Avaya SBCE 8.1 Security Configuration and Best Practices Guide

Release: 8.1

Issue: 1.0

February 2020

Notice

While reasonable efforts have been made to ensure that the information in this document is complete and accurate at the time of printing, Avaya assumes no liability for any errors. Avaya reserves the right to make changes and corrections to the information in this document without the obligation to notify any person or organization of such changes.

Documentation disclaimer

"Documentation" means information published in varying mediums which may include product information, operating instructions and performance specifications that are generally made available to users of products. Documentation does not include marketing materials. Avaya shall not be responsible for any modifications, additions, or deletions to the original published version of Documentation unless such modifications, additions, or deletions were performed by or on the express behalf of Avaya. End User agrees to indemnify and hold harmless Avaya, Avaya's agents, servants and employees against all claims, lawsuits, demands and judgments arising out of, or in connection with, subsequent modifications, additions or deletions to this documentation, to the extent made by End User.

Link disclaimer

Avaya is not responsible for the contents or reliability of any linked websites referenced within this site or Documentation provided by Avaya. Avaya is not responsible for the accuracy of any information, statement or content provided on these sites and does not necessarily endorse the products, services, or information described or offered within them. Avaya does not guarantee that these links will work all the time and has no control over the availability of the linked pages.

Warranty

Avaya provides a limited warranty on Avaya hardware and software. Refer to your sales agreement to establish the terms of the limited warranty. In addition, Avaya's standard warranty language, as well as information regarding support for this product while under warranty is available to Avaya customers and other parties through the Avaya Support website: https://support.avaya.com/helpcenter/getGenericDetails?detailId=C20091120112456651010 under the link "Warranty & Product Lifecycle" or such successor site as designated by Avaya. Please note that if You acquired the product(s) from an authorized Avaya Channel Partner outside of the United States and Canada, the warranty is provided to You by said Avaya Channel Partner and not by Avaya.

"Hosted Service" means an Avaya hosted service subscription that You acquire from either Avaya or an authorized Avaya Channel Partner (as applicable) and which is described further in Hosted SAS or other service description documentation regarding the applicable hosted service. If You purchase a Hosted Service subscription, the foregoing limited warranty may not apply but You may be entitled to support services in connection with the Hosted Service as described further in your service description documents for the applicable Hosted Service. Contact Avaya or Avaya Channel Partner (as applicable) for more information.

Hosted Service

THE FOLLOWING APPLIES ONLY IF YOU PURCHASE AN AVAYA HOSTED SERVICE SUBSCRIPTION FROM AVAYA OR AN AVAYA CHANNEL PARTNER (AS APPLICABLE), THE TERMS OF USE FOR HOSTED SERVICES ARE AVAILABLE ON THE AVAYA WEBSITE, HTTPS://SUPPORT.AVAYA.COM/LICENSEINFO UNDER THE LINK "Avaya Terms of Use for Hosted Services" OR SUCH SUCCESSOR SITE AS DESIGNATED BY AVAYA, AND ARE APPLICABLE TO ANYONE WHO ACCESSES OR USES THE HOSTED SERVICE. BY ACCESSING OR USING THE HOSTED SERVICE, OR AUTHORIZING OTHERS TO DO SO, YOU, ON BEHALF OF YOURSELF AND THE ENTITY FOR WHOM YOU ARE DOING SO (HEREINAFTER REFERRED TO INTERCHANGEABLY AS "YOU" AND "END USER"), AGREE TO THE TERMS OF USE. IF YOU ARE ACCEPTING THE TERMS OF USE ON BEHALF A COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT THAT YOU HAVE THE AUTHORITY TO BIND SUCH ENTITY TO THESE TERMS OF USE. IF YOU DO NOT HAVE SUCH AUTHORITY, OR IF YOU DO NOT WISH TO ACCEPT THESE TERMS OF USE, YOU MUST NOT ACCESS OR USE THE HOSTED SERVICE OR AUTHORIZE ANYONE TO ACCESS OR USE THE HOSTED SERVICE.

Licenses

THE SOFTWARE LICENSE TERMS AVAILABLE ON THE AVAYA WEBSITE, HTTPS://SUPPORT.AVAYA.COM/LICENSEINFO, UNDER THE LINK "AVAYA SOFTWARE LICENSE TERMS (Avaya Products)" OR SUCH SUCCESSOR SITE AS DESIGNATED BY AVAYA, ARE APPLICABLE TO ANYONE WHO DOWNLOADS, USES AND/OR INSTALLS AVAYA SOFTWARE, PURCHASED FROM AVAYA INC., ANY AVAYA AFFILIATE, OR AN AVAYA CHANNEL PARTNER (AS APPLICABLE) UNDER A COMMERCIAL AGREEMENT WITH

AVAYA OR AN AVAYA CHANNEL PARTNER. UNLESS OTHERWISE AGREED TO BY AVAYA IN WRITING, AVAYA DOES NOT EXTEND THIS LICENSE IF THE SOFTWARE WAS OBTAINED FROM ANYONE OTHER THAN AVAYA, AN AVAYA AFFILIATE OR AN AVAYA CHANNEL PARTNER; AVAYA RESERVES THE RIGHT TO TAKE LEGAL ACTION AGAINST YOU AND ANYONE ELSE USING OR SELLING THE SOFTWARE WITHOUT A LICENSE. BY INSTALLING, DOWNLOADING OR USING THE SOFTWARE, OR AUTHORIZING OTHERS TO DO SO, YOU, ON BEHALF OF YOURSELF AND THE ENTITY FOR WHOM YOU ARE INSTALLING, DOWNLOADING OR USING THE SOFTWARE (HEREINAFTER REFERRED TO INTERCHANGEABLY AS "YOU" AND "END USER"), AGREE TO THESE TERMS AND CONDITIONS AND CREATE A BINDING CONTRACT BETWEEN YOU AND AVAYA INC. OR THE APPLICABLE AVAYA AFFILIATE ("AVAYA").

