



A MITEL
PRODUCT
GUIDE

Unify OpenScape Branch

OpenScape Branch V11R2/R3

Security Checklist
11/2025

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1 Introduction

1.1 History of Change

Date	Version	What
22/12/2024	1	V11R2 Initialization
09/24/2025	2	V11R3 updates

1.2 General Remarks

Information and communication and their seamless integration in “Unified Communications and Collaboration” (UCC) are important, valuable assets forming the core parts of an enterprise business. These assets require every enterprise provide specific levels of protection, depending on individual requirements to availability, confidentiality, integrity and compliance for the communication system and IT infrastructure it utilizes.

Unify attempts to provide a common standard of features and settings of security parameters within delivered products. Beyond this, Unify generally recommends:

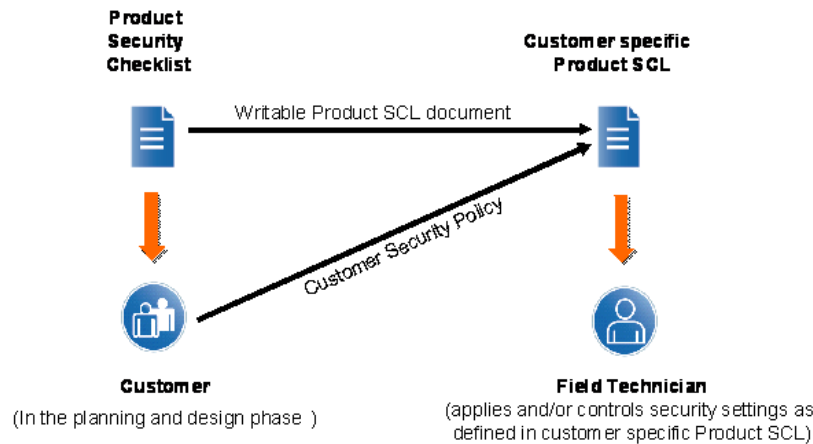
- to adapt these default settings to the needs of the individual customer and the specific characteristic of the solution to be deployed
- to weigh the costs of implementing security measures against the risks of omitting a security measure and to “harden” the systems appropriately.

Product Security Checklists are published as a basis to support the customer and service department in both direct and indirect channels, as well as self-maintainers, to document security setting agreements and discussions.

The Security Checklists can be used for two purposes:

1. In the planning and design phase of a particular customer project: Use the Product Security Checklists of each relevant product to evaluate, if all products that make part of the solution can be aligned with the customer's security requirements – and document in the Checklist, how they can be aligned. The Product Security Checklist containing customer alignments can be identified as Customer specific Product Security Checklist.
This ensures that security measures are appropriately considered and included in the Statement of Work to build the basis for the agreement between Unify and the customer: who will be responsible for the individual security measures:

- During installation/setup of the solution
 - During the solution's operation
2. During installation and during major enhancements or software upgrade activities:
- The Customer specific Product Security Checklists are used by the field technician to apply and/or control the security settings of each individual product.



Update and Feedback

- By their nature, security-relevant topics are subject to continuous changes and updates. New findings, corrections and enhancements to this checklist are included as soon as possible. Therefore, we recommend always using the latest version of the Security Checklists for the products that are part of your solution. They can be retrieved from the Unify Partner Portal.
- We encourage you to provide feedback where clarification is required or there are concerns with the application of this checklist.

Please contact the Mitel Product Security Office.

1.3 Security Strategy for Unify Products

Reliability and security are key requirements for all products, services and solutions delivered by Unify. These requirements are supported by a comprehensive security software development lifecycle that applies to all new products or product versions being developed from their design phase until the end of life of the product.

Unify Products are developed according to the Baseline Security Policy, which contains the technical guidelines for the secure development, release and sustaining of the company's products. It defines the fundamental measures for software security that are taken throughout the whole lifecycle of a product, from design phase until end of life and includes:

Product Planning & Design

Threat and Risk analysis (Theoretical Security Assessment) is performed to determine the essential security requirements for the product.

Product Development & Test

Penetration Tests (Practical Security Assessment) are performed to discover implementation vulnerabilities and to verify the hardening of the default system configuration.

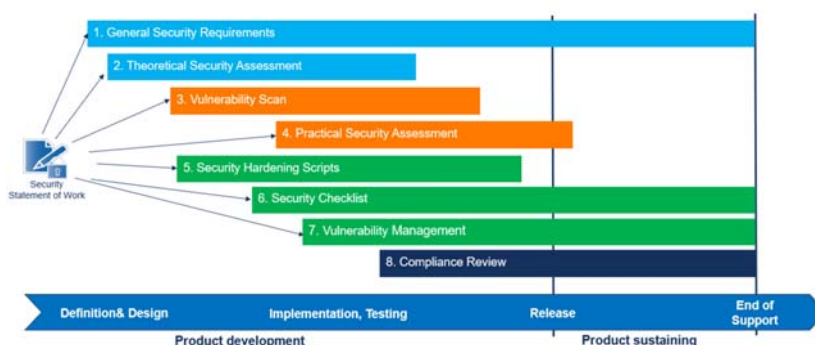
Installation and start of operation

Hardening Guides (like this Security Checklist) are published to support the secure configuration of the product according to the individual customer's security policy.

Operation and Maintenance

Proactive Vulnerability Management to identify, analyze and resolve security vulnerabilities that emerge after products have been released, and to deliver guidance, e.g., Security Advisories published at Mitel Security Advisories for customers to make informed decisions on how to mitigate or close these vulnerabilities.

Figure: Unify Baseline Security Policy - from Design to EOL



For more information about the Unify product security strategy we refer to the relevant Security Policies [2].

Unify has adopted the security principles security by design and security by default. However, security default cannot be achieved in all cases or a risk-based approach is more suitable for certain measures. The Product Security Checklist provides the necessary foundation to customize the security settings based on the specific customer security requirements.

The Security Checklist is a living document that integrates feedback and new security aspects during the whole product sustaining phase (Figure 2). To maintain the Unify product at the security level accomplished at installation time will be necessary to apply new security enhancements to the product during its lifetime. Additional security measures for the operation and maintenance phase of the product as described above in this chapter should also be applied.

CL-Mechanism	Key words
Sample Product Vxy	
Measure	<p>Measures proposed by Unify should have their pros and cons described above the table.</p> <p>The table should be self-explanatory for experts, while non-experts can find additional information in the description and references.</p> <p>o not copy content from existing manuals; instead, refer to them as needed.</p> <p>Please note that all proposed measures must be tested.</p>
References	<p>References that are useful to fulfil the measures above</p> <p>Reference to product manual (admin manual, service guide...)</p> <p>Reference to other chapters in the security checklist</p>
Needed Access Rights	<p>Access rights that are necessary to fulfil the measures. (e.g., user, admin ...). If the technician requires access rights beyond those related to the product, include that information here as well.</p>
Executed	<p>Yes: No:</p>
Customer Comments and Reasons ¹	

¹ Please describe which measures are chosen for your installation and why.

1.4 Security Policies for OpenScape Branch and Open Scape SBC

OpenScape Branch and OpenScape Session Border Controller are defined as Software appliances.

As such, the following security policies are applied:

1. The ability to update 3rd party components with security updates or patches in the field

The update of any 3rd party component embedded in the product (including the Operating System) is provided by Unify in the context

of regular product maintenance releases (or hotfixes in case of critical updates). The Operating System is based upon but not identical to a community developed distribution. Even when the community declares a version deprecated this does not necessarily mean that the OSB/SBC OS is deprecated as the packages and kernel are individually updated by the regular OSB/SBC releases or hotfixes. Customers should stay up to date regarding the product fix and hotfix releases as a whole: this ensures the continuous inclusion of 3rd party component security fixes (if relevant to the product).

Also refer to the Mitel Security [Advisories](#).

2. **The ability to install and operate additional security software on the same system (such as Antivirus SW, host-based IDS, logging/monitoring agents etc.)**

The installation of additional software is not supported. Instead, the product's built-in capabilities and interfaces should be used to integrate them into the customer's overall IT/managed services security concepts (e.g. run Antivirus SW in the virtual host, configure network-based IDS solutions appropriately, etc.)

1.5 Customer Deployment - Overview

This Security Checklist covers the product OpenScape Branch V11 and lists their security relevant topics and settings in a comprehensive form.

	Customer	Supplier
Company		
Name		
Address		
Telephone		
E-mail		

	Customer	Supplier
Covered Systems (e.g. System, SW version, devices, MAC/IP-addresses)		
Referenced Master Security Checklist	Version:	
	Date:	
General Remarks		
Open issues to be resolved until		
Date		

2 OpenScape Branch V11 R2 Hardening Procedures in General

The OpenScape Branch is an appliance which provides the functionality of SIP Proxy, Branch Session Border Controller with integrated Media Server. It offers variations with integrated Media Gateway to Analog Trunks (FXO), BRI, PRI, and the functionality of Analog Adapter. SIP Service Providers and Media Gateways can be used to connect to the PSTN, which provides the support to a set of features in survivable mode. This ensures continuous communications service even if a remote branch and the headquarters experience communication degradation or loss.

The OpenScape Branch can be managed via a local web interface (Local GUI) and via CMP by means of the OSB Assistant. It also offers the access via SSH and SFTP.

In terms of maintenance, it offers the support of alarming via SNMP v3 or SNMPv2 and logging via syslog. It can be integrated to OpenScape Trace Management.

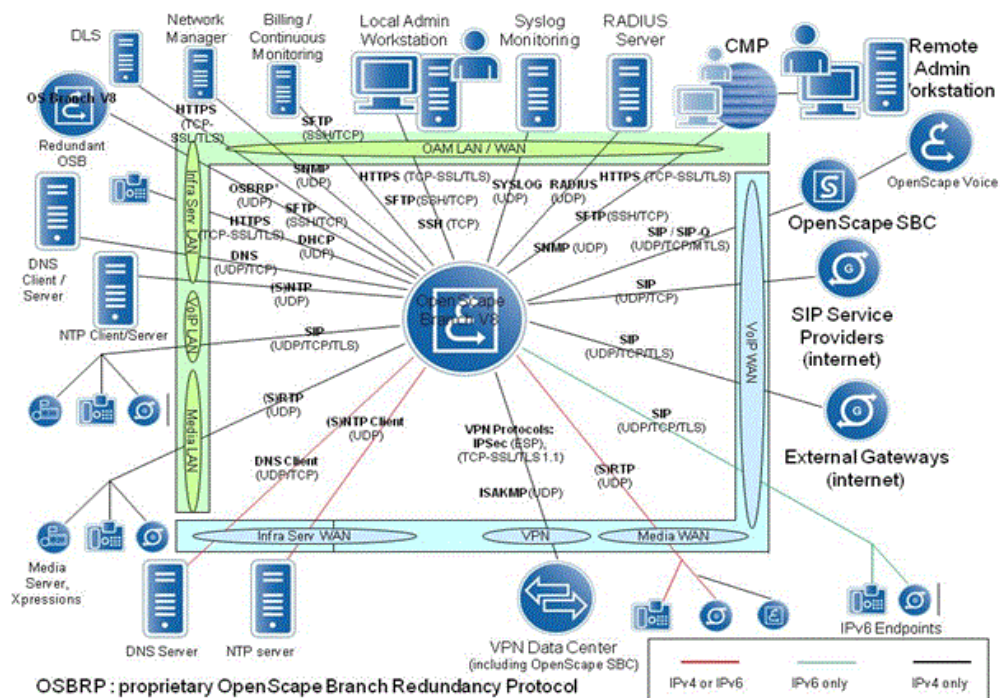
The following network services are supported by the OpenScape Branch:

- DNS server and DNS client
- DHCP server.
- NTP client and NTP server.
- Traffic shaping
- Authentication via RADIUS
- Authentication via PKI
- Digest Authentication
- Firewall
- Message Rate Control
- Denial of Service Mitigation

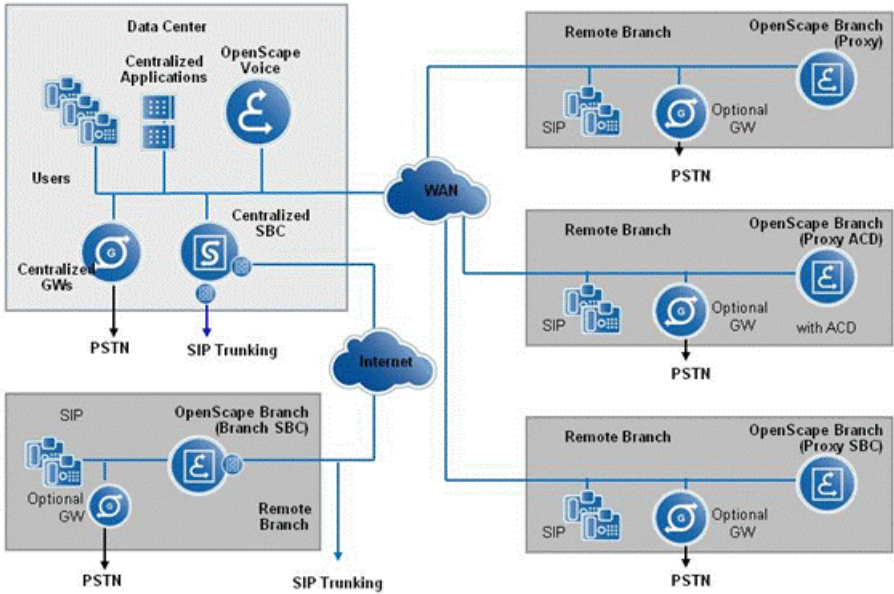
As a Branch SBC, it supports the following security services:

- VPN with IPSec or with OpenVPN.

