Cisco Videoscape Distribution Suite Service Broker

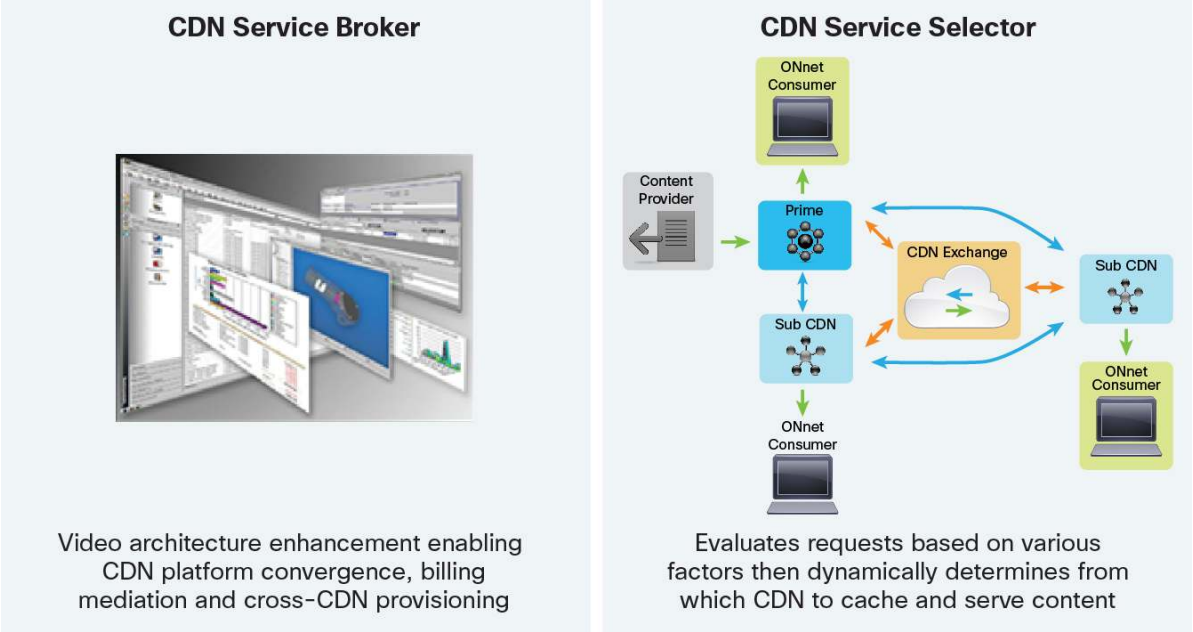
Product Overview

Cisco Videoscape™ Distribution Suite Service Broker (VDS-SB) encompasses a broad range of capabilities, particularly in accelerating Content Delivery Network (CDN) federation. The service broker provides CDN selection by combining various content routing functions with an open interface for real-time data feeds through a customizable business rules engine.

Cisco® VDS Service Broker intelligently manages cross-CDN functionality and back-office processes (Figure 1). Primary components include:

- **CDN Service Broker,** a video architecture enhancement providing CDN platform convergence, billing mediation, and cross-CDN provisioning
- **CDN Service Selector (CDN Selector),** which evaluates incoming subscriber content requests across several dimensions (including on- or off-network status, device type, content type, network conditions, and location), then dynamically determines from which CDN to cache and serve that content

Figure 1. Cisco VDS-SB Components



Major objectives of Cisco VDS Service Broker include:

- To enhance the overall video delivery architecture and ease the convergence of platforms
- To provide CDN flexibility, including use of ISP built or preferred CDNs to optimize end-to-end cost structure and facilitate potential combined transport (ISP and CDN) service-level agreements (SLAs)

- To use multiple CDNs per service, per geographical region (largely synonymous with ISP footprint), to manage the risk of systemic failures and other performance degradation
- To support per-end-user routing across these potential CDNs based on a flexible business logic set
- To develop a framework for managing performance of this video transport chain, both as an essential feed into the selection business rules and for wider operational and planning purposes

Cisco VDS-SB Architecture

Within Cisco VDS Service Broker, several core functions provide various services, notification mechanisms, and configurable rules for improved performance and quality of experience for end users. Figure 2 diagrams the CDN Selector architecture, with the included virtual machines (VMs). Table 1 describes the core functions.

