



Cisco Service Control Overview

Revised: May 27, 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:

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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.

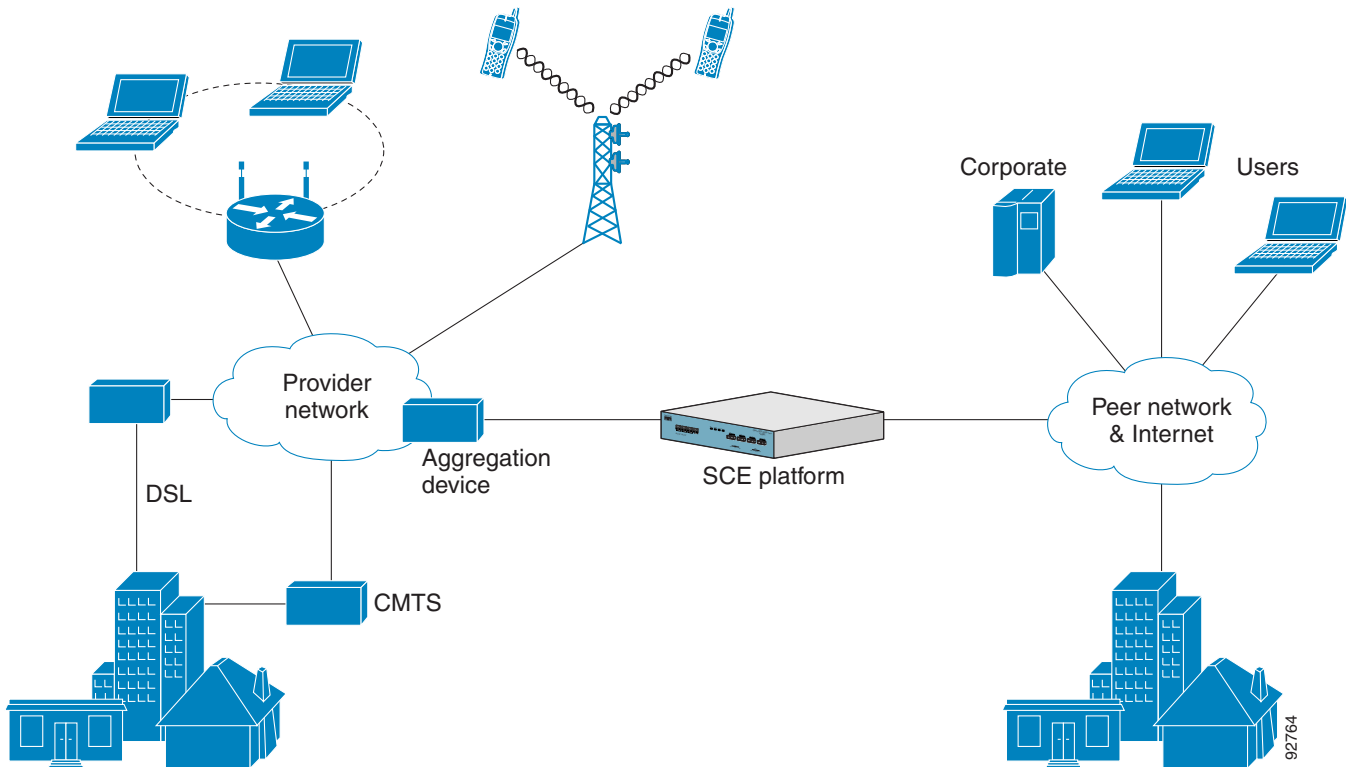
Cisco SCE Platform Description

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 an Cisco SCE platform in a network.

Figure 1-1 SCE Platform in the Network



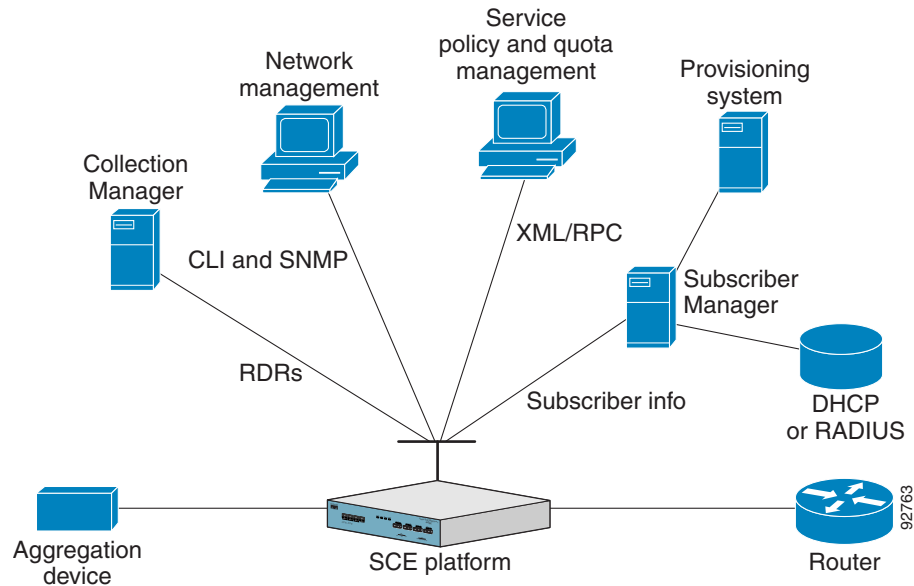
Management and Collection

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).

Figure 1-2 Service Control Management Infrastructure



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.