The following figure presents the network interfaces of the OpenScape Branch:



The following figure presents the scenarios in which the OpenScope Branch can be deployed:



The recommended measures are listed in the following chapters.

First point is to install only up-to-date software. The newest Software versions of software that is delivered by Unify always are available on

Unify Software Server. We recommend to also the installation of up-to-date software versions and patches of additionally needed 3rd party software. Please also consider the hardware manufacturer advisories as well as Unify security advisories [2].

The latest software version released should generally be installed for all components.

To tighten security on OpenScape Branch V11 R1/R2/R3, the following measures are recommended:

- Regarding to SNMP
 - SNMPv2 - Changing the SNMP Community Name from the defaults since these are essentially passwords used for data exchange of SNMP trap information.
 - SNMPv3 - configuring the passphrases for the encryption and integrity check.
- Changing predefined user account passwords from their defaults as these are well known.
- Changing the system default password policies.
- If the internal firewall is used, ensure it is properly configured.
- Ensure appropriate IP message rate limits are set for normal operation.
- Closing Unused IP Ports – Configure the ports required for operation of the system. If an external firewall is used, ensure that it is properly configured to pass the required traffic towards the system.
- Secure communications to SIP Servers using IPSec tunnels or VPN (OpenVPN) SSL connections in the absence of other mechanisms to secure SIP signaling. Using unsecured transport for SIP signaling provides opportunities for possible eavesdropping and disclosure.
- Use secure transport connections for SIP signaling whenever possible. Using unsecured transport for SIP signaling provided opportunities for possible eavesdropping and disclosure.
- Adopt appropriate media policies for using secure RTP media according to the network peer capability and profile wherever possible. Using unsecured media may lead to eavesdropping.
- Authenticate SIP subscriber by means of Digest Authentication.
- Deviations of the recommended security settings based on customer request shall be documented.
- Use customer PKI issued certificates.
- Minimize exposure to Denial-of-Service SIP message flooding attacks by limiting the SIP message rate that SIP endpoints can send SIP messages.
- Minimize exposure to Denial-of-Service SIP registration attacks by quarantining SIP endpoints which are unable to provide valid registration identities or digest authentication credentials.
- Protect Local GUI interface for Web Server access.

INFO: Based on the installed software, the necessary Patch Management for the customer shall be defined. Patch Management is out of scope of the Product Security Checklist.

3 Server Hardening

Each server the OpenScape Branch V11 R1/R2/R3 runs on must be hardened. That may be more than one server for distributed deployment of OpenScape Branch V11 R1/R2/R3 or if the OpenScape Branch V11 R1/R2/R3 always needs more than one server.

General requirements for all systems, which run communication clients and applications:

- The operating system version is released for the communication software (see sales information)
- Current security updates are installed (see chapter OpenScape Branch V11 R2 Hardening Procedures in General).
- The access to the system is protected by passwords according to the password rules in Password rules.
- After Installation all SW that were necessary as installation help (Diagnostic tools like Wireshark, putty, old SW Versions ...) shall be removed from Server.

3.1 Hardware Security Settings

There are no known necessary security hardware settings.

3.2 BIOS Settings

Preventing the possibility of booting from a USB device.

3.2.1 BIOS password protection

Access to the BIOS allows changing the boot order of the server. Once changed an intruder may use tools that are bootable from CD-ROM or USB device that allow a user to change the administrator password, install files or retrieve sensitive information. To prevent this, BIOS needs to be password protected.

CL-SBC-BIOS-PW	BIOS password protection
Measures	A BIOS password needs to be set to avoid changing essential settings (i.e., boot order) in the BIOS setup.
References	N/A
Needed Access Rights	Administrator

CL-SBC-BIOS-PW	BIOS password protection
Executed	Yes: No:
Customer Comments and Reasons	

INFO: BIOS passwords should be set in accordance with company security policies. This security policy can be found in the Addendum.

3.2.2 Boot order

When boot order in BIOS setup is set wrongly any intruder may use tools that are bootable from CD-ROM or USB device which allow him to change the administrator password, install files or retrieve sensitive information. To prevent this, the boot order must be set properly.

CL-SBC-BIOS-BOOT	BIOS boot order
Measures	Set boot order in BIOS to NOT boot from removable media.
References	N/A
Needed Access Rights	Administrator
Executed	Yes: No:
Customer Comments and Reasons	

3.3 OS Hardening

For products that are delivered as hardware or software appliances the operating system is delivered and installed as an integral part of the application load. Operating systems hardening is integral part of the product development. Hardening is performed according to baseline security requirements and industry best practices.

Applications do not include the operating system as part of their product delivery. In general customers provide the operating system for applications and are responsible for operating system hardening.

Where applications deliver hardening measures (e.g., scripts), they should be included in the security checklist, and it is recommended that customers are applying them during installation.

OpenScape Branch is deployed with a customized version of OpenSuse Leap 15.5.

OS specific password policy to be implemented see in Addendum.

Sources for customer specific certificates see in Addendum.

3.4 Clean Customer Deployment

The installation files are already cleaned, so only necessary applications are installed. Installation of additional applications are not recommended.

3.5 Changing the SNMP Community Name

SNMPV2 uses the notion of communities to establish trust between managers and agents. Community names are essentially passwords. A community name allows a level of access to MIB data. Data retrieval access levels are read-only (RO). An access level of read-write (RW) is not used.

CL-OSB-SNMP	Change SNMP Community Name
Measures	Change default values for Read-Only (RO) community name for SNMP Discovery since SNMP V2 community name is sent in clear text unless other security measures (e.g. VPN) are used for this traffic. By default, the OpenScape Session Border Controller sets the RO community name to "public". It is very important to change this default at installation as it is well known to the general public. See additional setting information below.
References	SNMP V2
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

NOTICE: In a redundant system, the Community Name is automatically synchronized to the Backup node.

It is possible to backup & restore the configured Community Name.

Additional Information for Settings:

From OSB V9R4 and up it is possible to change the SNMP RO community name either via CMP Profile or via Local GUI / OSB Assistant.

Changing via CMP Profile

It is possible to change the Community Name for the SNMP Discovery process via CMP Profile.

A profile for the configuration of security parameters allows entering the new Community Name and the IP address of the SNMP agent which is allowed to perform SNMP discovery. The profile can be applied to a set of selected OpenScape Branch boxes via Job Management.

An Alarm Manager log in WARN level is generated when the SNMP community string is changed.

The SNMP community string shall contain 20-32 alphanumeric characters or special characters ~ ! @ # \$ % ^ & * () +.

Changing via Local GUI and OSB Assistant

From OpenScape Branch V9R3 it is possible to change the Community Name from the Local GUI and also from the OSB Assistant.

The Community Name can be changed on the SNMP Configuration screen under SNMP v2c Trap Destinations.

3.6 Configuring SNMPv3

SNMPv3 supports the encryption and integrity check of the discovery and trap messages. It is recommended to activate the encryption (Privacy) and integrity check (Authentication) of the SNMPv3 interface.

CL-OSB-SNMPv3	Activate SNMPv3 encryption and integrity check
Measures	Activate the encryption and integrity check for the SNMPv3 interface. The encryption should be configured to use AES, and the security check should use SHA1. A passphrase should be configured for encryption and another one for the integrity check.
References	
Needed Access Rights	Administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

Up to 5 destinations can be configured for the SNMPv3 traps. For each of the destinations it is possible to configure:

- Security Level – Three options are offered: None, Auth Only and Auth+Priv. it is recommended to choose Auth+Priv in order to activate encryption (Privacy) and Integrity check (Authentication).
- Auth Protocol – It is highly recommended to choose SHA-1. Notice that MD5 is not considered a secure hash mechanism anymore.
- Auth Password – A passphrase of at least 8 and a maximum of 32 characters shall be configured.
- Priv Protocol – Two options are offered: AES and DES. It is highly recommended to choose AES. Notice that DES is not considered a secure encryption algorithm anymore.
- Priv Password – A passphrase of at least 8 and a maximum of 32 characters shall be configured.

NOTICE: The Engine ID is used to identify the SNMP Agent. The user can select the algorithm to generate the Engine ID from the following options: Generate Automatically, Generate from IP address, Generate from MAC address, Text entry and Hex string entry. If the user does not set the algorithm the system will generate automatically.

The SNMP gets is disabled by default. If enabled, it allows the read access of several internal MIB. To prevent the unauthorized access the SNMP get, the administrator have to configure the username, security level, authentication protocol, authentication password and priv password.

The following settings are used in SNMPV3 get:

- Read-only user - A username with at least 6 and a maximum 32 characters must be configured.
- Authentication pass - Passphrase of at least 10 and a maximum of 32 characters must be configured. Per configuration the minimum is 8, however 10 is recommended.
- Encryption pass - passphrase of at least 10 and a maximum of 32 characters must be configured. Per configuration the minimum is 8, however 10 is recommended.

Regarding the mibs, current the walkthrough in following several mibs are allowed.

To disable the mibs that should not be accessed a change in the /etc/init.d/snmpdx have to be done.

Fill the "" on the /etc/init.d/snmpdx with mibs that should be disable as below:

```
case "$1" in start)
echo -n "Starting SNMPD "
if grep -Fq "SNMPV3GET=1" $SNMPD_CONFIG ; then
SNMPD_DISABLED_MODULES="<Mib to be disable here>"
```

3.7 Changing Default Passwords

After the installation for each account, a default password is available. Since the default passwords are publicly available, it is required that all pre-defined passwords be changed for "root", "administrator", "service", "guest", "assistant", "ACD", "CDR" and "redundancy" (see Addendum, section Predefined Accounts) after the installation completes.

CL-SBC-Passwords	Use non-default OpenScape Branch passwords
Measures	During the installation, all accounts are created with predefined passwords, which are generally known. Thus, all passwords must be changed upon deployment. IMPORTANT: Even if RADIUS is used to authenticate pre-defined users, local passwords must be changed from their pre-defined values.
References	
Needed Access Rights	administrator IMPORTANT: Access Rights to change "root" password is "root".

CL-SBC-Passwords	Use non-default OpenScape Branch passwords
Executed Server 1:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The passwords can be administered via SSH, Local GUI or the OSB Assistant as indicated in the Addendum section Management Security.

In case of password administration via console or SSH, the following command shall be used:

```
passwd user
```

Where "user" is: "root", "administrator", "service", "guest", "assistant", "ACD", "CDR", "redundancy".

Passwords should be 15-40 characters long in accordance with the customer's password policy.

NOTICE: The password of "assistant" shall be synchronized between CMP and the OpenScape Branch, otherwise CMP will not be able to administer the OpenScape Branch. Notice that if the password for user "assistant" is modified in the CMP – OpenScape Branch Assistant, is automatically synchronized with the OpenScape Branch.

In redundant OpenScape Branch deployments, passwords for redundancy users are not synchronized and must be changed in both nodes before redundancy is configured. Also note that for redundancy users only administrators can change password through local GUI even on backup node.

NOTICE:

It is also possible to change the password of the users of a set of selected OpenScape Branch boxes by means of CMP Profiles which are applied with Job Management.