Avaya grants You a license within the scope of the license types described below, with the exception of Heritage Nortel Software, for which the scope of the license is detailed below. Where the order documentation does not expressly identify a license type, the applicable license will be a Designated System License as set forth below in the Designated System(s) License (DS) section as applicable. The applicable number of licenses and units of capacity for which the license is granted will be one (1), unless a different number of licenses or units of capacity is specified in the documentation or other materials available to You. "Software" means computer programs in object code, provided by Avaya or an Avaya Channel Partner, whether as stand-alone products, pre-installed on hardware products, and any upgrades, updates, patches, bug fixes, or modified versions thereto. "Designated Processor" means a single stand-alone computing device. "Server" means a set of Designated Processors that hosts (physically or virtually) a software application to be accessed by multiple users. "Instance" means a single copy of the Software executing at a particular time: (i) on one physical machine; or (ii) on one deployed software virtual machine ("VM") or similar deployment.

License type(s)

Designated System(s) License (DS). End User may install and use each copy or an Instance of the Software only: 1) on a number of Designated Processors up to the number indicated in the order; or 2) up to the number of Instances of the Software as indicated in the order, Documentation, or as authorized by Avaya in writing. Avaya may require the Designated Processor(s) to be identified in the order by type, serial number, feature key, Instance, location or other specific designation, or to be provided by End User to Avaya through electronic means established by Avaya specifically for this purpose.

Concurrent User License (CU). End User may install and use the Software on multiple Designated Processors or one or more Servers, so long as only the licensed number of Units are accessing and using the Software at any given time. A "Unit" means the unit on which Avaya, at its sole discretion, bases the pricing of its licenses and can be, without limitation, an agent, port or user, an e-mail or voice mail account in the name of a person or corporate function (e.g., webmaster or helpdesk), or a directory entry in the administrative database utilized by the Software that permits one user to interface with the Software. Units may be linked to a specific, identified Server or an Instance of the Software.

Heritage Nortel Software

"Heritage Nortel Software" means the software that was acquired by Avaya as part of its purchase of the Nortel Enterprise Solutions Business in December 2009. The Heritage Nortel Software is the software contained within the list of Heritage Nortel Products located at https://support.avaya.com/LicenseInfo under the link "Heritage Nortel Products" or such successor site as designated by Avaya. For Heritage Nortel Software, Avaya grants Customer a license to use Heritage Nortel Software provided hereunder solely to the extent of the authorized activation or authorized usage level, solely for the purpose specified in the Documentation, and solely as embedded in, for execution on, or for communication with Avaya equipment. Charges for Heritage Nortel Software may be based on extent of activation or use authorized as specified in an order or invoice.

Copyright

Except where expressly stated otherwise, no use should be made of materials on this site, the Documentation, Software, Hosted Service, or hardware provided by Avaya. All content on this site, the documentation, Hosted Service, and the product provided by Avaya including the selection, arrangement and design of the content is owned either by Avaya or its licensors and is protected by copyright and other intellectual property laws including the sui generis rights relating to the protection of databases. You may not modify, copy, reproduce, republish, upload, post, transmit or distribute in any way any content, in whole or in part, including any code and software unless expressly authorized by Avaya. Unauthorized reproduction, transmission, dissemination, storage, and or use without the express written consent of Avaya can be a criminal, as well as a civil offense under the applicable law.

Virtualization

The following applies if the product is deployed on a virtual machine. Each product has its own ordering code and license types. Unless otherwise stated, each Instance of a product must be separately licensed and ordered. For example, if the end user customer or Avaya Channel Partner would like to install two Instances of the same type of products, then two products of that type must be ordered.

Third Party Components

"Third Party Components" mean certain software programs or portions thereof included in the Software or Hosted Service may contain software (including open source software) distributed under third party agreements ("Third Party Components"), which contain terms regarding the rights to use certain portions of the Software ("Third Party Terms"). As required, information regarding distributed Linux OS source code (for those products that have distributed Linux OS source code) and identifying the copyright holders of the Third Party Components and the Third Party Terms that apply is available in the products, Documentation or on Avaya's website at: https://support.avaya.com/Copyright or such successor site as designated by Avaya. The open source software license terms provided as Third Party Terms are consistent with the license rights granted in these Software License Terms, and may contain additional rights benefiting You, such as modification and distribution of the open source software. The Third Party Terms shall take precedence over these Software License Terms, solely with respect to the applicable Third Party Components to the extent that these Software License Terms impose greater restrictions on You than the applicable Third Party Terms.

The following applies only if the H.264 (AVC) codec is distributed with the product. THIS PRODUCT IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO (i) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (ii) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE HTTP://WWW.MPEGLA.COM.

