

Meeting Insights On-Prem

Installation Manual

Version 2.5



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Notice

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Security Vulnerabilities

All security vulnerabilities should be reported to vulnerability@audiocodes.com.

WEEE EU Directive

Pursuant to the WEEE EU Directive, electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

Customer Support

Customer technical support and services are provided by AudioCodes or by an authorized AudioCodes Service Partner. For more information on how to buy technical support for AudioCodes products and for contact information, please visit our website at <https://www.audiocodes.com/services-support/maintenance-and-support>.

Stay in the Loop with AudioCodes



Related Documentation

Document Name
Meeting Insights On-Prem Release Notes
Meeting Insights On-Prem Administrator' and User's Manual
Meeting Insights On-Prem Brochure

Document Revision Record

LTRT	Description
26051	Initial document release for Version 2.5.

Documentation Feedback

AudioCodes continually strives to produce high quality documentation. If you have any comments (suggestions or errors) regarding this document, please fill out the Documentation Feedback form on our website at <https://online.audiocodes.com/documentation-feedback>.

1 Pre-Installation / Upgrade Requirements Guideline

1.1 Introduction

Meeting Insights On-Prem (MIA-OP) Version 2.5 supports both First-time Installation and Upgrade from Version 2.4.3.

This section outlines the steps that must be taken by the Customer before beginning the installation or upgrade of Meeting Insights On-Prem at a customer site. These steps should be executed following the commercial engagement required to obtain the download link and license key. The instructions and requirements detailed in this document must be completed to ensure a smooth and successful installation at the customer's site.

1.2 Deployment Models

Meeting Insights On-Prem version 2.5 supports two different STT engines:

- AudioCodes' STT Engine which specializes in Hebrew and English (only).
- Multi-Languages STT supports 50+ languages.

This section summarizes the installation and deployment models which differ in the following parameters:

- The chosen STT engine
- The maximum concurrent sessions (CCS) that the customer wants to achieve.
- AI (LLM) support (enabled/disabled)
- Telephony Support (enabled/disabled)

The user/customer must decide the required deployment model because it affects the best hardware requirements and software modules for reaching the optimal conditions and best results.

The following table summarizes the supported deployment options:

Table 1: Deployment Models

Deployment Model	STT Type	Languages	Maximum Concurrent Sessions	AI (LLM) Option	Telephony Option
1.A	AudioCodes (GPU is not required)	Hebrew/English only	4	Optional (GPU is required)	Optional
1.B			16		
1.C			30		
2.A	Multi-Languages STT (ML-STT) (GPU is required)	50+ Languages	16	Optional (additional GPU is required)	Optional
2.B			30		
2.C			50		

1.3 Telephony Sessions Support

All MIA-OP deployment models are supporting Telephony support option.

The telephony sessions support allows MIA-OP to record and transcribe telephony sessions (including meetings) like any other Voice session including AI summary option.

For Telephony support, two modules should be installed:

- **AudioCodes Mediant SBC (Session Border Controller) Version 7.40VA.500.222:** This entity is purchased separately from AudioCodes and allows routing and processing of SIP phone calls received from Phones, IP Phones, Mobile users, etc. The SBC should be installed on its own dedicated VM ("Mediant VE") or purchased as an appliance.
- **VAIC (Voice-AI Connect) Version 3.24.468:** This module connects between the SBC and MIA-OP. The VAIC software module is installed on the MIA-OP VM. During installation of MIA-OP VM, the user is asked whether to install the VAIC module or not.

1.4 Upgrade Process

Users who have already installed Meeting Insights On-Prem version 2.4.3 can use the Upgrade procedure to upgrade to Version 2.5 and **preserve existing configuration and data**.

The upgrade procedure supports upgrading to any of the deployment models described in Section 'Deployment Models'.

To upgrade, follow this order:

1. Make a VM backup of your current MIA-OP VM deployment in case the upgrade fails.
2. Section 'Pre-Installation / Upgrade Requirements Guideline' (this section): Make sure you have all hardware, software and licensing ready.
3. Section 'Meeting Insights On-Prem Upgrade Process': Upgrade MIA-OP - follow the upgrade process for the main MIA-OP VM.
4. Section '



At the end of the installation process, you **must** set the environment variables by running:
`source ~/.bashrc`

5. Installing Multi-Language STT (ML-STT)': If deployments 2.A, 2.B or 2.C were chosen, install ML-STT with version 2.5 in one of the following options:
 - **On dedicated VM** (same as was supported in version 2.4.3).
 - **On MIA-OP VM:** This deployment option is new to version 2.5. If you previously had a dedicated VM for ML-STT, then it is no longer required.
6. Section 'Installing LLM (AI Summaries)': If LLM (AI summaries) is required, install LLM with version 2.5 in one of the following options:
 - **On dedicated VM** (same as was supported in version 2.4.3).
 - **On MIA-OP VM:** This deployment option is new to version 2.5. If you previously had a dedicated VM for LLM, then it is no longer required.
7. Sections 'Initial Configuration' and 'Basic Functionality Tests': Initial configuration, checking basic functionality is working and license update.

1.5 First-Time Installation Process



- Customers who choose to make First-Time Installation will **not** preserve any previous data.
- The install procedure supports installation of any of the deployment models described in Section 'Deployment Models'.

For the installation process, follow this order:

1. Section 'Pre-Installation / Upgrade Requirements Guideline' (this section): Make sure you have all hardware and software and licensing ready.
2. Section 'Meeting Insights On-Prem Installation': Installation procedure of MIA-OP VM.



For MIA-OP v2.5, it is also possible to install ML-STT (deployments 2.A, 2.B or 2.C) and/or the LLM on the same VM.

3. Section 'Installing LLM (AI Summaries)': Install LLM (only if AI summary capabilities should be deployed).
4. Sections 'Initial Configuration' and 'Basic Functionality Tests': Initial configuration, checking basic functionality is working and license update.

1.6 Downloading the Required Software

The Meeting Insights On-Prem software must be downloaded from [here](#). This link includes several folders:

Table 2: Folders Containing Linux Installation Components

#	Folder Name	Contains
1	Documentation	Installation and User Manuals
2	miaop	Meeting Insights On-Prem installation package, including: <ul style="list-style-type: none"> ■ Main MIA-OP application packages ■ VAIC (optional) ■ Hebrew/English STT (optional)
3	Llm	LLM package (optional)
4	ml_stt	Multi-Language STT package
5	Gemalto	Gemalto License Server
6	SBC	SBC installation files

1.7 Hardware and Hosts Requirements

The Meeting Insights On-Prem solution has multiple deployment models (see Section 'Deployment Models'), which affect the number of virtual machines (VM's) required.

The Customer should choose the requested deployment model (maximum concurrent sessions and number of VMs) and must prepare the environment in accordance with the specifications described below.

The optional VM's deployments when using AudioCodes' STT (1.A, 1.B and 1.C) are described in the following table.

Table 3: Hardware Specification for AudioCodes STT

VM's Deployment	VM	CCS	vCPU	RAM [GB]	Storage [GB]	GPU Required
Option A: 1-3 VMs	VM-1: MIA-OP + AudioCodes' STT	4 (1.A)	10	24	130	No
		16 (1.B)	24	64	520	No
		30 (1.C)	38	120	1000	No
	VM-2: LLM (AI Summary) Optional	Up to 30	2	2	150	x 1
	VM-3: SBC VM. Optional	Unlimited	2	4	20	No
Option B: 1-2 VMs (supported in MIA-OP v2.5)	VM-1: MIA-OP + AudioCodes' STT + LLM (AI Summary)	4 (1.A)	12	28	260	x 1
		16 (1.B)	26	68	650	x 1
		30 (1.C)	40	124	1150	x 1
	VM-2: SBC VM. Optional	Unlimited	2	4	20	No

The optional VM's deployments for ML-STT (deployments 2.A, 2.B and 2.C) are described in the following table.

Table 4: Hardware Specification for ML-STT

VM's Deployment	VM	CCS	vCPU	RAM [GB]	Storage [GB]	GPU Required
Option C: 2-4 VM's	VM-1: MIA-OP only (ML-STT on separated VM)	16 (2.A)	8	8	520	No
		30 (2.B)	8	12	1000	No
		50 (2.C)	8	12	1700	No
	VM-2: ML-STT (Multi-Languages)	16 (2.A)	20	34	150	x 1
		30 (2.B)	34	55	150	
		50 (2.C)	54	85	150	
	VM-3: LLM (AI Summary). Optional	Up to 50	2	4	150	x 1
	VM-4: SBC VM. Optional	Unlimited	2	4	20	No

VM's Deployment	VM	CCS	vCPU	RAM [GB]	Storage [GB]	GPU Required
Option D: 1-3 VMs <i>(supported in MIA-OP v2.5)</i>	VM-1: MIA-OP + ML-STT	16 (2.A)	28	42	670	x 1
		30 (2.B)	42	66	1150	
		50 (2.C)	62	96	1850	
	VM-2: LLM (AI Summary). Optional	Up to 50	2	4	150	x 1
	VM-3: SBC VM. Optional.	Unlimited	2	4	20	No
Option E: 2-3 VMs <i>(supported in MIA-OP v2.5)</i>	VM-1: MIA-OP + LLM	16 (2.A)	10	12	670	x 1
		30 (2.B)	10	16	1150	
		50 (2.C)	10	16	1850	
	VM-2: ML-STT (Multi-Languages)	16 (2.A)	20	34	150	x 1
		30 (2.B)	34	55	150	
		50 (2.C)	54	85	150	
	VM-3: SBC VM. Optional.	Unlimited	2	4	20	No
Option F: 1-2 VMs <i>(supported in MIA-OP v2.5)</i>	VM-1: MIA-OP + ML-STT + LLM	16 (2.A)	30	46	800	x 2 (one for LLM and one for ML-STT)
		30 (2.B)	44	70	1300	
		50 (2.C)	64	100	2000	
	VM-2: SBC VM Optional	Unlimited	2	4	20	No



- Supported Operating Systems (for all VMs):
 - Linux Rocky 9 / RHEL 9
 - Ubuntu 24.04
 For other OS, please contact AudioCodes contact manager.
- CPU type (for all VMs):
 - x64 Instruction Set Architecture (ISA), AVX2 support, Min. at least 4GHz Turbo Speed.
- GPU cards supported for ML-STT VM:
 - RTX 6000 PRO
 - RTX 6000
 - L40S
- GPU card supported for LLM VM:
 - RTX 6000 PRO



Ensure machine time is synchronized across all machines and containers.

1.8 Getting Licenses

The system uses two different licenses:

Table 5: Used Licenses

	License type	Description	Procedure for Getting a License
1	Meeting Insights On-Prem license	The license specifies: <ul style="list-style-type: none"> ■ Number of transcription hours ■ Expiration date. 	See Section 'Meeting Insights On-Prem License Server' for details: Stage 1: Go to the following directory: <code>~/miaop_setup/prerequisite_scripts</code> Stage 2: Run the <code>get_computer_uuid.sh</code> script Stage 3: Send the generated <code>uuid.txt</code> file to your AudioCodes contact manager.
2	Gemalto License	Optimizing the system according to the required Concurrent Session.	See Section 'Gemalto License Server' for details: Stage 1: Install the Gemalto License server. Stage 2: From within the application, generate and send the xxx.C2V file to AudioCodes. and specify which deployment model was chosen (see Section 'Deployment Models').

