-Domain associations. Each association appears on a separate line. Each LEG-Domain association is specified the following parameter:

- `<LEG name>=domain_name1[,domain_name2,...]`

  Defines the domains for which subscriber mappings are cleared in response to a Subscriber Manager-LEG connection failure. The key is the `<LEG name>`.

  To determine the value or values to use for the `<LEG name>` key, consult the documentation of the LEG that you use. The `<LEG name>` part is usually divided into two parts: `<hostname>.<common suffix>`. The first part is a 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 Subscriber Manager. 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 example assigns values to this parameter:
Domain.XXX Section

Each Domain.XXX section in the configuration file specifies one domain. The “XXX in the expression 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.

- subscriber_ipv6_prefixes=IPv6 Prefix 1, [IPv6 Prefix 2,...]

  Defines the list of prefixes to be used in the pull lookup operation when an IPv6 pull request notification is received by the Subscriber Manager. To define more than one prefix, separate the values using a coma (,). Possible value range is from 32 to 64. The default value is 64.

  The lookup order is always from the higher prefixes to lower prefixes.

  The changes takes effect only after a Cisco Service Control Subscriber Manager restart.

- aliases=alias_name1[,alias_name2,...]

  Specifies domain aliases. When the Subscriber Manager receives subscriber information 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 the IP address of a network access device, in which, for example, each string value can be the IP address of a NAS or a CMTS.

  Each alias can appear in only one domain section.

  By default, there are no domain aliases.

  The following example assigns a value to this parameter:

  aliases=10.10.88.99,10.10.88.98

- property.name1=value1[,property.name2=value2,...]

  By default, there are no property mappings.

  The following example assigns a value to this parameter:

  property.name1=value1[,property.name2=value2,...]
Appendix A Configuration File Options

Configuration File Sections

Specifies the default policy property values for a domain. Unless the LEG/API overrides these defaults when it logs in the subscriber to the Subscriber Manager, the subscriber policy is set according to the default policy property values of its domain.

The policy format is a comma-separated list of property_name=property_value. Each property value is an integer.

Note
To learn more about policy specification, see Cisco Service Control Application for Broadband User Guide.

The following example assigns a value to this parameter:

property.packageId=1

Note
The property.name parameter is case sensitive and must be written exactly as defined by the SCA BB Console.

Default Domains Configuration Section

This section in the configuration file defines the default policy for the domain. It is used for those domain properties that were not defined in the domain policy configuration (see the “Domain.XXX Section” section on page A-6), and for domain properties for which no policy was defined.

This section contains the following parameter:

- property.name1=value1[,property.name2=value2,...]

Specifies the default policy property values for all domains. Unless the LEG/API overrides these defaults when it logs in the subscriber to the Subscriber Manager, 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 specifying a policy, see Cisco Service Control Application for Broadband User Guide.

The following example assigns a value to this parameter:

property.packageId=1

Note
The property.name parameter is case sensitive and must be written exactly as defined by the SCA BB Console.

Auto Logout Section

This section of the configuration file defines the parameters for the Auto Logout feature, which is relevant mainly for cable environments. This feature relates to automatic integrations for which the LEG/API cannot provide logout indications. In such a case, you can turn on the automatic logout mechanism, which instructs the Subscriber Manager 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.
Not using the Auto Logout feature in the scenario described above (a provisioning system that can provide subscriber login events to the Subscriber Manager but cannot provide subscriber logout events) might exhaust the SCE resources. SCE resources are depleted because subscribers are logged in but are never logged out.

This section contains the following parameters:

- **auto_logout_interval**
  Specifies the interval, in seconds, of the Subscriber Manager auto-logout mechanism. After each interval, the Subscriber Manager identifies the subscribers for which the lease time has expired. The Subscriber Manager automatically removes the IP address for such subscribers from the system.

  Lease time is the timeout duration that is defined by the LEG during the login operation per each IP address. All subscriber login events start a timer of lease-time seconds. When the timer expires and the grace period (see below) has also expired, the Subscriber Manager removes the subscriber IP addresses. This action removes the subscriber from the SCE platform database. Any login event by the subscriber with an existing IP address during the timer interval resets the timer, causing it to restart.

  Setting the interval value to zero (0) disables the Subscriber Manager auto-logout mechanism.

  Setting the interval to a value greater than zero enables the Subscriber Manager auto-logout mechanism.

  The default value for this parameter is 0 seconds, meaning the auto-logout mechanism is disabled. The following example assigns a value to this parameter:

  ```
  auto_logout_interval=600
  ```

  The following example deactivates the Auto Logout feature:

  ```
  auto_logout_interval=0
  ```

- **grace_period**
  Specifies the grace period, in seconds, for each subscriber. When a subscriber auto-logout timeout expires, and the grace period also expires, the Subscriber Manager automatically logs out the subscriber IP address.

  The default value for this parameter is 10 seconds. The following example assigns a value to this parameter:

  ```
  grace_period=10
  ```

- **max_rate**
  Specifies the maximum rate (logouts per second) that the auto-logout task is allowed to perform. This limit spreads out the number of the logout operations over time, which reduces the performance impact on other operations.

  Specify a value for this parameter that spreads the logouts over a duration that is at least half of the `auto_logout_interval` time. The default value is 50. The following example assigns a value to this parameter:
max_rate=50

**Note**
Specify 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 is similar to the maximum login rate to the Subscriber Manager.

**Inactive Subscriber Removal Section**

This section of the configuration file sets the parameters for the Inactive Subscriber Removal feature. This feature facilitates the removal of subscribers who have been logged out of the Subscriber Manager and are not mapped to any network-Id for a configurable time period. Effective use of this mechanism can keep the size of the Subscriber Manager database relatively small and close to the number of active subscribers.

A task runs intermittently to remove the inactive subscribers. The time interval between activations of the operation is set automatically based on the configured inactivity time.

**Note**
This feature applies 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**
  Specifies whether or not to remove inactive subscribers.
  Valid values for this parameter are **yes**, **no**, **true**, or **false**.
  The default value is **no**.

- **inactivity_timeout**
  Specifies the time period after which subscribers are removed from the Subscriber Manager database if they have not been assigned any network-Id.
  Valid 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**
  Specifies the maximum number of subscribers that the removal task can remove per second.
  Valid values for this parameter are integer numbers in the range 1–1000.
  The default value is **10**.

- **log_removals**
  Specifies whether or not to write user-log messages for each subscriber record removal.
  Valid values for this parameter are **true** or **false**.
  The default value is **true**.
Appendix A Configuration File Options

Radius Listener Section

This section of the configuration file for integrates with the RADIUS Listener LEG.

Note
For additional RADIUS Listener configuration information, see the Cisco SCMS SM LEGs User Guide.

This section contains the following parameters:

- **start**
  Specifies whether or not the Subscriber Manager runs the RADIUS Listener at startup.
  Valid values for this parameter are **yes** and **no**. The default value is **no**.
  The following example assigns a value to this parameter:
  \[ start=no \]

- **enable_ipv6**
  Specifies whether to process IPv6 attributes.
  Valid values for this parameter are **yes** and **no**. The default value is **no**.
  The following example specifies that the Cisco Service Control Subscriber Manager must process the IPv6 attributes:
  \[ enable_ipv6=yes \]

- **accounting_port**
  Specifies the RADIUS Listener’s accounting port number.
  The default value is 1813.
  The following example assigns a value to this parameter:
  \[ accounting_port=1813 \]

- **ip**
  This optional parameter specifies the IP address to which the RADIUS Listener should bind. Use this parameter in cluster setups or when the machine local-host IP is not the IP to which the RADIUS messages are sent.
  By default, this parameter is not set.
  The following example assigns a value to this parameter:
  \[ ip=192.56.21.200 \]

Radius.NAS.XXX Section

Each **Radius.NAS.XXX** section of the configuration file specifies a single Network Access System (NAS). The “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 example assigns a value to this parameter:
  ```
  domain=my_domain
  ```

- **IP_address**
  Specifies the IP address in dotted notation (xxx.xxx.xxx.xxx).
  The following example assigns 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 LEGs User Guide*.
  The following example assigns a value to this parameter:
  ```
  NAS_identifier=RedHat37
  ```

- **secret**
  Specifies a secret key defined in the NAS for this connection.
  The following example assigns a value to this parameter:
  ```
  secret=mysecret
  ```

### Radius.Subscriber Attributes Section

This section defines the additional attributes to be extracted from the RDRs. These configurations are then sent to the SCE. To define the additional attributes, configure the [Radius.Subscriber Attributes] section with the following parameters:

- **attributes_list**
  This parameter defines the additional RADIUS attribute or attributes to extract and process.
  Multiple attribute names are separated by commas when listed in this parameter.

- **enable_extended_vsa_support**
  This parameter enables this feature when the value is defined as true.
  The default value for this parameter is `false`.

The following is a configuration example defining a list of additional RADIUS attributes:

```
[Radius.Subscriber Attributes]
attributes_list=Cell-ID,SGSG-IP,RAI
enable_extended_vsa_support=true

[Radius.Field.Cell-ID]
radius_attribute=26(68;10)
radius_attribute_type=string

[Radius.Field.SGSG-IP]
radius_attribute=26(65;10)
radius_attribute_type=string
```
Radius.Subscriber ID Section

This section of the configuration file specifies 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, uncomment this section.

This section contains the following parameters:

- **fields**
  Specifies the RADIUS protocol field names. When defining multiple fields, use commas between the field names. A field name must not start or end with a space character and it cannot contain an '=' character. You can specify a maximum of three fields.
  The default value is user_name.
  The following example sets this parameter:
  fields=user_name,vpn

- **field_separator**
  Specifies the character or string that separates concatenated fields.
  If you define three values for the fields parameter (user_name, VPN, and IP) and you specify a field separator, the following rules apply:
  - The field_separator parameter must contain user_name, VPN, and IP in the same order as you specified them in the fields parameter.
  - The separator character between the 1st and 2nd attributes and between the 2nd and 3rd attributes can be different; for example, user_name-vpn::IP
  - The separator can be a string; for example, ::
  - The default value is _.
  The following example sets this parameter with the value '-':
  field_separator=user_name-vpn

- **field_manipulation.<field name>=<regular expression>**
  The field_manipulation parameter defines how to manipulate, by reduction, the RADIUS field values.
  The <field name> part of this parameter is one of the fields defined in the fields parameter. The <regular expression> part of this parameter is the reducted regular expression to use for the <field name> value.
It is possible to define a field_manipulation rule for each name in the field property. The following example sets this parameter:

```plaintext
field_manipulation.user_name=(.*)@.*
field_manipulation.vpn=(.*)
```

For each field defined by the `fields` parameter, you must also define a `[Radius.Field.<field name>]` section with the following parameters:

- **radius_attribute**
  Configure the `radius_attribute` parameter with the RADIUS attribute number. Use the following format for Vendor Specific Attributes (VSA): 26(vendor-id; sub-attribute). For example, `26(10415;1)`.
  
  The default value is `-1`.

- **radius_attribute_type**
  Configure the `radius_attribute_type` parameter according to the RADIUS attribute format.
  Valid values for this parameter are `integer` and `string`. The default value is `string`.

### Radius.Property.Package Section

This section of the configuration file defines the RADIUS attributes from which a subscriber package is retrieved.

**Note**: The configuration described in this section is optional.

This section contains the following parameters:

- **fields**
  Specifies the RADIUS protocol field names. When defining multiple fields, use commas between the field names. The field name must not start or end with a space character and it cannot contain an '=' character.
  
  This parameter has no default value.
  
  The following example sets this parameter:
  ```plaintext
  fields=user_name,ip
  ```

- **field_seperator**
  Defines the character to be inserted between concatenated fields.
  
  The default value is `_`.
  
  The following example sets this parameter with the value `-`:
  ```plaintext
  field_seperator=user_name-ip
  ```

- **field_manipulation.<field name>=<regular expression>**
  The `field_manipulation` parameter defines how to manipulate the RADIUS field values.
  
  The `<field name>` part of this parameter is one of the fields defined in the `fields` parameter. The `<regular expression>` part of this parameter is the reduced regular expression to use for the `<field name>` value.
  
  It is possible to define a field_manipulation rule for each name in the field property. This is the default rule if there is a non-configured field manipulation.
Appendix A Configuration File Options

Configuration File Sections

The following example sets this parameter:

```
field_manipulation.user_name=(.*)\.*
field_manipulation.ip=(.*)
```

- **mapping_table.<regExp>=<property-value>**

  The `mapping_table` parameter defines a conversion table between the results of the attribute value manipulation, the matching rule, and the property value.

  The `<regExp>` part of this parameter defines the regular expression matching rule. The `<property-value>` part of this parameter specifies the integer result if the regular expression is matched.

  There is no default value for this parameter, but it is possible to set a default value by using the following expression: `mapping_table.^$=<value>`. This value is used if the mapping result is an empty string.

  The following example sets this parameter.

  ```
mapping_table..\.*=1
mapping_table..*=2
```

For each field defined by the `fields` parameter, you must also define a `[Radius.Field.<field name>]` section with the following parameters:

- **radius_attribute**

  Configure the `radius_attribute` parameter with the RADIUS attribute number. Use the following format for Vendor Specific Attributes (VSA): 26(vendor-id;sub-attribute). For example, `26(10415;1)`.

  The default value is `-1`.

- **radius_attribute_type**

  Configure the `radius_attribute_type` parameter according to the RADIUS attribute format.

  Valid values for this parameter are `integer` and `string`. The default value is `string`.

- **allow_login_with_no_policy**

  Defines whether a login with no policy is allowed when no policy is found for the assignment.

  Valid values for this parameter are `true` and `false`. The default value is `false`.

**RPC.Server Section**

This section of the configuration file represents the PRPC server configuration.

This section contains the following parameters:

- **port**

  Specifies the PRPC server port. The default is 14374.

  The following example assigns 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 Subscriber Manager, they are authenticated if configured correctly.
Valid values for this parameter are **full**, **semi**, and **none**. The default value is **semi**.

**Note**
Starting with version 3.0.5, the SCA BB Console supports authentication with the Subscriber Manager PRPC Server; therefore, it can be used in conjunction with all **security_level** values.

**Note**
From version 3.0.5, the Subscriber Manager Java API, Subscriber Manager C/C++ API, and CNR LEG do not support authentication with the Subscriber Manager PRPC Server; therefore, if installed, the security level cannot be configured to **full**.

The following example assigns a value to this parameter:

```
security_level=semi
```

### MPLS-VPN Section

This section of the configuration file contains configuration parameters that are relevant to MPLS/VPN installations. See the *Cisco SCMS SM LEGs User Guide* for a description of subscriber management in MPLS/VPN networks.

This section contains the following parameters:

- **vpn_id**
  - Specifies the BGP attribute to use to identify the VPN subscribers.
  - Valid values for this parameter are **RD** or **RT**. The default value is **RT**.
  - The following example assigns a value to this parameter:
    ```
    vpn_id=RD
    ```

- **log_all**
  - Specifies the logging level of the BGP LEG.
  - Valid values for this parameter are **true** or **false**. The default value is **false**. If set to **true**, the Subscriber Manager logs all BGP packets that it receives. This log is useful during the integration and testing phase.
  - The following example assigns a value to this parameter:
    ```
    log_all=false
    ```

### SCE.XXX Section

Each **SCE.XXX** section in the configuration file represents a single SCE platform. The “XXX” represents the SCE logical name.

This section contains the following parameters:

- **ip**
  - Specifies the single IP address of a standalone SCE device or the two IP addresses of a cascade SCE pair.
  - The following example assigns a value to this parameter:
    ```
    ip=11.12.13.1
    ```
Configuration File Sections

The following example assigns a value to this parameter for a cascade SCE pair:


Note

For a cascade SCE pair, the Subscriber Manager adds two SCEs to the Subscriber Manager with the names XXX_cascade1 and XXX_cascade2. Therefore, the names _cascade1 and _cascade2 are reserved suffixes for the SCE names.

- port
  Specifies the port through which to connect to the SCE platform. The default is 14374.
  The following example assigns a value to this parameter:
  port=14374

FTP Section

The Subscriber Manager manages an internal FTP server for various purposes.

The FTP section of the configuration file contains the following parameters:

- start
  Specifies whether or not the Subscriber Manager runs the FTP server at startup.
  Valid values are yes and no. The default is no.
  The following example assigns a value to this parameter:
  start=yes

- port
  Specifies the FTP server port. The default is 21000.
  The following example assigns a value to this parameter:
  port=21000

  The following parameter defines the TCP port 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 through a firewall.

HTTP Tech-IF Section

The Subscriber Manager manages an internal HTTP adapter server that is a technician interface.

The HTTP Tech-IF section of the configuration file contains the following parameters:

- start
  Specifies whether or not the Subscriber Manager runs the HTTP server at startup.
Appendix A Configuration File Options

Configuration File Sections

Note
This is a technician interface and normally should not be used.

Valid values are yes and no. The default is no.
The following example assigns a value to this parameter:

```
start=yes
```

- port
  Specifies the HTTP server port. The default is 8082.
The following example assigns a value to this parameter:

```
port=8082
```

RDR Server Section

The Subscriber Manager manages an internal RDR server that is used to receive RDR messages from the SCE.
The RDR Server section of the configuration file contains the following parameters:

- start
  Specifies whether or not the Subscriber Manager runs the RDR server at startup.

Note
You should use this interface when installing the SCE-Sniffer LEGs on the Subscriber Manager.

Valid values are yes and no. The default is no.
The following example assigns a value to this parameter:

```
start=yes
```

- port
  Specifies the RDR server port. The default is 33001.
The following example assigns a value to this parameter:

```
port=33001
```

- max_connections
  Specifies the maximum number of connections accepted by the server. The default is 10.
The following example assigns a value to this parameter:

```
max_connections=10
```

Cable Adapter Section

The Subscriber Manager manages a cable adapter, a special cable support module that is a translator between the cable world (DHCP events) and the Subscriber Manager. For additional information, see CPE as a Subscriber in a Cable Environment, page C-1.
The Cable Adapter section of the configuration file contains the following parameter:
• allow_dynamic_CM
  Specifies whether or not to allow logins from cable modems that are not in the Subscriber Manager database.
  Valid values are yes and no. The default is no.
  The following example assigns a value to this parameter:
  allow_dynamic_CM=no

Data Repository Section

This section of the configuration file associates the Subscriber Manager operation with the Subscriber Manager database.

