CISCO Intelligent Traffic Steering with Scheduling Application

Product Overview

Network administrators are looking at new ways to steer traffic through networks to meet the needs of evolving applications. Network and IT administrators specifically want a model that offers the fine-grained control over traffic flows that traditional routing and switching cannot offer. For applications, such as high-performance computing in financial-services applications, the typical challenge is to offer predictable forwarding behavior with a strict ceiling on end-to-end path latency. This is possible with networks based on software-defined networking (SDN) with fine-grained flow grooming.

Cisco® Intelligent Traffic Steering with Scheduling (Cisco ITSS) is an intelligent traffic-steering application that runs on the Cisco Open SDN Controller and helps the network administrator define and provision fine-grained paths between different geographical endpoints, as highlighted in the Figure 1 illustration. The application establishes VLAN-based transport tunnels, which customers can use to carry their traffic. Cisco Intelligent Traffic Steering with Scheduling can be used across different type of networks and can be extended to be used in service provider, data center and enterprise IT networks.

Figure 1. Cisco Intelligent Traffic Steering with Scheduling User Interface

Application to Infrastructure Integration

Cisco Intelligent Traffic Steering with Scheduling addresses business challenges directly by connecting the two disparate worlds of enterprise applications and the networking stack. Through application to infrastructure integration, Cisco Intelligent Traffic Steering with Scheduling is able to control and dynamically provision network infrastructure. This enables more transparent development of network infrastructure-dependent applications while simultaneously reducing the amount of time spent coordinating between application and infrastructure teams. As seen in Figure 2, the disconnected worlds of applications and infrastructure are brought together through application to infrastructure integration.
Advantages of Cisco Intelligent Traffic Steering with Scheduling

Cisco Intelligent Traffic Steering with Scheduling offers better administrative control over fine-grained flows than using traditional routing and switching mechanisms. The application also supports point-to-point paths, as well as point-to-multipoint paths. Paths are automatically computed by the application based on various constraints such as shortest hops or latency. The application has the intelligence to continuously monitor the paths and implement reroute decisions if the current path becomes suboptimal.

Key benefits of Cisco Intelligent Traffic Steering with Scheduling are:

- Multiple supported methods for path computation
  - Shortest hops
  - Minimal latency
  - Guaranteed bandwidth
- Dynamic and automatic rerouting on failure
- Fine-grained monitoring over network events
- Rich set of RESTful APIs with an optional GUI

Cisco Intelligent Traffic Steering with Scheduling is a flexible network option for situations where users need to reliably route traffic between two endpoints with fine-grained control over latency, hops, and bandwidth.

Typical Deployment Scenario & Interaction with Other Systems

The Cisco Intelligent Traffic Steering with Scheduling application resides on a blade system and interacts with the Cisco Open SDN Controller, which acts as a back-end network controller system. This configuration helps the Cisco Intelligent Traffic Steering with Scheduling application interface with physical network devices. Cisco’s Intelligent Traffic Steering with Scheduling is powered by the integration capabilities of the Cisco Automation and Integration Platform (AIP). The platform enables third party-enterprise applications to be easily integrated with Cisco Intelligent Traffic Steering with Scheduling. This facilitates automation of different types of network workloads. Please refer to Figure 3.
Cisco Intelligent Traffic Steering with Scheduling exports its services as a rich set of RESTful APIs. These APIs make it possible to integrate the Cisco Intelligent Traffic Steering with Scheduling application with Enterprise Applications (CRM, OSS/BSS etc.) or any third party applications. Also, customers can rapidly create custom self-service provisioning portals.

**Figure 3.** Typical Deployment Scenario for the Cisco Intelligent Traffic Steering with Scheduling Application

![Deployment Diagram](image)

**Use Cases**

The Cisco Intelligent Traffic Steering with Scheduling application can be used in a variety of scenarios:

- Intelligent and dynamic path computation to maintain low latency for high-performance computing in financial services networks
- Low-latency transport for inter-data center communication and for virtual machine migration across data center networks as a VMware vMotion accelerator
- Dynamic applications in enterprises, such as on-demand low-latency paths during specific times of the day for special services. (e.g. video conferencing with branch offices)
- Integration of network behavior control with enterprise applications for self-service portals

**Product Features**

The Cisco Intelligent Traffic Steering with Scheduling web-based user interface provides a comprehensive dashboard of paths provisioned in the network. The application also has detailed screens that show the current state of each path and its statistics. Users can also provision new paths or edit existing paths visually.

