General Overview

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

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

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Information About the Cisco Service Control Concept

The Cisco Service Control Solution

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

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

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

Service Control for Wireless Service Providers

Wireless service providers are successfully rolling out 2.5G and 3G-based data services to their subscribers. These services are expected to significantly increase much needed average revenue per user (ARPU) for sustained business models and rapid rollout of new services.

These data services require new ways of offering services and new ways of billing these services to subscribers. The Cisco Service Control solutions enable:

- Support for multiple billing models
- Elimination of revenue leakage via real-time service control
- Flexible pricing plans—Postpaid, prepaid, MRC, pay-per-use
- Content-based billing for various applications
- Subscription-based and tiered application services

Service Control for DSL Providers and ISPs

DSL providers and ISPs targeting residential and business broadband customers must find new ways to get maximum leverage from their existing infrastructures, while differentiating their offerings with enhanced IP services.

Cisco products add a new layer of service intelligence and control to existing networks They:

- Provide granular visibility into network usage
- Automatically enforce application SLAs or acceptable use policies
- Implement different service levels for different types of customers, content, or applications
- Deploy from network edge to network core for end-to-end service control
- Integrate Cisco solutions easily with existing network elements and BSS/OSS systems

Service Control for Cable MSOs

Cable MSOs have successfully deployed high-speed cable modem services to millions of homes. Now they must move beyond providing commodity broadband access by introducing differentiated services and by implementing the service control necessary to fully manage service delivery through their broadband infrastructure. Cisco Service Control solutions enable:

- Reporting and analyzing network traffic at subscriber and aggregate level for capacity planning
- Identification of network abusers who are violating the Acceptable Use Policy (AUP)
- Identification and management of peer-to-peer traffic, NNTP (news) traffic, and spam abusers Enforcement of the AUP
- Limiting or preventing the use of servers in the subscriber residence and the use of multiple (unpaid) computers
- Customer-intuitive tiered application services and guarantee application SLAs
- Full integration with standard or legacy OSS for subscriber management and billing

Cisco Service Control Capabilities

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

- Subscriber and application awareness—Application-level drilling into IP traffic for real-time understanding and controlling of usage and content at the granularity of a specific subscriber.

  - Subscriber awareness—The ability to map between IP flows and a specific subscriber in order to maintain the state of each subscriber transmitting traffic through the SCE platform and to enforce the appropriate policy on this subscriber's traffic.

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

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

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

- Application-layer, stateful, real-time traffic control—The ability to perform advanced control functions, including granular BW metering and shaping, quota management, and redirection, using application-layer stateful real-time traffic transaction processing. This requires highly adaptive protocol and application-level intelligence.

- Programmability—The ability to quickly add new protocols and easily adapt to new services and applications in the ever-changing service provider environment. Programmability is achieved using the Cisco Service Modeling Language (SML).

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

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

- Scalable high-performance service engines—The ability to perform all these operations at wire speed.

The SCE Platform

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

- Layer 7 stateful wire-speed packet inspection and classification

- Robust support for over 600 protocols and applications, including:

- General—HTTP, HTTPS, FTP, TELNET, NNTP, SMTP, POP3, IMAP, WAP, and others
- P2P file sharing—FastTrack-KazaA, Gnutella, BitTorrent, Winny, Hotline, eDonkey, DirectConnect, Piolet, and others
- P2P VoIP—Skype, Skinny, DingoTel, and others
- Streaming and Multimedia—RTSP, SIP, HTTP streaming, RTP/RTCP, and others

- Programmable system core for flexible reporting and bandwidth control
- Transparent network and BSS/OSS integration into existing networks
- Subscriber awareness that relates traffic and usage to specific customers