NOTICE: The user passwords can be backed up and restored to a file. Passwords are stored in an encrypted format see pam.d on PAM Framework. Notice that some of the policy rules do not apply while restoring the user

passwords, like password iteration number and password iteration length.

3.8 Change Default Password Policies

Verify if the Password Policies required by the Customer matches to the default policies provided by the OpenScape Branch. If they do not match, the Password Policies must be changed.

CL-OSB-New_Account-Pass-words	Change customer's password policy within the OpenScape Branch
Measures	Ensure the customer's password policy has been applied to the system, preferably by using the <code>/etc/pam.d</code> mechanism.
References	
Needed Access Rights	root
Executed Server 1:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The procedures to manage the password policy are described in Administration/Management Security.

In a redundant OSB, the password policy is automatically synchronized to the backup OSB.

For new users created via Management Portal is recommend to set the change of password in first usage and also set an expiration date accord to the customer password polices.

3.9 Changing Default Passwords for Accounts

After the installation for each account, a default password is available. Since the default passwords are publicly available, it is required that all pre-defined passwords be changed for "root", "administrator", "service", "guest", "assistant", "ACD", "cdr" and "redundancy" (see Addendum, section Default Accounts after the installation completes.

CL-OSB-Passwords	Use non-default OpenScape Branch passwords
Measures	During the installation, all accounts are created with predefined passwords, which are generally known. Thus, all passwords must be changed upon deployment. IMPORTANT: Even if RADIUS is used to authenticate the pre-defined users, the local passwords shall be changed from their pre-defined values.
References	
Needed Access Rights	administrator IMPORTANT: Access Rights to change "root" password is "root".
Executed OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The passwords can be administered via SSH, Local GUI or the OSB Assistant as indicated in Administration).

In redundant OpenScape Branch deployments, the password policy is automatically synchronized to the backup OSB.

For new users created via the Management Portal, it is recommended to require a password change on first use and set an expiration date according to the customer's password policies.

3.10 Voicemail Passwords changes

Passwords are needed to retrieve the recorded messages by the user. The format of the passwords is digits with the length of min 3 up to 8 digits. Other entries like characters should not be allowed.

CL-OSB-Voicemail-Passwords	Use non-default OpenScape Branch passwords for voicemail accounts
Measures	Password for Accessing/Retrieving the Voicemail Messages by User. Verify only digits can be entered for such passwords.
References	OpenScape Branch V11 Administrator Documentation
Needed Access Rights	administrator

CL-OSB-Voicemail-Passwords	Use non-default OpenScape Branch passwords for voicemail accounts
Executed Server 1:	Yes: No:
Customer Comments and Reasons	

3.11 Disable not used accounts

Since V9R4 and up it is possible to disable via Management Portal the user accounts that are not used, this is not valid for root, and redundancy users. If there is only one administrator or service user, they also can't be disabled.

CL-OSB-Disable Not used accounts	Disable accounts for not used accounts
Measures	All not user accounts must be disabled.
References	OpenScape Branch V11 Administrator Documentation
Needed Access Rights	administrator
Executed Server 1:	Yes: No:
Customer Comments and Reasons	

3.12 Authentication via RADIUS

It is possible to authenticate the users via a RADIUS server. Up to two RADIUS servers can be configured on the OpenScape Branch to perform the user authentication. Every time a user tries to log in to OpenScape Branch via Web, via SSH, via SFTP or via Console, a request will be sent to the RADIUS server asking for the authentication of the user. The RADIUS server will accept or reject the user authentication by comparing the provided credentials with the credentials configured in it.

CL-OSB-RADIUS	User Authentication via RADIUS
Measures	<p>The user authentication is performed by a RADIUS server. The IP address of up to two RADIUS can be configured in the OSB.</p> <p>A secret must also be configured for each RADIUS server.</p>
References	OpenScape Branch V11 Administrator Documentation [2]
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information about the Functionality:

If the RADIUS server is reachable the authentication will be performed on the RADIUS server. If the RADIUS server is not reachable the users will be locally authenticated in the OSB. So, even if the predefined users are managed via RADIUS it is required to change their passwords from predefined value.

The users which are not locally configured on the OSB will have the same privileges as the pre-defined service user.

The communication between OSB and the RADIUS server is performed by means of the protocol EAP and the encryption algorithm is MD5.

Additional Information for Settings:

The authentication of users via the RADIUS server may be enabled in the OpenScape Branch. In order to activate the authentication via the RADIUS server, at least one RADIUS server must be configured in the OpenScape Branch. Server redundancy is possible by configuring 2 RADIUS servers.

The RADIUS service port is recommended (2115) but any value in the port range (0-65535) can be used.

In case of redundant OpenScape Branch the physical IP address of each node shall be configured in the RADIUS server (not the virtual IP address).

Regarding to the timeout, it is not recommended to configure a value of 1 or 2 seconds because any network problem would cause the RADIUS authentication to timeout. If the RADIUS authentication times out, the user is locally authenticated.

The authentication via the RADIUS server may be separately enabled for CLI (Console access), SSH (and SFTP) and Web.

NOTICE: The authentication of users via the `su` command is performed internally (via Console and SSH only). The OpenScape Branch pre-defined users shall also be configured in RADIUS in order to be able to login to OpenScape Branch when the RADIUS server is reachable. Users which are not pre-defined in OpenScape Branch, may also log in to OpenScape Branch for all services except SSH and SFTP.

NOTICE: Internal users “assistant” and “redundancy” must not be created on the RADIUS server. It is also possible to enable the RADIUS Accounting. If the Accounting service is enabled, the RADIUS server is informed about the duration of the sessions and it will get the vendor identification. The Accounting service may also be separately enabled for CLI (Console access), SSH (and SFTP) and Web.

NOTICE: The Accounting service uses one port higher than the port used for authentication. If the Authentication service uses the default port, the Accounting service will use the port 2116. A secret must be configured for each RADIUS server. This secret is a sequence of 16 characters which is shared between the OpenScape Branch and the RADIUS server. In order to increase security the secret length was fixed to 16 characters.

NOTICE: For the access via SSH, it is not possible to log in via users which are only defined in the RADIUS server. The SSH application requires that the user is configured locally. In order to get around this issue either the users administrator and/or service are configured in the RADIUS server or the authentication is performed locally.

3.13 User Authentication in SSH with PKI

It is possible to authenticate the users in SSH with PKI. In order to be authenticated, the client sends a signed message to the OpenScape Branch. This message is signed with the private key of the client. The OpenScape Branch verifies this message with the public key of the client which is associated to the user in the OpenScape Branch. The verification is only successful if the client has used the right private key.

It is very important that the client computer is properly hardened to protect against undesired access to the client private key.

CL-OSB-SSH-PKI	User Authentication in SSH with PKI
Measures	The user authentication in SSH is performed with PKI. The client computer must be properly hardened in order to avoid undesired access to the client private key.
References	OpenScape Branch V11 Administrator Documentation [2]
Needed Access Rights	administrator
Executed Server 1:	Yes: No:
Customer Comments and Reasons	

Additional Information about the Functionality:

The External User will begin by logging into their own machine. They will then generate a public/private key pair. The private key will remain on their computer, but the public key will be sent to a person who has authority to append their public key on the OpenScape Branch. For example, if the External User wants to be able to log in to the OpenScape Branch as the administrator user without having to enter the administrator password; they would send their public key to the administrator user (e.g., in an email). The administrator user will associate the public key to its user. Now, when the External User logs in on the OpenScape Branch as the administrator user, a password is not required. The management of the public keys and their association to the user is done in the PKI Configuration section in the Security tab.

In order to configure a PKI for SSH the following steps shall be executed:

- Enable PKI Configuration;
- Open the PKI Configuration screen;
- Click on the Add button;
- Select the internal user (administrator or service) to which the key will be associated;
- Select the public key file and click to import it;
- Apply the configuration.

Regarding to the public key, the OpenScape Branch supports .ppk files which are generated with:

- RCF4716 format (a multi-line text file beginning with the line '---- BEGIN SSH2 PUBLIC KEY ----') – the external user name is located either in the Subject or in the Comment field.
Example: ---- BEGIN SSH2 PUBLIC KEY ----
Comment: "rsa-key"Subject: "rsa-key-20120529"
AAAAB3NzaC1yc2EAAAABJQAAAIB4aDWB7v6rYmfvlADIKuUPFL3dXeUHMOhUEX5q9/
GpsyEnhNa85lYq0fiDP1NSHK9CmT04JjdWqev4habcdipHPXV2YY8Hw5LI3MygLHWWPgzxcdbu+gR5/
bSyIkE8cxjb20XUwuYoTv8yd5TUF8ViyEJIxUWIGpoaTU9y2t/DQ==
- Linux format – the external user name is located in the 3rd field in the file.
Example: ssh-rsa
AAAAB3NzaC1yc2EBCDABJQAAAIB4aDWB7v6rYmfvlADIKuUPFL3dXeUHMOhUEX5q9/
GpsyEnhNa85lYq0fiDP1NSHK9CmT04JjdWqev4hl9gJipHPXV2YY8Hw5LI3MygLHWWPgzxcdbu+gR5/
bSyIkE8cxjb20XUwuYoTv8yd5TUF8ViyEJIxUWIGpoaTU9y2t/DQ==
rsa-key-20120529

4 Virtualization Hardening

We recommend hardening the virtualization infrastructure according to security guidelines provided by the virtualization vendor. As an alternative, best practice standards like the Benchmarks issued by the Center of Internet Security (CIS) should be considered.

The OpenScape Branch may be virtualized using supported versions. (Check the Virtualization Guide to see the supported versions and configurations).

5 Securing the OpenScape Branch interfaces

5.1 Configuring the Internal Firewall(WAN)

The OpenScape Branch must be protected against attacks by using either an external firewall or own internal firewall.

CL-OSB-Firewall WAN	Firewall Protection for the OpenScape Branch - Branch SBC outside or access network (WAN).
Measures	<p>For the outside network (WAN) of the OpenScape Branch operating as Branch SBC, the OpenScape Branch internal firewall must be used if no other external firewall is used. If an external firewall is used it must be configured to either operate in transparent mode or in a no SIP-NAT mode with dynamic IP address.</p> <p>If the external firewall is operating in no SIP-NAT mode the OpenScape Branch 'Branch behind NAT' must be enabled.</p> <p>Regardless of the external firewall operation mode, the external firewall must provide equivalent protection as the internal firewall to allow/disallow communication between the OpenScape Branch and external networks.</p>
References	OpenScape Branch V11 Administrator Documentation
Needed Access Rights	administrator
Executed	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The OpenScape Branch Firewall settings and criteria to be used for the "Allow" setting shall be applied as detailed below for all networks considering IPv4 or IPv6 address types as supported in the network.

Under no circumstances shall "all protocols" be allowed for the OpenScape Branch outside or access network (WAN). Each protocol listed in the configuration shall be set to "blocked" unless explicit requirements are identified for setting to "allow".

The OpenScape Branch Firewall settings and criteria to be used for the "Allow" setting shall be applied as detailed below for all networks:

The following VOIP protocols can be restricted / allowed from being accessed via WAN interface:

- SIP
- TLS
- RTP/sRTP
- HMGCP, only if OpenScape Branch remote Media Servers are used
- SSH (and SFTP) – this service shall be enabled if the system is remotely administered via CMP.

The following Network Services can be restricted / allowed from being accessed via WAN interface:

- DNS
- SNMP
- FTP
- HTTPS – this service shall be enabled if the system is remotely administered via CMP or Local GUI.
- SSH (and SFTP) – this service shall be enabled if the system is remotely administered via CMP.
- ICMP
- Telnet
- NTP if sRTP is used and media security key negotiation protocol is MIKEY#0

Additionally it is recommended, the internal firewall White/Black list be configured according to customer requirements to allow / block communications from specific network IP addresses on the OpenScape Branch outside network Access network or WAN. The entries in the White / Black list can be made at the subnet level using the CIDR notation.

NOTICE: The rules which are defined in the internal firewall are valid for TCP and UDP

The following IP addresses are defined by IANA as special use:

- 10.0.0.0/8 – Private Use
- 172.16.0.0/12 –Private Use
- 192.168.0.0/16 – Private Use
- 169.254.0.0/16 – Autoconfiguration
- 127.0.0.0/8 – Loopback

Since these IP addresses are often used for spoofing they shall be added to the blacklist in the firewall if they are not supposed to be used.