The detailed feature set of the application is listed in Table 1.
### Table 1. Features of Cisco Intelligent Traffic Steering with Scheduling

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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| **Path provisioning:** point-to-point bidirectional | - Auto computing path between two specified endpoints  
- Computing path based on hop count, latency, or bandwidth  
- Specifies additional flow-match criteria based on:  
  - VLAN  
  - EtherType  
  - IP protocol type  
  - Source/Destination IP addresses  
  - Source/Destination TCP/UDP port  
- Rewrites VLANS at tunnel endpoints  
- Reserves a path and activate it later  
- Associates up to two static paths for a connection in lieu of a dynamically computed path  
- Automatic loop and continuity check validation for static paths  
- Automatic flow prioritization  
- Automatic conflict detection at the time of provisioning                                                                                                                                                                                                                   |
| **Path provisioning:** point-to-multipoint unidirectional | - Provision P2MP paths with 1 root and up to 16 listeners  
- Add and remove listeners dynamically at run time  
- Dynamic re-computation of multicast tree on network changes                                                                                                                                                                                                                 |
| Calendaring                                   | - Schedules creation of paths with an ability to specify one-time or recurring schedules  
- Schedules always-on paths with no end date or time  
- Supports weekly and/or monthly recurring schedules  
- Supports specification of schedule time stamps in ISO8601 format  
- Automatically collapses schedules for the same connection scheduled in a successive timeline (avoids unwanted setup or dismantle events)                                                                                                                                 |
| Service assurance                             | - Supports packet and byte count, packet and byte rates for each flow on a per node basis  
- Supports a network wide events and alarm table that granularly tracks network events and the impact on the established connections  
- Configuration events audit trail  
- Reports connection bandwidth utilization with every statistics update interval  
- Sets thresholds on bandwidth and raises events on threshold breach  
- Periodic and on-demand reports  
- SNMPv2-based traps to configured destinations                                                                                                                                                                                                                         |
| Resiliency                                    | - Continual monitoring of path and dynamic re-computation of path in the event of network changes  
- Fine-grained control knob (reroute on failure) to control rerouting behavior to aid in service differentiation  
- Fine-grained control knob (restore on recovery) to preempt backup paths and move back to primary on service resumption                                                                                                                                                 |
| Bandwidth management                          | - Monitors available capacity in network and support Connection Admission Control  
- Supports bandwidth-based path computation to route the connection through lesser-utilized segments of networks (improves utilization of network  
- Load balancing of connections through different network nodes to avoid congestion and single points of failure                                                                                                                                                  |
| Time-series data analysis and summary         | - Pushes statistics and events to an external time-series database for analytics  
- Summarizes events for snapshot views in network operations center (NOC) dashboards  
- Summarizes customer-facing port utilization across the network for NOC dashboard views                                                                                                                                                                                       |
| High availability                             | - Supports high-availability deployment by running two instances as an active-passive high-availability cluster with the ability to have active and passive nodes across different geographic locations  
- Supports virtual IP for the high-availability cluster for easy operation of end-user systems                                                                                                                                                                              |
| South-bound protocols                        | - Uses OpenFlow for talking with south-bound devices (currently supports OpenFlow 1.3)  
- Ability to support Netconf for capable devices that are not OpenFlow                                                                                                                                                                                                        |
| Security                                      | - Basic HTTP authentication  
- Role-based user access                                                                                                                                                                                                                                                      |
| UI                                           | - Comprehensive dashboard showing topology, alarm and events history, and available network capacity  
- Intuitive detailed screens for provisioning and monitoring                                                                                                                                                                                                                 |
Supported Devices
Cisco Intelligent Traffic Steering with Scheduling has been validated with the following Cisco devices:

- Cisco Nexus 3500 Series Switches
- Cisco Nexus 3100 Series Switches

Packaging & System Requirements
Cisco Intelligent Traffic Steering with Scheduling is packaged and distributed as a set of two components:

- A controller dependent layer, distributed as an Apache Karaf package, which needs to be deployed on top of Cisco Open SDN Controller 1.2 (layer requirements same as Open SDN Controller 1.2)
- A controller independent layer, distributed as an OVF package, that can be deployed on any hypervisor that can find 16 GB RAM and a dual- or quad-core i86-64 for the virtual machine

Ordering Information

<table>
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<tbody>
<tr>
<td>ITSS-AE-OY-M10-B</td>
<td>Cisco Intelligent Traffic Steering with Scheduling Advanced English language edition; on-premises, 1-year subscription; major release 1.0; node count license</td>
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