Note
Some of the parameters in this section are discarded on regular configuration loading. Resetting them requires restarting the Subscriber Manager.

The Data Repository section contains the following parameters:

• support_ip_ranges
  Specifies whether or not the Subscriber Manager supports IP-Ranges. Disabling this support provides better performance.

Note
To reset this parameter, you must restart the Subscriber Manager. The Subscriber Manager discards this parameter on regular configuration loading (using CLU).

Valid values are yes and no. The default is no.
  The following example assigns a value to this parameter:
  support_ip_ranges=yes

• checkpoint_interval_in_seconds
  Specifies the interval, in seconds, for calling the Subscriber Manager database checkpoints. Reducing the value affects performance. Increasing the value increases vulnerability to power-down.
  The default value is 60 seconds.
  The following example assigns a value to this parameter:
  checkpoint_interval_in_seconds=60

• max_range_size
  Specifies the maximum IP range size used in the system.
  Set this parameter to improve performance of the Subscriber Manager in Pull mode when the Data Repository section is configured with support_ip_ranges=yes.

Caution
If you specify a value for this parameter that is too low, the Subscriber Manager might not process pull requests correctly.
Appendix A Configuration File Options

Configuration File Sections

The default value is 256.
The following example assigns a value to this parameter:

max_range_size=256

- max_number_of_subscribers
  Specifies the maximum number of subscribers that the database supports. The limit is 20 million subscribers for Solaris and Linux 64-bit.

Note
You cannot decrease the value for this parameter without destroying the replicated data store.

Note
If you change this parameter, you must restart the Subscriber Manager process.

Note
To achieve better database performance, when possible, destroy the subscriber database after changing this parameter. Then rebuild the database.

- The default value is 200000.
The following example assigns a value to this parameter:

max_number_of_subscribers=1000000

- cache_size
  Specifies the subscriber cache size. The cache optimizes 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
If you change this parameter, you must restart the Subscriber Manager process.

Note
If you change this parameter, you must restart the Subscriber Manager process.

The default value is 100000.
The following example assigns a value to this parameter:

cache_size=1600000

- max_number_of_vpns
  Specifies the maximum number of VPNs supported by the Subscriber Manager. 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 data store.

Note
If you change this parameter, you must restart the Subscriber Manager process.

The default value is 2048.
The following example assigns a value to this parameter:

max_number_of_vpns=3000

- vpn_cache_size
Specifies the VPN cache size. The cache optimizes 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**
If you change this parameter, you must restart the Subscriber Manager process.

The default value is 2048.
The following example assigns a value to this parameter:
```
vpn_cache_size=3000
```

**CM.XXX Section**

Each **CM.XXX** section in the configuration file represents a single Collection Manager. The “XXX” represents the Collection Manager logical name.

This section contains the following parameters:

- **ip**
  Specifies the IP address of the Collection Manager.
The following example assigns a value to this parameter:
  ```
ip=11.12.13.1
```

- **port**
  Defines the port through which to connect to the Collection Manager. The default is 14375.
The following example assigns a value to this parameter:
  ```
port=14375
```

- **sce_list=<SCE logical name>,<SCE logical name>**
  Provides the list of SCE devices that report to the Collection Manager.
The following example assigns a value to this parameter:
  ```
sce_list=SCE1,SCE2
```
Introduction

This appendix describes the Command-Line Utilities (CLU) that are distributed with the Subscriber Manager application.

Command-Line Utilities

The Subscriber Manager provides a set of Command-Line Utilities (CLU) that enable you to view Subscriber Manager operations and statistics and to perform subscriber management. You can use the CLU to configure the Subscriber Manager only indirectly; that is, you use the CLU to load an edited configuration file onto the Subscriber Manager.

This appendix describes the CLU commands, their operations, and options. The shorter descriptions of the CLU commands presented in Chapter 5, “Configuration and Management” focus on the performance of routine management and configuration tasks.

You can execute CLU commands only if you are logged in to the machine by using the pcude account, which is always installed (see Chapter 4, “Installation and Upgrading”). The CLU runs as a process that is separate from the Subscriber Manager. The CLU communicates with the Subscriber Manager through a predefined communication port and interface. Therefore, the Subscriber Manager must keep open a communication port at all times, at least locally on the configured machine.
CLU Commands

This section describes in the Command-Line Utilities commands.

- Informative Output, page B-3
- Parsing CLU Operations and Options, page B-3
- The p3batch Utility, page B-4
- The p3cable Utility, page B-5
- The p3clu Utility, page B-6
- The p3cluster Utility, page B-6
- The p3db Utility, page B-7
- The p3domains Utility, page B-8
- The p3ftp Utility, page B-9
- The p3http Utility, page B-10
- The p3inst Utility, page B-10
- The p3log Utility, page B-12
- The p3net Utility, page B-12
- The p3rdr Utility, page B-14
- The p3rpc Utility, page B-16
- The p3sm Utility, page B-17
- The p3subs Utility, page B-22
- The p3subsdb Utility, page B-26
- The p3vpn Utility, page B-33

The following CLUs are not documented in this guide.

- The p3bgp Utility, page B-35
- The p3dhcpsniff Utility, page B-35
- The p3dhcpv6sniff Utility, page B-35
- The p3leasequery Utility, page B-35
- The p3v6leasequery Utility, page B-36
- The p3qrdr Utility
- The p3radius Utility, page B-36
- The p3radiussniff Utility, page B-36
- The p3qm Utility, page B-36
- The p3soap Utility, page B-36
- The p3vlink Utility, page B-36
- The p3ipdr Utility, page B-36
Informative Output

All CLU commands support the following operations for informative output:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--help</td>
<td>Prints the help for the specified CLU command, then exits.</td>
</tr>
<tr>
<td>--version</td>
<td>Prints the Subscriber Manager program version number, then exits.</td>
</tr>
</tbody>
</table>

Parsing CLU Operations and Options

Place in quotation marks a command operation or option that contains 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 presents several examples of the preceding rules:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--property=&quot;file name&quot;</td>
<td>Example of how operation/option should be written</td>
</tr>
<tr>
<td>--property=&quot;good\bad&quot;</td>
<td></td>
</tr>
<tr>
<td>--property=&quot;x=y&quot;</td>
<td></td>
</tr>
<tr>
<td>--name=&quot;\myQuotedName&quot;&quot;</td>
<td>(in this example, inner quotation marks are escaped)</td>
</tr>
<tr>
<td>--names=&quot;x,y&quot;</td>
<td></td>
</tr>
<tr>
<td>--names=&quot;x&amp;y&quot;</td>
<td></td>
</tr>
<tr>
<td>--names=&quot;myHost:myDomain&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Separation characters

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>comma (,)</td>
<td>--names=&quot;x,y&quot;</td>
</tr>
<tr>
<td>ampersand (&amp;)</td>
<td>--names=&quot;x&amp;y&quot;</td>
</tr>
<tr>
<td>colon (:)</td>
<td>--names=&quot;myHost:myDomain&quot;</td>
</tr>
</tbody>
</table>
You can use one-letter abbreviations 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 complete name | --domain=subscribers |
| Example of using abbreviated name | -d subscribers |

**The p3batch Utility**

The `p3batch` utility enables you to run many operations on a single connection with the Subscriber Manager. 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 character). Use the `p3batch` utility to run this file and execute the commands. 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, the system displays a progress indicator. The `p3batch` command has the following format:

```
p3batch [FILE-OPTION] [ERROR-OPTION]
```

Table B-1 and Table B-2 list the `p3batch` options.

**Table B-1 p3batch File Option**

<table>
<thead>
<tr>
<th>File Operation</th>
<th>Abbreviation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--file=FILE</code></td>
<td><code>-f</code></td>
<td>Runs a batch file. FILE specifies the CLU script (batch) file to run.</td>
<td>The system displays a progress indicator.</td>
</tr>
</tbody>
</table>

**Table B-2 p3batch Error Option**

<table>
<thead>
<tr>
<th>Error Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--skip-errors</code></td>
<td>Specifies that the batch operation should <em>not</em> halt if an error occurs. If you do not specify this parameter, the batch operation <em>will</em> halt if an error occurs.</td>
</tr>
</tbody>
</table>

**Examples**

The following command runs the batch file, which halts if an error occurs.

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

The following command runs the batch file so that it does not halt if an error occurs.

```
p3batch --file=mainBatchFile.txt --skip-errors
```
The p3cable Utility

In a cable environment, the CPE is the subscriber and inherits its policy and domain from the cable modem 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 the “CPE as a Subscriber in a Cable Environment” section on page C-1.

You can use the p3cable utility commands to import to the Subscriber Manager cable modem information from a CSV file. The command also enables you to export the cable modem information from the Subscriber Manager to a CSV file. You can also use this utility to clear the repository of all cable modems and to allow or deny the login of CPEs that belong to unfamiliar cable modems (that is, cable modems that do not exist in the Subscriber Manager database). However, the contents of the Cable Adapter Section of the configuration file (p3sm.cfg) determine whether such logins are allowed or denied. (See the “Cable Adapter Section” section on page A-17.)

The p3cable command has the following format:

```
p3cable OPERATION [FILE-OPTIONS]
```

Table B-3 and Table B-4 list the p3cable operations and options.

Table B-3  p3cable Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--import-cm</td>
<td>Imports cable modems from a CSV file. The filename to be imported is specified using the format --file=import-filename. The results go to a results file.</td>
</tr>
<tr>
<td>--export-cm</td>
<td>Exports cable modems to a CSV file. The filename to be exported is specified using the format --output=export-filename. The results go to a results file.</td>
</tr>
<tr>
<td>--clear-all-cm</td>
<td>Clears the repository of all cable modems.</td>
</tr>
<tr>
<td>--show-dynamic-mode</td>
<td>Shows whether to allow or deny the login of CPEs that belong to unfamiliar cable modems; for example, cable modems that do not exist in the Subscriber Manager database.</td>
</tr>
</tbody>
</table>

Table B-4  p3cable File Options

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file=FILE</td>
<td>-f FILE</td>
<td>Specifies the CSV FILE from which information is imported.</td>
</tr>
<tr>
<td>--output=FILE</td>
<td>-o FILE</td>
<td>Specifies the subscriber CSV FILE to which information is exported.</td>
</tr>
</tbody>
</table>
Examples
The following command imports cable modem information from the specified CSV file:

```bash
p3cable --import-cm -f CMFile.csv
```

The following command exports cable modem information to the specified CSV file:

```bash
p3cable --export-cm --outfile=myCMFile.csv
```

The following command clears the repository of all cable modems:

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

The following displays whether to allow or deny the login of CPEs that belong to unfamiliar cable modems (cable modems that do not exist in Subscriber Manager database):

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

The p3clu Utility

The `p3clu` utility prints a list of all supported CLU utilities and options.

The `p3clu` command has the following format:

```bash
p3clu OPERATION
```

Table B-5 lists the `p3clu` operations.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--help</td>
<td>Prints the currently supported CLU commands.</td>
</tr>
</tbody>
</table>

Example

The following command displays a listing of all supported CLU utilities and operations:

```bash
p3clu --help
```

The p3cluster Utility

The `p3cluster` utility displays the redundancy state of a cluster of two Subscriber Manager nodes and its components. This utility also supports operations that alter the redundancy state of the Subscriber Manager. Perform these operations and administrative tasks through the Subscriber Manager Cluster Agent.

The `p3cluster` command has the following format:

```bash
p3cluster OPERATION
```
Table B-6 lists the `p3cluster` operations.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--show</code></td>
<td>Displays the redundancy status of the Subscriber Manager and its components.</td>
</tr>
<tr>
<td><code>--active</code></td>
<td>Makes the specified Subscriber Manager the active Subscriber Manager in the cluster.</td>
</tr>
<tr>
<td><code>--standby</code></td>
<td>Makes the specified Subscriber Manager the standby Subscriber Manager in the cluster.</td>
</tr>
</tbody>
</table>

Example

The following command displays the redundancy status of the Subscriber Manager and its components:

`p3cluster --show`

The `p3db` Utility

The `p3db` utility manages and monitors the Subscriber Manager database. The CLU exposes capabilities of some of the Subscriber Manager database CLUs that pertain to specific needs of the Subscriber Manager.

The `p3db` command has the following format:

```
p3db OPERATION [OPTIONS]
```

Table B-7 and Table B-8 list the `p3db` operations and options.

Caution

Some CLU commands can affect the database. If used incorrectly, these commands can damage the database.

Table B-7 `p3db` Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--rep-status</code></td>
<td>Displays status of the replication agent.</td>
</tr>
<tr>
<td><code>--rep-start</code></td>
<td>Starts the replication agent.</td>
</tr>
<tr>
<td><code>--rep-stop</code></td>
<td>Stops the replication agent.</td>
</tr>
<tr>
<td><code>--rep-pause</code></td>
<td>Pauses the replication agent.</td>
</tr>
<tr>
<td><code>--rep-continue</code></td>
<td>Continues the replication agent.</td>
</tr>
<tr>
<td><code>--set-rep-scheme</code></td>
<td>Assigns a replication scheme to the database.</td>
</tr>
<tr>
<td><code>--drop-rep-scheme</code></td>
<td>Drops the replication scheme from the database.</td>
</tr>
<tr>
<td><code>--status</code></td>
<td>Displays the database status.</td>
</tr>
<tr>
<td><code>--destroy-rep-db</code></td>
<td>Destroys the replicated data-store.</td>
</tr>
</tbody>
</table>
**Example**

The following command displays the status of the replication agent:

```
p3db --rep-status
```

**The 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 **p3domains** command has the following format:

```
p3domains OPERATION [OPTIONS]
```

---

**Table B-7**  
*p3db Operations (continued)*

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--destroy-local-db</code></td>
<td>Destroys the local data-store.</td>
</tr>
<tr>
<td><code>--duplicate</code></td>
<td>Copies the data-store from the remote machine to the local machine.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>  This option applies only for a cluster setup. For additional information, see the “Data Duplication Procedure” section on page 4-23.</td>
</tr>
<tr>
<td><code>--upgrade-rep-protocol</code></td>
<td>Upgrades the replication protocol between the databases in the cluster.</td>
</tr>
<tr>
<td><code>--keep-in-mem [SECS]</code></td>
<td>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 Subscriber Manager restart time. <strong>Note</strong>  To prevent limitations in performing a database destroy, do not use values above a few minutes (that is, above a few hundred seconds).</td>
</tr>
<tr>
<td><code>--num-of-subs</code></td>
<td>Displays the current number of subscribers in the database.</td>
</tr>
<tr>
<td><code>--sub-exists</code></td>
<td>Verifies whether a particular subscriber exists in the database.</td>
</tr>
</tbody>
</table>

**Table B-8**  
*p3db Options*

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--local=LOCAL_HOSTNAME</code></td>
<td>Specifies the local machine.</td>
</tr>
<tr>
<td><code>--remote=REMOTE_HOSTNAME</code></td>
<td>Specifies the remote machine.</td>
</tr>
</tbody>
</table>

---
Table B-9 and Table B-10 list the `p3domains` operations and options.

**Table B-9  p3domains Operations**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--show-all</code></td>
<td>Displays all configured domains.</td>
</tr>
<tr>
<td><code>--show</code></td>
<td>Displays a domain and its associated network elements.</td>
</tr>
</tbody>
</table>

**Examples**

The following command displays all configured domains:

```
p3domains --show-all
```

The following command displays the specified domain and its associated network elements:

```
p3domains --show --domain=myDomain
```

**The p3ftp Utility**

The `p3ftp` utility monitors the Subscriber Manager internal FTP server.

The `p3ftp` command has the following format:

```
p3ftp OPERATION
```

**Table B-11  p3ftp Operations**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--show</code></td>
<td>Displays 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.</td>
</tr>
</tbody>
</table>

**Example**

The following command displays 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
```
The **p3http Utility**

The **p3http** utility monitors the HTTP adapter server.

**Note**

The HTTP adapter server is a technician interface that normally should not be used.

The **p3http** command has the following format:

\[
p3http \text{ OPERATION}
\]

Table B-12 lists the **p3http** operations:

**Table B-12  \textbf{p3http Operations}**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--show</td>
<td>Displays the port number that the server listens to, the state of the server, and the current number of open sessions.</td>
</tr>
</tbody>
</table>

**Example**

The following command displays the port number to which the server listens, the state of the server, and the current number of open sessions:

\[
p3http --show
\]

The **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 installing.

The **p3inst** command has the following format:

\[
p3inst \text{ OPERATION [FILE-OPTION] [ARGUMENT-OPTION]}
\]

Table B-13, Table B-14, and Table B-15 list the **p3inst** operations and options.

**Table B-13  \textbf{p3inst Operations}**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Abbreviation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--install</td>
<td>-i</td>
<td>Installs the specified application pqi file to the Subscriber Manager.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It may be necessary to specify arguments for the installation procedure in the command line. Requires a file option.</td>
<td></td>
</tr>
<tr>
<td>--uninstall</td>
<td>—</td>
<td>Uninstalls the specified application pqi file from the Subscriber Manager.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requires a file option.</td>
<td></td>
</tr>
</tbody>
</table>
Table B-13  p3inst Operations (continued)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Abbreviation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--upgrade</td>
<td></td>
<td>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.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td>--rollback</td>
<td></td>
<td>Returns the specified application to the previous version. Rollback is the opposite of an upgrade operation: it reverses the upgrade.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td>--describe</td>
<td>-d</td>
<td>Displays the contents of the specified application pqi file.</td>
<td></td>
</tr>
<tr>
<td>--show-last</td>
<td></td>
<td>Lists the details of the last installed application pqi file.</td>
<td></td>
</tr>
</tbody>
</table>

Table B-14  p3inst File Options

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file=FILE[;FILE...]</td>
<td>-f FILE[;FILE...]</td>
<td>Specifies one or more installation FILEs to use. If there is more than one FILE, separate them with semicolons.</td>
</tr>
</tbody>
</table>

Table B-15  p3inst Argument Options

<table>
<thead>
<tr>
<th>Argument Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--arg(ARG1[,ARG2...])</td>
<td>Specifies one or more arguments for the install and upgrade procedures.</td>
</tr>
</tbody>
</table>

Example

The following command installs the specified installation file:

    p3inst --install --file=myInstallation.pqi

The following command uninstalls the specified installation file:

    p3inst --uninstall -f oldInstallation.pqi

The following command upgrades an existing application using the specified application pqi file:

    p3inst --upgrade --file=newInstallation.pqi

The following command upgrades an existing application using the specified application pqi file, and using arguments in the command line:

    p3inst --upgrade -f newInstallation.pqi

The following command returns the specified application to the previous version:

    p3inst --rollback
The following command displays the contents of the specified application pqi file:
```
p3inst --describe --file=myInstallation.pqi
```

The following command lists the details of the last installed application pqi file:
```
p3inst --show-last
```

### The p3log Utility

The `p3log` utility configures and manages the Subscriber Manager user log. The user log contains all user-related events and errors. View the user log for the history of the system events and errors.

The `p3log` command has the following format:
```
p3log OPERATION [FILE-OPTION]
```

Table B-16 and Table B-17 list the `p3log` operations and options.

### Table B-16  `p3log Operations`

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--extract</td>
<td>Retrieves the user log from the agent.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td>--reset</td>
<td>Clears the user log.</td>
<td>—</td>
</tr>
</tbody>
</table>

### Table B-17  `p3log File Option`

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--output=FILE</td>
<td>-o FILE</td>
<td>Specifies the location to which the Subscriber Manager user log file should be extracted.</td>
</tr>
</tbody>
</table>

### Examples

The following command extracts the Subscriber Manager user log to the specified file:
```
p3log --extract -o aug20.log
```

The following command clears the Subscriber Manager user log:
```
p3log --reset
```

### The p3net Utility

The `p3net` utility shows the connection status of network elements and tries to reconnect disconnected elements.

The `p3net` command has the following format:
```
p3net OPERATION [NETWORK-ELEMENT-OPTION]
```
Table B-18 and Table B-19 list the p3net operations and options.

**Table B-18  p3net Operations**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--show-all</td>
<td>Shows all the configured network elements.</td>
</tr>
<tr>
<td>--show</td>
<td>Shows the element connection status/general information.</td>
</tr>
<tr>
<td>--connect</td>
<td>Tries to connect a disconnected element.</td>
</tr>
</tbody>
</table>

**Examples**

The following command connects a disconnected element to the network:

```
p3net --connect -n mainNE
```

The following command displays 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.

The following command displays all configured network element details in a table:

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

```
=====================================================================  
<p>| Name                 | Host         | Conn- | Sync-   | Domain       |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Status</th>
<th>Status</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>sceRome</td>
<td>1.2.3.4*</td>
<td>up</td>
<td>done</td>
<td>subscribers</td>
</tr>
<tr>
<td>sceRome</td>
<td>1.2.3.5</td>
<td>up</td>
<td>done</td>
<td>subscribers</td>
</tr>
<tr>
<td>sceLondon</td>
<td>1.2.3.6</td>
<td>up</td>
<td>done</td>
<td>domain1</td>
</tr>
</tbody>
</table>
```

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 Subscriber Manager does not synchronize the standby SCE; therefore, the **Subscriber Management** field on the standby SCE might appear as **not-done** if the SCE was never active.

---

**Table B-19  p3net Network Element Options**

<table>
<thead>
<tr>
<th>Network Element Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--ne-name=NAME</td>
<td>-n NAME</td>
<td>Specifies the logical NAME for the network element, or the cable modem when working with the VLM.</td>
</tr>
<tr>
<td>--detail</td>
<td></td>
<td>(Optional) Used with the --show-all operation to display additional information in a table.</td>
</tr>
</tbody>
</table>
The following command displays 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
Synchronization Status: done
Redundancy Status: Standalone
Quarantine Status: ok

The following command displays the connection status of cascaded SCEs. Specify 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
Synchronization Status: done
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
Synchronization Status: not-done
Redundancy Status: Standby
Quarantine Status: ok

The **p3rdr Utility**

The **p3rdr** utility displays configuration information and statistics for the RDR server. The **p3rdr** command has the following format:

```
p3rdr OPERATION
```
Table B-20 lists the `p3rdr` operations.

**Table B-20 p3rdr Operations**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--show</code></td>
<td>Displays the RDR server configuration, as well as other general information (for example, the maximum number of connections).</td>
</tr>
<tr>
<td><code>--show-statistics</code></td>
<td>Displays counters of RDR messages were processed or failed for each connection.</td>
</tr>
<tr>
<td><code>--show-connections</code></td>
<td>Displays a list of active connections.</td>
</tr>
<tr>
<td><code>--reset-statistics</code></td>
<td>Resets the counters of the processed RDR messages and rates.</td>
</tr>
</tbody>
</table>

**Examples**

The following command displays the status of the RDR server and the current configuration:

```
p3rdr --show
Active: true
Port: 33001
Connections:
  Max-limit: 10 connections
  Current: 2 connections
Command terminated successfully
```

The following command displays the current RDR statistics:

```
p3rdr --show-statistics
RDR Server Statistics:
======================
Handled RDRs: 12
Bad RDRs: 0
Current rate: 12.0 RDRs per second
Peak rate: 12.0 RDRs per second
Client statistics:
-------------------:
Connection from 10.1.8.81 statistics:
  Handled RDRs: 7
  Bad RDRs: 0
  Current rate: 7.0
  Is connected: true
  Times connected: 1
Connection from 10.1.8.82 statistics:
  Handled RDRs: 5
  Bad RDRs: 0
  Current rate: 5.0
  Is connected: true
  Times connected: 1
Command terminated successfully
```
The following command displays the current number of RDR server connections:

```
p3rdr --show-connections
```

The following clients are connected:
10.1.8.81 - 1 connection
10.1.8.82 - 1 connection
Command terminated successfully

The **p3rpc Utility**

The **p3rpc** utility displays information about the proprietary Cisco Remote Procedure Call (RPC) server interface to the Subscriber Manager. It also authenticates users.

The **p3rpc** command has the following format:

```
p3rpc OPERATION [OPTIONS]
```

Table B-21, Table B-22, and Table B-23 list the **p3rpc** operations and options.

### Table B-21  p3rpc Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--show</td>
<td>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.</td>
</tr>
<tr>
<td>--show-client-names</td>
<td>Displays the names of the connected clients. Can be used for extracting the LEG_NAME key, see the “LEG-Domains Association Section” section on page A-5.</td>
</tr>
<tr>
<td>--show-statistics</td>
<td>Displays the PRPC server statistics. The statistics include information about the number of current PRPC sessions and information about PRPC server actions such as invocations and errors.</td>
</tr>
<tr>
<td>--reset-statistics</td>
<td>Clears the PRPC server statistics.</td>
</tr>
<tr>
<td>--set-user</td>
<td>Adds or updates the username and password.</td>
</tr>
<tr>
<td>--validate-password</td>
<td>Validates the username and password.</td>
</tr>
<tr>
<td>--delete-user</td>
<td>Deletes a user configuration.</td>
</tr>
<tr>
<td>--show-users</td>
<td>Displays all configured users.</td>
</tr>
</tbody>
</table>

### Table B-22  p3rpc User Options

<table>
<thead>
<tr>
<th>User Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--username=USER-NAME</td>
<td>-u</td>
<td>Specifies the name of the user. Used with --set-user, --validate-password, and --delete-user operations.</td>
</tr>
<tr>
<td>--password=USER-PASSWORD</td>
<td>-p</td>
<td>Specifies the password of the user. Used with --set-user, --validate-password, and --delete-user operations.</td>
</tr>
</tbody>
</table>
Examples

The following command displays 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:

```
prpc --show
```

The following command displays the statistics of the PRPC server:

```
prpc --show-statistics
```

The following command clears the statistics of the PRPC server:

```
prpc --reset-statistics
```

The following command shows all of the users configured at the PRPC server:

```
prpc --show-users
```

The p3sm Utility

The `p3sm` utility performs general configuration and management of the Subscriber Manager.

The `p3sm` command has the following format:

```
p3sm OPERATION [OPTIONS]
```

Table B-24, Table B-25, Table B-26, and Table B-27 list the `p3sm` operations and options.

Table B-23  
---

<table>
<thead>
<tr>
<th>Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--remote=IP[:port]</td>
<td>-r</td>
<td>(Optional) Used with <code>--set-user</code>, <code>--validate-password</code>, and <code>--delete-user</code> for user operations on the remote Subscriber Manager in High Availability setups. Use the port option if the PRPC Server port on the remote Subscriber Manager machine differs from the default value (14374).</td>
</tr>
</tbody>
</table>

Table B-24  
---

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--show</td>
<td>Displays the current Subscriber Manager configuration and statistics.</td>
<td>—</td>
</tr>
<tr>
<td>--load-config</td>
<td>Reloads the Subscriber Manager configuration file. If you do not use the <code>-f</code> option, the <code>p3sm.cfg</code> file is loaded.</td>
<td>—</td>
</tr>
</tbody>
</table>
### Table B-24  p3sm Operations (continued)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--resync</code></td>
<td>Resynchronizes subscribers of the specified SCE with the Subscriber Manager database. The SCE is specified using the option <code>--ne-name=SCE_NAME</code></td>
<td>Progress indicator</td>
</tr>
<tr>
<td><code>--resync-all</code></td>
<td>Resynchronizes all subscribers of all SCEs with the Subscriber Manager database.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td><code>--start [--wait]</code></td>
<td>Starts the server. The option <code>--wait</code> causes the CLU to return only after the Subscriber Manager is up.</td>
<td>Default: started</td>
</tr>
<tr>
<td><code>--stop</code></td>
<td>Stops the server. <strong>Note</strong> When using fail-over, a simple shut-down of the Subscriber Manager does not work. The Veritas Cluster Server reveals that the Subscriber Manager is down and attempts to restart it. The correct procedure is as follows: 1. Perform the manual fail-over. See Chapter 3, “Subscriber Manager Failover”. 2. Use the Veritas Cluster Manager Application to stop the monitoring (probing) of the Subscriber Manager. 3. Use the Subscriber Manager CLU (p3sm <code>--stop</code> ) to stop the Subscriber Manager</td>
<td></td>
</tr>
<tr>
<td><code>--restart [--wait]</code></td>
<td>Stops the server operation and then restarts it. The option <code>--wait</code> causes the CLU to return only after the Subscriber Manager is up.</td>
<td></td>
</tr>
<tr>
<td><code>--sm-version</code></td>
<td>Displays the currently installed Subscriber Manager version.</td>
<td></td>
</tr>
<tr>
<td><code>--sm-status [--detail]</code></td>
<td>Displays the Subscriber Manager operational status, whether the Subscriber Manager is running or not, and whether it is Active or Standby. If errors have occurred, it also displays a summary of the errors. To receive a detailed description, use the option <code>--detail</code></td>
<td></td>
</tr>
</tbody>
</table>
Table B-24  p3sm Operations (continued)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--extract-support-file</td>
<td>Retrieves the support file from the agent. This command extracts the Subscriber Manager support information to a defined file, which is defined using the option --output=FILE. Subscriber Manager support information should be extracted and sent to Cisco customer support with each support request.</td>
<td></td>
</tr>
<tr>
<td>--reset-sm-status</td>
<td>Clears errors and warnings that were displayed.</td>
<td></td>
</tr>
<tr>
<td>--logging=[on/off]</td>
<td>Enables/disables the logging of user logons to the UserLog.</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>Enabling this parameter might affect performance.</td>
<td></td>
</tr>
<tr>
<td>--show-stats</td>
<td>Displays statistics regarding login operations and inactive subscriber removal operations. The rate results are updated once every 10 seconds.</td>
<td></td>
</tr>
<tr>
<td>--reset-stats</td>
<td>Resets the statistics information.</td>
<td></td>
</tr>
</tbody>
</table>

Table B-25  p3sm Subscriber Manager Options

<table>
<thead>
<tr>
<th>Subscriber Manager Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--ne-name=NAME</td>
<td>-n NAME</td>
<td>Specifies logical NAME of the SCE platform to resynchronize.</td>
</tr>
</tbody>
</table>

Table B-26  p3sm File Options

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--output=FILE</td>
<td>-o FILE</td>
<td>The location to which Subscriber Manager extracts the support information file, relative to the Subscriber Manager root directory.</td>
</tr>
<tr>
<td>--file=FILE</td>
<td>-f FILE</td>
<td>The Subscriber Manager configuration file to load, relative to the Subscriber Manager configuration directory.</td>
</tr>
</tbody>
</table>
The following command starts the server:

```bash
p3sm --start
```

The following command stops the server:

```bash
p3sm --stop
```

When using fail-over, a simple shut-down of the Subscriber Manager does not work. The Veritas Cluster Server reveals that the Subscriber Manager is down and attempts to restart it. The correct procedure is as follows:

1. **Step 1** Perform the manual fail-over. See Chapter 3, “Subscriber Manager Failover”.
2. **Step 2** Use the Veritas Cluster Manager Application to stop the monitoring (probing) of the Subscriber Manager.
3. **Step 3** Use the Subscriber Manager CLU (p3sm --stop) to stop the Subscriber Manager.

### Table B-27  p3sm Miscellaneous Options

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--ignore-warnings</td>
<td>-i</td>
<td>Ignore configuration validation warnings while loading the configuration file.</td>
</tr>
<tr>
<td>--remote=IP[:port]</td>
<td>-r</td>
<td>Used with --load-config to load the local configuration file to both the local Subscriber Manager and the remote Subscriber Manager.</td>
</tr>
<tr>
<td>--detail</td>
<td></td>
<td>Displays a detailed view of the Subscriber Manager status.</td>
</tr>
<tr>
<td>--wait</td>
<td></td>
<td>Used with --start or --restart to signal the CLU to return only when the Subscriber Manager is up.</td>
</tr>
</tbody>
</table>
The following command displays the Subscriber Manager configuration:

```
p3sm --show
```

```plaintext
Subscriber Management Module Information:
==========================================
Persistance 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-logouts: 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
```

The following command resynchronizes the subscribers of the specified SCE with the Subscriber Manager database:

```
p3sm --resync --ne-name=my_SCE_100
```

The following command stops the server operation and then restarts it:

```
p3sm --restart
```

The following command reloads the Subscriber Manager configuration file, `p3sm.cfg`:

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

The following command displays the Subscriber Manager operational status (active or inactive):

```
p3sm --sm-status
SM is running.
SM operational state is Active
Command terminated successfully
```

The following command extracts the Subscriber Manager support information to the specified file:

```
p3sm --extract-support-file --output=support.zip
```
The following command displays statistics regarding login 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-logouts:            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
```

### The p3subs Utility

The **p3subs** utility manipulates individual subscriber information in the Subscriber Manager 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 **p3subs** command has the following format:

```
p3subs OPERATION [SUBSCRIBER-OPTIONS]
```

*Table B-28* and *Table B-29* list the **p3subs** operations and options.

### Table B-28  p3subs Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--add</td>
<td>Adds/updates a subscriber. The operation fails if the subscriber exists, unless the <strong>--overwrite</strong> option is used.</td>
</tr>
<tr>
<td>--set</td>
<td>Adds/updates mappings and/or properties for the specified subscriber.</td>
</tr>
<tr>
<td></td>
<td>A new mapping overwrites all existing mappings, unless the <strong>--additive-mapping</strong> option is used.</td>
</tr>
<tr>
<td></td>
<td>A property is overwritten only when a new value is assigned to it, but not when a different property has a new value assigned to it.</td>
</tr>
<tr>
<td>--show</td>
<td>Displays information for the specified subscriber.</td>
</tr>
<tr>
<td>--remove</td>
<td>Removes the specified subscriber.</td>
</tr>
<tr>
<td>--show-all-mappings</td>
<td>Displays all the mappings for the specified subscriber.</td>
</tr>
<tr>
<td>--remove-mappings</td>
<td>Removes the specified mapping of the specified subscriber.</td>
</tr>
<tr>
<td>--remove-all-mappings</td>
<td>Removes all the mappings of the specified subscriber.</td>
</tr>
<tr>
<td>--show-property</td>
<td>Displays the value of the specified property of the specified subscriber.</td>
</tr>
<tr>
<td>--show-all-properties</td>
<td>Displays the values of all the properties of the specified subscriber.</td>
</tr>
<tr>
<td>--show-all-property-names</td>
<td>Displays all the property names and descriptions.</td>
</tr>
</tbody>
</table>
### Table B-28  
**p3subs Operations (continued)**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--reset-property</td>
<td>Resets the specified property of the specified subscriber to its default value.</td>
</tr>
<tr>
<td>--remove-properties</td>
<td>Removes all properties and custom properties from the subscriber record.</td>
</tr>
<tr>
<td>--clear-state</td>
<td>Clears applicative state of specified subscriber. This command clears only the backup copy at the Subscriber Manager; it does not clear the applicative state record in the SCE platform.</td>
</tr>
</tbody>
</table>

### Table B-29  
**p3subs Subscriber Options**

<table>
<thead>
<tr>
<th>Subscriber Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--overwrite</td>
<td>—</td>
<td>Used in add operations to replace the existing subscriber configuration, instead of failing.</td>
</tr>
<tr>
<td>--subscriber=NAME</td>
<td>-s NAME</td>
<td>Performs operation using specified subscriber NAME.</td>
</tr>
<tr>
<td>--additive-mappings</td>
<td>—</td>
<td>Adds the new mapping(s) to any existing ones. (Without this option, existing mappings are overwritten.)</td>
</tr>
</tbody>
</table>
| --ip=IP1[/RANGE][,...][@VPN-NAME] | — | Performs the operation using specified IP or IPv6 mappings.  
"/RANGE" is used for specifying several consecutive mappings, by specifying the number of consecutive set bits in the mask. For example, 1.1.1.0/30 means 1.1.1.0 to 1.1.1.3, or 1.1.1.0 with mask 255.255.255.252.  
"@VPN-NAME" is used to specify a tunneled IP address or the range of a VPN. |

**Note**  
We recommend that you do not assign the same IPv6 address to different subscribers with different prefix values.
### Table B-29  p3subs Subscriber Options (continued)