Service Provider

THE FOLLOWING APPLIES TO AVAYA CHANNEL PARTNER'S HOSTING OF AVAYA PRODUCTS OR SERVICES. THE PRODUCT OR HOSTED SERVICE MAY USE THIRD PARTY COMPONENTS SUBJECT TO THIRD PARTY TERMS AND REQUIRE A SERVICE PROVIDER TO BE INDEPENDENTLY LICENSED DIRECTLY FROM THE THIRD PARTY SUPPLIER. AN AVAYA CHANNEL PARTNER'S HOSTING OF AVAYA PRODUCTS MUST BE AUTHORIZED IN WRITING BY AVAYA AND IF THOSE HOSTED PRODUCTS USE OR EMBED CERTAIN THIRD PARTY SOFTWARE, INCLUDING BUT NOT LIMITED TO MICROSOFT SOFTWARE OR CODECS, THE AVAYA CHANNEL PARTNER IS REQUIRED TO INDEPENDENTLY OBTAIN ANY APPLICABLE LICENSE AGREEMENTS, AT THE AVAYA CHANNEL PARTNER'S EXPENSE, DIRECTLY FROM THE APPLICABLE THIRD PARTY SUPPLIER.

WITH RESPECT TO CODECS, IF THE AVAYA CHANNEL PARTNER IS HOSTING ANY PRODUCTS THAT USE OR EMBED THE H.264 CODEC OR H.265 CODEC, THE AVAYA CHANNEL PARTNER ACKNOWLEDGES AND AGREES THE AVAYA CHANNEL PARTNER IS RESPONSIBLE FOR ANY AND ALL RELATED FEES AND/OR ROYALTIES. THE H.264 (AVC) CODEC IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO: (I) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (II) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION FOR H.264 (AVC) AND H.265 (HEVC) CODECS MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE HTTP://WWW.MPEGLA.COM.

Compliance with Laws

You acknowledge and agree that it is Your responsibility for complying with any applicable laws and regulations, including, but not limited to laws and regulations related to call recording, data privacy, intellectual property, trade secret, fraud, and music performance rights, in the country or territory where the Avaya product is used.

Preventing Toll Fraud

"Toll Fraud" is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there can be a risk of Toll Fraud associated with your system and that, if Toll Fraud occurs, it can result in substantial additional charges for your telecommunications services.

Avaya Toll Fraud intervention

If You suspect that You are being victimized by Toll Fraud and You need technical assistance or support, call Technical Service Center Toll Fraud Intervention Hotline at +1-800-643-2353 for the United States and Canada. For additional support telephone numbers, see the Avaya Support website: https://support.avaya.com or such successor site as designated by Avaya.

Security Vulnerabilities

Information about Avaya's security support policies can be found in the Security Policies and Support section of https://support.avaya.com/security.
Suspected Avaya product security vulnerabilities are handled per the Avaya Product Security Support Flow (https://support.avaya.com/css/P8/documents/100161515).

Downloading Documentation

For the most current versions of Documentation, see the Avaya Support website: https://support.avaya.com, or such successor site as designated by Avaya.

Contact Avaya Support

See the Avaya Support website: https://support.avaya.com for product or Hosted Service notices and articles, or to report a problem with your Avaya product or Hosted Service. For a list of support telephone numbers and contact addresses, go to the Avaya Support website: https://support.avaya.com (or such successor site as designated by Avaya), scroll to the bottom of the page, and select Contact Avaya Support.

Trademarks

The trademarks, logos and service marks ("Marks") displayed in this site, the Documentation, Hosted Service(s), and product(s) provided by Avaya are the registered or unregistered Marks of Avaya, its affiliates, its licensors, its suppliers, or other third parties. Users are not permitted to use such Marks without prior written consent from Avaya or such third party which may own the Mark. Nothing contained in this site, the Documentation, Hosted Service(s) and product(s) should be construed as granting, by implication, estoppel, or otherwise, any license or right in and to the Marks without the express written permission of Avaya or the applicable third party.

Avaya is a registered trademark of Avaya Inc.

All non-Avaya trademarks are the property of their respective owners. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

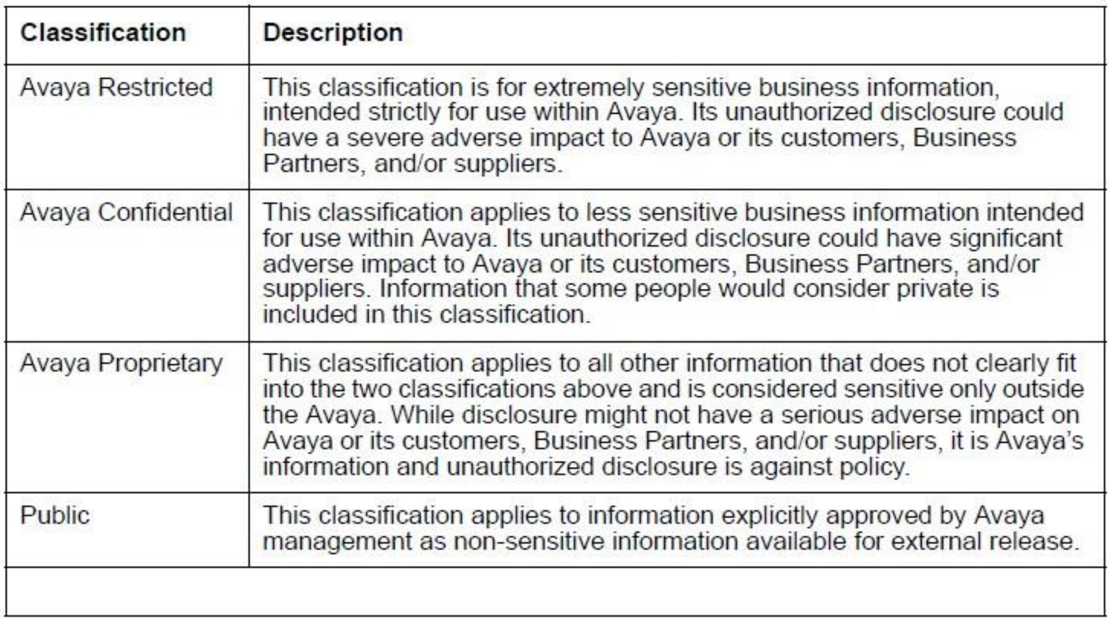
Contents

Introduction

This document provides an overview of security configuration and best practices for SBCE Release 8.1. The goal is to equip Avaya partners, customers, and sales and system engineers with the information required to configure SBCE securely.