If the internal firewall is configured to block incoming traffic for a certain service, it will block new incoming connections. However, if the connection is started by the OpenScape Branch the incoming flow will

be allowed for that service and for the peer party to which the connection had been established. This exception is valid for both transport types UDP and TCP.

If the external firewall is used with no SIP-NAT the following parameters must be configured:

- the External Firewall flag in Firewall Configuration shall be enabled
- If the external firewall is using a static IP address:
 - the external IP address of the external firewall in Firewall Configuration shall be configured

otherwise

the flag Branch behind NAT shall be checked and then the branch uses its "Branch-Name" as "Logical-Endpoint-ID" to be encrypted in the OPTIONS sent to OpenScape SBC.

5.2 Configuring the Internal Firewall (LAN)

The OpenScape Branch must be protected against attacks by using either an external firewall or own internal firewall.

CL-OSB-Firewall	Firewall Protection for the OpenScape Branch - Proxy, Proxy-SBC or Branch SBC local network (LAN)
Measures	For the local network (LAN) of the OpenScape Branch operating as Proxy, Proxy ACD, Proxy-SBC or Branch SBC, the OpenScape Branch internal firewall must be used if no other external firewall is used. If an external firewall is used it must provide equivalent protection as the internal firewall to allow/disallow communication between the OpenScape Branch and the local networks.
References	OpenScape Branch V11 Installation & Upgrade Guide [1]
Needed Access Rights	administrator
Executed OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The OpenScape Branch Firewall settings and criteria to be used for the "Allow" setting shall be applied as detailed below for all networks:

The following VOIP protocols can be restricted / allowed from being accessed via LAN interface:

- DNS
- SNMP
- HTTPS
- SSH (and SFTP)
- NTP
- SIP
- MGCP
- RTP
- ICMP
- TLS

The following protocols cannot be restricted on the LAN interface since they are essential to OpenScape Branch functionality: ICMP.

The following protocols cannot be enabled in the LAN interface:

- FTP
- Telnet

Since this firewall is associated to the LAN interface, all remaining protocols shall be allowed by default.

Additionally the internal firewall White/Black list should be configured according to customer requirements to allow / block communications from specific network IP addresses on the OpenScape Branch local network or LAN. The entries in the White / Black list can be made at the subnet level using the CIDR notation.

INFO: The rules which are defined in the internal firewall are valid for TCP and UDP

If the internal firewall is configured to block incoming traffic for a certain service, it will block new incoming connections. However, if the connection is started by the OpenScape Branch the incoming flow will be allowed for that service and for the peer party to which the connection had been established. This exception is valid for both transport types UDP and TCP.

If the SIP/MGCP/RTP/TCP/TLS is blocked by the configuration the know server have to be manually added to the whitelist.

5.3 Changing the Maximum IP Message Rate Threshold

The OpenScape Branch - Branch SBC utilizes the internal firewall to limit IP message traffic through the system to thwart denial of service (DoS) attacks. A large amount of data is transferred, to and from software servers, and between nodes of the cluster during installation. In order to prevent impeding this process, the detection threshold for

a DoS attack has been intentionally set at 20,000 messages per second. After installation, this value should be adjusted based on the OpenScape Branch outside or access network (WAN) configuration, traffic patterns (calls per second), simultaneous calls and background message traffic in support of subscriber registrations requiring far-end NAT traversal.

CL-OSB-DoS_Thresholds	Configure DoS thresholds according to traffic models
Measures	Change the default packet rate that will trigger a denial-of-service lock-out.
References	OpenScape Branch V11 Installation & Upgrade Guide[1]
Needed Access Rights	administrator
Executed OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

IP message rate limit thresholds are provisioned in the GUI as parameters and applied to the internal Message Rate Control logic. The following default ranges are used:

- Block Period: 1 to 2048 seconds, with default of 60 seconds.
- Rate Threshold: 1 to 120,000 packets per second, with a default of 20,000 packets per second.

Typically, no single network IP-Address (for example, single phone or server) will deliver heavy amounts of packet traffic; however, message concentrators such as another Session Border Controller or SIP proxy can create heavier amounts of packet traffic and need to be taken into account when setting the rate threshold value. Additionally; the “white list” of trusted hosts, identified by their IP addresses, must be considered as exempt from the rate threshold limit.

The administrator should carefully monitor the system after reducing the threshold values and modify the threshold and “white list” to values for the specific customer configuration.

5.4 Secure Communication with Servers Using IPSec Tunnels

Configure the OpenScape Branch to use IPSec tunnelling to the Data Center through a VPN Concentrator. When OpenScape Branch and OpenScape Voice are separated via a WAN connection the usage of

IPsec Tunnels will ensure that SIP, Voice (RTP) and MGCP messages are transported into a secure connection between both ends.

CL-OSB-IP sec	Secure OpenScape Branch communications on the outside or access network (WAN) to the Data Center using IPsec tunnels
Measures	<p>Verify that IPsec can be used to encrypt SIP and non-SIP communication between OpenScape Branch and servers on the WAN.</p> <p>The usage of IPsec Tunnels assure that OpenScape Branch will have a Private IP address that is only known by the OpenScape Voice for SIP, Voice (RTP) and MGCP communication so these messages will be encrypted for other parties that try to read the information unduly.</p>
References	OpenScape Branch V11 Administrator Documentation
Needed Access Rights	administrator
Executed	<p>Yes: No:</p>
Customer Comments and Reasons	

Additional Information for Settings:

After installation and configuration of VPN server supporting the IPsec tunnel in the Data Center, verify that the OpenScape Branch IPsec tunnel can be established and used for communication.

The OpenScape Branch will need a Public and a Private IP address for the IPsec configuration:

Under no circumstances, any other party besides the OpenScape Voice will know this Private IP as this one will be used to encrypt the messages transmitted in the WAN over the IPsec tunnel.

A VPN concentrator will establish the connection between the OpenScape Branch and OpenScape Voice for this we will have to configure the following:

OpenScape Branch:

- A Private (Main IP) and a Public IP (Admin IP) address under Network connection
- IPsec tunnel under Security -> VPN -> IPsec where the:
 - Partner: is the VPN concentrator IP

- Partner Network: OpenScape Voice network information
- Local: Public (Admin) IP address
- Local network: Private (Main) IP address
- Encryption information that matches the configuration made in the VPN concentrator
- OpenScape Voice: under the endpoint configuration, the Signaling IP address of OpenScape Branch will be the Private (Main) IP address
- VPN concentrator: an IPsec tunnel must be created matching the configuration done in the OpenScape Branch, such as authentication methods, secrets (passwords) and network addresses.

INFO: Note that this feature will only work on non-redundant OpenScape Branch Systems.

In addition, if more than one VPN concentrator is used (in case of geo-separated OpenScape Voice system for example) several IPsec tunnels can be created and established simultaneously.

5.5 Secure SIP Signalling with Gateways / Trunks

OpenScape Voice Remote Endpoints may be configured to be reachable through the OpenScape Branch to represent and identify remote network servers, e.g., SIP Service Providers or SIP media gateways. UDP, TCP may be used for the signalling transport however information is sent in clear-text which can be easily sniffed in a network. For TCP transport, TLS may be used to secure the connection.

It is highly recommended that SIP signaling be secured between the OpenScape Branch and OpenScape Branch Gateways / Trunks representing Media Gateways in the WAN or SIP Service Providers. These connections can be secured using TLS over TCP.

CL-OSB-TLS-Gateway_Trunk	Secure External Gateways / Trunks Signaling using TLS
Measures	<p>The OpenScape Branch provides a set of default TLS CA certificates that can be used to establish TLS connections however it is highly recommended that these default factory certificates be exchanged for real customer CA certificates from the Public Key Infrastructure (PKI).</p> <p>The certificate profiles shall be created with the parameter Minimum TLS version shall be set to TLSv1.2</p> <p>IMPORTANT: By default the certificate profiles are created with a cipher suite priority which gives preference to ephemeral cipher suites in order to provide Perfect Forward Secrecy.</p> <p>See Certificate Handling, references and additional information below for installing CA certificates.</p>
References	<p>Refer to the following documents:</p> <ul style="list-style-type: none"> • OpenScape Branch V11 Installation Guide [1] for installing CA Certificates • The administration documentation for the SIP Gateway / Trunk should be referenced to install CA certificates and configure SIP endpoints to use TLS.
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

Within the OpenScape Session Branch Certificate Authority (CA) Certificates may be associated with remote Gateways / Trunks using OpenScape Branch certificate profiles:

- Install CA Certificates
- Create / Modify CA certificate profiles, configuring them according to their planned usage, including:
 - Type of authentication to be performed
 - CA certificate file reference identifying as a local or remote CA file.
 - Select a key file (optional)
 - CA Certificate validation and revocation parameters
 - CA Certificate renegotiation parameters
 - Minimum TLS version to be supported (set to TLSv1.2)

- Cipher suites selection by means of the parameters: Perfect Forward Secrecy, Encryption and Mode of operation
- Configure the Gateway / Trunk transport security (TLS) for the type of TLS authentication supported and associate with the appropriate CA Certificate profile.

If an unsecured SIP signalling connection is used, the OpenScape Branch and other OpenScape Voice solution elements may be vulnerable to network endpoints "masquerading" or performing "man-in-the-middle" attacks. Even though the OpenScape Branch is supporting the signalling with the remote Gateway / Trunk, failure to follow these procedures may provide a false sense of security.

NOTICE: TLS is established on a hop-by-hop basis. To apply end-to-end signaling security, equivalent measures must be applied to the OpenScape Branch inside or core network (LAN) interface with OpenScape Voice as covered in another section.

NOTICE: The only certificate critical extension which is handled by OpenScape Branch is Basic Constraints. Certificates containing other critical extensions will not be validated by the OpenScape Branch.

5.6 Secure SIP Server VoIP Communications

By default, the OpenScape Branch interface with the SIP server (OpenScape Voice) or with the centralized Session Border Controller (OpenScape SBC) uses TCP transport for SIP signaling. Information is sent in clear-text which can be easily sniffed in the customer's network. The SIP signaling connection should be secured using TLS.

CL-OSB-TLS-Core	Secure OpenScape server VoIP communications using TLS
Measures	<p>The OpenScape Branch platform and OpenScape SIP server come with a set of default CA certificates that can be used to establish TLS connections however, it is highly recommended that these default factory certificates be exchanged for real customer CA certificates from the Public Key Infrastructure (PKI).</p> <p>The certificate profile which is configured in System TLS Certificate shall be set with the parameter Minimum TLS version as TLSv1.2.</p> <p>IMPORTANT: By default, the certificate profiles are created with a cipher suite priority which gives preference to ephemeral cipher suites in order to provide Perfect Forward Secrecy.</p> <p>See Certificate Handling, references and additional information below for installing CA certificates.</p>
References	<p>Refer to the following documents:</p> <ul style="list-style-type: none"> • OpenScape Branch V11 Installation Guide[1] for installing CA Certificates • OpenScape Voice Design & Planning Manual : Volume 3, Security Reference
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

NOTICE: TLS is established on a hop-by-hop basis. To apply end-to-end signaling security, equivalent measures must be applied to all connections on the OpenScape Branch outside or access network (WAN) interface involved in the call. Securing the OpenScape Branch outside or access network (WAN) connections for remote subscribers and remote endpoints is covered in other sections of this document.

5.7 Configure OpenScape Branch - Branch SBC Outside or Access Network (WAN) SIP Signaling IP Ports

The SIP signalling IP ports used in OpenScape Branch and its associated servers are listed in the Interface Management Data Base.

The OpenScape Branch SIP listening ports default to the well known SIP ports:

- 5060 - UDP
- 5060 - TCP
- 5061 - TLS

Since these ports are well known in the network many security vulnerabilities can be instigated by external attacks to these ports.

It is therefore required that the OpenScape Branch SIP listening ports be changed to other values which do not conflict with other provisioned ports.

CL-OSB-SIP_Ports	Configure OpenScape Branch Outside or Access Network (WAN) ports required for VoIP communication
Measures	Since SIP listening ports are well known in the network many security vulnerabilities can be instigated by external attacks to these ports. It is required that the OpenScape Branch SIP listening ports be changed to other non-conflicting ports to lessen the threat vulnerability.
References	OpenScape Branch V11 Installation Guide[1].
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

For example, within the port range 65000 to 65535, the SIP listening ports could be configured to:

- 65060 - UDP
- 65060 - TCP
- 65061 – TLS

When the SIP listening ports are changed to other values, the OpenScape Branch will only accept SIP requests received on the new SIP listening ports on both the outside or access network and the inside

or core network. All SIP servers, OpenScape Session Border Controller, Remote Gateways and OpenScape Voice interfacing with the OpenScape Branch must be reconfigured to use the assigned ports otherwise no SIP communication will be possible.