<table>
<thead>
<tr>
<th>Subscriber Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--vpn=VPN-NAMES-LIST</td>
<td></td>
<td>Performs the operation using all the tunneled IP addresses of a VPN (full-range). This has the same meaning as --ip=0.0.0.0/0@VPN-NAME.</td>
</tr>
<tr>
<td>--ipv6-prefix</td>
<td></td>
<td>Performs the operation using the specified IPv6 mappings. A 64-bit IPv6 address representation is supported. All the generic IPv6 notations with prefix are supported, provided the prefix is in the range of 32 to 64. The --add, --set, --show, and --remove-mappings operations support this subscriber option.</td>
</tr>
<tr>
<td>--community=AS:value@VPN-NAM E{,...}</td>
<td></td>
<td>Performs the operation using the community field of a VPN.</td>
</tr>
<tr>
<td>--property=KEY1[=VAL1]{,...}</td>
<td>-p KEY1[=VAL1]{,...}</td>
<td>Performs the operation using the specified KEY=VAL property/properties. These properties are defined by the application and influence the subscriber service in the SCE.</td>
</tr>
<tr>
<td>--custom-property=KEY1[=VAL1 }{,...}</td>
<td></td>
<td>Performs the operation using the specified KEY=VAL custom property/properties. These properties are user-defined and have no influence on the service the subscriber receives.</td>
</tr>
<tr>
<td>--domain=DOMAIN</td>
<td>-d DOMAIN</td>
<td>Performs the operation on the specified DOMAIN. If DOMAIN is none, the operation refers to subscribers who have no domain specified.</td>
</tr>
<tr>
<td>--up-vlink-name</td>
<td></td>
<td>Performs the operation using the specified up-vlink-name.</td>
</tr>
<tr>
<td>--down-vlink-name</td>
<td></td>
<td>Performs the operation using the specified down-vlink-name.</td>
</tr>
<tr>
<td>--giaddr</td>
<td></td>
<td>Performs the operation using the specified giaddr IP value.</td>
</tr>
</tbody>
</table>

### Examples

The following command adds a subscriber with the specified IP address:
The following command overwrites subscriber information. As the subscriber xyz already exists, this operation would have failed, but the overwrite option allows the IP address to be overwritten.

\[ \text{p3subs --add --subscriber=xyz --ip=96.142.12.7} \]

The following command sets a property value for the specified subscriber:

\[ \text{p3subs --set --subscriber=xyz --property=packageId=1} \]

The following command adds new mappings for the specified subscriber; any existing ones are overwritten:

\[ \text{p3subs --set --subscriber=xyz --ip=96.142.12.8} \]

The following command adds new mappings to the existing ones for the specified subscriber:

\[ \text{p3subs --set --subscriber=xyz --ip=96.142.12.0/24 --additive-mappings} \]

The following command adds tunneled IP addresses of a VPN, existing mappings are overwritten:

\[ \text{p3subs --set --subscriber=xyz --ip=10.1.1.0/24@myVpn} \]

The following command adds all tunneled IP addresses of a VPN, existing mappings are overwritten:

\[ \text{p3subs --set --subscriber=xyz --vpn=myVpn} \]

The following command adds a community of a VPN, existing mappings are overwritten:

\[ \text{p3subs --set --subscriber=xyz --community=1:10@myVpn} \]

The following command adds a subscriber with the specified IPv6 address:

\[ \text{p3subs --add --subscriber=sub5 --ipv6-prefix=2001:0db8:85a3:1000::/64} \]

The following command displays information for the specified subscriber:

\[ \text{p3subs --show --subscriber=xyz} \]

The following command removes the specified subscriber:

\[ \text{p3subs --remove --subscriber=xyz} \]

The following command displays all the mappings for the specified subscriber:

\[ \text{p3subs --show-all-mappings --subscriber=xyz} \]

The following command removes the specified mappings for the specified subscriber:

\[ \text{p3subs --remove-mappings --subscriber=xyz --ip=96.142.12.7,96.128.128.42} \]

The following command removes a range of consecutive mappings for the specified subscriber:

\[ \text{p3subs --remove-mappings --subscriber=xyz --ip=1.1.1.0/30} \]

The following command removes all the mappings for a specified subscriber:

\[ \text{p3subs --remove-all-mappings --subscriber=xyz} \]

The following command displays the value of the specified property for the specified subscriber:

\[ \text{p3subs --show-property --subscriber=xyz --property=reporting} \]

The following command displays the values of all the properties for the specified subscriber:

\[ \text{p3subs --show-all-properties --subscriber=xyz} \]
The following command displays all the property names and descriptions:

```
p3subs --show-all-property-names
```

The following command resets a specified property of a specified subscriber to its default value:

```
p3subs --reset-property --subscriber=xyz --property=rdr.transaction.generate
```

The following command clears the applicative state of the specified subscriber. This command clears only the backup copy at the Subscriber Manager. It does not clear the applicative state record in the SCE platform:

```
p3subs --clear-state --subscriber=xyz
```

### The p3subsdb Utility

The `p3subsdb` utility manages the subscriber database and performs operations on groups of subscribers. The `p3subsdb` command has the following format:

```
p3subsdb OPERATION [OPTIONS] [FILE-OPTIONS]
```

Table B-30, Table B-31, and Table B-32 list the `p3subsdb` operations and options.

#### Table B-30  p3subsdb Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>--clear-all</td>
<td>Removes all subscriber records from the Subscriber Manager database.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td>--clear-domain</td>
<td>Removes all subscriber records from the specified domain.</td>
<td>Progress indicator</td>
</tr>
<tr>
<td>--show-num</td>
<td>Displays the number of subscribers in the database for the specified domain.</td>
<td>—</td>
</tr>
<tr>
<td>--show-all</td>
<td>Lists all the subscriber names.</td>
<td>—</td>
</tr>
<tr>
<td>--show-domain</td>
<td>Lists all the subscriber names in the specified domain.</td>
<td>—</td>
</tr>
<tr>
<td>--import</td>
<td>Imports subscribers to the database from a specified CSV file.</td>
<td>Progress indicator</td>
</tr>
</tbody>
</table>

The `--import` operation imports subscribers to the database from a specified CSV file. See the “Subscriber CSV File Format used by the Cisco SCA BB Console for Import and Export of Subscriber Mappings” section on page B-30.

The filename of the file to be imported is specified using the format “--file=import-filename”.

The results go to a result file, `import-results.txt`, which is created in the same directory as the CSV file.
### Table B-30  
*p3subsdb Operations (continued)*

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
</table>
| `--export`      | Exports subscribers from the database to a specified CSV file. See “Subscriber CSV File Format used by the Cisco SCA BB Console for Import and Export of Subscriber Mappings” section on page B-30.  

Use the `--mapping-type=MAPPING_TYPE` option to export specific subscribers.  

The filename of the file to be exported is specified using the format “--output=export-filename”.  

The results go to a result file, `export-results.txt`, which is created in the same directory as the CSV file.  

Progress indicator |
| `--clear-all-states` | Clears the state of all subscribers in the Subscriber Manager database.                                                                                                                                      | —                                        |
| `--remove-property` | Removes a specified property from all subscribers in the system.  

*Note* After running this command, you should re-synchronize all SCE devices. |
| `--remove-all-ip` | Removes all the IP addresses of all the subscribers. In a dual-stack configuration, when used with the option `--mapping-type`, mapping type should be either ipv4-only or ipv6-only. If no option is used, all the mappings for all the subscribers are removed. |
| `--remove`       | Removes all the subscribers that are specified in the CSV file from the Subscriber Manager.                                                                                                               | —                                        |
## Table B-31  p3subsdb Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--mapping-type</code>= MAPPING TYPE</td>
<td>-m MAPPING TYPE</td>
<td>Used to specify the mapping type in a dual-stack configuration.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The mapping types that are supported are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv4-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv6-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- dual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The <code>--show-num</code>, <code>--show-all</code>, <code>--show-domain</code>, <code>--remove-all-ip</code>, and <code>--export</code> operations support this option.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider an example scenario where there are four subscribers with the following mapping details:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S1—IPv4 mappings only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S2—IPv6 mappings only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S3—Has both IPv4 and IPv6 mappings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S4—No mappings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the <code>--export</code> command is used with the specific mapping type:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv4-only—Exports only the subscribers with IPv4 mappings. In the example scenario, only S1 is exported.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv6-only—Exports only the subscribers with IPv6 mappings. In the example scenario, only S2 is exported.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- dual—Exports the subscribers having both IPv4 and IPv6 mappings. In the example scenario, only S3 is exported.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If no option is specified, the command exports all the subscribers, including those with no mappings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When any of the <code>--show-num</code>, <code>--show-all</code>, or <code>--show-domain</code> operation commands are used with the specific mapping type:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv4-only—Shows only the subscribers with IPv4 mappings. In the example scenario, only S1 is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ipv6-only—Shows only the subscribers with IPv6 mappings. In the example scenario, only S2 is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- dual—Shows the subscribers having both IPv4 and IPv6 mappings. In the example scenario, only S3 is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If no option is specified, <code>--show-num</code>, <code>--show-all</code>, or <code>--show-domain</code> operation commands shows all the subscribers, including those with no mappings.</td>
</tr>
</tbody>
</table>
The lines in a subscriber CSV files have the following fixed format of IPv4 only subscriber mappings:
subscriber-id, domain, mappings, package-id, upstream Virtual Link id, downstream Virtual Link id, monitor

The following is an example CSV file for use with the Subscriber Manager CLU:
JerryS, subscribers, 80.179.152.159, 0, 0, 0
ElainB, , 194.90.12.2, 3, 12, 1

The lines in a subscriber CSV files have the following fixed format of IPv4 only, IPv6 only, and dual-stack subscriber mappings:
subscriber-id, domain, mappings, mappings_ipv6, package-id, upstream Virtual Link id, downstream Virtual Link id, monitor

---

**Table B-31**  
*p3subsdb Options (continued)*

<table>
<thead>
<tr>
<th>Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--prefix=NAME</td>
<td>-</td>
<td>Used in the export operation for filtering the export.</td>
</tr>
<tr>
<td>--property=PROP</td>
<td>-</td>
<td>Used in removing of property PROP from all of the subscribers.</td>
</tr>
<tr>
<td>--domain=DOMAIN</td>
<td>-d DOMAIN</td>
<td>Performs the operation on the specified DOMAIN. If DOMAIN is none, the operation refers to the subscribers who have no domain specified.</td>
</tr>
</tbody>
</table>

**Table B-32**  
*p3subsdb File Options*

<table>
<thead>
<tr>
<th>File Option</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file=FILE</td>
<td>-f FILE</td>
<td>Specifies the subscriber CSV FILEs from which to import.</td>
</tr>
<tr>
<td>--output=FILE</td>
<td>-o FILE</td>
<td>Specifies the subscriber CSV FILE to which to export.</td>
</tr>
</tbody>
</table>

**Subscriber CSV File Format used by the Cisco SCA BB Console for Import and Export of Subscriber Mappings**

The lines in a subscriber CSV files have the following fixed format of IPv4 only subscriber mappings:
subscriber-id, domain, mappings, package-id, upstream Virtual Link id, downstream Virtual Link id, monitor

The following is an example CSV file for use with the Subscriber Manager CLU:
JerryS, subscribers, 80.179.152.159, 0, 0, 0
ElainB, , 194.90.12.2, 3, 12, 1

The lines in a subscriber CSV files have the following fixed format of IPv4 only, IPv6 only, and dual-stack subscriber mappings:
subscriber-id, domain, mappings, mappings_ipv6, package-id, upstream Virtual Link id, downstream Virtual Link id, monitor
The following is a sample CSV file for use with the Subscriber Manager CLU:

- IPv6 mappings only
  `subs1,subscribers,,abcd::/64,0,0,0`

- IPv4 mappings only
  `subs2,subscribers,194.90.12.2,,3,12,1`

- Both IPv4 and IPv6 mappings
  `subs3,subscribers,1.1.1.1,abcd::/64,1,2,3`

If no domain is specified, the default domain (subscribers) is assigned.

**Note**
The Subscriber Manager supports only one format at a time. Run the `p3sm --load-subaware-props` command after you change the format. All the changes should be made in the subaware.pro file too.

**Note**
Provide empty values in the mappings column to import IPv6 mappings, and provide empty values in the mappings_ipv6 column to import IPv4 mappings.

For a complete description of subscriber properties, see the *Cisco Service Control Application for Broadband User Guide*.

**Examples**

The following command imports subscribers from a specified CSV file:

```
p3subsdb --import --file=mySubscriberFile.csv
```

The following command exports subscribers to a specified CSV file:

```
p3subsdb --export -o mySubscriberFile.csv
```

The following command exports subscribers to a specified CSV file, using filtering options:

```
p3subsdb --export --prefix=a --output=mySubscriberFile.csv
```

The following command exports subscribers to a specified CSV file, using filtering options:

```
p3subsdb --export --prefix=a -o a.csv
```

The following command removes all subscriber records from the Subscriber Manager database:

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

The following command removes all subscriber records from the specified domain:

```
p3subsdb --clear-domain --domain=myDomain
```

The following command lists all the subscribers:

```
p3subsdb --show-all
```

The following command lists all subscribers in a specified domain:

```
p3subsdb --show-domain --domain=myDomain
```

The following command shows the number of subscribers in a specified domain:
The following command shows the number of subscribers with IPv4 address only in a dual-stack configuration:
```
p3subsdb --show-num --domain=myDomain
```

The following command shows the number of subscribers with only IPv6 address in a specified domain in a dual-stack configuration:
```
p3subsdb --show-num --d=myDomain -m=ipv6-only
```

The following command lists all the subscribers who have no domain specified:
```
p3subsdb --show-domain --domain=none
```

The following command clears the state of all the subscribers in the Subscriber Manager database:
```
p3subsdb --clear-all-state
```

The following command removes all the subscribers with IPv6 mappings or IPv6 addresses in a dual-stack configuration:
```
p3subsdb --remove-all-ip -m=ipv6-only
```

The following command removes all the subscribers with IPv4 mappings or IPv4 addresses in a dual-stack configuration:
```
p3subsdb --remove-all-ip -m=ipv4-only
```

The following command removes all the subscriber mappings in a dual-stack configuration:
```
p3subsdb --remove-all-ip
```

The following command removes the monitor property from all the subscriber records:
```
p3subsdb --remove-property --property=monitor
```
### The p3vpn Utility

The **p3vpn** utility manages the VPN entities in the Subscriber Manager.

The **p3vpn** command has the following format:

```
p3vpn  OPERATION  [OPTIONS]  [FILE-OPTIONS]
```

Table B-33, Table B-34, and Table B-35 list the **p3vpn** operations and options.

#### Table B-33  p3vpn Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--add</td>
<td>Adds a VPN to the Subscriber Manager. The operation fails if the VPN exists.</td>
</tr>
<tr>
<td>--set</td>
<td>Updates a VPN in the Subscriber Manager. A new mapping overwrites all existing mappings, unless the <strong>--additive-mapping</strong> option is used.</td>
</tr>
<tr>
<td>--remove</td>
<td>Removes the specified VPN.</td>
</tr>
<tr>
<td>--remove-mappings</td>
<td>Removes the specified mappings of the specified VPN.</td>
</tr>
<tr>
<td>--remove-all-mappings</td>
<td>Removes all mappings of the specified VPN.</td>
</tr>
<tr>
<td>--show</td>
<td>Displays information for the specified VPN.</td>
</tr>
<tr>
<td>--show-subs</td>
<td>Displays all the subscribers that belong to the specified VPN.</td>
</tr>
<tr>
<td>--show-all</td>
<td>Displays all VPN names.</td>
</tr>
<tr>
<td>--show-all-mappings</td>
<td>Displays all the mappings for the specified VPN.</td>
</tr>
<tr>
<td>--show-num</td>
<td>Displays the total number of VPNs.</td>
</tr>
</tbody>
</table>
| --import     | Imports VPNs from a CSV file. See the “VPN CSV File Format for import/export” section on page B-34.  
The filename of the file to be imported is specified using the format “--file=import-filename”.  
The results go to a result file, import-results.txt, which is created in the same directory as the CSV file. |
| --export     | Export VPNs to a CSV file. See the “VPN CSV File Format for import/export” section on page B-34.  
The filename of the file to be exported is specified using the format “--output=export-filename”.  
The results go to a result file, export-results.txt, which is created in the same directory as the CSV file. |
| --remove     | Remove the VPNs specified by a CSV file.  
The filename of the file that contains the VPNs to be removed is specified using the format “--file=remove-filename”.  
The results go to a result file, remove-results.txt, which is created in the same directory as the CSV file. |
| --remove-all-vlan | Removes all the VLAN-ids of all VPNs. |
| --remove-all-mpls-vpn | Removes all the MPLS/VPN mappings of all VPNs. |
Appendix B Command-Line Utilities

When working with VLAN mapping types, you must configure the Cisco SCE by 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 a sample CSV file for use with the Subscriber Manager CLU:

```
MPLS-VPN, subscribers, 1:1000@1.1.1.1
VLAN-VPN, subscribers, 10
```

### Examples

The following command adds a VPN with the specified VLAN:
The following command adds new mappings for the specified VPN; any existing ones are overwritten:

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

The following command adds new mappings to the existing ones for the specified subscriber:

```
p3vpn --set --vpn=myVpn --vlan-id=11 --additive-mappings
```

The following command adds a VPN with the specified MPLS/VPN mappings:

```
p3vpn --add --vpn=myVpn --mpls-vpn=1:10096.142.12.7
```

The following command displays information for the specified VPN:

```
p3vpn --show --vpn=myVpn
```

The following command removes the specified VPN:

```
p3vpn --remove --vpn=myVpn
```

The following command displays all the mappings for the specified VPN:

```
p3vpn --show-all-mappings --vpn=myVpn
```

The following command removes the specified mappings for the specified VPN:

```
p3vpn --remove-mappings --vpn=myVPN --vlan-id=10
```

The following command removes all the mappings for the specified subscriber:

```
p3vpn --remove-all-mappings --vpn=myVpn
```

## The p3bgp Utility

The `p3bgp` utility controls the operation of the BGP LEG and displays its status. For information about this CLU, see the “Using the MPLS/VPN BGP LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

## The p3dhcpsniff Utility

The `p3dhcpsniff` utility displays the SCE-Sniffer DHCP LEG configuration, status, and statistics. For information about this CLU, see the “Using the SCE-Sniffer DHCP LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

## The p3dhcpv6sniff Utility

The `p3dhcpv6sniff` utility displays the Cisco SCE-Sniffer DHCPv6 LEG configuration, status, and statistics. For information about this CLU, see the “Using the SCE-Sniffer DHCPv6 LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

## The p3leasequery Utility

The `p3leasequery` utility displays the DHCP Lease Query LEG configuration, status, and statistics. For information about this CLU, see the “Subscriber Manager Integration - Configuration” chapter in the *Cisco SCMS SM LEGs User Guide*. 
The **p3v6leasequery Utility**

The **p3v6leasequery** utility displays the DHCPv6 Lease Query LEG configuration, status, and statistics. For information about this CLU, see the “Subscriber Manager Integration - Configuration” chapter in the *Cisco SCMS SM LEGs User Guide*.