Information classifications and NDA requirements

This book provides security-related information according to the following information classifications:



Classification	Description
Avaya Restricted	This classification is for extremely sensitive business information, intended strictly for use within Avaya. Its unauthorized disclosure could have a severe adverse impact to Avaya or its customers, Business Partners, and/or suppliers.
Avaya Confidential	This classification applies to less sensitive business information intended for use within Avaya. Its unauthorized disclosure could have significant adverse impact to Avaya or its customers, Business Partners, and/or suppliers. Information that some people would consider private is included in this classification.
Avaya Proprietary	This classification applies to all other information that does not clearly fit into the two classifications above and is considered sensitive only outside the Avaya. While disclosure might not have a serious adverse impact on Avaya or its customers, Business Partners, and/or suppliers, it is Avaya's information and unauthorized disclosure is against policy.
Public	This classification applies to information explicitly approved by Avaya management as non-sensitive information available for external release.

As this book is generally available, the information herein is considered public. While the book contains references to additional information sources, some sources disclose both confidential and proprietary information and require a non-disclosure agreement (NDA) with Avaya.

Disclaimer

Avaya has used reasonable commercial efforts to ensure that the information provided here under is accurate at this date. Avaya might change any underlying processes, architecture, product, description, or any other information described or contained in this document. Avaya disclaims any intention or obligation to update or revise the book, whether as a result of new information, future events, or otherwise. This document is provided "as is," and Avaya does not provide any warranty of any kind, express or implied.

Avaya SBCE security overview

This document describes the security-related considerations, features, and services for Avaya SBCE. As a security product, Avaya SBCE must be resilient to attacks that cause malfunction or theft of service. Avaya SBCE as part of the Avaya solution must be protected from security threats such as:

- Unauthorized access or modification of data

- Theft of data
- Denial of Service (DoS) attacks
- Viruses and Worms
- Theft of data

Avaya multilayer hardening strategy

To prevent security violations and attacks, Avaya SBCE uses the Avaya multilayer hardening strategy:

- Secure by design
- Secure by default
- Secure communications

Secure by design

Secure by design encompasses a secure deployment strategy that separates Management from the enterprise production network.

The architecture is for the trusted communication framework infrastructure security layer and allows the design of dedicated security zones for:

- Management network
- Untrusted public network
- Trusted Enterprise network

The zones are like dedicated networks for particular functions or services. They do not need to have access from or to any other zones because they only accommodate the data they are built for.

Management network should be on different VLAN than untrusted and trusted networks on the Avaya SBCE.

Secure by default

Secure by default incorporates a hardened Red Hat Enterprise Linux operating system with inherent security features for Avaya SBCE. This hardened operating system provides only the functions necessary to support the core applications, which is important for securing mission-critical call processing applications and protecting the customer from toll fraud and other malicious attacks.

The Red Hat that Avaya has hardened limits the number of access ports, services, and executables. Also based on the service number of messages, or connection rate will be rate limited. These limits protect the system from typical modes of attack. At the same time, the reduction of Linux functions reduces the attack surface which reduces the number of mandatory security patches needed.

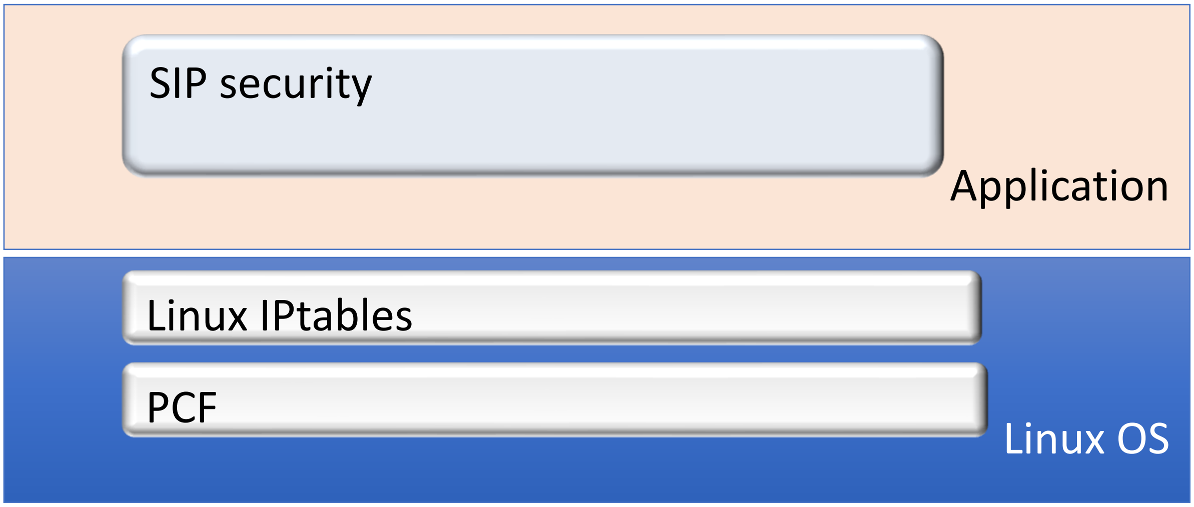
Secure Communication

Communications can be secured by encrypting the signaling and media with TLS/SRTP and granular admission control. Criteria used for admission control include source subnet, user agent, and URI group; which can be used to control things like device type and/or users that are allowed thru the SBC. See admin guide and app notes for admission control configuration in Endpoint Flows and Domain Policies.