1.8.1 Meeting Insights On-Prem License

Meeting Insights On-Prem License should be requested according to steps described in Section 'Meeting Insights On-Prem License Server'.

The installation of the MIA-OP license is described in Section 'Installing License File Via Browser'.



When upgrading MIA-OP Version 2.4.3 to Version 2.5, a new license is required only if the user would like to change at least one of the following licensing capabilities:

- Expiration date
- Number of transcription hours

1.8.2 Gemalto License

- For first time installation, the Gemalto server should be installed on the same VM targeted for MIA-OP VM. As described in Section 'Gemalto License Server'. **Ask for a new Gemalto license before installation.**
- For Upgrading procedure, the existing Gemalto server can be reused. If your system uses AI or if the deployment model or the maximum concurrent sessions were changed, **ask for a new Gemalto license before the upgrade.**



When a new Gemalto License is requested for installation or upgrading processes, the user should also specify the following information for the proper operation of the application:

- Will AI be deployed or not?
- The requested deployment model (as described in Section 'Deployment Models').
- The required maximum Concurrent Sessions (CCS).
- The machine fingerprint (see Section 'Getting Machine Fingerprint').

1.8.3 POC Terms and Conditions

The POC License is supported with the following terms:

- **Meeting Insights On-Prem License:**
 - **Expiration Date:** 45 days
 - **Max hours of audio:** 1,000
- **Gemalto License:**
 - **Max concurrent sessions:** 4 (online + offline)



When making upgrade of POC, new POC licenses should be requested for optimal operation.

2 Meeting Insights On-Prem Upgrade Process

2.1 Upgrade Limitations and Notes

Note the following restrictions and limitations of the upgrade procedure:

- **If you are using AI:**
 - Templates that were previously created might no longer be valid due to changes and enhancements in AI summaries. As a result, the System / Tenant admins must create new templates after upgrading to 2.5 using the newly supported AI summaries.
 - You should ask for a new Gemalto license with AI enabled.
- **Upgrade is supported only from release 2.4.3.** Users who are using earlier versions should first upgrade to version 2.4.3 by following the upgrade procedure described in MIA-OP Installation Manual version 2.4.3.
- The upgrade procedure allows switching from AudioCodes' Hebrew/English STT (speech-to-Text) engine to an industrial STT engine which supports multiple languages (ML-STT). Note that the transition to the new STT requires adding an additional GPU card as described in Section 'Pre-Installation / Upgrade Requirements Guideline'.
- The upgrade procedure supports upgrading LLM or Telephony features, only if these features existed in version 2.4.3. In case that LLM or Telephony are requested but didn't exist in 2.4.3, you need to consult AudioCodes for adding these features.
- The upgrade procedure supports installing ML-STT and/or LLM on the same VM as the MIA-OP application, instead of running these functionalities on dedicated VM/s. If a dedicated VM for ML-STT or LLM already exists, the user can choose to move any of them to the MIA-OP VM (instead of the previous VM/s).



The following sections should be performed one after another, in the same order as they appear.

2.2 Prepare Licenses

Before starting the upgrade process, make sure you have the required MIA-OP License and Gemalto License, as described in Sections 'Meeting Insights On-Prem License' and 'Gemalto License'.

Make sure the license request meets the requested deployment model, as described in Section 'Hardware and Hosts Requirements'.

2.3 Increase Storage Capacity

If storage capacity of the current VM needs to be increased (according to the hardware requirements in Section 'Hardware and Hosts Requirements', repeat the following steps to increase the storage size of each VM as required:

1. Backup the VM before increasing its size.
2. Shut down the VM.
3. Open your VM settings in your Hypervisor.
4. Locate the **Hard Disk** settings and find the **Resize** or **Expand** button.
5. Increase capacity according to the requirements in Section 'Hardware and Hosts Requirements'.

6. Apply changes and start the VM.

7. For VM with Ubuntu:

a. Install the following packages:

```
sudo apt update
sudo apt install cloud-guest-utils fdisk lvm2 -y
```

b. Identify your Partition Layout, run the **lsblk** command:

```
lsblk
```

c. Look at the mount point for the folder you want to increase (or /myStorage if it is on a separate disk). For MIA-OP VM, the folder is defined in the environment parameter MIAOP_DISK.

In the following example, /acdisk resides on device sdc1:

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINTS
sda	8:0	0	512G	0	disk	
└─sda1	8:1	0	99M	0	part	/boot/efi
└─sda2	8:2	0	1000M	0	part	/boot
└─sda3	8:3	0	4M	0	part	
└─sda4	8:4	0	1M	0	part	
└─sda5	8:5	0	510.9G	0	part	
└─rocky-root	253:0		0 510.9G	0	lvm	/
sdb	8:16	0	64G	0	disk	
└─sdb1	8:17	0	64G	0	part	/mnt
sdc	8:32	0	500G	0	disk	
└─sdc1	8:33	0	500G	0	part	/acdisk

d. If TYPE of **/acdisk** is 'lvm':

i. Grow your partition. For example, run the following if your disk is **sdc** and the LVM partition is **1**:

```
sudo growpart /dev/sdc 1
```

ii. Resize the Physical Volume:

```
sudo pvresize /dev/sdc1
```

iii. Extend the Logical Volume & Filesystem. Assume you would like to add 500G to your storage on that partition:

```
sudo lvextend -L +500G -r /dev/mapper/ubuntu--vg-ubuntu--lv
```

Note: The LV Path /dev/mapper/ubuntu... can be found using **sudo lvsdisplay**.

e. If TYPE is 'part':

i. Grow your partition. Assume your disk is **sdc** and the LVM partition is **1**:

```
sudo growpart /dev/sdc 1
```

ii. Resize the Filesystem:

```
sudo resize2fs /dev/sdc1
```

8. For VM with Rocky Linux:

a. Install the following packages:

```
sudo dnf install cloud-utils-growpart lvm2 -y
```

b. Identify your Partition Layout by running the following command:

```
lsblk
```

- c. Look at the mount point for the folder you want to increase / (or /myStorage if it's on a separate disk). In the following example, **/acdisk** folder resides on device sdc1:

```
NAME      MAJ:MIN RM  SIZE RO  TYPE MOUNTPOINTS
sda       8:0      0 512G 0    disk
├--sda1   8:1      0  99M 0    part  /boot/efi
├--sda2   8:2      0 1000M 0   part  /boot
├--sda3   8:3      0   4M 0    part
├--sda4   8:4      0   1M 0    part
└--sda5   8:5      0 510.9G 0   part
    └--rocky-root 253:0      0 510.9G 0    lvm    /
sdb       8:16     0  64G 0    disk
└--sdb1   8:17     0  64G 0    part  /mnt
sdc       8:32     0 500G 0    disk
└--sdc1   8:33     0 500G 0    part  /acdisk
```

- d. If TYPE of **/acdisk** is 'lvm':

- i. Resize the Physical Volume:

```
sudo pvresize /dev/sda3
```

- ii. Extend the Logical Volume. For example, for adding 500G use:

```
sudo lvextend -L +500G -r /dev/mapper/rl-root
```

Note: The LV Path "/dev/mapper/rl-root" can be found using **sudo lvsdisplay**.

- e. If TYPE is 'part' (i.e., XFS filesystem)

- i. Grow the partition:

```
sudo growpart /dev/sdc 1
```

- ii. Expand the XFS Filesystem:

```
sudo xfs_growfs /acdisk
```

9. Verify that the extra space was added to the requested folder:

```
df -h /acdisk
```

2.4 Installing ML-STT Version 2.5

If ML-STT deployment was chosen for Version 2.5 (deployment models 2.A, 2.B or 2.C in Section 'Deployment Models'), you need to install ML-STT according to Section '



At the end of the installation process, you **must** set the environment variables by running:
source ~/.bashrc

Installing Multi-Language STT (ML-STT) '.

In case that previous ML-STT was already deployed on 2.4.3, it is required to uninstall it and re-install the ML-STT of version 2.5.

2.5 Upgrading LLM VM to Version 2.5

If LLM VM was already deployed on Version 2.4.3, you need to uninstall LLM and re-install LLM of Version 2.5 instead. For LLM installation, see Section 'Installing LLM (AI Summaries) '.

2.6 Upgrading Existing MIA-OP VM

2.6.1 Upgrade MIA-OP VM Prerequisites

**Important!**

Create a backup of the existing MIA-OP VM's, using VM snapshot or other any other method, before starting the upgrade process.

This step is essential to protect your data in case the upgrade procedure fails.

Prepare for the upgrade procedure:

1. Choose the target deployment model you want to reach and make sure you have prepared the required hardware (number of vCPUs, memory size, and storage size) for the chosen deployment model according to Section 'Hardware and Hosts Requirements'.
2. If the number of vCPUs or memory size (RAM) needs to be changed, shut down the MIA-OP VM, make the changes in the VM settings, and then start the VM.
1. If storage size needs to be increased, follow the instructions in Section 'Increase Storage Capacity'.
2. Check if new licenses are required (see Section 'Getting Licenses') and get a license from AudioCodes accordingly.
3. Log in as a MIA-OP admin user and navigate to the **miaop_setup** folder:

```
cd ~  
cd miaop_setup
```

4. Delete the content of all files in the miaop_setup folder and download the installation files for MIA-OP 2.5 to this folder.
5. Extract the tar file in the **miaop_setup** directory:

```
tar -xvzf MiaOP_2.5.tar.gz
```

The following files are extracted:

- containers_app_dd.mm.yy.tar.gz
- containers_rcgn_dd.mm.yy.tar.gz
- prerequisite_scripts.tar.gz
- setup_miaop_all_dd.mm.yy.tar.gz
- setup_vaic_dd.mm.yy.tar.gz

2.6.2 Extracting the tar.gz Installation Files

You need to extract the following installation files with the tar command:

```
tar -xvzf containers_app*.tar.gz  
tar -xvzf containers_rcgn*.tar.gz  
tar -xvzf setup_miaop_all_*.tar.gz
```

2.6.3 Running the Upgrade Script on MIA-OP VM

Upgrade MIA-OP from Version 2.4.3:

1. Navigate to the directory with the installation files:

```
cd ~  
cd setup_miaop_all/install
```

2. Run the install script:

```
./install.sh
```

3. When prompted, choose **MIAOP upgrading**.
4. Follow the prompts of the upgrade script and answer according to the required deployment.

2.7 Update the Gemalto License

Follow the procedure in 'Uploading Generated License Key and Validating Uploaded License Key' to update the Gemalto license received from AudioCodes.