The **p3qrdr Utility**

The Quota RDR CLU (p3qrdr) displays quota RDR server configuration, status, connections, and statistics. For more details about this CLU, see the “Using the Quota Manager Command-Line Utility” chapter in the *Cisco Service Control Quota Manager User Guide*.

The **p3radius Utility**

The **p3radius** utility displays the statistics of the RADIUS Listener LEG. For information about this CLU, see the “Using the RADIUS Listener LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

The **p3radiussniff Utility**

The **p3radiussniff** utility displays the SCE-Sniffer RADIUS LEG configuration and statistics. For information about this CLU, see the “Using the SCE-Sniffer RADIUS LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

The **p3qm Utility**

The **p3qm** utility displays the quota manager configuration, status, and statistics. For information about this CLU, see the “Using the Quota Manager CLU” chapter in the *Cisco Service Control Management Suite Quota Manager User Guide*.

The **p3soap Utility**

The **p3soap** utility displays the SOAP LEG configuration and statistics. For information about this CLU, see the “Using the SOAP LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.

The **p3vlink Utility**

The **p3vlink** utility displays the virtual link statistics of the Virtual Link Manager. For information about this CLU, see the *Cisco Service Control for Managing Remote Cable MSO Links Solution Guide*.

The **p3ipdr Utility**

The **p3ipdr** utility displays the IPDR server and IPDR LEG information. For information about this CLU, see the “Using the IPDR LEG CLU” chapter in the *Cisco SCMS SM LEGs User Guide*.
APPENDIX C

CPE as a Subscriber in a Cable Environment

Published: December 23, 2013

Introduction

This appendix describes the special case in which the Customer Premise Equipment (CPE) is the subscriber in the Cisco Service Control Solution for a cable environment. It contains the following sections:

- Cable Support Module, page C-1
- Cable Modem and CPE in the Subscriber Manager, page C-2
- Static and Dynamic Cable Modems, page C-2

A cable environment presents different issues for subscribers, in addition to the normal subscriber management issues that exist in other networks, such as DSL and Wireless.

Note

This appendix does not apply to the more common case in which a cable modem and all CPEs associated with it is considered the subscriber.

Cable Support Module

The Subscriber Manager includes a special cable support module (p3cable) for dealing with the special case in which the CPE is considered a subscriber in a cable environment. The cable support module functions as a translator between the cable context (DHCP events) and the Cisco Subscriber Manager. It provides an API in addition to the basic Subscriber Manager API functionality. You can access this API by using the Java/C/C++ APIs to call the cableLogin and cableLogout methods.

To ensure the correct behavior of the cable support module, you are required to complete a number of configuration steps. You must correctly configure domains and the static/dynamic cable modem.

The cable support module, which translates between the Subscriber Manager and the DHCP events in the cable context, performs the following functions:

- Associates between CPEs and cable modems
- Makes CPEs inherit application policy from their cable modem
- Allows/denies the introduction of CPEs whose cable modem is unfamiliar to the Subscriber Manager
For additional information regarding the functions of the cable support module, see the “The p3cable Utility” section on page B-5.

The cable support module uses the hardware (MAC) addresses of the cable modem as its subscriber name. The subscriber name of the CPE is the hardware address of its cable modem followed by the hardware address of the CPE.

Cable Modem and CPE in the Subscriber Manager

For the special case in which CPEs are considered subscribers, cable modems are not associated with the SCE in any way, and are not considered subscribers in the Cisco Service Control Solution. However, for ease of integration and simplicity, cable modems are saved as subscribers in the Subscriber Manager only (but are never introduced to the SCE).

Cable modem Subscriber Manager subscribers are saved in special hidden subscriber domains called cable modem domains. These cable modem domains do not contain any SCE and are created automatically upon an insertion of a cable modem. For a CPE in a given subscriber domain, its cable modem will reside in a cable modem domain that has the same name as the CPE domain but with the prefix CM_.

Because cable modem domains are hidden, they cannot be configured in the configuration file. However, it is possible to run subscriber-related commands (p3subs and p3subsdb) on these domains.

A cable modem subscriber name has the following form: <cable modem MAC> (the MAC of the cable modem as sent in the DHCP protocol).

A CPE subscriber name (for such a cable modem) has the following form: <cable modem MAC>__<CPE MAC> (the MAC of the cable modem, followed by two underscore characters, 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 cable modem with an IP address.

When importing cable modems, you must provide the complete cable modem domain name (CM_ plus the domain name of its CPEs).

Example

In this configuration example, the Subscriber Manager has a domain called DomainA. To enable CPEs arriving from CMTS with IP 1.2.3.4 to reach this domain, the value 1.2.3.4 is configured 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 is 1.2.3.4 (the alias of domain DomainA), so the cable modem subscriber is 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 is entered into domain DomainA with the name 0X0Y0Z__0A0B0C.

Static and Dynamic Cable Modems

Login and logout events of CPEs whose cable modem does not exist in the subscriber database are ignored, because no subscriber is created in the Subscriber Manager and aggregated to the SCE. This CPE traffic is treated as a default subscriber.
The Subscriber Manager supports two modes of integrating with cable modems. Editing and loading the `p3sm.cfg` configuration file controls these modes. (Configuring dynamic cable modem support is described in Appendix A, “Configuration File Options.” Use the CLI `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 are ignored. Consequently, the CPE traffic of these cable modems is treated as default subscriber.

- **Allow Dynamic CM**—In this mode, login/logout events of cable modems that were **not** imported using the `p3cable` command result in automatic addition of the cable modem to the subscriber database. These cable modems receive the application tuneables that are 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.*
### Troubleshooting

Revised: January 16, 2014

### Introduction

This appendix describes how to troubleshoot the Subscriber Manager installation and daily operation.

- Using the Troubleshooting, page D-1
- Subscriber Manager User Log Messages, page D-3
- General Errors, page D-2
- General Setup Errors, page D-12
- Subscriber Manager Database Setup Errors, page D-13
- Network Management Command Line Utility (p3net) Errors, page D-21
- Subscriber Database Command Line Utility (p3subsdb) Errors, page D-23
- Cable Support Command Line Utility (p3cable) Errors, page D-27
- Configuration Errors, page D-28

### Using the Troubleshooting

Each entry in this appendix consists of an error message, probable cause(s), and solution.

Note

The same error message may appear in more than one section of this appendix.

When an unexpected error occurs during installation or daily operation, search for the error message in this appendix. 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

This section provides more details on 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 `p3sm --sm-status`):
|               | `>p3sm --sm-status`  
|               | Could not connect to SM.

| Probable cause: | The Subscriber Manager server has not been started.

| Solution: | Use the following command to start/restart the Subscriber Manager server:  
|           | `>p3sm --start`

SM in Failure Mode

| Error message: | The following sequence of output appears (in response to the command `p3sm --sm-status`):
|               | `>p3sm --sm-status`  
|               | SM is running.  
|               | SM operational state is Failure  
|               | Command terminated successfully

| Probable cause: | The Subscriber Manager server restarted three times in 30 minutes due to an internal error.

| Solution: | This error can occur 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. Respond to the problem in the logs.  
|           | You can attempt the following additional operations:  
|           | - Use the following command to extract a support file:  
|           | `>p3sm --extract-support-file -f ../support.zip`
|           | - Send the support file to Cisco customer support  
|           | - Issue the following command to start/restart the Subscriber Manager server to recover from the Failure state:  
|           | `>p3sm --restart`
Subscriber Manager User Log Messages

The Subscriber Manager maintains log files that can provide additional information about Subscriber Manager operations. The files can be extracted using the p3log CLU (add link to the p3log). The Subscriber Manager user log is located in the directory `p-cube home directory/sm/`.

The following list presents the Subscriber Manager Log Messages that might appear in the User Log:

**General**

1. EM Agent Started. Version: `{Version number}`
2. EM Agent shutdown
3. Running `{operational name}` operation due to management link failure
4. Failure in setting up SM database: `{exception message and class name}`
5. Creating support file `{ the name of the support file }`
6. Restarting EM Agent in `{number of seconds}` seconds.
7. Detected LEG `{leg name}` connection failure.
8. The database is full

**HTML Adaptor**

1. HTML adaptor server started on port `{port}`
2. Unable to start HTML adaptor server on port `{port}`
3. HTML adaptor server stopped
4. HTML adaptor server port changed from `{old port}` to `{new port }`

**FTP Server**

1. FTP server started on port `{port number}`. Passive ports are: `{first passive port - last passive port}`.
2. Unable to start FTP server on port `{error message exception}`
3. FTP server stopped.
4. FTP server port changed from `{old port}` to `{new port }`
5. FTP server passive ports changed from `{old first port - old last port}` to `{new first port- new last port}`
Domain Messages

1. Domain {domain name} added
2. Errors occurred while adding network elements {elements logical names} to domain {domain name}
3. Domain {domain name} removed.
4. All of the domains were removed.
5. All of the elements were removed from domain {domain name}
6. Elements {logical names of elements (one or more)} were removed from domain {domain name}
7. Domain {domain name} was moved to {target domain}
8. Domain {old name} was renamed to {new name}.
9. Domains were reset back to defaults.
10. All SM domains reset to defaults
11. Domain {domain name} was cleared from subscribers.

SCE Messages

1. Network element {logical name-super user-description} at host {host} added.
2. Connection to {logical name} is ready.
3. Connection to {logical name} is lost, trying to establish connection...
4. Connection to {logical name} lost.
5. Network element {logical name} reset back to defaults.
6. All network elements were reset back to defaults.
7. All network elements were removed.
8. Network element {logical name} was removed.
9. All network elements were removed
10. Network element {logical name} was removed.
11. SCE {logical name} has been put in quarantine for the next {quarantine time} seconds - {quarantine reason}
12. Quarantine of SCE {logical name} ended
13. Quarantine of SCE {logical name} was stopped by the user
14. Post-quarantine timeout has expired for SCE {logical name}
Subscriber Manager-SCE Synchronization Messages

1. Started SM synchronization of {SE logical name} in {domain name} domain
2. Started SM pull-mode synchronization of {SE logical name} in {domain name} domain
3. Finished SM synchronization of {SE logical} in {domain name} domain (logins) subscribers
4. Finished SM pull-mode synchronization of {SE logical} in {domain name} domain.
5. Aborted SM synchronization of {SE logical name} in {domain name} domain
6. {subscriber/VPN name} - operation failure {description} on {SE logical name} domain
7. Started SM VPN synchronization of {logical name} in {domain name} domain.
8. Finished SM VPN synchronization of {logical name} in {domain name} domain (successful logins) VPNS, (failed logins) failures).
9. Aborted SM VPN synchronization of {logical name} in {domain name} domain.

Auto-Logout Messages

1. Starting task of logging out expired subscribers
2. Finished task of logging out expired subscribers. Task ran for {number of seconds task ran} seconds. Logged out {number of subscriber logged out} IP mappings
3. Finished task of logging out expired subscribers. Task ran for {number of seconds task ran} seconds. Sent {number of subscriber sent to external pull} IP mappings to external MBean

Inactive Subscribers Removal Messages

1. Removed subscriber {subscriber ID} due to inactivity

PRPC Messages

1. PRPC connection to {Peer inet address} established, client name is {client name}, session name is {session encoding}
2. PRPC connection to {peer inet address} closed ok: {message}
3. PRPC connection to {peer inet address} closed BAD: {message}
4. PRPC server started on port {port}
5. PRPC server port changed from {old port} to {new port}
6. PRPC server stopped.
Subscriber Messages

1. Removing all subscribers from SM
2. VLAN \{removed VLAN\} was removed from \{logged out subscriber\} due to conflict with VLAN \{removed\} of \{logged in subscriber\} on domain \{domain\}.
3. IP mapping \{removed IP range\} was removed from \{logged out subscriber\} due to conflict with \{gained IP range\} of \{logged in subscriber\} on domain \{domain\}.
4. \{subscriber name\} - Operation failure \{description\} on \{SE logical name\} (domain: \{domain\}).
5. Clearing subscribers mapping in domain \{domain name\}, due to LEG \{leg name\} connection failure.
6. Failed \{import\export operation name\}: \{error string\}
7. Could not find configuration file \{ import\export file name\}
8. Reloading configuration
9. Getting all subscriber names to file \{file name\}
10. Importing subscribers from file \{file name\}
11. Exporting subscribers to file \{file name\}
12. Adding subscriber \{Subscriber name\}
13. Removing subscriber \{Subscriber name\}
14. Showing subscriber by name \{Subscriber name\}
15. Showing subscriber by ip-range \{Subscriber name\}
16. Showing subscriber by VLAN \{Subscriber name\}
17. Setting domain of subscribers \{Subscriber name\} to \{domain name\}
18. Setting mapping of \{subscriber name\} to \{mapping\}
19. Getting mapping of \{subscriber name\}
20. Clearing mapping of \{subscriber name\}
21. Setting property \{property name + value\} of \{subscriber name\} to \{property name + value\}
22. Getting property \{property name\} of \{subscriber name\}
23. Setting properties of \{Subscriber name\}
24. Getting properties of \{Subscriber name\}
25. Clearing all subscribers.
26. Getting the number of subscribers.
27. Login: \{login info\}
28. Introduce: \{subscriber info\}
29. Unintroduce: \{subscriber name\} from domain \{domain name\}
30. Logout: \{Subscriber info\}
31. Logout by IP: \{Subscriber IP\}
32. Logout by VLAN: \{Subscriber VLAN\}
33. Remove: \{Subscriber name\}
34. Put: \{Subscriber info\}
Appendix D Troubleshooting

Cable-Related Messages

1. Importing cable modems from file {filename}
2. Exporting cable modems to file {filename}
3. Cleared all cable modems
4. Reload configuration called.

High-Availability Messages

1. The agent’s Operational state has changed to failure.
2. The Agent’s Operational state has changed to fatal. {Operation performed : restart or shutdown}
3. Agent {agent name}: {operation fail message}. details: {error details}
4. Agent {agent name} timeout expired during operation {operation}. Agent {agent name} failed while performing {operation}. details: {error details}
5. SM operational state switched from {mode} to {mode}

Configuration File Messages

1. Loaded p3sm.cfg configuration file
2. Warning : {Warning name}
3. Unknown property {property name} found in section [{section name}] in configuration file {configuration filename}.
4. Unknown section [{section name}] found in configuration file {configuration filename}.
5. Error value {property value} for property {property name} in section [{section name}]. Optional values: [{allowed values}]
6. Property key {property name} does not match expected type in section [{section name}].
7. Missing mandatory property {property name} in section [{section name}].
8. Error value {property value} for property {property name} in [{section name}] section. Valid format: [0..255].[0..255].[0..255].[0..255]
9. Error empty value for {property name} property in [{section name}] section - must have at least one character
10. Configuration file loading failed due to {num of errors} errors {num of warnings } warnings
11. Configuration file loaded successfully - {warning message}
Quota Manager Messages

1. Got quota notification {quota notification name} for subscriber {subscriber ID}
2. Subscriber {Subscriber ID} has more quota in SCE than expected (bucket ID= {bucket ID}, last quota= {last quota}, current quota= {current quota}). Possible causes: Another server provisions quota to this subscriber, QM restart
3. Quota profile ID {quota profile ID } does not exist in configuration - Ignoring quota notification {quota notification name} for subscriber {subscriber ID}
4. Subscriber {subscriber ID} was moved from SCE {old SCE IP} to SCE {new SCE IP}
5. Got quota notification {quota notification name} at {provision time} for subscriber {subscriber ID} that is too adjacent to last provision time ({last provision time })
6. Subscriber {subscriber ID} changed quota profile from {old quota profile ID} to {new quota profile ID} - Quota is replenished (with or without reset history)
7. Subscriber {subscriber ID} changed quota profile from {old quota profile ID} to {new quota profile ID}. Number of configured buckets is not equal between profiles. Therefore - replenish quota
8. Subscriber {subscriber ID} changed quota profile from {old quota profile ID} to {new quota profile ID}. Slice periods are not equal between profiles. Therefore - replenish quota
9. Quota profile {quota profile ID} configuration was changed - Quota is replenished for subscriber {subscriber ID}
10. New aggregation period started for subscriber {subscriber ID} - Quota is replenished
11. Calling quota update for subscriber {subscriber ID}: {quota operation}
12. Quota Update operation for subscriber {subscriber ID} failed, error message = {error message}
13. Get Quota Status operation for subscriber {subscriber ID} succeeded
14. Get Quota Status operation for subscriber {subscriber ID} failed, error message = {error message}
15. Subscriber {subscriber ID} has negative quota in SCE (bucket ID={ bucket ID}, last quota={last quota}, current quota={current quota} ).
16. Quota bucket {subscriber ID} has depleted for subscriber {bucket ID} till {end of aggregation period}
17. Quota bucket { bucket ID } has depleted for subscriber {subscriber ID}
18. Cannot update quota bucket {bucket ID} for subscriber {subscriber ID} due to large update value {update value} - setting the dosage value instead
19. Identified breach of bucket {bucket ID} for subscriber {subscriber ID} - moving the subscriber to {penalty profile} profile for {penalty period} minutes period.
20. Subscriber {subscriber ID} usage was lower than {post penalty threshold} - going to move the subscriber to quota profile {profile ID}
21. Identify breach within bucket {bucket ID} for subscriber {subscriber ID} while moving to penalty profile {penalty profile}. Remaining quota is {remaining quota}.
22. Ignoring the bucket id {bucketId} values reported: {sceRemainingQuotaReported} as part of Quota Status rdr since last quota provisioning is close.

This message is triggered instead of the message “Got quota notification {quota notification name} at {provision time} for subscriber {subscriber ID} that is too adjacent to last provision time ({last provision time })” if the handle_multi_bucket_in_grace_period tunable is enabled.
23. Subscriber: \{subscriberID\} reported unexpected quota: \{sceRemainingQuotaReported\} without quota update in SCE for bucket id: \{bucketId\}
   This message is triggered if a quota RDR reports a positive value as the remaining quota even before the quota update reaches the Cisco SCE.

24. Notification received from a Cisco SCE that belongs to a different domain, quota will be replenished.

25. Ignoring the additional quota update with threshold rdr: \{updateValue\}
   This message is triggered typically on receiving a threshold RDR from the Cisco SCE for the last dosage. If the remaining quota in Cisco Service Control Quota Manager is less than the dosage, additional quota update is ignored and the above message is triggered.

RDR Formatter Messages

1. Quota RDR server started on port \{server Port\}
   This message is displayed when the quota RDR server becomes active.