Multilayer security firewall

To prevent network attacks, Avaya SBCE uses the Avaya multilayer firewall strategy.

Architecturally there are three firewall layers, each layer using different techniques/technology to target specific type of attacks. This Layered firewall approach designed to delay and limit the ipact of an attack through multiple layers.



There are mainly three layers:

PCF - PCF is a custom-built Linux firewall module for Avaya SBCE. This module functionality includes:

- blocks all the traffic by default
- allow only configured ports.
- Media ports opened per call basis based on signaling negotiation
- To minimize any latency in media, the media packets are processed in fast path mode.

Iptables - Iptables is an extremely flexible firewall utility built for Linux operating systems. Avaya SBCE uses iptables for Layer 3 and layer 4 firewall in Avaya SBCE. By default, all the IP traffic is blocked and based on the configuration iptables rules are added for

- Rate limiting the UDP packets

- Rate limit the connection rate
- Rate limit traffic through the connection
- Detect and protect from known attack vectors
- Black list/ white list IP addresses or subnets

Avaya SBCE SIP security layer – Avaya SBCE implemented various techniques to detect and prevent different type of attacks. Refer to section Avaya SBCE Application security for further details.

Complementing security guides of other Avaya products

This document describes security-related issues and security features of Avaya SBCE. This document complements the security guides that are available for all the managed elements in the Avaya solution. The security guides describe the potential security risks to Avaya products and the features that Avaya products offer to mitigate these security risks.

This document is a descriptive guide, not a procedural guide. Where appropriate, the guide references other product documentation for the actual procedures for configuring and using security features.

Some Avaya Security Guides available on the Support website are:

- Avaya Toll Fraud Security Guide
- Security Best Practices Checklist for Unified Communications Deployment
- Avaya and Vulnerability Scanning
- Mapping Common Vulnerability Exposure (CVE) numbers to Avaya Security Advisories (ASAs)

Virtualization

Virtualization of SBCs becomes more common. However, some network security professionals are concerned that DMZ virtualization might decrease security. This is understandable, because virtualization involves new terminology and technology. The biggest risk to a DMZ in a virtual environment is misconfiguration, not the technology. Thus you need strong audit controls to ensure that you avoid misconfiguration, either accidental or malicious. Before deploying SBC refer to VMware best practices guide for DMZ - http://www.vmware.com/files/pdf/dmz_virtualization_vmware_infra_wp.pdf

Because of this following is our order of preference:

1. Physical appliance
2. Vmware –DMZ with Separate Physical Trust Zones – Aura and Avaya SBCE located in separate servers
3. Vmware - DMZ with Virtual Separation of Trust Zones – Aura and Avaya SBCE located in same servers and are separated by virtual trust zones. need strong audit controls to ensure that you avoid misconfiguration. Virtual servers must use the physical network and pass through physical security devices to communicate Avaya SBCE trust zones. In other words use separated NICs for trusted and untrusted zones.

4. VMware – collapsed DMZ - This completely virtual infrastructure can fully enforce isolation and security between the Avaya SBCE zones. This will be complex and highly risky. So, least preferred and we don't recommend this option.

Management/services should always use separate NIC.

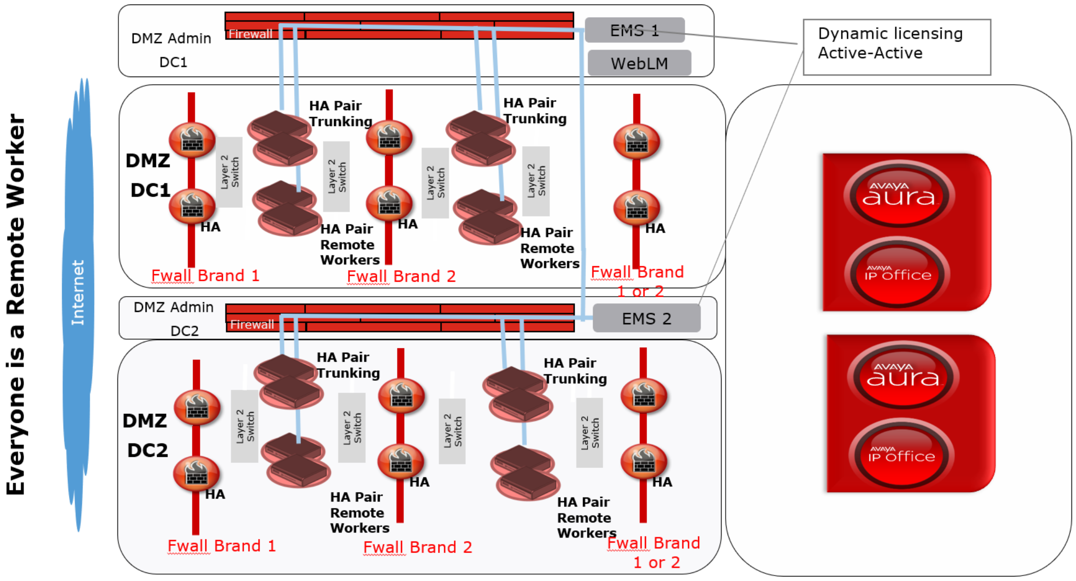
Best practices deployment

When it comes to best practices, ultimately the final decision will always be yours and more specifically the one from your internal security team. Security is not a set of features or a product but a combination of these latter and a set of constantly evolving practices enabling one infrastructure to be and remain secure.