3 Meeting Insights On-Prem Installation

3.1 Introduction

This section describes the fresh installation procedure for the Meeting Insights On-Prem solution in a Docker environment.

The installation is performed using a command-line script that deploys the entire solution on a Linux machine running either **Rocky Linux** or **Ubuntu** distributions.

Once installation is complete, refer to the *User Manual* for configuring users and tenants.

3.2 Environment Pre-installation Requirements

The following table describes the software required for installing MIA-OP VM:

Table 6: Pre-installation Requirements

#	Requirements	To be prepared	Notes
1	Docker and docker compose	Docker CE (community edition) <ul style="list-style-type: none"> ■ Docker version must be 27.5.0 and above ■ Docker compose version must be 2.32.3 and above Packages required: <ul style="list-style-type: none"> ■ docker-ce ■ docker-ce-cli ■ containerd.io Docker utility permissions must be available to the Linux user.	For Ubuntu see: https://docs.docker.com/engine/install/ubuntu/ For Rocky see: https://docs.docker.com/engine/install/rhel/
2	Third-party packages required for flawless installation of the environment	Packages required: <ul style="list-style-type: none"> ■ openssl (latest) ■ vim ■ nano ■ telnet ■ mc ■ unzip ■ coreutils sed ■ curl ■ mawk (Ubuntu) / gawk (Rocky) ■ dnsutils (Ubuntu) / bind-utils (Rocky) ■ dmidecode 	Use for the installation: <ul style="list-style-type: none"> ■ sudo dnf install <package name> for Rocky ■ sudo apt install <package name> for Ubuntu
3	Windows workstation (used for AudioCodes Professional Services personnel and is not a part of the deployment)	Software <ul style="list-style-type: none"> ■ Chrome version 108 and above ■ Wireshark ■ Putty ■ Notepad++ ■ 7zip / Winzip ■ WinSCP Hardware <ul style="list-style-type: none"> ■ Microphone ■ Speakers 	The Customer should provide a workspace with a Windows workstation for the AudioCodes installation team to use during deployment and for handling support issues.

#	Requirements	To be prepared	Notes
4	FQDN Certificates	<ol style="list-style-type: none"> 1. Prepare a valid FQDN for the servers and obtain official certificates (tls.crt, tls.key) from a well-known certificate authority. 2. Generate an authority-signed certificate based on the machine's FQDN. 3. Ensure that all browsers used to connect to Meeting Insights On-Prem have this certificate installed in their trust store. 4. Certificate format: Pem Certificate + private key 	<p>Certificate Requirements:</p> <ul style="list-style-type: none"> ■ Format: PEM certificate + private key ■ The FQDN in the certificate must use lowercase characters only ■ The installation package includes a self-signed certificate by default ■ If company policy prohibits the use of self-signed certificates, the Customer must prepare an FQDN and provide an official certificate from a recognized authority ■ A wildcard certificate may be used as an alternative to multiple individual certificates <p>Note: It is essential to ensure that the server FQDNs are resolvable by DNS before beginning the installation process.</p>
5	Disable SELinux	SELinux must be disabled on the provided Linux machines	<p>Check SELinux on Ubuntu:</p> <ul style="list-style-type: none"> ■ sudo apt install policycoreutils ■ sestatus <p>Check SELinux on Rocky Linux:</p> <ul style="list-style-type: none"> ■ sudo dnf install policycoreutils selinux-policy-targeted libselinux-utils ■ sestatus

3.3 Firewall / Port Access Requirements

The solution requires dedicated ports to access Meeting Insights On-Prem via the Web/Telephony. The following ports must be configured on the customer premises to allow access to Meeting Insights On-Prem:

Table 7: Firewall requirements

Required Port (src - dest)	Notes
443 (any- Meeting Insights On-Prem)	internal and external
8443 (any – Meeting Insights On-Prem)	internal and external
1947 (any – Meeting Insights On-Prem)	internal and external (Gemalto license)
9443 (any – Meeting Insights On-Prem)	internal and external
25/2525 (Meeting Insights On-Prem– mail server)	Port used by Meeting Insights On-Prem

3.4 Installing Gemalto Server

To install the Gemalto License Server on MIA-OP VM, see Section 'Gemalto License Server'.



If you already have Gemalto License Server installed on different VM, you can reuse that Gemalto Server, but need to update the IP address of that server in the environment parameters as described in Section 'Initial Configuration'.

3.4.1 Requesting Gemalto License

Before starting the installation process, make sure you have requested a Gemalto license from AudioCodes as described in Section 'Requesting License'.



When upgrading MIA-OP Version 2.4.3 to Version 2.5, a new license is required only if the user would like to change at least one of the following licensing capabilities:

- Expiration date
- Number of transcription hours

Gemalto License'.

Make sure the license request will fit the requested deployment model, as described in Section 'Hardware and Hosts Requirements'.

3.4.2 Uploading Gemalto License

To update the Gemalto license received from AudioCodes, see Section 'Uploading Generated License Key and Validating Uploaded License Key'.

3.5 MIAOP App Software Preparation for Installation

On the installation Linux machine, perform the following steps:

1. Log in as a MIA-OP admin user who belongs to the **sudoers** group. If required, you can add your username to the sudoers group this way:

```
sudo usermod -aG sudo <username> (for Ubuntu)
```

```
sudo usermod -aG wheel <username> (for Rocky)
```

2. After successfully downloading and validating the Meeting Insights On-Prem installation package file (MiaOP_2.5.tar.gz), create the **/miaop_setup** directory (if it does not already exist) in the /home/<user>/ path, then copy the file into that directory.
3. Extract the installation file in the /miaop_setup directory:

```
tar -xvzf MiaOP_2.5.tar.gz
```

This extracts the following files:

- containers_app_dd.mm.yy.tar.gz
- containers_rcgn_dd.mm.yy.tar.gz
- prerequisite_scripts.tar.gz
- setup_miaop_all_dd.mm.yy.tar.gz
- setup_rcgn_dd.mm.yy.tar.gz

4. Navigate to the /miaop_setup directory:

```
cd ~  
cd miaop_setup
```

5. Validate the checksum of the files with the below command:

```
sha256sum -c sha256sum.txt
```

6. Extract the prerequisite tar.gz file.

```
tar -xvzf prerequisite_scripts.tar.gz
```

7. Add the MIA-OP admin user to the docker group:

```
sudo usermod -aG docker <username>
```

8. Navigate to the directory prerequisite_scripts folder:

```
cd prerequisite_scripts
```

9. Run the script **check_all.sh**.

```
./check_all.sh
```

10. Review the script output on screen for any error messages marked in red or yellow, and correct the issues as needed.

Note: GPU is not required for deployments 1.A, 1.B and 1.C without LLM (Option A in **Table 3a**).

11. If the check is completed without errors, proceed with the installation.
12. If issues remain, consult with AudioCodes support using the generated log file **script.log**.

3.6 Extracting the tar.gz Installation Files

You need to extract the following installation files with the tar command:

- tar -xvzf containers_app*.tar.gz
- tar -xvzf containers_rcgn*.tar.gz
- tar -xvzf setup_miaop_all_*.tar.gz

If Telephony support is required, the VAIC containers, extract the VAIC containers file by running:

```
tar -xvzf setup_vaic*.tar.gz
```

3.7 Running the Installation Script

To run the installation script, go to the installation folder and run it:

```
cd setup_miaop_all/install/  
./install.sh
```

When prompted, provide the following inputs:

1. Which STT type do you want to install?
 - Hebrew/English STT (AudioCodes STT)
 - Multi-Languages STT (ML-STT)
2. Do you want to install VoiceAI Connect on this computer? [y/n]
Note: VoiceAI Connect (VAIC) is essential for transcription of telephony sessions.
3. Please enter MIAOP_HOME directory: /ac
 - Default: /ac
 - Press **Enter** to accept the default.
4. Please enter MIAOP_DISK directory: /acdisk
 - Default: /acdisk
 - The MIAOP_DISK is where all database and voice files will be stored for the long term. You must ensure that this folder resides in a partition which has enough free storage so it can increase in size dramatically.
 - Press **Enter** to accept the default.
5. Certificate setup options:
The script pauses to let you choose between two setup paths:
 - a. **Pause installation** – Recommended if using a private or well-known authority certificate.
 - b. **Continue without pause** – For self-signed certificate usage.
If you have certificates from a well-known or private Certificate Authority, copy them to /ac/certs with the following filenames:
 - ◆ Private key: tls.key
 - ◆ Certificate: tls.crt
 - ◆ If using a private CA, also include:
 - Root CA: rootCA.crt
 - Intermediate CA: intrCA.crt
6. Certificate Handling:
If installation was **paused** for certificate setup, copy the required certificates to **/ac/certs** as described in Step 4.

3.8 Running the Setup Script

1. Run the setup script by running:

```
source ~/.bashrc
cd /ac/install/
./setup.sh
```

2. Continue for the next prompts.

You are prompted to enter the maximum Concurrent Sessions (CCS) and approve your hardware resources accordingly. The CCS is referring to the sum of concurrent offline tasks and online tasks, online tasks also including telephony sessions and meetings. **Note that if you approve continuing installation although your hardware resources are below the recommended size, then the performance might be reduced and as result the requested CCS will not be achieved within a reasonable duration.**

3. You are prompted to enter max number of off-line concurrent sessions. This figure is an upper limit for the concurrent off-line tasks and also allows a place holder reservation for online tasks according to the total CCS minus the offline CCS. Some examples:
 - If all tasks are expected to be offline, the set Offline CCS = CCS.
 - If all tasks are expected to be online, the set Offline CCS = 0.
4. You are prompted to enter the **Fully Qualified Domain Name (FQDN)** of this machine:
 - Must be valid and resolvable by the customer's DNS to the IP address of the installation machine.
 - Example: miaop.example.com
5. Select the type of certificate used, providing 3 options:
 - 1 – Certificate issued by well-known certificate authority
 - 2 – Certificate issued by private certificate authority
 - 3 – Self-signed certificate

Enter 1 or 2 or 3 based on the type of certificate you prepared in Section 'Running the Installation Script'.

6. System admin user:
 - Provide the master admin user name to the system (default provided "adm").
 - Example: Administrator
7. System admin password:
 - Provide the master admin password to the system (default provided an auto generated password).
 - Example: xCf56G6
8. Enter the SMTP server address:
 - Provide the SMTP server address provided by customer.
 - Example: SMTP.mail.com



If not provided, there will be no mail support, and the following three SMTP related prompts are not shown.

9. Enter the SMTP server user:
 - Provide the SMTP server user credentials provided by customer.
10. Enter the SMTP server password:
 - Provide the SMTP server password credentials provided by customer.

11. Enter the email address of the sender:

- Provide the SMTP server user email address used for sending emails.
- This value must be supplied by the customer.

The installation process takes approximately 10 minutes. Upon completion, a confirmation message is displayed.

If any errors occur during installation, a log file named `installation.log` is generated. This file can be used to identify the source of the issue.