2. Quota RDR Client \{SCE IP\} connection is created.
   This message is displayed when a Cisco SCE connects to the quota RDR server.

3. Client \{SCE IP\} has closed the socket connection
   This message is displayed when a Cisco SCE closes the socket connection.

4. Not processing quota indication because redundancy mode is not Active or no PRPC connection to SCE
   \{SCE IP\} quota RDR processing is stopped.
   This message is displayed when an RDR is received from the standby machine or the PRPC connection between Cisco Service Control Subscriber Manager and Cisco SCE is lost.

5. Can not create new client connection, exceeded maximum limit: \{maxConnections\}
   This message is displayed when the total number of Cisco SCE RDR clients connected to the quota RDR server exceeds the maximum number of connections.

6. Cannot accept SCE RDR Connection \{sceIP\} as there is no QM PRPC connection.
   This message is displayed when the PRPC connection between Cisco Service Control Subscriber Manager and Cisco SCE is not established and the RDR connection from Cisco SCE is ignored.

7. Quota rdr queue is over threshold so dropping non priority rdr's, total dropped rdr's: \{rdrStats.countDropped()\}
   This messages is displayed when the quota RDR queue crosses the threshold and hence the status and threshold RDRs are dropped.

8. Quota rdr queue is full, total dropped rdr's: \{rdrStats.countDropped()\}
   This message is displayed when the quota RDR queue is full and hence the quota RDRs are dropped.
Lease Query LEG Messages

1. Lease-Query LEG: Session {session Id}: sending query of IP {queried IP} to the DHCP server (DHCP server IP)
2. Lease-Query LEG: Session {session Id}: queried IP (queried IP) and CIADDR (CIADDR field) do not match, reply is discarded
3. Lease-Query LEG: Session {session Id}: the lease is not active for IP {queried IP}
4. Lease-Query LEG: Session {session Id}: Lease reply received for IP {queried IP}, but there is no session in the repository - maybe the session has expired
5. Lease-Query LEG: Session {session Id}: no modem MAC address (option 82) was provided for IP {queried IP}, reply is discarded
6. Lease-Query LEG: Session {session Id}: successful query, subscriber info: {subscriber Info}
7. Lease-Query LEG: Session {session Id}: subscriber properties customization failed. DHCP info: DHCP packet info
8. Lease-Query LEG: Session {session Id}: query of IP {queried IP} to the DHCP server (DHCP server IP) has timed-out, releasing session
9. Lease-Query LEG: Server {DHCP server IP} failure detected, but there is no redundant server to switch to
10. Lease-Query LEG: Server {failed DHCP server IP} failure detected, failing-over to {1}
11. Lease-Query LEG: LEG initialization failure: message
12. Failed to assign default package to {subscriber ID} (package ID {package ID}).
13. Assigned a default package to {subscriber ID} (package ID {package ID}).
14. No package ID was found for {subscriber ID} under the package-name of {package ID}
15. Failed to assign a package to {subscriber ID} (package ID {package ID}).
16. Assigned a package to {subscriber ID} (package ID {package ID}).
17. Successfully logged CPE: subscriber name {subscriber ID}, mapping {IP}, lease time {lease-time}
18. Successfully logged CM: subscriber name {subscriber ID}
19. Successfully logged out CPE: mapping {logged out IP address}
20. Failed to login CPE: subscriber name {subscriber ID}, mapping {IP} (exception name)
21. Failed to login CM: subscriber name {subscriber ID} (exception name)
22. Failed to logout CPE: mapping {logged out IP address} (exception name)
23. Dropped RDR due to missing option 51. Assigned IP {Assigned IP}
24. Dropped RDR due to missing option 82. Assigned IP {Assigned IP}
25. Dropped RDR due to missing package information for subscriber {subscriber ID} (no default package is configured)
SOAP LEG Messages

1. SOAP-LEG query operation for: {subscriber ID}
2. SOAP-LEG query failed for: {subscriber ID}
3. SOAP-LEG query success for: {subscriber ID}
4. SOAP-LEG convert fail for: {subscriber ID}
5. SOAP-LEG login operation for: {subscriber ID}
6. SOAP-LEG login operation failed for {subscriber ID}: {error description}

VLM Messages

For VLM messages please refer to the Cisco Service Control for Managing Remote Cable MSO Links Solution Guide - Userlog Messages section.

RADIUS Listener LEG Messages

7. Login of subscriber {subscriber name} failed, {error message}
8. Logout of subscriber {subscriber name} failed, {error message}
9. Login of subscriber {subscriber name} failed, cannot translate attribute value {attribute value} to property {property name}. Check mapping table configuration.
10. Missing data to login {subscriber name} - ignoring. NAS {NAS}
11. Accounting-Stop received from NAS {NAS} with no subscriber-Id attribute and no Network-Id
12. Accounting-{Start/Interim} received from NAS {NAS} with no subscriber-Id attribute and no Network-Id
13. Invalid Framed-IP-Address attribute received - {error description}
14. Invalid attribute {attribute} received: {attribute data}
15. Invalid attribute {attribute} received: {attribute data} - {error description}
16. Invalid Framed-IP-Address attribute received: {attribute data}
17. Invalid IP Address, IP address {attribute} is reserved by the application.
18. Invalid VPN attribute {attribute} received: {attribute data}

BGP LEG Messages

19. Received an Add-Route message from BGP LEG for a known VPN {VPN: PE@RD} with IP range {bgpRange} and MPLS tag {label}
20. Received a Remove-Route message from BGP LEG for an existing route with IP range {bgpRange} and MPLS tag {label} for VPN {VPN: PE@RD}
21. Database format is not compatible with MPLS/VPN mappings, see release notes to fix that
General Setup Errors

This section consists of general setup errors:

- **Cannot Run this Script—/etc/motd File Exists**, page D-12
- **install-sm.sh Script—User is not Root**, page D-12
- **install-sm.sh Script—User pcube Exists**, page D-13

### Cannot Run this Script—/etc/motd File Exists

**Error message:** The following sequence of output appears when running one of the installation/upgrade scripts:
```
>./<script-name>
<script-name>: Cannot run this script - /etc/motd file exists
<script-name>: Please remove the file or move it to another location
<script-name>: and run the script again
```

This error applies to the following scripts:

- `install-sm.sh`
- `upgrade-sm.sh`
- `cluster-upgrade.sh`
- `install-vcs-agents.sh`

**Probable cause:** The `/etc/motd` 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:** The following sequence of output appears (in response to the command `./install-sm.sh`):
```
>./install-sm.sh
install-sm.sh: Starting SM installation sequence
install-sm.sh: Error - this script must be run by root - exiting.
```

**Probable cause:** You started the installation sequence as `user` and not as `superuser`.

**Solution:** Run the `install-sm.sh` script as `superuser`. 
install-sm.sh Script–User pcube Exists

| Error message: | The following sequence of output appears (in response to the command ./install-sm.sh):
| # ./install-sm.sh
| install-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. |

| Probable cause: | Your machine already has the user pcube. |
| Solution: | Run the installation using the –o option (overwrite), as follows:
| # ./install-sm.sh -o |

Subscriber Manager Database Setup Errors

This section consists of SM database errors:

- Introduction, page D-13
- Subscriber Manager Database DSN Configuration—Cannot Find Requested DSN, page D-15
- Subscriber Manager Database DSN Configuration—Data Source Name Not Found, page D-15
- Subscriber Manager Database Settings—Cannot Connect to Data Source, page D-16
- Subscriber Manager Database Configuration Error—Not Enough Memory, page D-17
- Subscriber Manager Database Configuration Error—Incorrect Memory Definitions, page D-17
- Subscriber Manager Database Configuration Error—Cannot Create Semaphores, page D-18
- Subscriber Manager Database Configuration Error—Cannot Read Data Store File, page D-19
- Subscriber Manager Database Configuration Error—Data Store Space Exhausted, page D-19
- Subscriber Manager Database Error on Uninstall—Failed to Uninstall SM Database, page D-20

Introduction

The Subscriber Manager database configuration consists of several configuration files. This section explains the purpose and scope of each of these files. When troubleshooting the Subscriber Manager database, you will be requested to edit these configuration files and reboot the machine or restart the Subscriber Manager. In most cases, the defaults applied by the Subscriber Manager installation procedure are satisfactory.

Caution

Be extremely careful when changing the Subscriber Manager database configuration files. It is best to consult Cisco technical support prior to making any changes. See the “Obtaining Documentation and Submitting a Service Request” section on page -xviii for more information.

- System (Kernel) Configuration File, page D-14
- Subscriber Manager Database Configuration File sys.odbc.ini, page D-14
System (Kernel) Configuration File

The kernel configuration file is a system configuration file, which affects systemwide configuration parameters:

- For Solaris, it is the file /etc/system.
- For RedHat, it is the 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 must reboot the machine for the changes to take effect.

Caution

If you are running other applications that require changes in this file’s semaphore and shared memory values, ensure that the Subscriber Manager database 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.

Subscriber Manager Database Configuration File sys.odbc.ini

The file sys.odbc.ini is a Subscriber Manager database configuration file that configures system DSNs. Any user on the machine on which the system DSN is defined can use this file. The Subscriber Manager DSNs are system DSNs that are named PCube_SM_Repository and PCube_SM_Local_Repository, and have the following system DSN configuration parameters:

- LogFileSize—The size of the Subscriber Manager database 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 Subscriber Manager database 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 Table 4-7 on page 4-13 (Memory Configuration Parameters Versus Number of Subscribers—without Quota Manager) or Table 4-10 on page 4-16 (Memory Configuration Parameters Versus Number of Subscribers—with Quota Manager).

- 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).

Use the sm-db-conf.sh script to configure the parameters (PermSize, TempSize, LogFileSize and SMPOptLevel) in sys.odbc.ini. The sm-db-conf.sh script is in the Subscriber Manager installation package.
Configuration File ~pcube/.odbc.ini

The file ~pcube/.odbc.ini is a Subscriber Manager database configuration file that configures user DSNs.

Subscriber Manager Database DSN Configuration—Cannot Find Requested DSN

Error message: The following sequence of output appears (in response to the command p3sm
--sm-status):

> p3sm --sm-status
SM is running.
SM operational state is XXX
Error - Times-Ten DB is not setup correctly:
[TimesTen][TimesTen 7.0 CLIENT]Cannot find the requested DSN (PCube_SM_Repository_CS) in ODBCINI

Probable cause: The Subscriber Manager database Client DSN is not configured correctly in file ~pcube/.odbc.ini.

Solution: Ensure that file ~pcube/.odbc.ini contains the following:

[ODBC Data Sources]
PCube_SM_Repository_CS=TimesTen 7.0 Client Driver

Subscriber Manager Database DSN Configuration—Data Source Name Not Found

Error message: The following sequence of output appears (in response to the command p3sm
--sm-status):

> p3sm --sm-status
SM is running.
SM operational state is XXX
Error - Times-Ten DB is not setup correctly:
[TimesTen][TimesTen 7.0 ODBC Driver]Data source name not found and no default driver specified

Probable cause: The Subscriber Manager database Client DSN is not configured correctly in file ~pcube/.odbc.ini.

Solution: Ensure that file ~pcube/.odbc.ini contains the following:

[PCube_SM_Repository_CS]
TTC_SERVER_DSN=PCube_SM_Repository

Ensure that file sys.odbc.ini contains the following:

[ODBC Data Sources]
PCube_SM_Repository=TimesTen 7.0 Driver
[PCube_SM_Repository]
Driver=__TTDIR__/TimesTen/pcubesm22/lib/libtten.so
DataStore=__VARDIR__/pcube_SM_Repository
### Subscriber Manager Database Settings—Cannot Connect to Data Source

| Error message: | The following sequence of output appears (in response to the command `p3sm --sm-status`):
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&gt;p3sm --sm-status</code></td>
<td>SM is running.</td>
</tr>
<tr>
<td></td>
<td>SM operational state is XXX</td>
</tr>
<tr>
<td></td>
<td>Error - Times-Ten DB is not set up correctly:</td>
</tr>
<tr>
<td></td>
<td>[TimesTen][TimesTen 7.0 CLIENT]Unable to connect to data source</td>
</tr>
<tr>
<td></td>
<td>(DSN: pcube_SM_Repository_CS; Network Address: X.X.X.X; Port Number: XXX):</td>
</tr>
<tr>
<td></td>
<td>This operation has Timed Out. Try increasing your ODBC timeout attribute</td>
</tr>
<tr>
<td></td>
<td>or check to make sure the target TimesTen Server is running</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probable cause:</th>
<th>The following causes are possible:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The address of the Server DS is incorrect.</td>
</tr>
<tr>
<td></td>
<td>The port of the Server DS is incorrect.</td>
</tr>
<tr>
<td></td>
<td>Subscriber Manager database is not active.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solution:</th>
<th>The Service Control solutions for the above causes are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(The address of the Server DS is incorrect.) Ensure that file <code>~pcube/.odbc.ini</code> contains the following:</td>
</tr>
<tr>
<td></td>
<td>TTC_SERVER=127.0.0.1</td>
</tr>
<tr>
<td></td>
<td>(The port of the Server DS is incorrect.) On a default installation, ensure that file <code>~pcube/.odbc.ini</code> does not contain “TTC_SERVER_PORT”.</td>
</tr>
<tr>
<td></td>
<td>On a nondefault installation, ensure that file <code>~pcube/.odbc.ini</code> does contain “TTC_SERVER_PORT=Non-default-port”.”</td>
</tr>
<tr>
<td></td>
<td>(Subscriber Manager database is not active.) Issue the following command:</td>
</tr>
<tr>
<td></td>
<td><code>p3db --status</code></td>
</tr>
<tr>
<td></td>
<td>If Subscriber Manager database is not working, re-install Subscriber Manager database.</td>
</tr>
<tr>
<td></td>
<td>If the above solutions do not work, please refer to the Subscriber Manager database manual.</td>
</tr>
</tbody>
</table>
### Subscriber Manager Database Configuration Error—Not Enough Memory

**Error message:** The following sequence of output appears (in response to the command `p3sm --sm-status`):

```
$p3sm --sm-status
SM is running.
SM operational state is XXX.
Error - Times-Ten DB is not setup correctly:
[TimesTen][TimesTen 7.0 ODBC Driver][TimesTen]TT0836:
Cannot create data store shared-memory segment,
error 1455 -- file "db.c", lineno 6289, procedure "sbDbConnect()"
```

**Probable cause:** There is not enough memory to create a Subscriber Manager database.

**Solution:** Do all of the following:

- Ensure that the Unix machine has at least 1024 MB of memory installed.
- Ensure that the configured memory size parameters (`PermSize` and `TempSize`) specified in file `sys.odbc.ini` are less than the total amount of memory installed on the machine.
- For Solaris, ensure that the maximum shared memory (parameter `shmsys:shminfo_shmmax`) specified in file `/etc/system` is less than the total amount of memory installed on the machine.
- For Red Hat, ensure that the maximum shared memory (parameter `kernel.shmmax`) specified in file `/etc/sysctl.conf` is less than the total amount of memory installed on the Linux Machine.

### Subscriber Manager Database Configuration Error—Incorrect Memory Definitions

**Error message:** The following sequence of output appears (in response to the command `p3sm --sm-status`):

```
$p3sm --sm-status
SM is running.
SM operational state is XXX.
Error - Times-Ten DB is not setup correctly:
[TimesTen][TimesTen 7.0 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
```

**Probable cause:** The memory definitions of DSN are incorrect.

**Solution:** Ensure that the configured permanent memory size and log file size (parameters `PermSize` and `LogSize`) are less than the total amount of memory and of disk space specified in the file `sys.odbc.ini`. 
Subscriber Manager Database Configuration Error—Cannot Create Semaphores

| Error message: | The following sequence of output appears (in response to the command `p3sm --sm-status`):

```
p3sm --sm-status
SM is running.
SM operational state is XXX
Error - Times-Ten DB is not setup correctly:
[TimesTen][TimesTen 7.0 ODBC Driver][TimesTen]TT0925: Cannot create data store semaphores (Invalid argument) -
file "db.c", lineno 5124, procedure "sbDbCreate()", sqlState: 08001, errorCode: 925
```

| Probable cause: | Subscriber Manager database was unable to create the data store semaphores that are defined in the kernel configuration file (/etc/system for Solaris; /etc/sysctl.conf for Red Hat).

| Solution: | Do all of the following:

- Ensure that the machine has at least 1024 MB of memory installed.
- Reboot the machine after the first time that Subscriber Manager database is installed.
- Verify the contents of the system (kernel) configuration file:
  - For Solaris, ensure that the file `/etc/system` contains the following:
    ```
    semsys:seminfo_semmni = 20
    semsys:seminfo_semmns = 2000
    semsys:seminfo_semmnu = 2000
    semsys:seminfo_semmsl = 100
    ```
  - For Red Hat, ensure that file `/etc/sysctl.conf` contains the following:
    ```
    kernel.sem = "SEMMSL_250 SEMMNS_32000 SEMOPM_100 SEMMNI_100"
    ```

*------ Begin settings for SM Database
kernel.sem = "SEMMSL_250 SEMMNS_32000 SEMOPM_100 SEMMNI_100"
*------ End of settings for SM Database
Subscriber Manager Database Configuration Error—Cannot Read Data Store File

Error message: The following sequence of output appears (in response to the command `p3sm --sm-status`):

```plaintext
> p3sm --sm-status
SM is running.
SM operational state is XXX.
Error - Times-Ten DB is not setup correctly:
OS-detected error: Error 0 -- file "db.c", lineno 6320, procedure "sbDbConnect()"
```

Probable cause: Subscriber Manager database was unable to read the data store file, probably due to an error during installation. This error occurs when installing a Subscriber Manager database application in addition to an existing Subscriber Manager database, without first uninstalling the old Subscriber Manager database.

Solution: Do the following:

1. Remove the database by using the Subscriber Manager `p3db` CLU with the following commands:
   ```plaintext
   > p3db -destroy-rep-db > p3db -destroy-local-db
   ```

2. Uninstall Subscriber Manager database with the following commands:
   ```plaintext
   > su Password: # /pcube/lib/tt/TimesTen/pcubesm22/bin/setup.sh -uninstall
   ```

3. Re-install Subscriber Manager database either by running the Subscriber Manager `install-tt.sh` script or by using the installation files supplied by Subscriber Manager database.