Additionally, it can generally be noted that according to the SIP protocol, phones send a REGISTER message with 'Contact' information about their own IP address and port number. Network endpoints are typically statically provisioned with the same 'Contact' information.

On the OpenScape Branch inside access or branch (LAN) network, OpenScape Branch sends SIP messages to the IP address / port number provided by the phones during registration or as statically provisioned for Gateways / Trunks. Usually, these ports are 5060 (for UDP or TCP) or 5061 (for TLS over TCP), but can sometimes be configurable like the OpenScape Branch above.

On the OpenScape Branch outside or access (LAN) network, the OpenScape Branch sends SIP messages to the OpenScape Voice or to the OpenScape SBC provisioned IP address / port number, which is usually 5060 (for TCP) or 5061 (for Mutual Authentication TLS).

Refer to Port Table for more information.

5.8 Configure OpenScape Branch Media Stream Security (SRTP)

SIP media sessions (RTP) established through the OpenScape Branch may be encrypted (SRTP). These media sessions establish media streams which traverse the OpenScape Branch which may be passed through virtually untouched. In the case of OpenScape Branch 50i or OpenScape Branch 500i, the integrated Gateway media sessions may be encrypted (SRTP). It is also possible to configure SRTP for FXS Ports in Proxy ATA 24/48.

To establish a secure media session the SIP client, i.e., SIP phone, SIP soft client or SIP server must negotiate the secure media session using a SRTP key negotiation protocol according to:

- MIKEY [RFC 3830]
- SDP Security Descriptions (SDS)[RFC 4568]

If both media endpoints are within the same subnet and use the same media security key negotiation protocols it is possible to optimize the media session to allow direct media flow.

The following media configurations are supported by the OpenScape Branch 50i / 500i. These are based upon configuration and SRTP key negotiation protocol requirements.

Both the SDS and MIKEY#0 key negotiation profiles identified below are best effort allowing the media security using SRTP to be downgraded to insecure RTP if required or SRTP only. The following

media policies including security key management protocol combinations are possible:

- SRTP (SDS)
- SRTP (MIKEY#0)

Additionally to the transmission of media via SRTP, it is also strongly recommended that SIP Signalling is transmitted via TLS as defined in sections Secure SIP Signalling with Gateways / Trunks and Secure SIP Server VoIP Communications. Otherwise the keys are exchanged in clear text messages.

The registration of an IP device with OpenScape Business shall be protected by an individual password. This secures from bringing a new device with a known call number to the network taking the part of the original device.

CL-OSB-Media_Security	Configure OpenScape Branch Media Security for outside or access network (WAN) and inside or branch network (LAN)
Measures	Identify media security as the preferred profile for media endpoints whenever possible. See additional information below for more information.
References	OpenScape Branch V11 Installation Guide[1].
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

OpenScape Branch media policies are configured for each Gateway or SIP Service Provider to support the media policy identified above. The media security applied for a call is determined in real time, based upon the OpenScape Branch provisioned media profile for peer gateway or trunk, how the call was routed between the peers and signalling information supplied by the remote peer identifying its support for the desired media profile.

- The OpenScape Branch Gateway / Trunk shall be configured to support media security, identifying the supported media security key negotiation protocol.
- The OpenScape Branch inside or core network (LAN) should be configured to use SRTP with the media security key management protocol used by media peers in the branch.

If secure media sessions using MIKEY#0 as the media security key negotiation protocol profile must be terminated, the OpenScape Branch

must be configured with a synchronized time base using Network Time Protocol (NTP).

CL-OSB-NTP	Configure OpenScape Branch Secure Network Time Protocol
Measures	Secure media termination using the MIKEY#0 secure media key profile for negotiation requires a synchronized time base using the customer's Network Time Protocol (NTP) server. Configure the address of the NTP server in the OpenScape Branch configuration
References	OpenScape Branch V11 Installation Guide[1]
Needed Access Rights	administrator
Executed	
OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

5.9 Activate Digest Authentication to the SIP Subscribers

By default, Digest Authentication is not activated after installation. Even if Digest Authentication is enabled in the OpenScape Voice it does not mean that a SIP Subscriber will be challenged when the OpenScape Branch is operating in survivable mode. So, Digest Authentication shall be enabled in the OpenScape Branch.

CL-OSB-Digest_Authentication_to_SIP_Subscribers	Activate Digest Authentication to the SIP Subscribers & SIP Endpoints in Survivable Mode
Measures	Enable Digest Authentication Prerequisite – the connection to OSV must be MTLS so that Digest Authentication can be enabled in OpenScape Branch.
References	<ul style="list-style-type: none"> OpenScape Voice Design and Planning Manual: Security Checklist [3] OpenScape Branch V11 Administrator Documentation [2]
Needed Access Rights	administrator

CL-OSB-Digest_Authentication_to_SIP_Subscribers	Activate Digest Authentication to the SIP Subscribers & SIP Endpoints in Survivable Mode
Executed OpenScape Branch:	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

When the feature Digest Authentication is enabled in the OpenScape Branch, the credentials for the subscribers are automatically synchronized with the OpenScape Voice when the SIP Subscriber registers on the OpenScape Voice by using the OpenScape Branch as an outbound proxy.

Due to the synchronization process which only happens when the OpenScape Branch is operating in normal mode, changes to the credentials on the SIP phones and on the OpenScape Voice must be performed very carefully in order to guarantee that the credentials are correctly synchronized to the OpenScape Branch.

5.10 Protect Against SIP Registration DoS Attacks

The OpenScape Branch may be configured to protect itself and OpenScape Voice against a class of SIP registration attacks by detecting abnormal registration sequences. When a SIP interface attempting to gain unauthorized access providing invalid credentials or uses an invalid identity the sender's IP address is blacklisted or quarantined for a finite period.

Two SIP registration DoS attack detection mechanisms are used:

1. SIP users with valid OpenScape Voice identities which are unable to provide valid digest authentication credentials after several successive registration attempts.
2. SIP interfaces attempting to register using unknown to OpenScape Voice user identities.

Each type of violation uses its own quarantine time interval.

CL-OSB-REG-DOS	Protect Against SIP Registration DoS Attacks
Measures	Enable Remote User DoS Mitigation options for: <ul style="list-style-type: none"> • Unauthorized Users • Block Unknown Users Establish minimum quarantine intervals for each type of violation.
References	OpenScape Branch V11 Administrator Documentation
Needed Access Rights	administrator
Executed	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
Customer Comments and Reasons	

Additional Information for Settings:

OpenScape Voice SIP Digest Authentication must be enabled and users configured with proper credentials.

If the OpenScape Branch is operating in Normal mode, the decision of adding the IP address of the offending computer is based on the responses provided by the OpenScape Voice.

If the OpenScape Branch is operating in Survivable mode, the decision is based on the configuration of Digest Authentication in the OpenScape Branch. If Digest Authentication is enabled in the OpenScape Branch, a 403 Prohibited is sent back when the Max Retries in reaction to a challenge (401 Unauthorized) is reached and the IP address of the offending computer is added to the quarantine list. If the Subscriber DN does not exist in the OpenScape Branch, 404 Unknown is responded back and the Source IP is quarantined. If Digest Authentication is disabled in the OpenScape Branch, no control of registration is performed.

Once a violator for the respective detection mechanism is determined, the IP message source IP address is quarantined for the specified time interval. The quarantine time interval may be adjusted. Note that a too small value may prevent a potential attacker from moving on and insufficient DoS protection while a too large value may prevent legitimate SIP users which have been incorrectly configured from being reinstated into service in a timely manner.

6 3rd Party Components

OpenScape Branch is an appliance and does not deliver external third-party components.

7 Administration

The OpenScape Branch is managed by using:

- A local instance of OpenScape Branch Assistant that runs on the same server as the external OpenScape Branch application. The client for the local instance of OpenScape Branch Assistant is a standard web browser. The interface from the client to this OpenScape Branch Assistant is protected by HTTPS.

NOTICE: The local instance of OpenScape Branch Assistant that runs on the OpenScape Branch server is used only to administer the OpenScape Branch server and provides a specialized Graphical User Interface.

- The Common Management Portal by means of the OpenScape Branch Assistant is used to authenticate the user or "assistant" against the OpenScape Branch. The "assistant" password must be synchronized between the OpenScape Branch Assistant and the OpenScape Branch.

The OpenScape Branch can also be configured to authenticate users remotely via a RADIUS server (See section Authentication via RADIUS).

7.1 System Access Protection – Authorization

7.1.1 Change Default Certificates for Web Server (HTTPS)

Provisioning in the OpenScape Branch is performed by means of a web interface. An administrator can access the provisioning interface either directly by means of the Local GUI or by means of the central management CMP. In both cases, https is used to communicate with the Web server in the OpenScape Branch. Some customers may request to change the default certificates which are used by https to a certificate which matches to the company PKI.

CL-OSB-HTTPS-PKI	Replace HTTPS default certificates by PKI
Measures	<p>If PKI is required for the customer also for HTTPS, the HTTPS profile shall be modified.</p> <p>The certificate profile which is configured in System TLS Certificate shall be set with the parameter Minimum TLS version as TLSv1.2.</p> <p>IMPORTANT: By default the certificate profiles are created with a cipher suite priority which gives preference to ephemeral cipher suites in order to provide Perfect Forward Secrecy.</p>
References	OpenScape Branch V11 Administrator Documentation [2]
Needed Access Rights	administrator, root
Executed	
OpenScape SBC:	Yes: No:
Customer Comments and Reasons	

7.1.2 Protect LAN Interface for Administration access

A secure web server (HTTPS) is used in the OpenScape Branch for central management CMP or Local GUI provisioning. The network services SSH and SFTP are also used for the administration of OpenScape Branch. The access to Local GUI, to SSH and to SFTP shall be protected in such a way that only one of a few computers can have access to them.

CL-OSB-PROT-HTTPS-LGUI	Protect the Local GUI, SSH and SFTP, only allow provisioning CMP and predefined IP addresses.
Measures	The CMP provisioning interface IP address and the Local GUI, SSH and SFTP provisioning IP address must be identified and placed in the administrative access control list. The certificate profile which is used for the System HTTPS shall be configured with the Minimum TLS version set to TLS V1.0
References	OpenScape Branch V11 Administrator Documentation [2]
Needed Access Rights	administrator,

CL-OSB-PROT-HTTPS-LGUI	Protect the Local GUI, SSH and SFTP, only allow provisioning CMP and predefined IP addresses.
Executed	Yes: No:
Customer Comments and Reasons	

Additional Information for Settings:

The IP address of the Central CMP and of the computers which shall be granted access to Local GUI, SSH and SFTP must be identified. These IP addresses must be provisioned identifying https access as allowed within the security tab, firewall section, White List for the LAN interface.

The IP addresses shall be added for both HTTPS port (port 443) and SSH/SFTP port (port 22).

In order to add the IP addresses and ports to the LAN Firewall, please follow these steps:

1. Log in to Local GUI or to CMP / OSB Assistant.
2. Go to **Security > Firewall**.
3. Select the LAN Interface and click **Edit**.
4. Add the IP address or subnet / Logical-Endpoint-ID of the administration computer(s) and the CMP server with the ports 443 and 22 to the Whitelist.
5. Select **Block** for HTTPS and SSH network connections.
6. Click **OK** and then click **Apply Changes**.

It is recommended that a secured secondary SSH access be identified in the Whitelist to prevent lockout situations. For example, if by mistake an incorrect IP address is inserted in the administrative access control list or CMP IP address reconfiguration takes place, the OpenScape Branch Web server will be inaccessible. If this should occur, the following steps must be followed.

- Login to OpenScape Branch via an SSH session from the secured server as the service user
- Increase the user privileges to root: su + <password>.
- Type the CLI command "iptables -F" - This command removes all firewall rules until the corrective action can be completed.
- Use the central CMP access or Local GUI to correct the mistake which also reapplies the firewall rules.

NOTICE: These steps cause bypassing the OpenScape Branch firewall rules until the corrective action is completed requiring this maintenance activity to be planned accordingly.