At the end of the installation process, you **must** set the environment variables by running:
`source ~/.bashrc`

4 Installing Multi-Language STT (ML-STT)

The installation of ML-STT is required for the following deployment models (as described in Section 'Deployment Models'):

- 2.A
- 2.B
- 2.C

ML-STT can be installed on the MIA-OP VM or dedicated VM.

4.1 Prerequisites for ML-STT VM on Dedicated VM

Installing ML-STT on a dedicated VM, as described in Table 4 (**Option C** or **Option E**), includes the following ML-STT VM deployment models:

Table 8: Deployment Models for ML-STT on Dedicated VM

VM Deployment	ML-STT Deployment	Maximum CCS	Number of vCPUs	VM Memory size (GB)	Storage size (GB)
Option C <i>or</i> Option E	2.A	16	20	34	150
	2.B	30	34	55	150
	2.C	50	54	85	150

- CPU Architecture: x86_64, preferably Xeon-SP with turbo speed of 4GHz or more
- GPU attached to the VM using **PCI Passthrough**: RTX 6000 / L40S / RTX 6000 PRO
- OS supported (guest VM):
 - Ubuntu (version 24.04)
 - Rocky Linux (version 9.6)

4.2 Installing ML-STT on MIA-OP VM

For installation of ML-STT on MIA-OP VM, make sure that the MIA-OP VM has enough resources (vCPUs, memory, storage and GPU) as described in Table 4 (**Option D or Option F**) and summarize in the following table:

Table 9: Deployment Models for ML-STT on MIA-OP VM

VM Deployment	ML-STT Deployment	Maximum CCS	Number of vCPUs	VM Memory size (GB)	Storage size (GB)
Option D (ML-STT on MIA-OP VM)	2.A	16	28	42	670
	2.B	30	42	63	1150
	2.C	50	62	93	1850
Option F (ML-STT & LLM on MIA-OP VM)	2.A	16	30	46	800
	2.B	30	44	67	1300
	2.C	50	64	97	2000

If **upgrading** an existing MIA-OP VM:

- Increase the VM resources (vCPUs, memory, storage) as described in Section 'Meeting Insights On-Prem Upgrade Process' according to the requested option (**Option D or Option F**).
- Add GPU cards attached to the MIA-OP VM using PCI Passthrough:
 - **Option D:** Add one GPU.
 - **Option F:** Add two GPUs.
 (GPU supported: RTX 6000 PRO)

4.3 Security Rules and Network Ports

For proper operation of MIA-OP application, the following ports and directions should be opened in the organization's firewall:

Table 10: Firewall requirements

Required Port(src -> dest)	Notes
443 (any -> Mia-OP)	Internal and external
8443 (any -> Meeting Insights On-Prem)	Internal and external
1947 (any -> Meeting Insights On-Prem)	Internal and external (Gemalto license)

4.4 Installation of GPU and Docker Support for ML-STT

To add GPU and Docker support to the target VM, see 'Installing Support Environment for LLM / ML-STT VM'.

4.5 ML-STT Installation

Install ML-STT (Multi-Languages STT):

1. Log in as a MIA-OP admin user who belongs to the sudoers group. If required, you can add your username to the sudoers group:

```
sudo usermod -aG sudo <username> (for Ubuntu)
```

```
sudo usermod -aG wheel <username> (for Rocky)
```

2. Add the MIA-OP admin user to the docker group:

```
newgrp docker
```

```
sudo usermod -aG docker <username>
```

3. Create a folder for the installation and navigate to the folder:

```
cd ~
```

```
cd ml_stt_setup
```

4. Copy the ML-STT installation files to the installation folder:

- containers_ml_stt_dd.mm.yy.tar.gz
- setup_ml_stt_dd.mm.yy.tar.gz

5. Extract the two tar.gz installation files:

```
tar -xvzf containers_ml_stt*.tar.gz
```

```
tar -xvzf setup_ml_stt*.tar.gz
```

6. Navigate to the installation folder and run the installation script:

```
cd setup_ml_stt/install/
```

```
./install_ml_stt.sh
```

7. When prompted, enter the following:

- a. MIAOP_HOME directory: /ac

Default: /ac

Pressing **Enter** accepts the default.

Enter the URL of Keycloak (same URL as MIA-OP VM). For example, <https://miaop-dns.example.com:8443>.

- b. Enter the Gemalto License server IP address.

- c. Run the **setup_ml_stt.sh** script:

```
source ~/.bashrc
```

```
./setup_ml_stt.sh
```

- d. Enter the URL of Keycloak.

5 Installing LLM (AI Summaries)

LLM installation is optional and applicable to all deployment models, as described in Section 'Deployment Models'.

The LLM package can be installed on the MIA-OP VM or dedicated VM.

5.1 Prerequisites for LLM on Dedicated VM

For LLM installation on a dedicated VM as described in Table 3 (**Option A**) and Table 4 (**Option C** or **Option D**), the hardware requirements for LLM VM are:

VM's Deployment	Maximum CCS	vCPUs	Memory	Storage
Options A, C, or D	30	2	2GB	150GB

- CPU Architecture: x86_64, preferably Xeon-SP with turbo speed of 4GHz or more.
- GPU attached to the VM using **PCI Passthrough**: RTX 6000 PRO (for other GPU types, please consult with your AudioCodes sales representative).
- Supported OS (on guest VM):
 - Ubuntu (version 24.04)
 - Rocky Linux (version 9.6)

5.2 Installing LLM on MIA-OP VM

For installation of the LLM package on MIA-OP VM, make sure that the MIA-OP VM has enough resources (vCPUs, memory, storage and GPU) as described in Table 3 (**Option B**) or Table 4 (**Option E** or **Option F**) and summarized in the following table:

Table 11: LLM on MIA-OP VM deployment models

VM Deployment	ML-STT Deployment	Maximum CCS	Number of vCPUs	VM Memory size (GB)	Storage size (GB)
Option E (LLM on MIA-OP VM)	2.A	16	10	12	670
	2.B	30	10	12	1150
	2.C	50	10	12	1850
Option F (ML-STT & LLM on MIA-OP VM)	2.A	16	30	46	800
	2.B	30	44	67	1300
	2.C	50	64	97	2000

In case of making an **upgrade** of existing MIA-OP VM:

- Increase the VM resources (vCPUs, memory, storage) as described in Section 'Meeting Insights On-Prem Upgrade Process' according to the requested option (**Option E or Option F**).
- Add GPU card/s attached to the MIA-OP VM using PCI Passthrough (**Option E** – add one GPU *or* **Option F** – add two GPUs). GPU supported: RTX 6000 PRO

5.3 Security Rules and Network Ports

For proper operation of the MIA-OP application, the following ports and directions should be opened in the organization's firewall:

Table 12: Firewall Requirements

Required Port (src -> dest)	Notes
443 (any -> Mia-OP)	Internal and external
8443 (any -> Meeting Insights On-Prem)	Internal and external
1947 (any -> Meeting Insights On-Prem)	Internal and external (Gemalto license)

5.4 Installation of GPU and Docker Support for LLM VM

To add GPU and Docker support, see Section 'Installing Support Environment for LLM / ML-STT VM'.

5.5 LLM (AI) Installation

To install LLM (AI summary feature) on a dedicated machine:

1. Create a folder for installation and navigate to the folder:

```
cd ~
cd miaop_setup
```

2. Copy the LLM installation files to the installation folder:

- containers_ai_dd.mm.yy.tar.gz
- setup_ai_dd.mm.yy.tar.gz

3. Extract the two tar.gz installation files:

```
tar -xvzf containers_ai*.tar.gz
tar -xvzf setup_ai*.tar.gz
```

4. Navigate to the installation folder and run the installation script:

```
cd setup_ai/install/
./install.sh
```

5. When prompted, enter the following:

- a. MIAOP_HOME directory: /ac

Default: /ac

Pressing **Enter** accepts the default.

- b. Allow the installer to set up the LLM containers and validate the required AI support drivers.

If drivers are missing, follow the AI installation guide to install them before proceeding.

- c. Enter the **LLM API key**, ensuring it matches the key provided during the Meeting Insights On-Prem installation on the other machine.
6. Enter the **number of GPU layers** based on available GPU memory:

Available VRAM	N_GPU_LAYERS
Up to 4 GB	5
Up to 16 GB	45
24 GB or more	63

7. At the end of the installation, set the environment variables:

```
source ~/.bashrc
```

6 Initial Configuration

This chapter explains the initial configuration required after installation.

6.1 Configuring Web Pages Access (Optional)

The Meeting Insights On-Prem system can be accessed through a web interface that allows users to log in to different tenants via the main page URL:

```
https://<main-url>/offline_client/
```

1. Hide the tenant list:

If the Customer prefers not to display the tenant list, edit the `.env` file and set the following parameter:

```
EXPOSE_TENANTS_LIST=false
```

2. Access tenants when list is hidden:

If `EXPOSE_TENANTS_LIST` is set to **false**, the tenant list is not shown on the main page. To access a tenant, enter the tenant name manually in the text field on the login page using a direct URL:

```
https://<main-url>/offline_client?tenant=<tenant-name>
```

3. Access the master tenant:

```
https://<main-url>/offline_client?tenantat=master
```



Changes in the `.env` file require restarting the Meeting Insights On-Prem system.

6.2 Restarting Meeting Insights On-Prem

To restart the system, follow these steps:

1. Navigate to the `/ac` directory:

```
cd /ac
```

2. Stop and restart the Docker containers:

```
./stop.sh  
./start.sh
```

6.3 Exchanging Additional Configuration Needed

If the Customer uses **Microsoft Exchange** as the mail server for sending emails from the Meeting Insights On-Prem system, the following configuration steps are required:

1. Open the Exchange ECP (Exchange Control Panel).
2. Navigate to the appropriate section for receive connectors or mail flow settings (depending on Exchange version).
3. Add the IP address of the Meeting Insights On-Prem application as an authorized receiving client.

6.4 Installing License File Via Browser

To install a license file through the web interface:

1. Log in to the **Master Tenant** using an administrator account.
2. Click your **email address** located in the top-left corner of the interface.
3. Select **System Settings** from the dropdown menu.
4. In the system settings menu, click **License Management**.
5. Click **Select New License** and upload the provided license file.
6. Review the license details and click **Confirm** to complete the installation.

The screenshot shows the user interface for license management. On the left, a user profile for 'adm adm' is visible with a dropdown menu containing 'Local Users List', 'License Management', and 'Manage Customers (Tenants)'. The main area is titled 'License Management' and features a 'Select New License File' button. Below this, the 'Current License' details are shown: Product Key: D88E24383FF02DM5, Status: Active, Expiration Date: 2026-12-31, Days Until Expiration: 312, and Transcription Hours: 0%. A progress bar indicates 'Total Hours: 10,000 Availability: 9,979'. There is also a 'Support AI' toggle switch. At the bottom, there are 'Confirm' and 'Cancel' buttons.