Subscriber Manager Database Configuration Error—Data Store Space Exhausted

Error message: The following sequence of output appears in the Subscriber Manager log (while using the Subscriber Manager APIs):

```plaintext
java.io.IOException: Failure in putting subscriber 45977166__00:50:bf:97:c1:b2 : [TimesTen][TimesTen 7.0 ODBC Driver][TimesTen]TT0802: Data store space exhausted -- file "blk.c", lineno 1571, procedure "sbBlkAlloc"
```

Cisco Service Control Subscriber Manager User Guide
## Subscriber Manager Database Error on Uninstall—Failed to Uninstall SM Database

### Probable cause:
The Subscriber Manager database has already reached its maximum capacity, which caused the operation of adding a new subscriber to the database to fail.

### Solution:
Usually, doing just one of the following is sufficient:
- Reduce the number of subscribers managed by the Subscriber Manager (of course, this solution is not always possible).
- Configure the system to support a larger number of subscribers. Note that this solution may require editing one or more of the Subscriber Manager database configuration files discussed in the “Introduction” section on page D-13 as well as rebooting the machine.
- Move the Subscriber Manager to a more powerful machine; this could be a faster CPU (or more CPUs), a larger disk, more RAM, etc.

For help and guidance in implementing the last two solutions, please contact Cisco Technical Support. See Obtaining Documentation and Submitting a Service Request, page -xviii.

### Error message:
The following error message appears when you uninstall Cisco Service Control Subscriber Manager when there is an open connection to SM database.

```
There are existing connections to datastores related to this installation.
Some clean up might be needed.
TimesTen was not uninstalled.
uninstall-sm.sh: problem with SM Database uninstall - skipping link and var removal
uninstall-sm.sh: Error - failed to uninstall SM Database - exiting.
```

### Probable cause:
SM database has open connections that are not closed properly.

### Solution:
Do the following:

1. Go to SM database installation directory and stop the SM database daemon.
   
   ```bash
   /opt/pcube/lib/tt/TimesTen/pcubesm22/bin/ttDaemonAdmin -stop
   ```

2. Uninstall Cisco Service Control Subscriber Manager.
Network Management Command Line Utility (p3net) Errors

This section contains Network Management Command Line Utility (p3net) Errors, their causes, and solutions.

- **First Connection—Operation Timed Out**, page D-21
- **Status Error—Connection Down**, page D-21
- **Status Error—Subscriber Management Down**, page D-22

### First Connection—Operation Timed Out

<table>
<thead>
<tr>
<th>Error message:</th>
<th>The following sequence of output appears (in response to the command \texttt{p3net --connect}):</th>
</tr>
</thead>
</table>
|               | \texttt{>p3net --connect --ne-name=YYYY} Error - failed to connect to element 'YYYY'
|               | Operation timed out: connect \texttt{connect}                                                  |

<table>
<thead>
<tr>
<th>Probable cause:</th>
<th>The following causes are possible:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- The IP address is incorrect.</td>
</tr>
<tr>
<td></td>
<td>- The element YYYY is down.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solution:</th>
<th>The Service Control solutions for the above causes are the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Ensure that the IP address is correct.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that the element YYYY is online and is connected via its</td>
</tr>
<tr>
<td></td>
<td>management port.</td>
</tr>
</tbody>
</table>

### Status Error—Connection Down

<table>
<thead>
<tr>
<th>Error message:</th>
<th>The following sequence of output appears (in response to the command \texttt{p3net --show-ne}):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>\texttt{&gt;p3net --show --ne-name=se0}</td>
</tr>
</tbody>
</table>

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
Status Error—Subscriber Management Down

Probable cause:
The following causes are possible:
  - The IP address is incorrect.
  - The element YYYY is down.

Solution:
Service Control solutions for the above causes are the following:
  - Ensure that the IP address is correct.
  - Ensure that the element YYYY is online and is connected via its management port.
  - Ensure that the PRPC adapter is online on the port that the status indicates.

Error message:
In response to the `p3net--show-ne` command, the following sequence of output appears:

```plaintext
>p3net --show --ne-name=SCE2000
Network Element Information:
============================
Name: SCE2000
Host: 10.78.242.24
Ip: 10.78.242.24
Port: 14374
Status: Connection ready
Type: SCE2000
Domain: subscribers
Synchronization Status: done
Redundancy Status: Standalone
Quarantine Status: ok
Command terminated successfully
```

Probable cause:
Synchronization Status field indicates whether the Subscriber Manager successfully performed Subscriber Manager-SCE subscriber synchronization. If the value of the field is **Not Done**, it is possible that the Subscriber Manager failed to synchronize the SCE.

Solution:
One possible solution is to force Subscriber Manager-SCE resynchronization by using the CLU command `p3sm --resync`. 
## Subscriber Database Command Line Utility (p3subsdb) Errors

This section contains Subscriber Database Command Line Utility (p3subsdb) Errors, their causes, and solutions.

### CSV File Validation Error

<table>
<thead>
<tr>
<th>Error message:</th>
<th>In response to the command <code>p3subsdb --import</code>, the following sequence of output appears:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>&gt;p3subsdb --import --file=/export/home/pcube/XXX.csv</code> Error - Failed to validate the file XXX.csv</td>
</tr>
<tr>
<td></td>
<td>See <code>import-results.txt</code> for detailed errors description.</td>
</tr>
<tr>
<td></td>
<td><code>&gt;cat import-results.txt</code></td>
</tr>
<tr>
<td></td>
<td>x.csv:1: expected 2 items but got 4 items.</td>
</tr>
<tr>
<td></td>
<td>1 subscribers, 1 errors.</td>
</tr>
<tr>
<td></td>
<td>NO APPLICATION INSTALLED, MAKE SURE TO INSTALL PQI BEFORE IMPORTING CM WITH TUNEABLES.</td>
</tr>
<tr>
<td>Probable cause:</td>
<td>You tried to import a four-field CSV file to the Subscriber Manager, but no application (SCA BB) was installed.</td>
</tr>
<tr>
<td></td>
<td>For example, the following CSV file for a SCA BB application contains four fields:</td>
</tr>
<tr>
<td></td>
<td>```</td>
</tr>
<tr>
<td></td>
<td># CSV line format: subscriber-id, domain, mappings, package-id</td>
</tr>
<tr>
<td></td>
<td>JerryS,subscribers,80.179.152.159,0</td>
</tr>
<tr>
<td></td>
<td>ElainB,subscribers,194.90.12.2,3</td>
</tr>
<tr>
<td></td>
<td>```</td>
</tr>
<tr>
<td></td>
<td>However, the default definition file that defines CSV file parsing rules contains only two fields: name and ip mapping.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Do one of the following:</td>
</tr>
<tr>
<td></td>
<td>• Install an application (Cisco SCA BB) on the Subscriber Manager (for details, see the Cisco Service Control Application for Broadband User Guide).</td>
</tr>
<tr>
<td></td>
<td>• Import a CSV file that has just two fields.</td>
</tr>
</tbody>
</table>
Clear-all Error in Cluster Mode

Error message:

In response to the `p3db -rep-status` command, the following output appears on the standby machine:

```
-bash-3.00$ p3db --rep-status (of standby machine)
Peer name     Host name     Port    State   Proto
----------------     ------------------------ ------  ------- ----- 
PCUBE_SM_REPOSITORY SM_REP1                 15111   Start   20
Last Msg Sent Last Msg Recv Latency TPS RecordsPS Logs
------------- ------------- ------- ------- --------- ----
15:16:10      00:00:20      -1.00   -1      -1        2
```

Warning 8025: Replication Log Threshold limit reached at master. The Replication state for this subscriber data store is now set to FAILED. This store is not in sync with the master the subscriber DB is in failed state.

Probable cause:

This error indicates that the replication NICs bandwidth is not set high enough for the required DB changes. The DB replication log file, which is responsible for sending the replication messages to the standby machine, is overloaded. This occurs when there are a large number of DB changes (usually caused by the `p3subsdb --clear-all` command when there are a large number of subscribers).

Solution

To resolve this problem, increase the replication log file size from 20MB to a higher value.

To increase the replication log file size on the standby machine, complete the following steps:

1. Open the `/etc/TimesTen/odbc.ini` file.
2. In the `[Pcube_SM_Repository]` section, increase the value of the LogFileSize attribute from 20MB to a higher value.
4. Restart the Subscriber Manager database process (as root user):
   ```
   /etc/init.d/tt_pcubesm22 restart
   ```
5. Perform a Subscriber Manager machine switchover.
6. Execute Steps 1 through 4 for the second Subscriber Manager machine.
### Subscriber Database is Not Replicated on Standby Server

<table>
<thead>
<tr>
<th>Error message:</th>
<th>In response to the <code>p3db --rep-status</code> command, the following output appears on the active and standby SM servers:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACTIVE SM</strong></td>
<td><img src="image" alt="Output from active SM server" /></td>
</tr>
<tr>
<td><strong>STANDBY SM</strong></td>
<td><img src="image" alt="Output from standby SM server" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="The following timers are set to 0 every few seconds" /></td>
</tr>
<tr>
<td></td>
<td>- Last Msg Sent</td>
</tr>
<tr>
<td></td>
<td>- Last Msg Recv</td>
</tr>
</tbody>
</table>

The subscriber DB is ok
Command terminated successfully
<table>
<thead>
<tr>
<th>Probable cause:</th>
<th>In the SM cluster, the standby server has been replaced, reinstalled, or the database of the server has been deleted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution</td>
<td>This error indicates that the subscriber database is not replicated on the standby server. To resolve this problem, follow these steps:</td>
</tr>
<tr>
<td></td>
<td>1. Stop Veritas Cluster on both servers as root user.</td>
</tr>
<tr>
<td></td>
<td># hastop -local</td>
</tr>
<tr>
<td></td>
<td>2. Stop replication on the standby server as pcube user.</td>
</tr>
<tr>
<td></td>
<td>$ p3db --rep-stop</td>
</tr>
<tr>
<td></td>
<td>3. Pause and continue on the active server.</td>
</tr>
<tr>
<td></td>
<td>$ p3db --rep-pause</td>
</tr>
<tr>
<td></td>
<td>p3db --rep-continue</td>
</tr>
<tr>
<td></td>
<td>4. Drop replication scheme on the standby server.</td>
</tr>
<tr>
<td></td>
<td>$ p3db --drop-rep-scheme</td>
</tr>
<tr>
<td></td>
<td>5. Set replication scheme on the standby server.</td>
</tr>
<tr>
<td></td>
<td>$ p3db --set-rep-scheme</td>
</tr>
<tr>
<td></td>
<td>$ p3db --rep-start</td>
</tr>
<tr>
<td></td>
<td>7. Start Veritas Cluster on both systems as root user.</td>
</tr>
<tr>
<td></td>
<td># hasstart</td>
</tr>
<tr>
<td></td>
<td>8. Verify if VCS is running.</td>
</tr>
<tr>
<td></td>
<td># hasstatus -sum</td>
</tr>
<tr>
<td></td>
<td>9. Verify if replication is running.</td>
</tr>
<tr>
<td></td>
<td>$ p3db --rep-status</td>
</tr>
</tbody>
</table>
## Cable Support Command Line Utility (p3cable) Errors

This section contains the Cable Support Command Line Utility (p3cable) Errors, their causes, and solutions.

### CSV File Import Error

<table>
<thead>
<tr>
<th>Error message:</th>
<th>In response to the <strong>p3cable --import-cm</strong> command, the following sequence appears:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>&gt;p3cable --import-cm --file=/export/home/pcube/XXX.csv</code></td>
</tr>
<tr>
<td></td>
<td>Importing cable modems ... 0%</td>
</tr>
<tr>
<td></td>
<td>Importing cable modems ... 100%</td>
</tr>
<tr>
<td></td>
<td>Error - Errors during import from 'H:\work\Mng\dev\install\ems\bin\win32\x.csv':</td>
</tr>
<tr>
<td></td>
<td>Imported 1 CM(s). 1 Error(s).</td>
</tr>
<tr>
<td></td>
<td>See cm-import-results.txt for detailed errors description.</td>
</tr>
<tr>
<td></td>
<td><code>&gt;cat cm-import-results.txt</code></td>
</tr>
<tr>
<td></td>
<td>x.csv:1: expected 2 items but got 4 items. 1 cable modem(s); 1 error(s).</td>
</tr>
<tr>
<td></td>
<td>NO APPLICATION INSTALLED, MAKE SURE TO INSTALL PQI BEFORE IMPORTING CM WITH TUNEABLES.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probable cause:</th>
<th>You tried to import a four-field CSV file to the Subscriber Manager, but no application (SCA BB) was installed.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For example, the following CSV file for a SCA BB application contains four fields:</td>
</tr>
<tr>
<td></td>
<td># CSV line format: subscriber-id, domain, mappings, package-id</td>
</tr>
<tr>
<td></td>
<td>JerryS,subscribers,80.179.152.159,0</td>
</tr>
<tr>
<td></td>
<td>ElainB,subscribers,194.90.12.2,3</td>
</tr>
<tr>
<td></td>
<td>However, the default definition file that defines CSV file parsing rules contains only two fields: <strong>name</strong> and <strong>ip mapping</strong>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solution:</th>
<th>Do one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Install an application (Cisco SCA BB) on the Subscriber Manager (for details, see the <em>Cisco Service Control Application for Broadband User Guide</em>).</td>
</tr>
<tr>
<td></td>
<td>• Import a CSV file that has just two fields.</td>
</tr>
</tbody>
</table>
Configuration Errors

This section explains about configuration errors.

- Network Management Errors, page D-28
- Domain Errors, page D-29
- PRPC Errors, page D-30
- RADIUS Listener Errors, page D-30
- Common Validation Errors, page D-30

Network Management Errors

<table>
<thead>
<tr>
<th>Error message (1):</th>
<th>Error section &lt;section name&gt;: cannot contain white spaces.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>[SCE.XXX] section cannot contain white spaces (SCE name cannot contain white space).</td>
</tr>
<tr>
<td>Solution:</td>
<td>Remove the white spaces.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (2):</th>
<th>Error in section &lt;section name&gt;: host &lt;ip address&gt; already exists in section &lt;section name&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>Configuration cannot contain two SCEs with the same IP address.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Change the IP address of one of the SCEs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (3):</th>
<th>Unknown NE &lt;name&gt; found in domain &lt;domain name&gt; section: it does not have [SCE.&lt;name&gt;] section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>Under the elements property, the section &lt;domain name&gt; includes an SCE that is not defined in an [SCE.XXX] section.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Add the missing [SCE.XXX] section to the file.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (4):</th>
<th>Duplicate NE &lt;name&gt; found in domain &lt;domain name&gt; section: it already appears in &lt;domain name&gt; domain section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>An SCE cannot belong to more than one domain.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Remove the SCE from all but one of the domains.</td>
</tr>
</tbody>
</table>
## Domain Errors

### Error message (1):

<table>
<thead>
<tr>
<th>Error message (1)</th>
<th>Error in section <code>&lt;section name&gt;</code>: cannot contain white spaces.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td><code>[Domain.XXX]</code> section cannot contain white spaces (domain name cannot contain white space).</td>
</tr>
<tr>
<td>Solution</td>
<td>Remove the white spaces.</td>
</tr>
</tbody>
</table>

### Error message (2):

<table>
<thead>
<tr>
<th>Error message (2)</th>
<th>Error <code>&lt;alias name&gt;</code> value - alias name should not start with ‘CM_’.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td>The alias name cannot start with CM_ because this is the prefix of hidden domains generated by the Subscriber Manager for cable modems (see Appendix C, “CPE as a Subscriber in a Cable Environment.”).</td>
</tr>
<tr>
<td>Solution</td>
<td>Use a different prefix for the alias.</td>
</tr>
</tbody>
</table>

### Error message (3):

<table>
<thead>
<tr>
<th>Error message (3)</th>
<th>Alias <code>&lt;alias name&gt;</code> already exists in <code>[&lt;domain name&gt;]</code> section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td>Each alias can appear in only one <code>[Domain.XXX]</code> section.</td>
</tr>
<tr>
<td>Solution</td>
<td>Alias mentioned in the error message should be removed from all but one <code>[Domain.XXX]</code> section.</td>
</tr>
</tbody>
</table>

### Error message (4):

<table>
<thead>
<tr>
<th>Error message (4)</th>
<th>Unknown domain <code>&lt;domain name&gt;</code> found in [LEG-Domains Association]. It does not appear as a section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td>Domain mentioned in given section does not have a <code>[Domain.XXX]</code> section.</td>
</tr>
<tr>
<td>Solution</td>
<td>Domain mentioned in error message should be given a <code>[Domain.XXX]</code> section.</td>
</tr>
</tbody>
</table>

### Error message (5):

<table>
<thead>
<tr>
<th>Error message (5)</th>
<th>Invalid non-integer value: <code>&lt;value&gt;</code> for property <code>&lt;property name&gt;</code> in section <code>[section name]</code>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td>Properties in <code>[Domain.XXX]</code> sections do not have integer values.</td>
</tr>
<tr>
<td>Solution</td>
<td>Properties mentioned in error message should be given integer values.</td>
</tr>
</tbody>
</table>

### Error message (6):

<table>
<thead>
<tr>
<th>Error message (6)</th>
<th>Error in section <code>&lt;domain name&gt;</code>: Property - <code>&lt;name&gt;</code> not found: <code>&lt;list of application properties&gt;</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause</td>
<td>Property defined in <code>[Domain.XXX]</code> section is not found in the properties list defined by the installed application.</td>
</tr>
<tr>
<td>Solution</td>
<td>Delete the properties mentioned in the error message (or define them in the installed application).</td>
</tr>
</tbody>
</table>
Appendix D Troubleshooting

PRPC Errors

Error message (7):
New configuration was not applied due to the following warnings:
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 p3sm.cfg 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 `p3sm --load-config` is activated.

Solution: To avoid this warning, use the --ignore-warnings option.

PRPC Errors

Error message:
New configuration was not applied due to the following warnings:
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 `p3sm --load-config` is activated when the PRPC configuration in the p3sm.cfg file has been changed.