7.2 System Access Protection - Authentication

7.2.1 PAM Framework

The enforcement of the user account and password settings is done using PAM framework configuration files located in the `/etc/pam.d` directory which are password-related—`login`, `passwd`, `sshd`, and `su`. The configuration of these files specifies the default behavior for all applications that manipulate the password.

Module Type	Module Flag	Module Name	Arguments
password	requisite	pam_passwdqc.so	pw_iteration_nr=3 retry=3 match=4 similar=deny passphrase=0 enforce=everyone pw_iteration_length=180 min=disable, disable, disabled,8,8 max=40 random=42
password	requisite	pam_unix2.so	use_authtok nullok

IMPORTANT: The arguments that appear in **bold text** must not be changed.

7.2.2 Editing PAM Configuration Files

Editing of the PAM configuration files is performed from the command line. Standard OS-level commands and custom commands assist in this activity.

For example, to change the number of cycles before a password can be reused (password iterations number) from the default value of 3 to the new value of 4, the system administrator:

1. Log on to OpenScape Branch as administrator or service
2. Increase the user privileges to root : `su + <password>`

3. Edit the password-related file: **/etc/pam.d/common-password-pc**
4. Change "pw_iteration_nr=3" to "pw_iteration_nr=4" as follows:
password requisite pam_passwdqc.so
min=disabled,disabled,disabled,8,8 max=40 passphrase=0
match=4 similar=deny random=42 enforce=everyone retry=3
pw_iteration_nr=4 pw_iteration_length=180.
5. Save the file
6. Log off

NOTICE: For the meaning of the parameters in **/etc/pam.d/common-password-pc** please refer to Password Rules.

8 Infrastructure

8.1 Secure LAN Design

Refer to Chapter Configuring the Internal Firewall (LAN).

8.2 Protection of internal LAN Communications

Refer to Chapter Configuring the Internal Firewall (LAN).

8.3 LAN Interfaces and Ports – Firewall Concept

Interfaces, which are not used, are deactivated by default, and shall not be activated without explicit need. The ports used with OpenScape Branch can be found in the addendum, Chapter Temporarily Blocking Accounts. This information may be used for external firewall configuration e.g., for network separation to increase security.

8.4 Redundancy

In a redundant OpenScape Branch, the PAM configuration file `/etc/pam.d/common-password-pc` as other security relevant configuration are automatically synchronized to the backup node.

8.5 VPN connection (IPSec based)

VPNs (virtual private network) also known as secure tunnel can be realized in different ways. Most used Mechanism to realize a VPN with IPSec.

Many modern Operating systems contain components, with which a VPN can be built. Linux contains an IPSec implementation since Kernel

2.6. Elder kernel versions need the KLIPS-IPSec-Kernel module, by openswan.

VPN offers you:

- Secure connection via an unprotected medium (Internet)
- Protection of confidential data against manipulation
- Secure business processes
- Reliable integration of external partners in the corporate network
- Access to corporate information for field service

Secure tunnels are recommended for networking as well as for remote access. For every VPN remote subscriber, a dedicated authentication shall be selected. This allows easy blocking of a remote access e.g., when an employee leaves the company.

In VPN, the encryption of data occurs via different security mechanisms such as IPSec tunnelling, Security Associations, and authentication methods (peer-to-peer, digital signatures).

IPSec is used to encrypt data and can generally be implemented with and without tunnels. IPSec is an option for implementing VPN. You can encrypt the entire IP packet here with the IP header: this occurs in tunnel mode.

Tunnels must always be configured for both VPN peers.

IPSec supports the automatic key management system, Internet Key Exchange (IKE). This is a standard that is integrated in IPSec.

Default settings:

CL-VPN1	Networking and remote access allowed via VPN only
OSB / external router	
Measures	<p>Recommended operation mode:</p> <ul style="list-style-type: none"> • IKE (Internet-Key-Exchange-Protocol) "Main Mode" with Perfect Forward Secrecy and DH Group 2 / 5 (provides automatic key exchange management) (Default) • Encryption with AES (check setting in the VPN Client) <p>Pre-shared Key (Recommended only for a limited number of devices)</p> <ul style="list-style-type: none"> • Choose key word according to password recommendation (see Chapter GDPR). • A secure transmission and storage of the key word has to be guaranteed. <p>Certificates may be used for increased security requirements or with an existing PKI Infrastructure</p> <ul style="list-style-type: none"> • Recommended operation mode: RSA and hash function with SHA-1. • Configuration is more complex (expert mode). Documentation of certificates and serial numbers and safe storage has to be guaranteed.
References	
Needed Access Rights	administrator
Executed	<p>Yes: _____ No: _____</p>
Customer Comments and Reasons	

9 Addendum

9.1 GDPR

The OpenScape Branch is compliant with GDPR. The OpenScape Branch does not store any personal data, and any personal data transported (names) can be encrypted via TLS. The closest thing we have for personal data is administration passwords, and these are stored encrypted by the Operating System.

9.2 Password Policies

9.3 Password Rules

A password policy is a set of rules designed to enhance computer security by encouraging users to employ strong passwords and use them properly. The product password policies are mandated by technical means. OpenScape OpenScape Branch technically supports the password policies depicted in **Table A: Password rules supported by OpenScape Branch**. There for every password rule a default value and a range of values that can be configured for that rule are given. If the default values don't fit with the customer's password policy, the values the customer wants to be configured shall be depicted in **Table B: Password Policy agreed for customers deployment**.

Password rules are globally enforced using custom PAM module **pam_passwdqc.so** in **/lib/security**.

This module checks password strength for PAM-aware password changing programs, such as **passwd**. In addition to checking regular passwords, it offers support for password history and pass phrases, and can provide randomly generated passwords. All features are optional and can be reconfigured without rebuilding.

It is possible to modify the password rules and aging management either via Command Line Interface.

INFO: Changing these parameters does not affect any new user or current password. Any password syntax rule changes take effect the next time a user's password is changed.

Via CMP Profile

The most significant password policy parameters can be changed by means of an OpenScape Branch profile in CMP namely: Password Aging Max Days, Min Three Class Length, Min Four Class Length, Password Iteration Number and Password Iteration Length. It is possible to apply the profile to a set of selected OpenScape OpenScape Branch boxes via Job Management.

Via Command Line Interface

There are several supported parameters which can be used to modify the behavior of pam_passwdqc. The table below lists and describes each; defaults are in brackets. Some parameters are NOT allowed to be changed (such that security would be lessened) and some parameters have stricter limitations than standard PAM. As the settings are just edited using a standard editor, it will be possible to make some of these settings invalid, so care and proper testing is needed to verify any changes made.

The password policies presented below are the customer PW/PIN rules for the PW Policy on OpenScape Branch level. Please implement them as default values. Filling the below table with customer specific values is only necessary if:

INFO: The customer PW Policy is different from the default values depicted in **Table A: Password rules supported by OpenScape Branch**.

9.3.1 Password rules supported by OpenScape Branch

Table: Table A: Password rules supported by OpenScape Branch

Parameter	Description
min=N0,N1,N2,N3,N4	<p>This parameter sets the minimum allowed password lengths for different kinds of passwords and pass phrases. The keyword disabled can be used to disallow passwords of a given kind regardless of their length. Each subsequent number is required to be no larger than the preceding one.</p> <ul style="list-style-type: none"> • N0 is used for passwords consisting of characters from one character class only. The character classes are digits, lowercase letters, uppercase letters, and other characters. There is also a special class for non-ASCII characters, which cannot be classified, but are assumed non-digits. <ul style="list-style-type: none"> – N0 is not supported • N1 is used for passwords consisting of characters from two-character classes, which do not meet the requirements for a pass phrase. <ul style="list-style-type: none"> – N1 is not supported • N2 is used for pass phrases. A pass phrase must consist of sufficient words (see the pass phrase parameter description below). • N3 is used for passwords consisting of characters from three-character classes. The minimum supported value is 8. • N4 is used for passwords consisting of characters from four character classes. <p>Default: [min=disabled,disabled,disabled,8,8]</p> <p>When calculating the number of character classes, uppercase letters used as the first character and digits used as the last character of a password are not counted.</p> <p>In addition to being long enough, passwords are required to contain:</p> <ul style="list-style-type: none"> • Enough different characters for the character classes • The minimum length they have been checked against
max=N	<p>This parameter sets the maximum allowed password length. This can be used to prevent users from setting passwords which may be too long for some system services. The value 8 is treated specially : if max is set to 8, passwords longer than 8 characters will not be rejected, but will be truncated to 8 characters for the strength checks and the user will be warned.</p> <p>Default: [max=40]</p>

9.3.2 PW Policy agreed for customers deployment

These are the customer PW/PIN rules for the PW Policy on OpenScape Branch level. Please implement them as default values. Filling the below table with customer specific values is only necessary if:

- The customer PW Policy is different from the default values.

	Password	PIN
Minimal length		
Minimal number of upper-case letters		
Minimal number of numerals		
Minimal number of special characters		
Maximal number of repeated characters		
Maximal number of sequential characters		
Change interval		
Maximum number of erroneous login attempts		
Password History		

9.4 Password Aging

Password aging rules are globally enforced by one of the following methods:

- By accepting the defaults for accounts creation in `/etc/login.defs`, which indicate the password aging controls (used by `useradd`) listed in the table below.

INFO: Note that changing these parameters does not affect any existing users. The following commands must be executed to change those users.

Additionally, the following command must be executed to require the user to change the password upon initial login:

`chage -d 0 <username>`

- By using the `passwd` command, as follows:
`passwd -x 90 -n 1 -w 14 -i 30 <username>`

In this command:

- `-x` sets the maximum number of days before the expiration.

- -n sets the minimum number of days before the next change.
- -w sets the number of days of warning days before the expiration.
- -i sets the login grace period after password expired before the account is locked.

NOTICE: The root password does not age.

Parameter	Description
TMOUT=60	Longest duration of an inactive SSH session
MAXSESSIONS=5	Maximum number of parallel SSH sessions.

NOTICE: The root password does not age.

The longest duration of a Local GUI https session can be configured in the screen Maintenance & Diagnostics > Administration (Default value = 1 hour). The longest duration of a CMP session can be configured in Configuration > CMP > System Settings (Default value = 30 minutes).

The number of times a user may try to login with the wrong password before the ssh session is blocked, is configured in the file /etc/ssh/sshd_config:

- MaxAuthTries=3 (by default)

NOTICE: This parameter is only honored with the PuTTY tool version 0.60 or higher. Lower versions of PuTTY do not honor this configuration and closes the session by entering the wrong password only once.

NOTICE: By changing the parameter MaxAuthTries, the ssh application shall be restarted by means of the following command: `systemctl restart sshd.service`

9.5 Temporarily Blocking Accounts

The user accounts can be temporarily blocked in case of a certain number of wrong attempts to enter the password. To define the conditions of temporarily blocking, the following files must be changed by adding the configuration lines in /etc/pam.d/login:

Example:

auth	requisite	pam_nologin.so
auth	requisite	pam_tally2.so onerr=fail deny=3 unlock_time=60
account	required	pam_tally2.so
auth	required	pam_tally2.so onerr=fail deny=3 unlock_time=60
account	required	pam_tally2.so
auth	required	pam_tally2.so onerr=fail deny=3 unlock_time=60
account	required	pam_tally2.so

The parameter "deny" indicates the number of times the wrong password can be entered before the user account is blocked; in the example this is three times. The parameter "unlock time" (in seconds) indicates for how long the user account will be blocked; in the example this is set to 60 seconds.

NOTICE: The account blocking shall be carefully used because it can be used by an attacker for a Denial of Service attack by blocking the users indefinitely. It is recommended to protect the access via SSH and Web by creating a white list of the IP addresses which are allowed to manage the system (see section Activate Digest Authentication to the SIP Subscribers).