6.5 Adding Users to a Tenant

At least one user must be added to an existing tenant to enable testing or working with Meeting Insights On-Prem. To add users to Realm (using Offline Client):

1. Log in to the **Master Tenant** with an administrator account.
2. Click your **email address** in the top-left corner of the interface.
3. Select **System Settings** from the dropdown menu.
4. In the system settings menu, click **Local Users List**.
5. Click **Create New User**.
6. Complete all required fields and click **Confirm** to add the user to the realm.

The screenshot shows the 'Add User' form in the Meeting Insights On-Prem interface. The form is titled 'Add User' and contains several input fields: Username *, User Email *, Password *, Confirm Password *, Name *, Last Name *, Office Phone Number, Mobile Phone Number, Home Phone Number, and Comments. There is also a dropdown menu for Permission Level * with a current selection of Permission Level. The form has 'Confirm' and 'Cancel' buttons at the bottom right. On the left, a user profile card is visible for 'adm adm' with email 'adm@dot.com'. A dropdown menu is open from the profile card, showing options: System Settings, Local Users List, License Management, and Manage Customers (Tenants). A 'Sign out' link is also visible below the menu.



Adding users to the realm can also be performed by a **Tenant Administrator**, not only by the **Master Tenant Administrator**.

7 Basic Functionality Tests

7.1 Checking Offline Client

1. Log In
Log in to the relevant tenant as an **operator** or **administrator**.
2. Create an Offline Task
 - a. Click Create an Offline Task.
 - b. Upload an MP3 file and fill in all required details.
 - c. Click **Create** to submit the task.
3. Monitor Task Progress
Wait a few seconds for the task to appear with the status **Transcription in Progress** in the **Status** column.
4. Review Transcription
 - a. In the same row as the task, click **To File List** in the **left column**.
 - b. When the file status changes to **Transcription**, click **To Improve Transcription** and check the following:
 - ◆ **STT** – Recognized text is available.
 - ◆ **SRD** – Text is correctly split by speakers.
 - ◆ **NLP** – Text includes punctuation (e.g., **periods, commas**).
5. Verify Completion. Return to the **File List** page and ensure the status is **Ready**.

7.2 Checking Recording Client

1. Log in.
Log in to the relevant tenant as an **operator** or **administrator**.
2. Create an online task.
 - a. Click Create an Online Task.
 - b. Fill in all required details, then click **Continue**.
3. Start and stop recording.
 - a. Click **Start Recording**, then speak into the microphone.
 - b. Click on the **bell icon** and verify that the message "**Connecting to STT server successfully**" appears.
 - c. Click Stop Recording.
4. Verify transcription. Switch to the **Offline Client** and repeat step 3 to check the transcription status.

7.3 Checking Dictation Client



The dictation client is disabled when choosing to work in Deployment models B.1 or B.2.

1. Log in.
Log in to the relevant tenant as an **operator** or **administrator**.
2. Create a dictation task.
 - a. Click Dictation.
 - b. Enter a Dictation Name.
3. Start and stop dictation.
 - a. Click **Start Dictation**, then speak into the microphone.
 - b. Verify that the alert "Connecting to STT server successfully" appears.
 - c. Click Stop Dictation.
 - d. Click **Send**.
4. Verify transcription. Switch to the **Offline Client** and repeat steps 3 to check the transcription status.

<input type="checkbox"/>	Task Name [i]	Task Type [i]	File Count [i]	Date Created [i]	Task Manager & Editors [i]	Status [i]	Last Update ↓	View Files
<input type="checkbox"/>	test	Offline Meeting	1	23.02.2026 15:00	adm@dot.com	Ready for Review	23.02.2026 15:01	

<input type="checkbox"/>	File Name [i]	Transcriber Email [i]	File Format [i]	File Size [i]	Status [i]	Last Status Update ↓	Open Proofing Tool [i]
<input type="checkbox"/>	2min1.mp3	<input type="button" value="Select Transcriber"/>	mp3	3004 kb	Ready for Review	23.02.2026 15:01	

8 Maintenance

8.1 Changing Deployment Model

After the installation is complete, it is possible to increase the deployment model to increase the maximum concurrent sessions (CCS):

- Increase deployment model 1.A to 1.B or 1.C (i.e., from 4CCS to 16CCS or 30CCS)
- Increase deployment model 2.A to 2.B or 2.C (i.e., from 16CCS to 30CCS or 50CCS)

8.1.1 Increasing Deployment Model from 1.A

The following sections describe the steps for increasing the deployment model from 1.A to 1.B or 1.C.

To choose your target deployment model:

Choose your target deployment model (1.B or 1.C) according to Section 'Hardware and Hosts Requirements'.

Make sure you have the available vCPUs, memory and storage resources according to Table 3.

Requesting a new Gemalto License:

Due to increasing the CCS, a new Gemalto license should be prepared. When asking AudioCodes for a new Gemalto license, please specify:

1. The newly requested deployment model: 1.B or 1.C.
2. Will AI be used: yes / no.
3. Machine Fingerprint – as described in Section '41Getting Machine Fingerprint'.

Increasing the MIA-OP VM Size:

Increasing the MIA-OP VM size requires shutting down the MIA-OP service and should be done during a maintenance window, as follows:

1. Backup your MIA-OP VM.
2. Navigate to MIAOP_HOME, for example:

```
cd /ac
```
3. Stop the MIA-OP service:

```
./stop.sh
```
4. Follow Section 'Upgrading Existing MIA-OP VM'.
5. Increase Storage CapacityUploading Generated License Key and Validating Uploaded License KeyReset the MIA-OP VM.
6. Verify that basic functionality is working properly (see Section 'Basic Functionality Tests').

8.1.2 Increasing Deployment Model from 2.A

The following sections describe the steps for increasing deployment model from 2.A to 2.B or 2.C.

To choose your target deployment model:

1. Choose your target deployment model (1.B or 1.C) according to Section 'Hardware and Hosts Requirements'.
2. Make sure you have the required vCPUs, memory and storage resources, according to Table 4.

Requesting a new Gemalto License:

Due to increasing the CCS, a new Gemalto license should be prepared. When asking AudioCodes for a new Gemalto license, please specify:

1. The newly requested deployment model: 2.B or 2.C.
2. If AI is used: yes / no.
3. Machine Fingerprint, as described in Section 'Getting Machine Fingerprint'.

Increasing the MIA-OP VM Size:

Increasing the MIA-OP VM size requires shutting down the MIA-OP service. This should be done during the maintenance window.

1. Back up your MIA-OP VM.
2. Navigate to MIAOP_HOME, for example:

```
cd /ac
```

3. Stop the MIA-OP service:

```
./stop.sh
```

4. Follow Section 'Upgrading Existing MIA-OP VM'.

8.2 Changing Encrypted Environment Variables

Some of the variables configured during installation are encrypted (using passwords, keys and secrets).

To change one of these environment parameters (if required), use the following command line:

```
KEY=ENV_PASS VALUE='ENV_VALUE' && sed -i
"s|^${KEY}=.*|${KEY}=${VALUE}|" "$MIAOP_HOME"/.env &&
"$MIAOP_HOME/update/hide" encrypt "$KEY"
```

For example, to replace the SMTP_PASS parameter's value with "my-new-password":

```
KEY=SMTP_PASS VALUE='my-new-password' && sed -i
"s|^${KEY}=.*|${KEY}=${VALUE}|" "$MIAOP_HOME"/.env &&
"$MIAOP_HOME/update/hide" encrypt "$KEY"
```

9 Troubleshooting

9.1 Introduction

This section describes possible errors encountered during installation and possible solutions.

9.2 Issues Found

Docker-Load Errors:

- **Description:** During installation scripts, sometimes docker-load command fails on the docker daemon.
- **Solution 1:** manual: Restart the docker daemon service on the OS (might depend on the Linux distribution. Example: `sudo service docker restart`)
- **Solution 2:** on installation script: error-recovery of failed commands with some limited retries

Keycloak+Maria-DB Issue on Some Linux Distros

- **Description:** Keycloak failed and crashes on startup and keeps restarting, showing error messages from MariaDB.

The key to this problem is a warning message that MariaDB attempted to allocate some memory size to multicast socket buffer, but the OS only allows a small part of it.

- **Example:** "WARN: the send buffer of socket MulticastSocket was set to 20MB, but the OS only allocated 212.99KB"
- **Solution:** To ensure MariaDB operates properly, the following command needs to run:

```
RUN sysctl -w net.core.rmem_max=25600000 && sysctl -w net.core.wmem_max=1024000
```

Nginx responds with "Forbidden" on any request sent to the /html folder, and logs "permission denied" on the error.log file

- **Possible cause:** access on the /html folder might not be allowed.
- **Solution:** run `chown -R` on the nginx folder to recursively change access permissions for read / write.

Containers can't communicate with the Keycloak server

- **Possible cause:** DHCP is not configured, and the address is not being resolved. This can also occur if DNS is configured manually in the Linux OS `/etc/hosts` file.
- **Solution:** Add a static hostname resolution entry for all containers in `compose.yaml`.

Example:

```
image: ${REGISTRY}proofingbe:${proofingbe}
extra_hosts:
  - "my.custom.domain.com:192.168.1.100"
```

Linux Machine Goes to Sleep or Hibernates

- **Possible cause:** Usually happens when a AI server is installed on a laptop and goes to sleep due to lid closing or saving power reasons

- **Solution:**

1. Disable sleep / hibernate (relevant for Ubuntu and Linux):

```
sudo systemctl mask sleep.target suspend.target  
hibernate.target hybrid-sleep.target
```

2. Edit the file `/etc/systemd/logind.conf` and set the below parameters:

```
HandleLidSwitch=ignore  
HandleLidSwitchDocked=ignore  
HandleSuspendKey=ignore  
HandleHibernateKey=ignore
```

3. Restart the `systemd-logind`:

```
sudo systemctl restart systemd-logind
```

A Meeting Insights On-Prem License Server

A.1 Introduction

The Meeting Insights On-Prem License Server keeps the following keys:

- Number of transcription hours that can be used. This is reduced upon any audio session / meeting, according to its length.
- AI support (enable or disable).
- Expiration date.

A.2 Get System ID

The following steps explain how to retrieve the UUID (Universal Unique Identifier or FP_DATA) of the license server.

1. Navigate to the script directory:

```
bash
cd ~/miaop_setup/prerequisite_scripts
```
2. Run the `get_computer_uuid.sh` script.
3. A new text file named “`computer_uuid.txt`” is created in the same directory and it contains the System ID.

A.3 Request a license

Send the generated “`computer_uuid.txt`” file to your AudioCodes contact manager and specify:

- Which deployment model is required (choose from Table 1: Deployment Models).
- Is the AI (summary) feature required or not?

A.4 API Endpoints

All requests use the HTTPS protocol with authentication.

A.5 Authentication

All requests to the API must include the following authorization header:

- **Key:** authorization
- **Value:** Bearer 3248954350243754938576458957455

A.6 Available Functions

Verify a new license file.