The below summarizes the dimensions that Avaya has captured as needing to be considered when looking at best Avaya SBCE deployment:

1. Type of appliance – Hardware vs Virtual – this dimension has been discussed in the previous chapter – the conclusion is that there is no right or best answer – whatever you, as an IT team feels more comfortable with is the right answer for you.
2. Overall deployment Topology – Whether you are considering a single Datacenter or Geo redundant, local user to your DC or 100% remote workers, the recommended deployment approach is to sandwich your SBCE in the DMZ between two firewalls of different brands.
3. Vertical layering: To simplify the SBCE configuration, ease of licensing management but above all Isolation of functions for better control and behavior predictability (to quickly identify and react to any abnormality which could be related to a hack / hack attempt)
4. Horizontal layering : Most commonly encountered nowadays in Europe and/or financial institution vertical, this layering approach consist in 2 layers of DMZ – 3 firewalls with SBCEs in each of the DMZ to separate the security duties and isolate the privacy policies check and enforcement (the more traditional security policies being taken care of in the first DMZ)
5. High Availability and Geo-redundancy: Avaya SBCE being the single point central point where your SIP trunking and remote worker collapse, making sure that High availability combined with geo redundancy is obviously one of the best practice dimensions. The former protecting your environment against a hardware appliance failure, the second against a total datacenter failure.
6. Optimal Software licensing: in this dimension besides considering the HA licensing, dynamic licensing comes into play to enable cost optimized and load balancing geo redundant setups
7. And finally overall SBCE management and configuration: in this category falls, keeping your SBCE software up to date, not using wild card certs, not white listing *.*, managing your SBCE only from trusted side, separating your SIP traffic from the management traffic, encrypting all communications when possible (not all ITSP offer encrypted SIP trunks)

When all of these Best practices' dimensions are considered and come together then the "ideal" topology for an highly secure and robust deployment comes down to the following diagram:



The diagram should not be considered as what you must do for making your deployment secure.

At the end of the day, a single SBCE connected directly to the internet is going to secure an SMB UC/CC access but the above should be really considered as what an highly security aware enterprise IT team in the highly regulated vertical such as finance, Telecom or Governmental institutions should thrive for.

Avaya SBCE Application security

The Avaya SBCE Control Center allows you to view various security-related features of Avaya SBCE security products, such as:

- Denial-of-Service (DoS) Policies
- Protocol Scrubber Rules
- Encryption
- Secure Remote Access

Denial-of-Service (DoS) Policies

The Avaya SBCE supports following DOS policies:

Single Source DoS Any type of DoS attack that is directed against one or more enterprise endpoints that originate from a single source. Based on the deployment thresholds for this are configurable. These thresholds are global. Avaya SBCE enforces these thresholds based on the source of an attack.

Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

Default configuration

Single source DoS threshold value is 300 (default) SIP messages per 5sec and Action is **Alert**.

Recommended initial configuration

For Trunk solution the configuration Single source DOS threshold value should be **20** SIP messages per 5sec and Action should be **Block.**

For remote worker solution the configuration Single source DOS threshold value should be changed to **300** SIP messages per 5sec and Action should be **Block.**

If the SBCE is configured for Trunk and Remote worker solution use the remote worker limits.

To configure Single source DOS thresholds, go to **Global Parameters -> DOS/DDOS -> Single Source DoS**

To enable single source DOS feature for the SBCE go to **Device specific settings -> Advanced Options -> Feature control**

Phone DoS/DDoS A type of DoS attack that is directed against a single enterprise endpoint. Based on the deployment thresholds for this are configurable. These thresholds are absolute. Avaya SBCE enforces these thresholds based on the destination of an attack. This ensures Avaya SBCE can identify DDoS attacks on a particular destination. Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

Default configuration

Phone DoS/DDoS threshold value is 200 (default) SIP messages per 3sec and action is **Alert**.

Recommended initial configuration

For Trunk solution the configuration Phone DoS/DDoS threshold value should be **10** SIP messages per 3sec and Action should be **Block.**

For remote worker solution the configuration Phone DoS/DDoS threshold value should be changed to **200** SIP messages per 3 sec and Action should be **Block.**

If the SBCE is configured for Trunk and Remote worker solution use the remote worker limits.

To configure Phone DOS thresholds go to **Global Parameters -> DOS/DDOS -> Phone DoS**

To enable Phone DOS feature for the SBCE go to **Device specific settings -> Advanced Options -> Feature control**

Stealth DoS/DDoS A type of low-volume DoS attack that is directed against an endpoint. These thresholds are Global. Avaya SBCE enforces these thresholds based on the destination of an attack. This ensures Avaya SBCE can identify DDoS attacks on a particular destination where the source of the call is constantly changed. Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

By Default this feature will be disabled.

For Trunk/Remote worker solutions recommended threshold value **5** consecutive average inter call duration threshold violations with average inter call duration threshold of **2** min.

Initially configure Action as **alert** to see if there are any false positives.

To configure Stealth DoS/DDoS thresholds go to **Global Parameters -> DOS/DDOS -> Stealth DoS/DDoS.**

To enable Stealth DoS/DDoS feature for the SBCE go to **Device specific settings -> Advanced Options -> Feature control**

Call Walking A type of DoS attack whereby serial calls originating from a single source (normally spoofed) are directed against a sequential group of endpoints. This feature stops the attacks at the reconnaissance phase itself, when an attacker is collecting data to launch attacks. The thresholds are based on unique destinations per minute. Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

By Default this feature will be disabled.