Solution: Use the --ignore-warnings 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 <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 p3sm.cfg file is unknown to the Subscriber Manager. The name might be 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.
<table>
<thead>
<tr>
<th>Error message (2):</th>
<th>Unknown section [section name] found in configuration file (2).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>The section written in the p3sm.cfg file is unknown to the Subscriber Manager. The name might be misspelled.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Ensure that the section name is spelled correctly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (3):</th>
<th>Error value &lt;value&gt; for property &lt;property name&gt; in section [section name]. Optional values: [&lt;values range&gt;]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>Value of the property is invalid. The &lt;values range&gt; field contains the valid values.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Specify any valid value for the property.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (4):</th>
<th>Missing mandatory property &lt;property name&gt; in section [section name].</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>The property &lt;property name&gt; is mandatory and must appear in the section &lt;section name&gt;.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Set a value for the requested property in the specified section.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (5):</th>
<th>Error value &lt;property value&gt; for property &lt;property name&gt; in [section name] section. Valid format: [0..255].[0..255].[0..255].[0..255]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>The value is an invalid IP address.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Specify a valid IP address.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (6):</th>
<th>Error empty value for &lt;property name&gt; property in [section name] section - must have at least one character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>Value of &lt;property name&gt; is empty; for example, prop=</td>
</tr>
<tr>
<td>Solution:</td>
<td>Specify a non-empty value for the property.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error message (7):</th>
<th>Section &lt;section name&gt; added when already exists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>The section with &lt;section name&gt; appears more than once. This error is most likely to occur for the [SCE.XXX] and [Domain.XXX] sections.</td>
</tr>
<tr>
<td>Solution:</td>
<td>Use the specified section name only once.</td>
</tr>
</tbody>
</table>
Cisco Service Control Quota Manager Error Messages

This section contains the Cisco Service Control Quota Manager error messages.

RDR Formatter Errors

<table>
<thead>
<tr>
<th>Error message:</th>
<th>&quot;com.scms.qm.QuotaRdrListener&quot;,&quot;I/O error while reading from socket&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable cause:</td>
<td>The RDR formatter in Cisco Service Control Subscriber Manager does not receive RDRs.</td>
</tr>
<tr>
<td>Solution:</td>
<td>If the RDRs are not received, check these:</td>
</tr>
<tr>
<td></td>
<td>• Check the connection status:</td>
</tr>
<tr>
<td></td>
<td>p3qrdr –show</td>
</tr>
<tr>
<td></td>
<td>• Check the port details:</td>
</tr>
<tr>
<td></td>
<td>netstat –an</td>
</tr>
<tr>
<td></td>
<td>• Check the server IP address in the Quota RDR section of p3qm.cfg. If you run a standalone setup, the IP address of Subscriber Manager should be configured. If you run a cluster setup, the VIP should be configured.</td>
</tr>
<tr>
<td></td>
<td>• Check if the RDR formatter is correctly configured with Cisco Service Control Subscriber Manager IP as destination with port 32145.</td>
</tr>
</tbody>
</table>
Veritas Cluster Server

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Introduction

This appendix provides basic guidelines for configuring the Veritas Cluster Server (VCS) in a Subscriber Manager cluster installation. It assumes basic knowledge of the VCS environment; it does not replace the VCS user guide. This appendix does not cover installation of the cluster or of the Subscriber Manager cluster agents.

This appendix lists the software and hardware system requirements for the VCS. It also describes how to configure the Subscriber Manager cluster using the VCS configuration tools. Most of the examples are based on using the Java Veritas Manager GUI. However, you can perform the operations by using the Veritas command-line utilities.

The Subscriber Manager supports Veritas Cluster Server versions 5.x and 6.0 on Solaris and Red-Hat Linux machines.

- Veritas Cluster Servers, page E-2
- Configuring Subscriber Manager Cluster Resources, page E-6
- Adding Subscriber Manager Cluster Resources, page E-11
- Useful Operations, page E-20
- Linking the Resources, page E-23
- Verifying that the Service Group is Online, page E-24
- SNMP Support, page E-25
- Configuring the SnmpConsole Attribute, page E-28
- Examples, page E-29
Veritas Cluster Servers

This section consists of these topics:

- Veritas Cluster Server System Requirements, page E-2
- Veritas Cluster Server Nodes on Remote Sites, page E-3
- Replication Configuration Guidelines, page E-3

Veritas Cluster Server System Requirements

For your convenience, the following Veritas Cluster Server System Requirements are extracted from the Symantec website:

http://www.symantec.com/

- Supported Platforms:
  - Sun Solaris 10 Update 9
  - Red Hat Linux 5.5 and later, or 6.x
  - Centos 5.5 and later or 6.x

- 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://www.symantec.com/business/support/index.jsp or contact your Symantec sales representative for the latest list of certified server hardware.
    - Sun Solaris 10 Update 9
    - Red Hat Linux 5.5 and later, or 6.0
    - Centos 5.5 and later, or 6.x

- Supported Storage Hardware:
  - Please refer to http://www.symantec.com/business/support/index.jsp or contact your Symantec sales representative for the latest list of certified storage hardware.
    - Sun
    - Red Hat Linux
Veritas Cluster Server Nodes on Remote Sites

Veritas Cluster Server nodes establish heartbeat links, which communicate using the Low Latency Transport (LLT) Ethernet/dlpi protocol. The nodes transmit Ethernet broadcasts. The nodes must be on the same broadcast network. Each heartbeat link can support a separate Layer 2 switch.

The distance between Veritas Cluster Server nodes depends on a number of factors including LLT network connectivity, latency, and performance. LLT requires Direct Layer 2 low latency connections that have a maximum round-trip time of 500 milliseconds. You must design large campus clusters, or metropolitan area clusters, 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 a Subscriber Manager Cluster topology in which the nodes are at a distance from each other, please consult 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 set up (as described in the “Replication Network Configuration” section on page E-3), you must implement the replication scheme in the database. Implement the replication scheme by 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 an existing replication scheme is already established, run the following CLU to drop the previous replication scheme. Then implement the new scheme:

```
p3db --drop-rep-scheme
```

Start the replication agent by configuring and running the VCS agent of the replication agent or by running the `p3db --rep-start` CLU.

Replication Network Configuration

Plan carefully the configuration of the replication private network between the two Subscriber Managers of the cluster. This section describes guidelines for performing the configuration.

The Subscriber Manager database 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

In the operating system configuration files, verify that the /etc/hosts file is used before using a name server.

Example:

Figure E-1 illustrates a replication network.

Figure E-1  Veritas Replication Network Configuration

To configure the replication network shown in Figure E-1, do the following:

- Configure the IP addresses of each of the replication NICs (each 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, 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
```
Veritas Cluster Server Configuration Guidelines

The following procedures assume that the listed operations are performed before starting the VCS configuration:

- Installation of the VCS on both machines. As part of this installation, the following tasks must be completed:
  - Each machine is 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 is allocated for the cluster (hereafter, the cluster’s IP).
- The Subscriber Manager and the Subscriber Manager database are installed on both machines.
- The Subscriber Manager VCS agents are installed on each machine.
- The VCS manager Java console is installed on the administrator PC.

Note that in a Subscriber Manager cluster, two Subscriber Manager 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 Subscriber Manager database replication mechanism. Each machine is connected to the network by way of 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.
Configuring Subscriber Manager Cluster Resources

To configure the VCS with the Subscriber Manager 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).

![Figure E-2 Cluster Monitor: New Cluster](image)

**Step 3** Configure the cluster (Figure E-3).

![Figure E-3 Adding a Cluster](image)

- Cluster Alias—Cluster name
- Host name—One of the machine's IP addresses or hostname. Do not use the VIP here.

**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 as shown in **Figure E-4**.

**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 specify which machine will start after a boot of both nodes. If you do not set these parameters, when both nodes boot, the cluster remains offline.

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**Step 1** From the service group display, click **Show All Attributes**.

**Step 2** Ensure that both nodes are defined in the AutoStartList (Figure E-5 and Figure E-6).

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**Figure E-5 AutoStart List**

![AutoStart List](image)

**Figure E-6 AutoStart List Values**

![AutoStart List Values](image)
Step 3  Specify which node will start by defining the AutoStartPolicy parameter (Figure E-7 and Figure E-8).

Figure E-7  AutoStart Policy

![AutoStart Policy](image)

Figure E-8  AutoStart Policy Values

![AutoStart Policy Values](image)
Step 4  Ensure that the AutoStart parameter is set to true (if false, both nodes will come up as standby) (Figure E-9 and Figure E-10).

Figure E-9  AutoStart

![AutoStart screenshot](image)

Figure E-10  AutoStart Values

![AutoStart Values screenshot](image)
Adding Subscriber Manager Cluster Resources

This section describes how to add the various Subscriber Manager cluster resources.

- Adding Resources—General Guidelines, page E-11
- Adding Network NICs, page E-12
- Adding Network VIPs, page E-14
- Adding Subscriber Manager Resources, page E-15
- Adding Subscriber Manager Database Daemon Resources, page E-16
- Adding Subscriber Manager Database Replication Agent Resources, page E-17

Adding Resources—General Guidelines

**Step 1**

From the right-click menu of the service group, click **Add Resource** as shown in **Figure E-11**.

*Figure E-11  Adding Resources - General Guidelines*

![Image of Add Resource screen](add_resource.png)

The Add Resource screen appears as shown in **Figure E-12**.

*Figure E-12  Adding MultiNICA Resource: Select MultiNICA*

![Image of MultiNICA resource configuration](multi_nica.png)
Step 2  On the Add Resource screen, from the Resource Type drop-down list, choose the resource type and enter a name for the resource.
Step 3  Configure required attributes.
Step 4  When you are finished, click OK.

**Adding Network NICs**

You must configure the network NICs because the Veritas will automatically push a virtual IP on the online cluster’s element.

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**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.

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**Note**

Use the LOCAL option and configure each machine separately because the IP addresses are different in each machine.

In the following illustration, **bge0** and **bge3** are the network NICs (*Figure E-13*).

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*Figure E-13  Adding Network NIC: Device Attribute 1*
- NetMask—Assign a relevant network mask. For example, you can specify 255.255.255.255 as a network mask (Figure E-15).

**Figure E-15 Adding Network NIC: NetMask Attribute**

![Edit Attribute: Adding Network NIC: NetMask Attribute](image)

**Step 4** Click the **Enabled** and **Critical** attributes of the resource as shown in Figure E-16.
Adding Network VIPs

You must configure the Network VIPs because the VERITAS will automatically set a virtual IP on the online cluster’s element.

**Step 1** Select an IP address of the cluster.

**Step 2** Add an IPMultiNIC resource called *Network-VIP* to the service group.
Step 3 Define the Address, NetMask, and MultiNICAResName parameters (Figure E-17).
- **Address**—Enter the Cluster IP address.
- **NetMask**—Enter the network-mask you want to use for this IP.
- **MultiNICAResName**—Enter *Network-NICs* to specify the relevant NICs.

*Figure E-17 Adding Network VIP Resource*

Step 4 Check the **Enabled** and **Critical** check boxes. See *Figure E-16*.

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**Adding Subscriber Manager Resources**

Step 1 Import the SubscriberManager agent's type from the file /opt/VRTSvcs/bin/SubscriberManager/SubscriberManager.cf.

Step 2 Add a SubscriberManager resource called *Subscriber Manager* to the service group.
Step 3  Define the SmBinPathName and SmDebugLevel parameters (Figure E-18).

- SmBinPathName—Enter the path to the bin directory under the Subscriber Manager installation directory, for example, /opt/pcube/sm/server/bin/.
- SmDebugLevel—Enter a number between 1 and 4 to view debug messages. Enter 0 to disable debug messages.

Figure E-18  Adding Subscriber Manager Resource

Note
When adding the following resources, you must check the Critical check box:
MultiNICA
Network-VIP
SM-Cluster
Subscriber Manager database Deamon

Adding Subscriber Manager Database Daemon Resources

Step 1  Import the OnOnlyProcess agent’s type from file

Step 2  Add an OnOnlyProcess resource called TimesTenDaemon to the service group.
Step 3 Define the OnlineCmd, PathName, and Arguments parameters (Figure E-19).

- **OnlineCmd**—Enter the Subscriber Manager database Daemon start command:
  
  `/etc/init.d/tt_pcubesm22 start`

- **PathName**—Enter the Subscriber Manager database Daemon process path, for example,
  
  `/opt/pcube/lib/tt/TimesTen/pcubesm22/bin/timestend`

- **Arguments**—To view the arguments, run the following operating system command:
  
  `ps -eaf | grep timestend`

  For example, the arguments can be: `-initfd 13`

---

**Adding Subscriber Manager Database Replication Agent Resources**

**Step 1** Import the TimesTenRep agent's type from the 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 (Figure E-20).

- **TtBinPathName**—Enter the TimesTen bin directory path, for example, `/opt/pcube/lib/tt/TimesTen/pcubesm22/bin`.
- **TtDebugLevel**—Enter a number in the range of 1-4 for viewing debug messages. Enter 0 to disable the debug messages.

**Figure E-20 Adding Subscriber Manager Database Replication Agent**

![Add Resource Window](image)

**Note** Ensure that the **Critical** check box is unchecked when you add the ReplicationAgent resource.

---

**Sample main.cf File**

Below is sample main.cf file:

```bash
include *types.cf*
include *OnOnlyProcess.cf*
include *SubscriberManager.cf*
include *TimesTenRep.cf*

cluster SM-Cluster {
    UserNames = { admin = gJKcJEjGKiSKeJH }
    Administrators = { admin }
}

system Machine1 {
}

system Machine2 {
}

group Bush {
    SystemList = { Machine1 = 2, Machine2 = 1 }
}
AutoStartList = { Machine1, Machine2 }
AutoStartPolicy = Priority

IPMultiNIC Network-VIP {
    Address = "1.1.3.1"
    MultiNICAResName = Network_NIC
    NetMask = "255.0.0.0"
}

MultiNICA Network_NIC {
    Device #Machine1 = { bge0 = "1.1.1.1" }
    Device #Machine2 = { bge0 = "1.1.2.1" }
    NetMask = "255.0.0.0"
}

OnOnlyProcess TimesTenDaemon {
    OnlineCmd = "/etc/init.d/tt_pcubem22 start"
    PathName = "/opt/pcube/lib/tt/TimesTen/tt_pcubem22/bin/timestend"
    Arguments = " -initfd 13"
}

SubscriberManager SM {
    SmBinPathName = "/opt/pcube/sm/server/bin"
}

TimesTenRep ReplicationAgent {
    Critical = 0
    TtBinPathName = "/opt/pcube/lib/tt/TimesTen/tt_pcubem22/bin"
}

Network-VIP requires Network_NIC
SM requires Network-VIP
SM requires ReplicationAgent
SM requires TimesTenDaemon

// resource dependency tree
//
// group Bush
// {
//   SubscriberManager SM
//   {
//     IPMultiNIC Network-VIP
//     {
//       MultiNICA Network_NIC
//     }
//     TimesTenRep ReplicationAgent
//     OnOnlyProcess TimesTenDaemon
//   }
// }
//
Useful Operations

The following sections describe operations that are useful for managing the VCS.

- Logging into the Cluster, page E-20
- Saving the Configuration, page E-20
- Closing the Configuration, page E-20
- Importing Types, page E-21

Logging into the Cluster

After you add a cluster, you are required to log in to the cluster.

Step 1
Click the login 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, be 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, ensure your configuration is closed. Some operations (like rebooting the system) could fail or a configuration conflict could occur if the configuration is in read/write mode.

Step 1
Click the icon, or choose File > Close Configuration.
Before exiting the VCS, ensure your configuration is closed. Some operations (like rebooting the system) could fail or a configuration conflict could occur if the configuration is in read/write mode.
Importing Types

To configure the Subscriber Manager Veritas agents, first you must import the type file of these agents.

Step 1

From the File menu, choose **Import Types**.

A navigation window appears as shown in Figure E-21.

*Figure E-21  Importing Types*

The window enables you to navigate through one of the cluster-system’s file system (Figure E-22).

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-22  Importing Types: Select File*
Step 3  
Select the file with the .cf extension.

The resource parameters are shown in Figure E-23.

**Figure E-23**  Importing Types: Resource Parameters
Linking the Resources

When you link resources, you establish the sequence by which resources initialize and shutdown. For example, the Network-VIP resource does not start its initialization process until the Network-NICs resource is set. Additionally, the Network-NICs agent shutdown process does not start until the Network-VIP agent finishes its shut-down operation.

**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 Figure E-24.

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**Figure E-24**  
Linked Resources

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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 Subscriber Manager database Daemon, the NICs, and the Subscriber Manager database Replication Agent should all be online on all of the systems.

The state should be similar to the one shown in Figure E-25.

*Figure E-25  Verifying Service Group is Online*
SNMP Support

VCS provides a method for notifying you 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-25
- Adding NotifierMngr Resource, page E-25
- Configuring the NotifierMngr Attributes, page E-26

Configuring NotifierMngr

Add and configure NotifierMngr using either the command line or the Cluster Manager Java Console. When started from the command line, the VCS does not control the Notifier process.

For optimal results, use the NotifierMngr agent that is bundled with VCS to configure Notifier as part of a highly available service group. Then you can activate, monitor, and shutdown the Notifier.

The following sections describe how to configure the Notifier by using the Cluster Manager Java Console.

Adding NotifierMngr Resource

**Step 1** Add a NotifierMngr resource called Notifier to the service group (Figure E-26).

*Figure E-26 Adding Notifier Manager Resource: Add Resource*
The Add Resource screen appears as shown in Figure E-27.

**Figure E-27 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 Properties View: Notifier screen appears as shown in Figure E-28.

**Figure E-28 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 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.
Configuring the SnmpConsole Attribute

The SnmpConsole attribute specifies the IP addresses to which you want the SNMP traps sent. You can specify different trap severity for each IP address (Figure E-29).

Figure E-29 Configuring SNMP Console Attributes

Linking to IPMultiNIC

Viewing Traps

After adding and configuring NotifierMngr, it sends 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, 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-20 in Adding Subscriber Manager database Replication Agent Resources.
Examples

Figure E-30 shows an instance in which the cluster is configured, and all resources are working.

- Network-NICs, ReplicationAgent and Subscriber Manager database Daemon are online on both machines.
- Network-VIP and Subscriber Manager are online on the 2nd Machine, which is currently Active.

Figure E-30  Properly Configured Cluster
Figure E-31 shows a cluster in which the VCS on one side (Server 1) is disabled, which indicates the following consequences:

- The GUI indicates that PQB_AL_RACK27-HP3 is AutoDisabled.
- ReplicationAgent and Subscriber Manager database Daemon are online on both machines because they are configured as OnOnly processes.

To recover, you should start the VCS on “PQB_AL_RACK27-HP3” by issuing the `/opt/VRTSvcs/bin/hastart` command.

**Figure E-31 Improperly Configured Cluster**