9.6 Default Accounts

The following accounts (users) are supported by default:

User	Assistant	Local GUI	ssh/sftp	Groups
guest	No access	Read only	No access	user
assistant	Read and Write	No access	sftp only	assistant, sshlogin
administrator	No access	Read and Write	ssh (Read only)	User, sshlogin
service	No access	Read and Write	ssh/sftp (Read and Write)	www, user, admin, sshlogin, assistant

User	Assistant	Local GUI	ssh/sftp	Groups
root	No access	Read and Write	No access ¹	root
ACD	No access	Read only (Read and Write for ACD parameters)	sftp only	user, sshlogin
cdr	No access	No Access	sftp only	cdr, sshlogin
redundancy	No access	No access	sftp only	user,sshlogin

¹ Root privileges via ssh can be obtained by using sudo

For the accounts below, the Management Interface grants rights to change and reset the password :

Management Interface	User	Rights to Change Password	Rights to Reset Password
CMP (Assistant)	assistant	guest, assistant, administrator, service, ACD, cdr, redundancy	guest, assistant, administrator, service, root, ACD, cdr, redundancy
Local GUI	administrator and service	guest, assistant, administrator, service, ACD, cdr, redundancy	guest, assistant, administrator, service, root, ACD, cdr, redundancy
	service	guest, assistant, administrator, service, ACD, cdr, redundancy	None
	root	guest, assistant, administrator, service, root, ACD, cdr	guest, assistant, administrator, service, root, ACD, cdr, redundancy
	guest and ACD	Own password	None
CLI (ssh)	root (via su command)	guest, assistant, administrator, service, root, ACD, cdr, redundancy	None
	service (via sudo)	guest, assistant, administrator, service, root, ACD, cdr, redundancy	None

9.7 Certificate Handling

The OpenScape Branch provides a set of default TLS CA certificates which can be used to establish TLS connections. It is highly recommended that the customer replace these default factory certificates

with their own CA Certificates from the Public Key Infrastructure (PKI). TLS connections are supported using either server authentication or mutual authentication.

Remote Gateways and Trunks addressing SIP servers, SIP trunking gateways, or SIP service providers using TLS connections may be supported using either server or mutual authentication. The OpenScape Branch typically operates as a TLS server however TLS client operation is also supported.

The OpenScape Branch inside network or branch network interface TLS connection with Gateways typically uses mutual authentication TLS.

The OpenScape Branch outside network or access network interface TLS connection with OpenScape Voice or OpenScape SBC typically uses mutual authentication TLS.

TLS Server Authentication

For a TLS server authenticated connection the following is installed in the OpenScape Branch:

TLS server authentication where the OpenScape Branch is the TLS server:

- Server Certificate
- Server intermediate CA certificates (if any)
- Server public key (in the server certificate file)
- Private key
- Server Root CA Certificate (optional) is used to check the validity of its own Certificate and its Certificate CA chain

TLS authentication where the OpenScape Branch is the TLS client:

- Private key
- Server Root CA Certificate is used to validate the CA chain of the received server certificate

Mutual Authentication

For mutual authentication, the following information is installed in the OpenScape Branch:

- Local Server Certificate
- Server intermediate CA Certificates (if any)
- Server public key (in the server certificate file)
- Private key
- Local Server Root CA Certificate is optional and is used to check the validity of its own Certificate and its Certificate CA chain
- Local Client Certificate
- Client intermediate CA Certificate (if any)
- Client public key (in the client certificate file)
- Local Client Root CA Certificate which is used to verify the validity of its own Certificate in its Certificate CA chain

- Remote Client Root CA which is used to validate the CA chain of the received client certificate
- Remote Server Root CA Certificate which is used to validate the CA chain of the received server certificate

The cipher suites can be configured per certificate profile by means of three parameters:

- Perfect Forward Secrecy with the options Preferred PFS (default) or Without PFS.
- Encryption with the options Preferred AES_-128
- (default), Required AES_-256
- Mode of operation with the options Preferred GCM (default), CBC only, GCM only

The following table presents the sequence of cipher suites according to the configuration:

Preferred Forward Security	Encryption	Mode of Operation	Cipher suites
Preferred PFS	Preferred AES-128	Preferred GCM	ECDHE-ECDSA-AES128-GCM- HA256ECDHE-RSA-AES128-GCM- SHA256ECDHE-ECDSA-AES128- SHA256ECDHE-RSA-AES128- SHA256ECDHE-ECDSA-AES256- GCM-SHA384ECDHE-RSA-AES256- GCM-SHA384ECDHE-ECDSA- AES256-SHA384ECDHE-RSA- AES256-SHA384ECDH-ECDSA- AES128-GCM-SHA256ECDH-RSA- AES128-GCM-SHA256ECDH- ECDSA-AES128-SHA256ECDH-RSA- AES128-SHA256ECDH-ECDSA- AES256-GCM-SHA384ECDH-RSA- AES256-GCM-SHA384ECDH- ECDSA-AES256-SHA384ECDH-RSA- AES256-SHA384AES128-GCM- SHA256AES256-GCM- SHA384AES128-SHAAES256-SHA
Preferred PFS	Preferred AES-128	CBC Only	ECDHE-ECDSA-AES128- SHA256ECDHE-RSA-AES128- SHA256ECDHE-ECDSA-AES256- SHA384ECDHE-RSA-AES256- SHA384ECDH-ECDSA-AES128- SHA256ECDH-RSA-AES128- SHA256ECDH-ECDSA-AES256- SHA384ECDH-RSA-AES256- SHA384AES128-SHAAES256-SHA
Preferred PFS	Preferred AES-128	GCM Only	ECDHE-ECDSA-AES128-GCM- SHA256ECDHE-RSA-AES128-GCM- SHA256ECDHE-ECDSA-AES256- GCM-SHA384ECDHE-RSA-AES256- GCM-SHA384ECDH-ECDSA- AES128-GCM-SHA256ECDH-RSA- AES128-GCM-SHA256ECDH- ECDSA-AES256-GCM- SHA384ECDH-RSA-AES256-GCM- SHA384AES128-GCM- SHA256AES256-GCM-SHA384
Preferred PFS	Required AES-256	Preferred GCM	ECDHE-ECDSA-AES256-GCM- SHA384ECDHE-RSA-AES256-GCM- SHA384ECDHE-ECDSA-AES256- SHA384ECDHE-RSA-AES256- SHA384ECDH-ECDSA-AES256- GCM-SHA384ECDH-RSA-AES256- GCM-SHA384ECDH-ECDSA- AES256-SHA384ECDH-RSA- AES256-SHA384AES256-GCM- SHA384AES256-SHA

Preferred Forward Security	Encryption	Mode of Operation	Cipher suites
Preferred PFS	Required AES-256	CBC Only	ECDHE-ECDSA-AES256-SHA384ECDHE-RSA-AES256-SHA384ECDH-ECDSA-AES256-SHA384ECDH-RSA-AES256-SHA384AES256-SHA
Preferred PFS	Required AES-256	GCM Only	ECDHE-ECDSA-AES256-GCM-SHA384ECDHE-RSA-AES256-GCM-SHA384ECDH-ECDSA-AES256-GCM-SHA384ECDH-RSA-AES256-GCM-SHA384AES256-GCM-SHA384
Without PFS	Preferred AES-128	Preferred GCM	ECDH-ECDSA-AES128-GCM-SHA256ECDH-RSA-AES128-GCM-SHA256ECDH-ECDSA-AES128-SHA256ECDH-RSA-AES128-SHA256ECDH-ECDSA-AES256-GCM-SHA384ECDH-RSA-AES256-GCM-SHA384ECDH-ECDSA-AES256-SHA384ECDH-RSA-AES256-SHA384AES128-GCM-SHA256AES256-GCM-SHA384AES128-SHA
Without PFS	Preferred AES-128	CBC Only	ECDH-ECDSA-AES128-SHA256ECDH-RSA-AES128-SHA256ECDH-ECDSA-AES256-SHA384ECDH-RSA-AES256-SHA384AES128-SHA
Without PFS	Required AES-128	GCM Only	ECDH-ECDSA-AES128-GCM-SHA256ECDH-RSA-AES128-GCM-SHA256ECDH-ECDSA-AES256-GCM-SHA384ECDH-RSA-AES256-GCM-SHA384AES128-GCM-SHA256AES256-GCM-SHA384
Without PFS	Required AES-256	Preferred GCM	ECDH-ECDSA-AES256-GCM-SHA384ECDH-RSA-AES256-GCM-SHA384ECDH-ECDSA-AES256-SHA384ECDH-RSA-AES256-SHA384AES256-GCM-SHA384AES256-SHA
Without PFS	Required AES-256	CBC Only	ECDH-ECDSA-AES256-SHA384: ECDH-RSA-AES256-SHA384: AES256-SHA
Without PFS	Required AES-256	GCM Only	ECDH-ECDSA-AES256-GCM-SHA384ECDH-RSA-AES256-GCM-SHA384AES256-GCM-SHA384

The certificates can be signed with SHA-1 (SHA-128) and SHA-2 (SHA-256, SHA-384 and SHA-512).

The Minimum TLS Version can be set to TLS V1.0, TLS V1.1 and TLS V1.2. If Minimum TLS Version is set to TLS V1.0, the TLS V1.2 is offered but fallback to TLS V1.0 is accepted. For security reasons SSLv2 and SSLv3 are not supported anymore.

The OpenScape Branch also allows the customization of HTTPS certificates. A certificate profile can be created for HTTPS which will contain the following information:

- Local Server Certificate
- Server intermediate CA certificates (if any)
- Local key

The certificate profile for HTTPS shall be selected at **Security > Certificate Management > System Certificate**.

It is possible to set the Minimum TLS Version.

The cipher suites can also be configured for the HTTPS certificate profiles by means of the parameters Perfect Forward Secrecy, Encryption and Mode of Operation.

It is also possible to use certificates for establishing the VPN connection. In this case a certificate profile shall be created for VPN. The following information is then required:

- Local Server Certificate
- Server intermediate CA certificates (if any)
- Local key

By configuring the tunnel connection the correct certificate profile shall be selected.

The uploaded and created certificates and keys are automatically propagated to the pair node, in case of redundant OpenScape Branches.

The maximum number of certificate profiles is defined as follows:

- OSB50, OSB50i, OSB250 – Max Certificate Profiles shall be 5.
- OSB500i, IBM 3250, IBM 3550, Fujitsu RX200, Fujitsu R300 – Max Certificate Profiles shall be 15.

The validation of certificates can be configured per certificate profile by means of the following parameters:

- Certificate validation - Enables the validation of the CA chain and CA signature, Validity Period and Critical Extensions
- Revocation status - Enables the verification of revoked certificates according to the CRL of the CA
- Subject authentication - Enables the validation of certificate Subject CN or Subject Alternative Name according to the configured gateway/trunk FQDN or IP Address.

INFO: It is possible to upload up to 5 certificate files to a set of selected branches via a CMP Profile.

The procedure to configure and activate Certificates in the OpenScape Branch is described in [2] OpenScape Branch V11 Administrator Documentation (e-Doku or Customer Portal / product information).

9.7.1 Credentials used for OpenScape Branch

Since the default certificates do not meet even the minimum security requirements, it is necessary to change them into customer specific certificates immediately after installation process.

IMPORTANT:

Be aware that most successful attacks to Mitel systems are caused by unchanged default values.

Interface	Custom-ers requirement for Open-Scape Branch creden-tials	Expira-tion Date for Custom-erDeaf-ult creden-tials	Usage	
SIP Server (OSV)		default certifi-cate	TLS mutual authenti-cation requires at a min-imum both local cli-ent and server Certifi-cates be installed as well as the Root CA Certifi-cate for the Open-Scape Voice server	
SIP sub-scriber		default certifi-cate	TLS server authenti-cation is typically sup-ported requir-ing that at a min-imum the cus-tomer CA Certifi-cate must be installed	

Interface	Custom-ers require-ment for Open-Scape Branch creden-tials	Expira-tion Date for Custom-erDeaf-ult creden-tials	Usage	
SIP Ser-vice Pro-vider & Gateway (TLS mutual authenti-cation)		default certi-ficate	If TLS server authenti-cation is used, the Open-Scape Branch operat-ing as the TLS client requires the Root CA certifi-cate and interme-diate Root CA(s) for each SIP SP remote end-point be installed	

Interface	Custom-ers requirement for Open-Scape Branch creden-tials	Expira-tion Date for Custom-erDeaf-ult creden-tials	Usage	
SIP Ser-vice Pro-vider & Gateway (TLS mutual authenti-cation)		default certi-ficate	If TLS mutual authenti-cation is used, the Open-Scape Branch requires installa-tion of both a cus-tomer local cli-ent and server CA certif-icate (unless both are the same) as well as the Root CA certif-icate and interme-diate Root CA(s) for each SIP SP remote endpoint	

Interface	Custom-ers require-ment for Open-Scape Branch creden-tials	Expira-tion Date for Custom-erDeaf-ult creden-tials	Usage	
CMP & Local GUI Manage-ment		default certi-ficate	The cus-tomer CA Certifi-cate must be installed in place of the default.	