Recommended thresholds for Trunk/Remote worker solutions:

10 sip messages in 1 min

5 INV in 1 min

5 REG in 1 min

Initially configure Action as **alert** to see if there are any false positives.

To configure Call Walking thresholds go to **Global Parameters -> DOS/DDOS -> Call Walking**

To enable Call Walking feature for the SBCE go to **Device specific settings -> Advanced Options -> Feature control**

Server DOS Per-device signaling and media overload control, call rate control to prevent DoS attacks from reaching service infrastructure such as SIP servers. SIP servers are identified on per IP basis. Since the destination IP of a server cannot be identified before routing is applied, these thresholds are applied after routing. The thresholds are based on both policy and absolute server capacity. Avaya SBCE provides an easy configuration screen for initial recommended thresholds and then admin can adjust the thresholds as needed. Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

Remote worker solution - recommended values for 1000 users and 100 Max Concurrent Sessions (Active calls).

SIP Method	Initiated Threshold (per 10 sec)	Pending Threshold	Failed Threshold (per 10 sec)
ALL	16958	1696	1696
INVITE	16	3	2
OPTIONS	2200	440	110
PUBLISH	2200	440	110
REGISTER	2200	440	110
SUBSCRIBE	8800	880	880

Trunk Solution - recommended values for 100 Max Concurrent Sessions(Active calls).

SIP Method	Initiated Threshold (per 10 sec)	Pending Threshold	Failed Threshold (per 10 sec)
ALL	227	45	23
INVITE	166	33	17
OPTIONS	20	10	10
PUBLISH	0	0	0
REGISTER	2200	440	110
SUBSCRIBE	0	0	0

To configure Server DoS go to **Server Configuration -> {Server Profile} -> Advanced Tab and select the Enable DoS Protection checkbox. Next select the Dos Protection tab and recalculate values.**

Domain DOS This is similar to server DOS. Avaya SBCE provides an easy configuration screen for initial settings and then admin can adjust the thresholds as needed. Although default configuration is provided, it is recommended that based on the traffic it needs to be tuned to avoid false positives/ negatives.

Remote worker solution - recommended values for 1000 users and 100 Max Concurrent Sessions (Active calls).

SIP Method	Initiated Threshold (per 10 sec)	Pending Threshold	Failed Threshold (per 10 sec)
ALL	16958	1696	1696
INVITE	16	3	2
OPTIONS	2200	440	110
PUBLISH	2200	440	110
REGISTER	2200	440	110
SUBSCRIBE	8800	880	880

Trunk Solution - recommended values for 100 Max Concurrent Sessions(Active calls).

SIP Method	Initiated Threshold (per 10 sec)	Pending Threshold	Failed Threshold (per 10 sec)
ALL	227	45	23
INVITE	166	33	17
OPTIONS	20	10	10
PUBLISH	0	0	0
REGISTER	2200	440	110
SUBSCRIBE	0	0	0

To configure Domain DoS go to **Global Profiles -> Domain DoS.** After creating the profile you want to enable it on your Security Rules by going to **Domain Policies -> Security Rules -> {Security Profile} -> Domain DoS and Editing the DoS settings to select the profile created.**

Protocol Scrubber

Protocol Scrubbing is an Avaya SBCE feature that utilizes a highly sophisticated statistical mechanism to thoroughly check incoming SIP signaling messages for various types of protocol-specific events and anomalies. It verifies certain message characteristics such as proper message formatting, message sequence, field length, and content against updatable templates received from Avaya. Typically, messages which violate the security rules dictated by the scrubber templates will be dropped while those which violate syntax rules will be repaired (either re-written, truncate, rejected, or dropped, depending upon the processing rules imposed by the templates).

The following Scrubber Packages can be used for Remote Worker/Trunking Scenarios. There could be a common place holder ticket if there are false positives reported for these Scrubber Packages.

Package	**Description**	**Used for**
SPKG0001 - Syntax	Rules are derived based on the SIP 3261 ABNF for mandatory/optional SIP/SDP headers	Trunk
SPKG0002 – Protos	Rules are derived based on the SIP Protos Test Suite [Validates IP Address/Domains] for mandatory/optional SIP/SDP Headers	Trunk, Remote worker
SPKG0003	Not applicable to Avaya	Do not use
SPKG0004 - Avaya	Avaya	Remote worker

To configure Scrubber go to **Domain Policies -> Security Rules -> {Security Profile} -> Scrubber**

For Scrubber default action is **Alert.** To change the Scrubber action go to **Global Parameters -> Scrubber -> Rules.**

Encryption

Encryption can reduce the risk of intercepting phone conversations, voice mail, and the SIP messages that support them both. A call consists of voice (RTP) data and signaling (SIP) messages. Both media and signaling data can pass through many devices and networks, sometimes over a separate network or virtual path from each other. Without encrypting both data types anyone with access could intercept: □ RTP in phone calls and voice mail □ SIP messages.

- □ compares how encryption

Following table shows how encryption mitigates the vulnerabilities in SIP and RTP.

	Unencrypted (Clear)	Encrypted
SIP	Susceptible to message spoofing and registration hijacking	Prevents message spoofing and hides sensitive information
RTP	Vulnerable to eavesdropping	Prevents eavesdropping

Avaya SBCE uses the Transport Layer Security (TLS) protocol as a transport protocol for encrypting SIP messages to prevent eavesdropping and tampering of communications sent across a network. Refer to Chapter 9 in the Administering Avaya Session Border Controller for Enterprise guide for configuring the TLS for remote worker solution.