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

Figure 1-1   **SCE Platform in the Network**
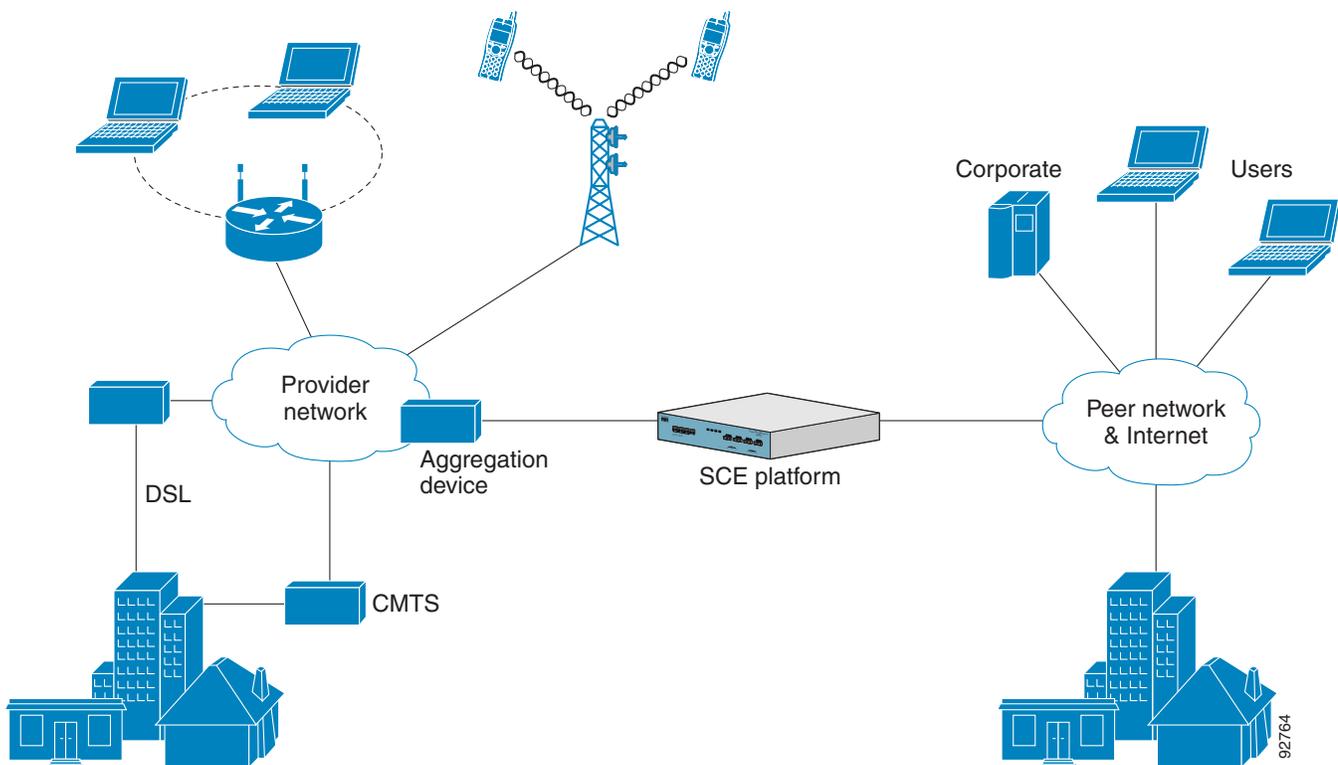
Information About Management and Collection

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

- Network management
- Subscriber management
- Service Control management

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

Figure 1-2   Service Control Management Infrastructure
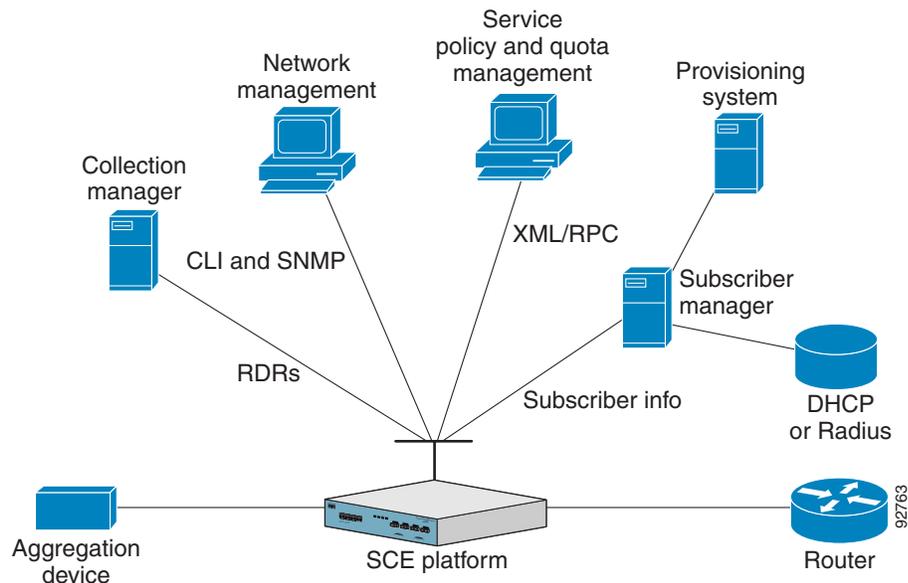
Network Management

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

Two interfaces are provided for network management:

- Command-line interface (CLI)—Accessible through the Console port or through a Telnet connection, the CLI is used for configuration and security functions.

- SNMP—Provides fault management (via SNMP traps) and performance monitoring functionality.

Subscriber Management

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

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

Subscriber information may be obtained in one of two ways:

- Push Mode—The SM pushes subscriber information to the SCE platform automatically upon logon of a subscriber.

- Pull Mode—The SM sends subscriber information to the SCE platform in response to a query from the SCE platform.

Service Configuration Management

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

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

Data Collection

All analysis and data processing functions of the SCE platform result in the generation of Raw Data Records (RDRs). These RDRs are processed by the Cisco Service Control Management Suite Collection Manager. The Collection Manager software is an implementation of a collection system that receives RDRs from one or more 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 wide variety of information and statistics, depending on the configuration of the system. There are three main categories of RDRs:

- 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, describing the traffic generated by that subscriber for a defined interval.

- Link RDRs—Records generated per link, describing the traffic carried on the link for a defined interval.

The Cisco Service Control Application for Broadband

Cisco provides a specific solution that runs on top of the SCE platform and addresses the IP network control challenges that service providers face. This solution is the Cisco Service Control Application for Broadband (SCA BB).

SCA BB allows service providers to detect complex and evasive network application protocols (such as P2P), and to control them according to their business and service delivery requirements. It also enables the creation of differentiated tiered services that the service provider uses to boost revenues and provide competitive services to end customers. SCA BB's programmable application detection and subscriber awareness makes tiered service possible from a central point in the network. SCA BB requires no network changes or upgrades, and it is compatible with all existing IP network switches, routers, and infrastructure.