9.8 Port Table

For latest updates of the OpenScope Branch port tables refer to the Interface Management Database (IFMDB) directly:

https://apps.g-dms.com/ifm/php/php_ifmdb/scripts/login.php or via Customer Portal.

To get all necessary Security Checklist Port Table information you should select the appropriate data category according to the stakeholder and then navigate to the report generation section. Perform the following actions to create a customized report:

1. Choose "Firewall Scenario Report"
2. Select **Generic Scenarios**:
 - a) Choose "select all" to include all generic solutions which are to be considered in the report followed by the right-most arrow to continue.
 - b) Or, select the appropriate "OSV Solution Vx" which the OpenScope Branch is a member to get a more "solution specific" report, followed by the right-most arrow to continue
 - c) Or, select a predefined report selection followed by the right-most arrow to continue, proceeding to step 6). For OpenScope Branch the following reports are predefined: "SCL_OSB_Proxy_V11", "SCL_OSB_BranchSBC_V11" and "SCL_OSB_SBCProxy_V11". One can use one of the predefined reports as a template or starting point and modify Entities, SW-Versions, and Interfaces as desired for building the customized report.
3. Select **Entities**:

- a) Choose "Select all released" to consider all possible released entities for the report however this will include entities which have no communication possibilities with the OpenScape Branch.
 - b) Or, select only those entities which are present in the network or have OpenScape SBC communication possibilities of interest and are to be considered in the report.
For internal testing, "select all" is possible however unreleased Entities would also be shown for the next selection.
4. Select **SW-Version**:
- a) Choose "Select latest Release" for the most recent software versions to be considered.
 - b) For internal testing, "select latest" is possible however unreleased SW versions would also be shown for the next selection. This can be narrowed to a more manageable number by choosing the other options, "select latest", "select all Released", "select latest Released".
5. Select **Interfaces**:
- Here product specific information must be selected by the user.
- a) With "select all" many undefined or unused interfaces will be included in the report.
 - b) A better choice would be to select individual interfaces of interest. The user may elect to store this report in the IFMDB which can be retrieved at a later time under "select generic scenarios in the Field below the menu.
 - To store a report, enter a Filename into the textfield below the Select Interfaces menu .e.g. "SCL_OSB_Proxy_V11".
 - Steps 1 through 5 are stored as a reference or starting point for generating future reports.
6. Select left & right side of **Firewall**:
- a) Put OpenScape Branch V11 on one Side of the firewall.
 - b) All other SW Versions including the OpenScape Branch V11 (as a peer) shall be put on the other side.
7. Select information to be shown in the report:
Suggest keeping it as is for Port Table view.
8. Available report styles:
The recommended report style for Security checklists is AF005P.
The description is Firewall Scenario port table.

	Destination/ Source Port#	Network/ Applica- tion Proto- col	Default State	con- figur- able	From	To	Description/Function
1	P: 0,0	UDP/IPSEC	Open	No	OSB IPSec VPN	VPN Concen- trator	VPN tunnel endpoint based on IPSec (IPv4) - IPSecEncapsulating Security Payload
2	D: 443	HTTPS/TCP- SSL/TLS	Open	No	Central CMP or Local GUI Web Browser	OSB Web Server	https based CMP management or Web session
3	P: 500,500	ISAKMP/UDP	Open	No	OSB IPSec VPN	VPN Concen- trator	VPN tunnel endpoint based on IPSec (IPv4) - IPSecInternet Key Exchange
4	S: 514, D: 500- 600	Syslog/UDP	Open	No	OSB	Syslog Server	Syslog Server in OSV-TM
5	P: 4500	NAT-T/UDP	Open	No	OSB	Remote Endpoint	VPN tunnel endpoint based on IPSec (IPv4) – NAT traversal
6	P: 5060	SIP/UDP	Open	Yes	OSB/LAN Network Interface	LAN Net- work Inter- face/ OSB	SIP Signaling / UDP from/to LAN Interface
7	P: 5060	SIP/UDP	Open	Yes	OSB/ WAN Network Interface	WAN Network Inter- face/ OSB	SIP Signaling / UDP from/to LAN Interface
8	P: 5060	SIP/TCP	Open	Yes	OSB/LAN Network Interface	LAN Net- work Inter- face/ OSB	SIP Signaling / TCP from/to LAN Interface
9	P: 5060	SIP/TCP	Open	Yes	OSB/ WAN Network Interface	WAN Network Inter- face/ OSB	SIP Signaling / TCP from/to LAN Interface
10	P: 5060	SIP/TCP-TLS	Open	Yes	OSB/LAN Network Interface	LAN Net- work Inter- face/ OSB	SIP Signaling / TCP from/to LAN Interface

	Destination/ Source Port#	Network/ Application Proto- col	Default State	con- figur- able	From	To	Description/Function
11	P: 5060	SIP/TCP-TLS	Open	Yes	OSB/ WAN Network Interface	WAN Network Inter- face/ OSB	SIP Signaling / TCP from/to LAN Interface
12	S: 35000 - 65000, D: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 20000 - 20499 55000 - 65000	(S) RTP - (S) RTCP / UDP	Closed	Dynami c	OSB LAN (iGW with SRTP/ G.729)an d WAN (Branch SBC and SBC Proxy)	OSB LAN or WAN (S)RTP - (S)RTCP Media End- point, OSB peer, OS-SBC	OSB Source port determined dynami- cally during SIP signaling
13	D: 35000 - 65000, S: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 20000 - 20499 55000 - 65000	(S) RTP - (S) RTCP / UDP	Closed	Dynami c	LAN or WAN (S)RTP - (S)RTCP Media End- point, OSB peer, OS- SBC	OSB LAN (iGW with SRTP/ G.729)a nd WAN (Branch SBC and SBC Proxy)	OSB Destination port determined dynamically during SIP signaling
14	D : 7444	HTTPS /TCP - SSL / TLS	Closed	Yes	WebRTC	OSB UC embed- ded Web Client	UC WebRTC client access in surviv- able mode

	Destination/ Source Port#	Network/ Applica- tion Proto- col	Default State	con- figur- able	From	To	Description/Function
15	S: 10000 - 19999, D: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 20000 - 20499 55000 - 65000	(S)RTP – (S) RTCP / UDP	Closed	Dynami c	OSB LAN (iGW without SRTP/ G.729)	OSB LAN (S)RTP – (S)RTCP Media End- point, OSB peer, OS-SBC	OSB Source port determined dynami- cally during SIP signaling
16	D: 10000 - 19999, S: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 20000 - 20499 55000 - 65000	(S)RTP – (S) RTCP / UDP	Closed	Dynami c	LAN (S)RTP – (S)RTCP Media End- point, OSB peer, OS- SBC	OSB LAN (iGW without SRTP/ G.729)	OSB Destination port determined dynamically during SIP signaling

	Destination/ Source Port#	Network/ Application Proto- col	Default State	con- figur- able	From	To	Description/Function
17	S: 20000 - 20499, D: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 55000 - 65000	(S) RTP – (S) RTCP / UDP	Closed	Dynami c	OSB LAN (inte- grated Media Server)	OSB LAN (S)RTP – (S)RTCP Media End- point, OSB peer, OS-SBC	OSB Source port determined dynami- cally during SIP signaling
18	D: 20000 - 20499, S: 10000 - 49999 29100 - 30099 32768 - 43647 35000 - 65000 5004 - 5059 10000 - 19999 55000 - 65000	(S) RTP – (S) RTCP / UDP	Closed	Dynami c	LAN (S)RTP – (S)RTCP Media End- point, OSB peer, OS- SBC	OSB LAN (inte- grated Media Server)	OSB Destination port determined dynamically during SIP signaling
19	D: 123	SNTP / UDP	Open	No	SNTP Cli- ent	OSB SNTP	SNTP time query
20	D: 22	(S)FTP or SSH/ UDP	Open	Yes	OSB/ OSVTM, CLI, Mass Provi- sioning, Traffic Tool, Bill- ing Tool	OSB	Secure File Transfer client access / CLI SSH Billing
21	D: 22	(S)FTP	Open	Yes	OSB	Billing Tool	Billing

	Destination/ Source Port#	Network/ Applica- tion Proto- col	Default State	con- figur- able	From	To	Description/Function
22	S: 162 D: 162	SNMP / UDP	Open	Yes	OSB SNMP Agent	CMP, Net- work Manage- ment, Alarming	Network Alarming
23	P: 1075, 1075	OSB Redun- dancy /UDP	Open	No	OSB	OSB	Internal OSB redundancy
24	D: 22	SSH/UDP	Open	No	OSB/CLI, Mass Provi- sioning	OSB	CLI SSH & service access
25	D: 68	DHCP/UDP	Closed	No	OSB	DHCP Server	DHCP Server only for simplified installation
26	D: 2427	SSH/UDP	Open	Yes	OSV	OSB	MGCP Server on OSB
27	S: 1024 - 65535	DNS/TCP or UDP	Closed	No	OSB	DNS	DNS Client
28	D: 53	DNS/TCP or UDP	Closed	No	SIP Sub- scriber or Endpoint	OSB DNS Server	DNS Server
29	S: 1024 - 65535	RADIUS/ TCP	Closed	No	OSB	RADIUS Server	RADIUS authentication / accounting
30	D: 443	SOAP / HTTP / TCP-TLS	Open	Yes	CMP, Web Cli- ent	OSB	SOAP via HTTPS with WSDL tun- nelled. Also for Local GUI WBM
31	S: 10000 - 14999	SOAP/HTTP/ TCP-TLS	Open	Yes	OSB	CMP,Web Client	SOAP via HTTPS to access Assistant for Simplified Installation and License Management - Secure Web client for Assistant access - the server uses lis- tening port 4709
32	P: 10000 - 14999	BFCP/ UDP,TCPor TCP-TLS	Closed	Yes	Remote BFCP Endpoint	OSB / Remote BFCP Endpoint	BFCP ports determined dynamically during SIP signaling
33	D: 80HTTP	Open		No	Central CMP or LocalGui Web browser	OSB Web Server	Forwarded to port 443 for HTTPS- based CMP management or Web ses- sion

10 Glossary

The following table lists the acronyms commonly used in this document.

Table: Table of acronyms

Acronym	Expanded form
AP	Access Point
BIOS	Basic Input/Output System
BRI	ISDN Basic Rate Interface
CIS	Center of Internet Security
CLA	Customer License Agent (location of license File on customer Side)
CLC	Customer License Client (located at Product on Customer Side)
CLM	Customer License Management (located at User on Customer Side)
CLS	Customer License Server (located on Unify Side)
CSCm	Customer Site Components Modular (located at User on customer Side)
CMP	Common Management Portal
CSTA	Computer Supported Telecommunications Applications
DECT	Digital Enhanced Cordless Telecommunications
DISA	Defense Information Systems Agency
FM	Fault Management
HFA	HiPath Feature Access
HLP	Client component of License Management (CLC component)
HMP	CLM and CSCm components for License Management
HTTP	Hypertext Transfer Protocol
HTTPS	Secure Hypertext Transfer Protocol
IFMDB	Interface Management Data Base
IP	Internet Protocol
IPsec	Secure Internet Protocol
ISDN	Integrated Services Digital Network

Acronym	Expanded form
LAN	Local Area Network
LDAP	Lightweight directory access protocol
MS	Microsoft
NAT	Network Address Translation
OS	Operating System
PSTN	Public Switch Telephony Network
PW	Password
QM	Quality Management
RSP	Remote Service Platform
SCL	Security Checklist
SEBA	Unify Partner Portal
SIP	Session Initiation Protocol
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SQL	Structured Query Language
SSDP	Smart Service Delivery Platform
SSH	Secure Shell
SSO	Single Sign On
SW	Software
TAPI	Telephony Application
TDM	Time Division Multiplex
TLS	Transport Layer security
UM	User Management
URL	Uniform Resource Locator
VM	Virtual Machine
VPN	Virtual Private Network
WL	Wireless Phone by Unify
WLAN	Wireless LAN

11 References

[1] **OpenScape SBC Administrator Documentation and Server Guidelines**

available via e-Doku or Partner Portal (SEBA)/ product information

[2] **Unify Security Advisories and Product Security Policies**

Unify Security Advisories

[3] **Interface Management Database (IFMDB)**

available via SEBA Partner Portal

[4] **Center of Internet Security – Security Benchmarks**

Center of Internet Security