- **Method:** POST
- **Endpoint:** /hrec/licenses/verify
- **Request Body:** JSON object containing license information
- **base64Content:** .lic file content as received from Audiocodes contact manager

Example Request Url and headers:

```
POST https://<app_fqdn>/hrec/licenses/verify
Content-Type: application/json
authorization: Bearer 3248954350243754938576458957455
```

Example Request Body:

```
json
{
  "base64Content": " eyJpdiI...=="
}
```

Successful Response (200 OK):

```
json
{
  "license": {
    "APPLICATION_NAME": "MIAOP",
    "FP_DATA": "<FP-DATA>",
    "PRODUCT_KEY": "<PRODUCT-KEY>",
    "OPERATION_TYPE": "New",
    "Options": {
      "MIAOP-PK": " <PRODUCT-KEY>",
      "ExpirationDate": "2026-12-31T00:00:00.000Z",
      "NumOfHours": "50000"
    },
    "issueDate": "2026-05-24T12:11:46.098Z",
    "licenseId": "e703ab5bb6440c64dbdd09dce8caa301d349b10b9b2afea76118f77af6a322dc"
  }
}
```

Unsuccessful Response (Status Code 422 Unprocesable Entity):

```
json
{
  "id": "422", "error": "License decoder failed"
}
```

A.6.1 Troubleshooting

Service Not Starting

If the service doesn't start after installation:

1. Verify that the certificate files (tls.crt and tls.key) are valid.
2. Check the logs folder for error messages.
3. Ensure you have administrative privileges.
4. Verify port is not already in use (3003 Linux).

Authentication Errors

If you receive a 401 Unauthorized response:

1. Verify that you're including the correct authorization header.
2. Check for any typos in the Bearer token.

API Connection Issues

If you cannot connect to the API:

1. Verify the service is running.
2. Check that the hostname is resolved correctly to the server IP.
3. Ensure port 443 is open on the server firewall.
4. Validate the SSL/TLS certificates are trusted by your client.

B Gemalto License Server

B.1 Introduction

This section provides an overview of the installation and configuration of the **Gemalto License Server** for the **STT (Speech-to-Text)** engines (required for both AudioCodes and Industrial STT engines). It also outlines the steps required to request and activate a license key.

B.2 Getting Started

The License Server must be deployed in an environment where an **STT server is already installed and configured** to obtain its license from this License Server.



The STT application runs as a Docker container on a Linux machine and cannot function without access to a valid license key from the License Server.

B.3 Installing License Server

The Gemalto License Server must be installed on a **dedicated Linux machine** (see system requirements) and be **accessible on port 1947** from the STT application.

B.3.1 Installing the License Application on a Dedicated Linux Server

The procedure below describes how to install the License Application on a Dedicated Linux Server.

B.3.1.1 Prerequisites

The LM installation files include:

- Gemalto LM installer tar.gz file, namely **aksusbd_94011-9.12.1.tar.gz**
- Configuration INI file, namely **hasplm.ini**
- This document file

Target Instance \ VM \ Server Operating System must be one of the following:

- Ubuntu 18.04, 20.04, 22.04, 24.04
- Rocky Linux 8, 9
- RHEL 8, 9
- CentOS 8

Actions:

- Verify Operating System key found by executing “hostnamectl” on a bash terminal to the target.
- Ensure the Operating System includes **tar** utility (check with “tar –version” on a bash terminal to the target)
- The Gemalto LM must be installed using **sudo** or **root** user.

B.3.1.2 Installation

Step 1: Copy Files to Target Machine

Copy following files into the user's home folder (e.g. /home/ubuntu for ubuntu user, /root for root user, etc. all according to operating system type and target available users):

- aksusbd_94011-9.12.1.tar.gz
- haslm.ini

Step 2: Extract the Driver Installer

From the previous step folder run to extract installer by executing from bash terminal to the target:

```
tar -xvzf aksusbd_94011-9.12.1.tar.gz
```

Verify that the "aksusbd-9.12.1" folder was created, by executing "ls -ltr | find aksusbd-9.12.1". This should find the folder.

Step 3: Install the Driver

From the previous step folder run following to install by executing from bash terminal to the target:

```
cd aksusbd-9.12.1
sudo ./dinst
cd ..
sudo cp hasplm.ini /etc/hasplm/
```

Step 4: Restart the Driver

From the previous step folder run following to restart driver by executing from bash terminal to the target:

```
sudo systemctl restart aksusbd
```

Step 5: Post-Installation Check

From remote computer, using the browser direct to the Gemalto LM web portal (<http://<target IP>:1947>) to operate standard licensing procedure of vendor to customer and vice versa to gain fingerprint and apply license.

Step 6: Cleanup

The following copied and extracted folder may be deleted from the target:

- rm -fr aksusbd-9.12.1
- rm aksusbd_94011-9.12.1.tar.gz
- rm hasplm.ini



To uninstall, the folder **aksusbd-9.12.1** must remain and should not be deleted.

B.3.1.3 Un-Install Procedure

Uninstall driver

From the install folder run following to uninstall by executing from bash terminal to the target:

- `cd aksusbd-9.12.1`
- `sudo ./dunst`

Cleanup

The following copied and extracted folder may be deleted from the target as well:

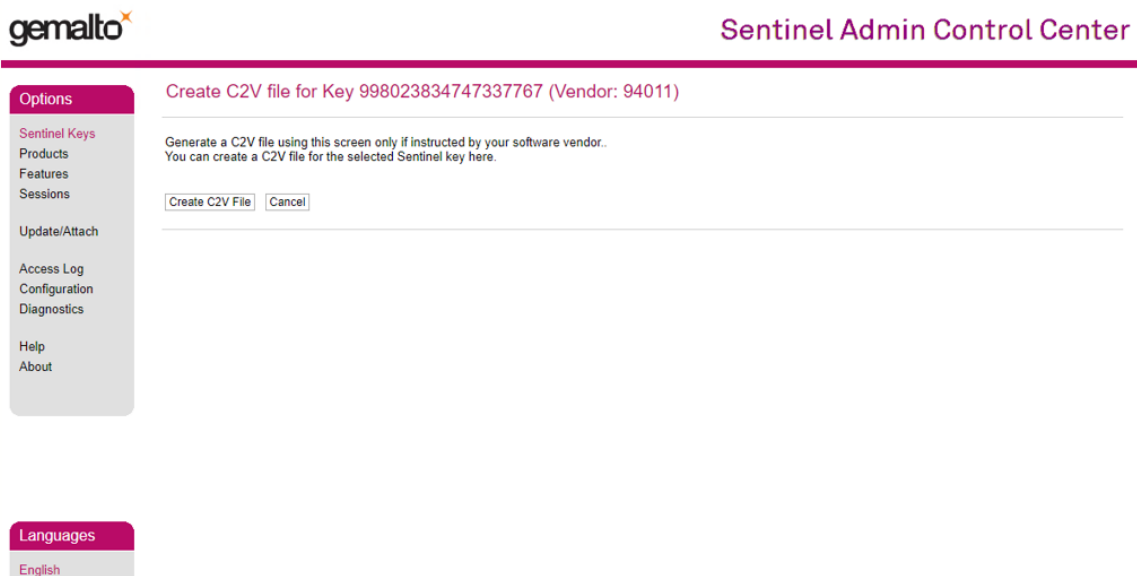
- `rm -fr aksusbd-9.12.1`
- `rm aksusbd_94011-9.12.1.tat.gz`
- `rm hasplm.ini`

B.4 Getting Machine Fingerprint

The procedure below describes how to get the machine fingerprint and upload the generated license key.

To receive the machine fingerprint:

1. Open Google Chrome browser and type: **<gemalto machine ip>:1947**.
2. Create the C2V file on the license server; the file created provides a fingerprint of the server.



3. Send the created fingerprint (C2V file) to your AudioCodes contact person and specify the deployment model. AudioCodes contact person will send back the appropriate license key (V2C file).

B.5 Uploading Generated License Key and Validating Uploaded License Key

The procedure below describes how to upload the License Key and validate the uploaded license key.

To upload the license key:

Receive the V2C file from AudioCodes and then upload it to the server (Update/Attach > Choose File and Apply File).

The screenshot shows the Gemalto Sentinel Admin Control Center interface. The page title is "Update/Attach License to win-i43fpteqk8b". On the left, there is a navigation menu with options: Sentinel Keys, Products, Features, Sessions, Update/Attach (highlighted), Access Log, Configuration, Diagnostics, Help, and About. The main content area is titled "Apply File" and contains the instruction "Select a V2C, V2CP, H2R, R2H, H2H or ID file:". Below this is a "Choose File" button and the text "No file chosen". There are "Apply File" and "Cancel" buttons. Below the buttons, there is a section titled "The following file types can be applied:" followed by a bulleted list:

- A V2C file contains a license update from your software vendor, or a firmware update for your Sentinel HL keys.
- A V2CP file contains license update package from your software vendor.
- An H2R file contains a detached license.
- An R2H file contains a cancelled detached license (to be re-attached to its original key).
- An H2H file contains a rehomed protection key.
- An ID file contains the identifiers of the Sentinel License Manager on a remote machine (occasionally required for creating a detached license).

To validate the uploaded license key:

1. Access <gemalto machine ip>:1947 > Products to see the product is shown correctly.
2. Access <gemalto machine ip>:1947 > Features.
3. Check the **Features** page to see that the license was uploaded successfully.

C Installing Support Environment for LLM / ML-STT VM

C.1 Installation on Ubuntu 24.04

C.1.1 Preparation

Assumed Linux operating system: Ubuntu 24.04.2 LTS, architecture: x86_64 a

1. Update the OS using the package manager:

```
sudo apt-get update
sudo apt-get -y upgrade
```

2. Verify the Nvidia graphic card is recognized by the system:

```
lspci | grep -i nvidia
```

Example output:

```
00:1e.0 3D controller: NVIDIA Corporation GA102GL [A10G]
(rev a1)
```

- If your graphics card is from NVIDIA and it is listed in <https://developer.nvidia.com/cuda-gpus>, your GPU is CUDA-capable (which is true for 99% of Nvidia's graphic cards).
- If you do not see any output, update the PCI hardware database:

```
sudo update-pciids
```

3. Verify the version of gcc:

```
gcc --version
```

Example output (first line):

```
gcc (GCC) 14.2.1 20250110 (Red Hat 14.2.1-7)
```

- Supported versions of gcc are: 6.x - 14.x
- If you get the following error message:

```
-bash: gcc: command not found
```

It means that gcc is not installed. Install it with:

```
sudo apt-get -y install gcc
```

Then verify that a supported version of gcc was installed.