Figure 2. CDN Selector Architecture

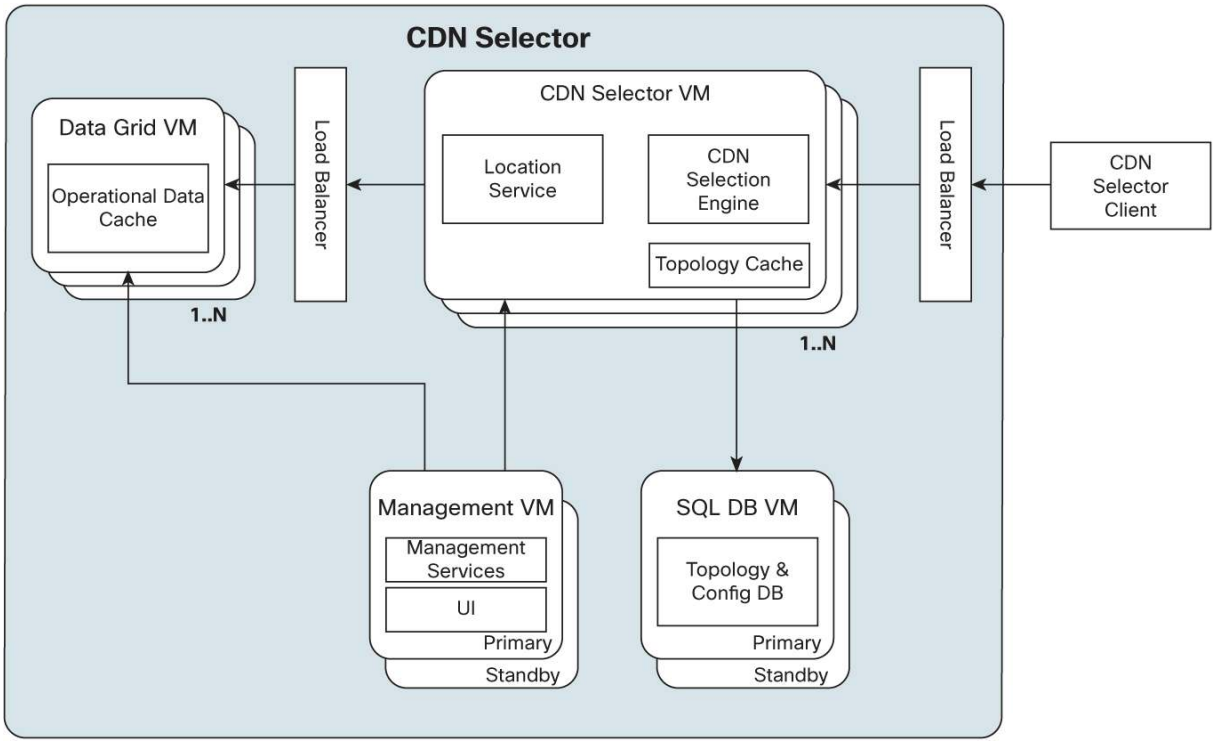


Table 1. Cisco VDS-SB Core Functions

CDN Selector Service	Central logic and rules engine utilizing HTTP Get, DNS or a Web Services Engine
Location Service	Correlates device and client IPs with geo-data
Operational Data Cache	Storage of key service status and operation data, such as CDN status, resource usage or geo-location
Topology Cache	Includes a replicated SQL database to store system topology and configuration data all in memory cache
Management Services	Deploys and monitors system VM instances as well as determine its identity and tracks the overall master registry of components in the system
User Interface	Interface for system configuration and monitoring, enabling CDN topology, CDN Selection rule assignment and status view

How the CDN Selection Engine Works

The CDN Selection Engine performs the bulk of the CDN selection work. It is a stateless application. Any state data that it may need to maintain is stored in the data grid. This allows any instance of the CDN Selection Engine to access and operate on the data.

The CDN Selection Engine is invoked by the CDN Selector Client. This client may be a content management system, session manager, CPE device, or DNS server. The exact method depends on the architecture of the system. The CDN Selection Engine can perform CDN Selection using an HTTP Group Encrypted Transport (GET) interface, DNS interface, or web services interface.

The CDN Selection Engine implements the following steps:

- Receive and parse CDN Select request (using one of the interfaces specified)
- Optionally validate the signed HTTP request
- Extract the CDN selection criteria from the request
- Invoke the location service if the CDN selection rules use CPE location as criterion
- Read the CDN status and resource usage data from the data grid if this information is available
- Implement the CDN selection rules
- Optionally rewrite and re-sign the URL based on the selected CDN
- Return the CDN selection results

The CDN Selection Engine also has a status and resource usage interface to the CDNs. As a CDN forwards status and resource information to the CDN Selection Engine, an instance of the CDN Selection Engine will write the status and resource usage data to the data grid, allowing all nodes to access the CDN status information.

CDN Selection Criteria

The CDN Selector can use a variety of criteria to perform CDN selection. The available criteria are based on the interface used to invoke the CDN Selector, as listed in Table 2.

Table 2. CDN Selection Criteria

Criteria	HTTP GET	DNS	Web Service
Location of CPE (city, country, etc.)	Yes	Yes	Yes
Distance from CPE to the closest edge cache in a CDN	Yes	Yes	Yes
Content type	Yes	No	Yes
CPE type	Yes	No	No
Delivery service	Yes	Yes	Yes
Percentage allocation	Yes	Yes	Yes
Parameter in content or CDN URL	Yes	No	Yes
Parameter in HTTP header	Yes	No	No
CDN or streaming server status	Yes	Yes	Yes
CDN analytics	Yes	Yes	Yes
ISP	Yes	No	Yes

Cisco VDS-Service Broker Use Cases

Figure 3 shows use cases for Cisco VDS-SB.

Figure 3. Cisco VDS-SB Use Cases

Cisco VDS Service Broker Summary

Routing to CDNs from multiple vendors:

- CDN interconnect federation
- Multiple in-house CDNs
- Multiple external CDNs

Multiple interfaces for content routing:

- Web services, HTTP redirect, DNS
- Invoked by CMS, session manager, or CPE

Rules-based routing engine:

- Selection based upon factors such as location, content, delivery service, and load
- Definition of multiple rule sets, selectable by Boolean expressions or pattern matching

Resource, status, and location received from cache servers:

- CDN reports operational status and capacity by streamer, region, or entire CDN

Deploy Cisco VDS Service Broker today and start realizing the benefits of:

- Improved quality of experience for end users
- Lower costs from third-party CDNs, with balanced use of available CDN resources
- Greater system awareness of trends, issues, and bottlenecks
- Straightforward approach to adding new services to in-house CDN
- New sources of revenue

For More Information

To learn how Cisco is helping today's service providers compete successfully in tomorrow's video world, visit http://www.cisco.com.

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