Avaya SBCE supports SRTP for encrypting the media traffic to prevent eavesdropping. Refer to the Chapter 5 in Avaya SBCE admin guide for configuring SRTP as part of Media rules.

Secure Remote Access

Setting files and firmware files

In Remote Worker solution Avaya phones uses HTTP/HTTPS to get initial configurations settings file(46xx_settings.txt) and firmware upgrades. 96x1 phones supports identify certificates. These certificates can be used for TLS mutual authentication for securing the settings file download and firmware upgrades. To avoid unauthorized access to settings file and firmware files use TLS mutual authentication. Refer to Avaya SBCE admin guide for configuring the TLS mutual authentication in the TLS profile.

Please note all the phones does not support mutual authentication for firmware download, refer to the phone documentation for the support and configuration to enable TLS mutual authentication for firmware download.

Recommended configuration and procedures TLS mutual authentication

Configure SBCE http proxy service for https(no http) for settings file and firmware download. Do not use relay service for file downloads.

Phone staging:

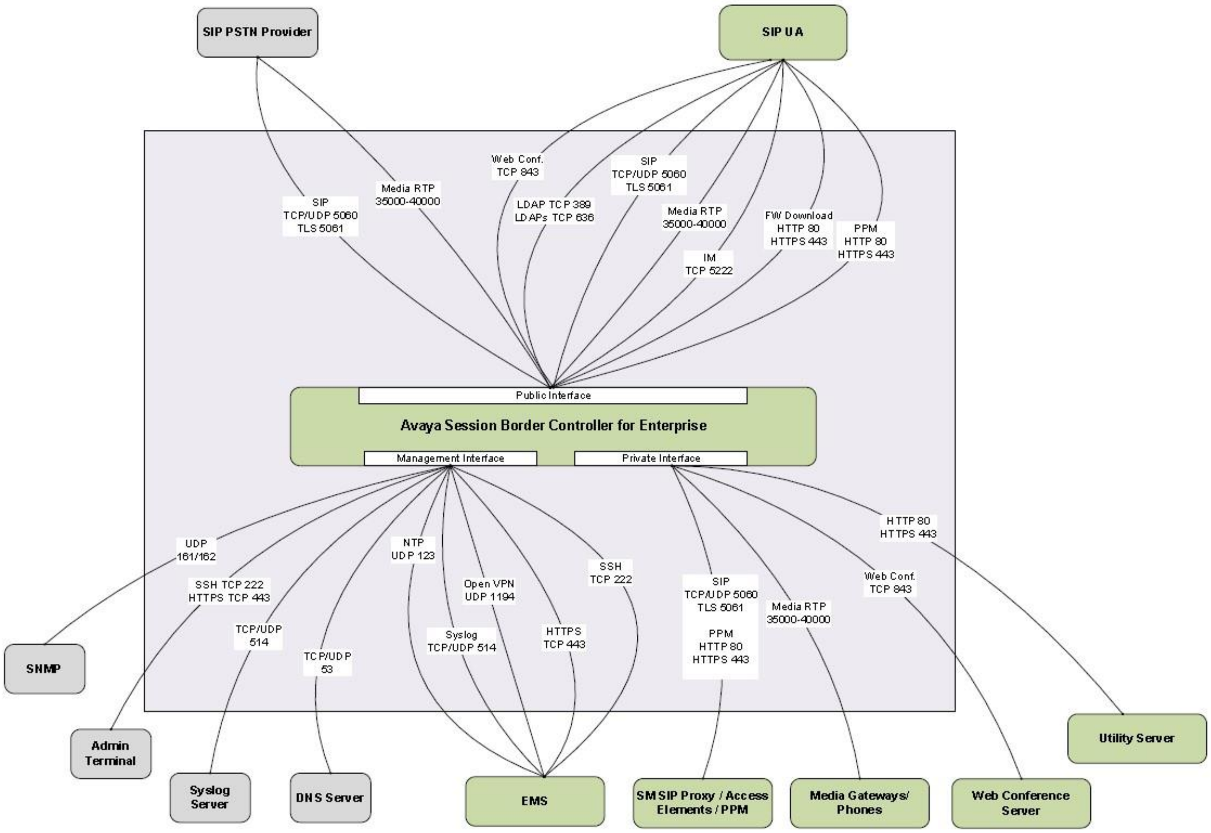
A two-step approach is required if there is no http access from remote locations and mutual authentication is required.

1) The phone must internally download the settings/certificates via http

2) Ready for remote deployment

Port Matrix

Following are the default ports used.


SIP PSTN Provider
SIP U A
SIP
TCP/UDP 5060
TLS 5061
Media RTP
35000-40000
Web Conf.
TCP 843
LDAP TCP 389
LDAPs TCP 636
SIP
TCP/UDP 5060
TLS 5061
Media RTP
35000-40000
IM
TCP 5222
FW Download
HTTP 80
HTTPS 443
PPM
HTTP 80
HTTPS 443
Public Interface
Avaya Session Border Controller for Enterprise
Management Interface
Private Interface
UDP
161/162
SSH TCP 222
HTTPS TCP 443
TCP/UDP
514
TCP/UDP
53
NTP
UDP 123
Syslog
TCP/UDP 514
Open VPN
UDP 1194
HTTPS
TCP 443
SSH
TCP 222
SIP
TCP/UDP 5060
TLS 5061
PPM
HTTP 80
HTTPS 443
Media RTP
35000-40000
Web Conf.
TCP 843
HTTP 80
HTTPS 443
SNMP
Admin
Terminal
Syslog
Server
DNS Server
EMS
SM SIP Proxy / Access
Elements / PPM
Media Gateways/
Phones
Web Conference
Server
Utility Server