

# **Avaya SIP Trunking**

## **5 Days (Lecture and Labs)**

### **Who Needs to Attend**

Those planning on deploying SIP trunking using Avaya products.

### **Prerequisites**

Exposure to the Avaya Communications Manager is desirable but not required.

### **Course Description**

Class covers several key topics: SIP trunking, Avaya Network Regions (NR), SIP technology essentials, regular expression, overview of the Avaya System Manager, synchronizing communications manager and messaging data with Avaya System Manager, managing users, securing Avaya products, managing the Avaya System Manager routing, configuring and monitoring Session Manager instances, managing events and session data, SIP Enablement Server overview, outbound SIP call routing in communication manager, SIP trunking troubleshooting and engineering Avaya SIP trunking.

Class also involves hand-on labs that include: Deploying your own ITSP (deploying a SIP trunking service to mimic actual ITSPs), configuring the Avaya Session Manager, configuring the SIP Communication Manager and SIP troubleshooting with Wireshark.

### **What You'll Learn In Class**

Students will leave the classroom with the skills and confidence to admin the Avaya Communication Manager and Session Manager. All students will be able to secure and troubleshoot problems that may arise while working with Avaya products. Students will be given extensive hand-on experience with Avaya Session Manager and Call Manager, as well as gain valuable experience troubleshooting network issues with Wireshark.

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## 1. SIP Trunking

- Migration from Circuit to Packet
- An analysis of the migration process towards SIP Trunking
- What a SIP Trunk is
- Trusted Host style SIP trunking
- Challenge response SIP trunking
- SIP protocol essentials (SIP, SDP, RTP)
- The big picture of administering Avaya SIP trunking

## 2. Avaya Network Regions (NR)

- Network Region defined
- Reasons to create separate Network Regions (Why we need network regions)
- Authoritative domain (per Network Region)
- Configuring a Network Region
  - ip-codec-set
    - Codec
    - Packet interval
    - How coded and packet interval effect bandwidth
  - How a phone or gateway is assigned to a region
    - ip-network-map
    - clan
    - Media processor
    - Authoritative domain for ip-network-region (Integration with SM)
  - Connection Admission Control
    - Now that the regions are defined, define max bandwidth between regions

## 3. SIP technology essentials (Things you should know about the SIP protocol before configuring SIP Trunking on Avaya SM and CM (Communications Manager))

- How SIP messages are routed
  - The SIP URI structure (User ID and Domain)
  - SIP Domain defined
  - SIP User defined
  - Strict routing
  - Loose Routing
  - Record Route, Route, and Via:
  - How to configure the DNS to improve SIP trunking
- Avaya's "Far-end domain" defined
- How the SES or SM uses loose routing
- How Network Region uses SIP domains
- The Communications Manager's "Far-end domain" defined
- DNS vs. static IP address assignment
- Design issues with Avaya "Trusted Host Table" and DNS based SIP routing
- Associating Network Regions with SIP domains

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#### 4. Regular Expression

- Why nearly every vendor is using regular expression for call routing
- Introduction to the meta characters (+, \*, ^, \$, ., etc)
- How to read and write regular expressions
- How the SM uses regular expression for inbound and outbound regular expression
- Exercises writing Regular Expression

#### 5. Overview of System Manager

- Log on to System Manager
- Password and security policies for users with username admin
- SIP Application Server

#### 6. Synchronizing Com Manager and messaging data with Sys Manager

- Introduction
- Creating a Communication Manager instance
- Creating a messaging instance
- Initializing Synchronization
- Synchronizing Messaging Data
- Manage Elements field descriptions
- Application Details field descriptions

#### 7. Managing Security

- Introduction
- Setting SCEP enrollment password
- Adding a Session Manager application
- Viewing trusted certificates
- Adding trusted certificates
- Exporting the Session Manager Certificate
- Removing trusted certificates
- Refreshing CA Certificate List
- Viewing identity certificates
- Enrollment Password field descriptions
- Manage Elements field descriptions
- Application Details field descriptions
- Trusted Certificates field descriptions
- Add Trusted Certificate field descriptions
- View Trust Certificate field descriptions
- Delete Trusted Certificate Confirmation field descriptions
- Identity Certificates field descriptions

#### 8: Managing Users

- Introduction
- Adding users

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- Managing communication profiles
- Modifying user accounts
- Viewing details of a user
- Removing user accounts
- Creating duplicate users
- Filtering users
- Searching for users
- Viewing deleted users
- Restoring a deleted user
- New User Profile field descriptions
- User Profile Edit field descriptions
- User Profile View field descriptions
- User Delete Confirmation field descriptions
- Managing bulk importing and exporting

## 9: Managing Session Manager routing

- Overview of Session Manager routing
- Prerequisites for Routing Setup
- Routing
- Domains
- Locations
- Adaptations
- SIP Entities
- SIP Entity References
- Entity Links
- Time Ranges
- Routing Policies
- Dial Patterns



## 10. Configuring and monitoring Session Manager instances

- Dashboard
- Session Manager Administration
- Branch Session Manager Administration
- Communication Profile Editor
- Network Configuration
- Device and Location Configuration
- Application Configuration
- System Status
- System Tools

## 11. Managing events

- Managing alarms
- Managing logs

## 12. Managing system data

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- Administering backup and restore
- Data Replication Service
- Managing scheduled jobs

### 13. SES Overview (Optional)

- Edge SES defined
- Home SES defined
- Combined Home/Edge SES defined
- The role of SES with outbound calls (To an ITSP – Internet Telephone Service Provider)
- The role of SES with inbound calls (From an Internet Telephone Service Provider)
- The role of SES with inbound or outbound calls to a non Avaya device (IVR, Cisco Call Manager, etc.)
- The role of the SES in Call Manager to Call Manager calls (Intra CM calls)
- What the SES can do, which the Call Manager cannot do (Why we need an SES)
- Using the SES as a registrar for generic SIP phones
- Administer stations
- Redirect calls off the network
- Administration for visiting user

### 14. Outbound SIP Call routing in the CM – (Communications Manager to SM)

- The detailed picture of outbound call routing
  - Show every logical and physical component in the call route
  - Show the protocol issues
  - Show the security issues
- ARS based call routing into SIP trunks
  - Displaying ARS analysis information
  - Modifying ARS call routing
  - Adding a new area code or prefix
  - Dialed digit modification
  - Trunk group configuration
  - Signaling group configuration
- Authoritative domain (How Network Region is associated with call routing)
- Far-end network region
- Far-end domain
- Best Practices (The following screens are explained in detail)
  - Dial Plan Analysis screen
  - Feature Access Codes screen page 1
  - Feature Related Systems Parameters screen, page 3
  - IP Codec Set screen
  - IP Network Map screen
  - IP Network Region screen
  - IP Node Names screen
  - Locations screen
  - Media Gateway screen
  - Numbering—Public/Unknown Table screen
  - Off-PBX Station Mapping screen page 1
  - Off-PBX Station Mapping screen page 2
  - Route Pattern screen

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- Signaling Group Page 1 screen
- Station screen, page 1
- System Capacity screen
- System-Parameters screens
- System Parameters Features screen, page 1
- System Parameters Call Coverage/Call forwarding screen, page 2
- System Parameters Customer Options screen
- Trunk Group screens (1-4)
- SIP device as an OPS extension

## 15: Solving common SIP trunking problems

- Testing a SIP trunk
- How to run the SM Trace Logger
- How to read a SIP trace and determine what may be wrong
- Solving One way speech problems
- Solving QoS related issues (garbled speech)

## 16: Engineering Avaya SIP Trunking

- How does SIP integrate into your system?
- SIP-related support
- Trunking
- Stations
- CDR
- Access control (FRL and COR)
- Requirements for SIP
- Software
- Hardware
- Firmware
- SIP trunk engineering notes
- TLS links for failover
- Converge multiple networks.
- How to implement Enterprise Survivable Servers (ESSs) for increased network survivability.
- Implementing Inter-Gateway Alternate Routing (IGAR).



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## Avaya SIP Telephony Labs

### Deploy your own ITSP (you will deploy a SIP trunking service to mimic actual Internet Telephone Service Providers)

- Install a SIP trunk to your ITSP system
- Connect locations through Wide Area Networks (WANs).
- Create network regions (NR).
- Configure network regions using Call Admission Control (CAC).

### Configure Session Manager

- Configure users
- Synchronization
- SIP Trunks
- CM connectivity
- Routing
- Security

### Configure SIP Support in Communication Manager using the following screens

- Dial Plan Analysis screen
- Feature Access Codes screen page 1
- Feature Related Systems Parameters screen, page 3
- IP Codec Set screen
- IP Network Map screen
- IP Network Region screen
- IP Node Names screen
- Locations screen
- Media Gateway screen
- Numbering—Public/Unknown Table screen
- Off-PBX Station Mapping screen page 1
- Off-PBX Station Mapping screen page 2
- ARS Analysis screens
- Route Pattern screen
- Signaling Group Page 1 screen
- Station screen, page 1
- System Capacity screen
- System-Parameters screens
- System Parameters Features screen, page 1
- System Parameters Call Coverage/Call forwarding screen, page 2
- System Parameters Customer Options screen
- Trunk Group screens (1-4)
- SIP device as an OPS extension

### Solving SIP problems

- List trace station xxxx
- List trace tac xx
- How to read a SIP trace and determine what may be wrong

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- Using Wireshark (More specifically, how to point out the guilty party)
- DNS testing



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