C.1.2 Installing Docker Engine (if not already installed)

Follow: <https://docs.docker.com/engine/install/ubuntu/>

1. Set up Docker's apt repository:

```
sudo apt-get update
```

```
sudo apt-get -y install ca-certificates curl
```

```
sudo install -m 0755 -d /etc/apt/keyrings
```

```
sudo curl -fsSL
```

```
https://download.docker.com/linux/ubuntu/gpg -o  
/etc/apt/keyrings/docker.asc
```

```
sudo chmod a+r /etc/apt/keyrings/docker.asc
```

3. Add the repository to Apt sources:

```
echo "deb [arch=$(dpkg --print-architecture)  
signedby=/etc/apt/keyrings/docker.asc]  
https://download.docker.com/linux/ubuntu $(. /etc/osrelease  
&& echo "${UBUNTU_CODENAME:$VERSION_CODENAME}") stable" |  
sudo tee  
/etc/apt/sources.list.d/docker.list > /dev/null
```

```
sudo apt-get update
```

4. Install the Docker packages:

```
sudo apt-get -y install docker-ce docker-ce-cli  
containerd.io docker-buildx-plugin docker-composeplugin
```

You *may* need to reboot the machine at this point (sudo reboot).

5. Verify that the installation is successful by running the hello-world image:

```
sudo docker run hello-world
```

This command downloads a test image and runs it in a container. When the container runs, it prints a confirmation message and exits:

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
e6590344b1a5: Pull complete
Digest: sha256:dd01f97f252193ae3210da231b1dca0cffab4aadb3566692d6730bf93f123a48
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```

C.1.3 Installing CUDA Toolkit and Driver

Follow: https://developer.nvidia.com/cuda-downloads?target_os=Linux&target_arch=x86_64&Distribution=Ubuntu&target_version=24.04&target_type=deb_network

Linux > x86_64 > Ubuntu > 24.04 > deb (network)

1. Install the toolkit:

```
wget
https://developer.download.nvidia.com/compute/cuda/repos/ubuntu2404/x86_64/cuda-keyring_1.1-1_all.deb
sudo dpkg -i cuda-keyring_1.1-1_all.deb
sudo apt-get update
sudo apt-get -y install cuda-toolkit-12-9
```

2. Install the driver (proprietary kernel module):

```
sudo apt-get -y install cuda-drivers
```

3. Verify the installation:

```
nvidia-smi
```

You should see a table with the GPU status and various details. Example output:

```
+-----+-----+-----+-----+-----+-----+-----+-----+
| NVIDIA-SMI 572.40                Driver Version: 572.40          CUDA Version: 12.8          |
+-----+-----+-----+-----+-----+-----+-----+-----+
| GPU  Name                Driver-Model | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf          Pwr:Usage/Cap |           Memory-Usage | GPU-Util  Compute M. |
|=====+=====+=====+=====+=====+=====+=====+=====+
|   0   NVIDIA RTX A500 Laptop GPU  WDDM             00000000:03:00.0 Off  |           0MiB / 4096MiB |      0%      Default |
| N/A   30C    P0              8W / 30W         |           0MiB / 4096MiB |           |           MIG M.     |
|=====+=====+=====+=====+=====+=====+=====+=====+
| Processes:                                                                                               |
| GPU  GI  CI           PID   Type   Process name                      GPU Memory |
|   ID  ID  ID                                 Name                               Usage     |
|=====+=====+=====+=====+=====+=====+=====+=====+
| No running processes found                                                                                               |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

The specific model / driver version / CUDA version may be slightly different than the provided example. The importance is that this monitor screen is shown, and not some error message.

C.1.4 Installing NVIDIA Container Toolkit

1. Install this toolkit with the following command (assuming Ubuntu distribution):

```
sudo apt-get -y install nvidia-container-toolkit
```
2. Then, configure Docker to access the GPU:

```
sudo nvidia-ctk runtime configure --runtime=docker
```
3. Verify the above command: review file `/etc/docker/daemon.json` - it should be:

```
{
  "runtimes": {
    "nvidia": {
      "path": "nvidia-container-runtime",
      "runtimeArgs": []
    }
  }
}
```

4. Apply the configuration changes by restarting the Docker service:

```
sudo systemctl restart docker
```
5. Verify: Run a Docker container that utilizes the GPU service:

```
sudo docker run --rm --gpus all nvidia/cuda:12.9.0base-ubuntu24.04 nvidia-smi
```

You should see a table with the GPU status and various details, as output from `nvidia-smi` command (same as in step 3c). Example output:

```

+-----+-----+-----+-----+-----+-----+-----+-----+
| NVIDIA-SMI 572.40                | Driver Version: 572.40          | CUDA Version: 12.8          |
+-----+-----+-----+-----+-----+-----+-----+-----+
| GPU  Name                   | Driver-Model | Bus-Id      | Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf             | Pwr:Usage/Cap |           | Memory-Usage | GPU-Util  Compute M. |
|=====+=====+=====+=====+=====+=====+=====+=====+
|   0   NVIDIA RTX A500 Laptop GPU | WDDM        | 00000000:03:00:0 | Off    |      N/A              |
| N/A   0C    60             | 8W / 30W    |           | 0MiB / 4096MiB |    0%      Default   |
|=====+=====+=====+=====+=====+=====+=====+=====+
| Processes:                               |
| GPU   GI   CI                | PID  Type  Process name          | GPU Memory |
|  ID   ID   ID                |             |           | Usage          |
+-----+-----+-----+-----+-----+-----+-----+-----+
| No running processes found              |
+-----+-----+-----+-----+-----+-----+-----+

```

The specific model / driver version / CUDA version may be slightly different than the provided example. The importance is that this monitor screen is shown, and not some error message.

C.2 Installation on Rocky Linux

C.2.1 Installation of Essential Packages

Assumed Linux operating system: Rocky 9.6 (Blue Onyx), architecture: x86_64

1. Update the OS using the package manager:

```
sudo dnf check-update
```

```
sudo dnf update -y
```

2. Verify the Nvidia graphic card is recognized by the system:

```
lspci | grep -i nvidia
```

Example output:

```
00:1e.0 3D controller: NVIDIA Corporation GA102GL [A10G]  
(rev a1)
```

- If your graphics card is from NVIDIA and it is listed in <https://developer.nvidia.com/cuda-gpus>, your GPU is CUDA-capable (which is true for 99% of Nvidia's graphic cards).

- If you do not see any output, update the PCI hardware database:

```
sudo update-pciids
```

Then run the above `lspci` command again.

- If you get the following error message:

```
-bash: lspci: command not found
```

It means that package `pciutils` is not installed. Install it with:

```
sudo dnf -y install pciutils
```

Then run the above `lspci` command again.

3. Install gcc and other dependencies:

```
sudo dnf -y install tar bzip2 make automake gcc gcc-c++  
elfutils-libelf-devel libglvnd-opengl libglvnd-glx libglvnd-  
devel acpid pkgconf
```

4. Then, verify that a supported version of gcc was installed:

```
gcc --version
```

Example output (first line):

```
gcc (GCC) 11.5.0 20240719 (Red Hat 11.5.0-5)
```

Supported versions of gcc are: 6.x - 14.x

C.2.1.1 Installing Docker Engine (if not already installed)

Follow: <https://docs.docker.com/engine/install/rhel/>

1. Set up Docker's rpm repository:

```
sudo dnf -y install dnf-plugins-core
```

```
sudo dnf config-manager --add-repo  
https://download.docker.com/linux/rhel/docker-ce.repo
```

2. Install the Docker packages:

```
sudo dnf -y install docker-ce docker-ce-cli containerd.io  
docker-buildx-plugin docker-composeplugin
```

3. Start the Docker daemon: Reboot:

```
sudo reboot
```

4. Then start the Docker daemon:

```
sudo systemctl enable --now docker
```

5. Verify that the installation is successful by running the hello-world image:

```
sudo docker run hello-world
```

This command downloads a test image and runs it in a container. When the container runs, it prints a confirmation message and exits:

```
Unable to find image 'hello-world:latest' locally  
latest: Pulling from library/hello-world  
e6590344b1a5: Pull complete  
Digest: sha256:dd01f97f252193ae3210da231b1dca0cffab4aadb3566692d6730bf93f123a48  
Status: Downloaded newer image for hello-world:latest  
  
Hello from Docker!  
This message shows that your installation appears to be working correctly.  
  
To generate this message, Docker took the following steps:  
1. The Docker client contacted the Docker daemon.  
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.  
   (amd64)  
3. The Docker daemon created a new container from that image which runs the  
   executable that produces the output you are currently reading.  
4. The Docker daemon streamed that output to the Docker client, which sent it  
   to your terminal.  
  
To try something more ambitious, you can run an Ubuntu container with:  
$ docker run -it ubuntu bash  
  
Share images, automate workflows, and more with a free Docker ID:  
https://hub.docker.com/  
  
For more examples and ideas, visit:  
https://docs.docker.com/get-started/
```

C.2.1.2 Installing CUDA Toolkit and Driver

Follow: https://developer.nvidia.com/cuda-downloads?target_os=Linux&target_arch=x86_64&Distribution=Rocky&target_version=9&target_type=rpm_network

Linux > x86_64 > Rocky > 9 > rpm (network)

1. Install the toolkit:

```
sudo dnf config-manager --set-enabled crb
```

```
sudo dnf config-manager --add-repo
https://developer.download.nvidia.com/compute/cuda/repos
/rhel9/x86_64/cuda-rhel9.repo
```

```
sudo dnf clean all
```

```
sudo dnf -y install cuda-toolkit-12-9
```

2. Install the driver (proprietary kernel module):

```
sudo dnf -y install epel-release
```

```
sudo dnf -y install kernel-devel kernel-headers perl
```

```
sudo dnf -y module install nvidia-driver:latest-dkms
```

3. Verify the installation:

```
nvidia-smi
```

You should see a table with the GPU status and various details. Example output:

```

+-----+-----+-----+-----+-----+-----+-----+-----+
| NVIDIA-SMI 572.40                Driver Version: 572.40          CUDA Version: 12.8          |
+-----+-----+-----+-----+-----+-----+-----+-----+
| GPU  Name                   Driver-Model | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf              Pwr:Usage/Cap |      Memory-Usage | GPU-Util  Compute M. |
|====+=====+====+=====+=====+=====+=====+=====+
|   0  NVIDIA RTX A500 Laptop GPU  WDDM           | 00000000:03:00.0 Off |            0%      N/A | |
| N/A   0C    P0               8W / 30W     |  0MiB / 4096MiB |              Default |
|                               |                      |                      | N/A |
+-----+-----+-----+-----+-----+-----+-----+-----+
|
| Processes:
| GPU   GI    CI          PID   Type   Process name                      GPU Memory
|  ID   ID   ID              |   |          |
+-----+-----+-----+-----+-----+-----+-----+
| No running processes found
+-----+-----+-----+-----+-----+-----+-----+-----+

```

The specific model / driver version / CUDA version may be slightly different than the provided example. The importance is that this monitor screen is shown, and not some error message.

C.2.1.3 Installing NVIDIA Container Toolkit

1. This toolkit can be installed with (assuming Rocky distribution):

```
sudo dnf -y install nvidia-container-toolkit
```

2. Then, configure Docker to access the GPU:

```
sudo nvidia-ctlk runtime configure --runtime=docker
```

3. Verify the above command: review file /etc/docker/daemon.json - it should be:

```
{
  "runtimes": {
    "nvidia": {
      "path": "nvidia-container-runtime",
      "runtimeArgs": []
    }
  }
}
```

4. Apply the configuration changes by restarting the Docker service:

```
sudo systemctl restart docker
```

5. Verify: Run a Docker container that utilizes the GPU service:

```
sudo docker run --rm --gpus all nvidia/cuda:12.9.0base-ubuntu24.04 nvidia-smi
```

You should see a table with the GPU status and various details, as output from `nvidia-smi` command (same as in step 3c). Example output:

```
+-----+
| NVIDIA-SMI 572.40                Driver Version: 572.40          CUDA Version: 12.8          |
+-----+-----+-----+-----+-----+-----+
| GPU  Name                Driver-Model | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf           Pwr:Usage/Cap |      Memory-Usage | GPU-Util  Compute M. |
|                                           MIG M.         |
+-----+-----+-----+-----+-----+-----+
|   0   NVIDIA RTX A500 Laptop GPU  WDDM             00000000:03:00.0 Off   |          0%      N/A   | |
| N/A   0C    P0              8W / 30W           0MiB / 4096MiB |                      | Default  |
|                                           |                      |          N/A   |
+-----+-----+-----+-----+-----+-----+
| Processes:                         |
| GPU  GI  CI           PID   Type   Process name          GPU Memory |
|   ID   ID              |                 |           |                     | Usage   |
+-----+-----+-----+-----+-----+-----+
| No running processes found        |
+-----+-----+-----+-----+-----+-----+
|
```

The specific model / driver version / CUDA version may be slightly different than the provided example. The importance is that this monitor screen is shown, and not some error message.

D Keycloak Active Directory Integration Guide

D.1 Introduction

This section provides step-by-step instructions for connecting your service to Active Directory (AD) through Keycloak using LDAP user federation.

D.2 Prerequisites

- Access to Keycloak admin console.
- Active Directory credentials and connection details.
- Permission to modify environment variables and restart services.

D.3 Realm Setup

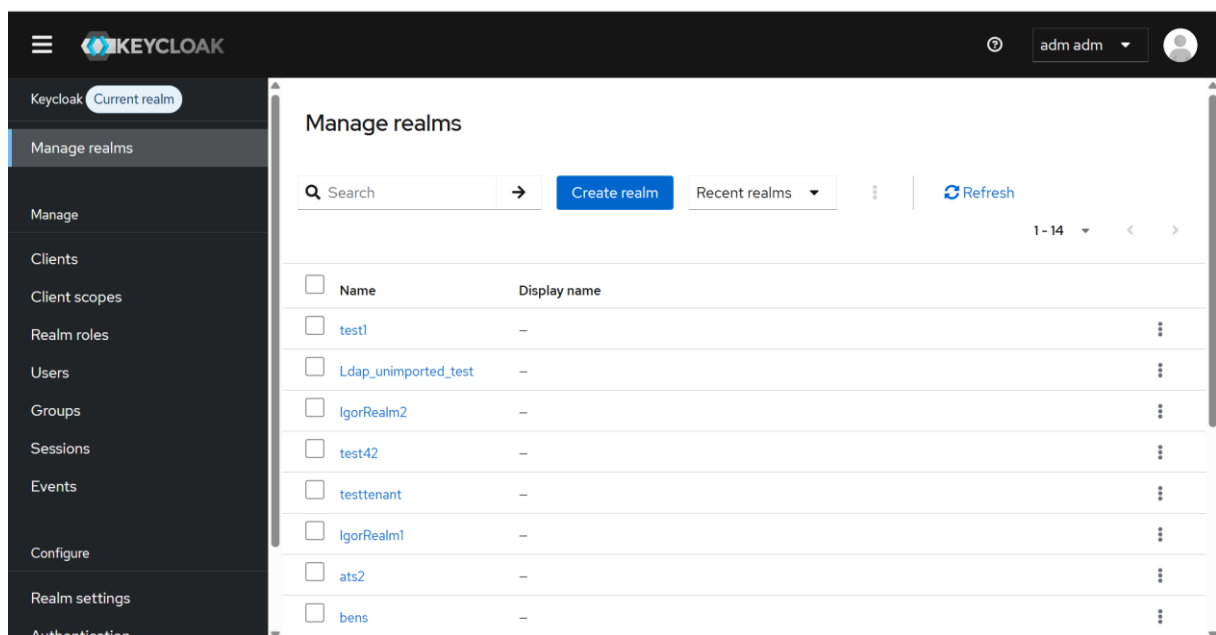
If you already have a realm, you can skip the realm creation steps above and proceed directly to D.4.

1. **Configure the realm name** - add your desired realm name to the environment variable: `KEYCLOAK_REALMS`
2. **Run the setup script** - execute the Keycloak setup script: `./update/kc_setup.sh`
3. **Restart the service** - restart Keycloak to apply the changes.

D.4 Configure LDAP User Federation

Step 1: Access Keycloak Admin Console

1. Log in to the Keycloak admin console.
2. Navigate to your realm from the **Manage realms** in the left sidebar.



Step 2: Navigate to User Federation


1. In the left sidebar, click on **User Federation**.
2. Click the **Add Ldap Provider** button.

User federation


User federation provides access to external databases and directories, such as LDAP and Active Directory. [Learn more](#)

To get started, select a provider from the list below.

Add providers



Add Kerberos providers



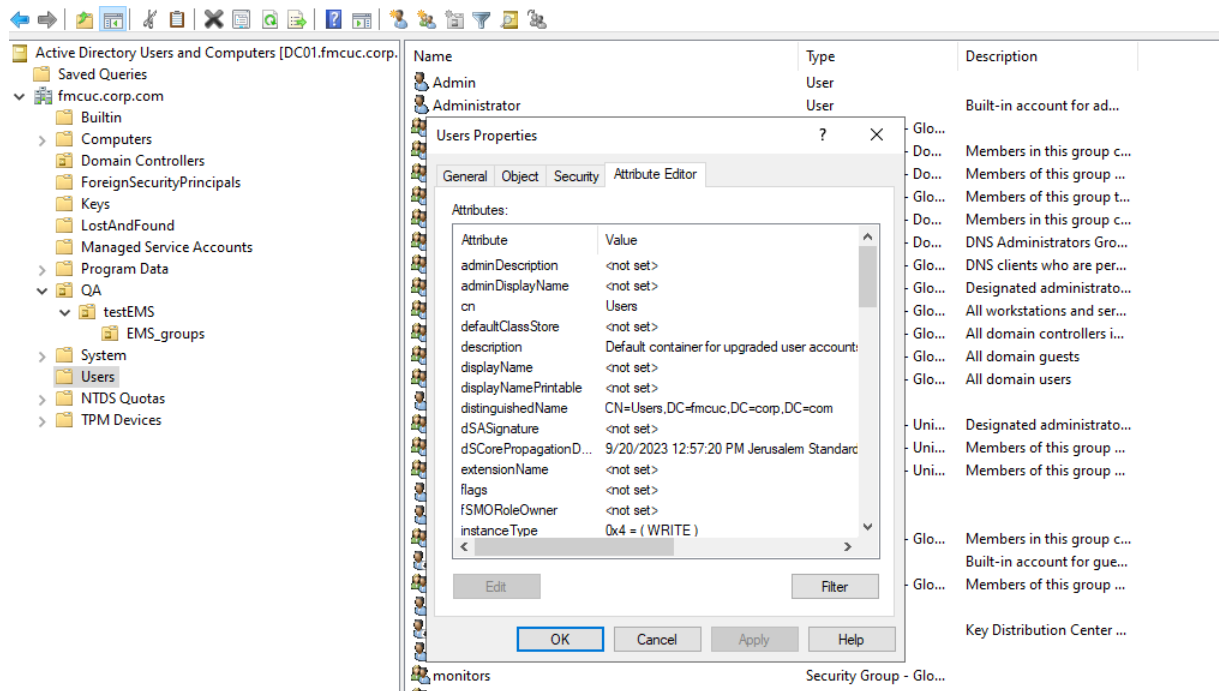
Add Ldap providers

Step 3: Configure LDAP connection settings

Fill in the following required fields:

Category	Field	Value to enter
General Settings	UI Display Name	Enter a descriptive name (e.g., "Company AD").
	Vendor	Select Active Directory.
Connection Settings	Connection URL	`ldap://<AD-server-hostname-or-ip>:389` or `ldaps://<AD-server-hostname-or-ip>:636` (for SSL)
	Enable start TLS	Off
	Use Truststore SPI	Always
	Connection pooling	Off
	Connection timeout	(Should be empty)
	Test the connection: Click Test Connection to verify Keycloak can reach your AD server.	
Authentication Settings	Bind Type	Select simple .
	Bind DN	Enter the Distinguished Name for the bind user.
	Bind Credentials	Enter the password for the bind user.
	Test the authentication: Click Test authentication to verify the bind credentials are correct.	
LDAP Searching and Updating	Edit Mode	Choose based on your needs: <ul style="list-style-type: none"> ■ READ_ONLY: Users cannot be modified in Keycloak. (Recommended for us). ■ WRITABLE: Changes in Keycloak sync to AD. ■ UNSYNCED: Changes stay in Keycloak only.

Category	Field	Value to enter
	Users DN	Base DN where users are located – distinguishedName. Example: (`CN=Users,DC=fmcuc,DC=corp,DC=com`)
	Relative user creation DN	(Should be empty)
	Username LDAP attribute	CN This is the attribute name for username usage.
	RDN LDAP attribute	CN This is the field used to identify the user in LDAP.
	UUID LDAP attribute	objectGUID This is the unique ID of the user in LDAP.
	User Object Classes	person, organizationalPerson, user These are LDAP object types that define a user.
	User LDAP filter	(Should be empty) This is the filter that selects which LDAP entries are treated as users.
	Search scope	One level This defines how deep Keycloak searches for users in LDAP One level / subtree.
	ReadTimeout	(Should be empty)
	Pagination	Off
	Referral	(Should be empty)



Category	Field	Value to enter
Synchronization Settings	Import users	Off
	Sync Registrations	Off
	Batch size	(Should be empty)
	Periodic full sync	Off
	Periodic changed users sync	Off
	Remove invalid users during searches	On
Kerberos Integration	Allow Kerberos authentication	Off
	Use Kerberos for password authentication	Off
Cache Settings	Cache policy	Default
Advanced Settings	Enable the LDAPv3 password modify extended operation	Off
	Validate password policy	Off
	Trust Email	Off
	Connection trace	Off

Step 4: Save and Synchronize

Click **Save** to store the configuration.

Step 5: Verify AD access via Keycloak

1. Navigate to Users in the left sidebar.
2. Search for user or search * to get full user list.
3. Verify that AD users appear in the user list.

D.5 Configure Group Mapper

Group mappers allow you to import AD groups into Keycloak and automatically assign users to the predefined roles: admin, operator, and monitor.



This mapping must be created three times, one for each group: admin, operator, monitor.

Step 1: Access Mappers

1. In the LDAP provider configuration page, navigate to the **Mappers** tab.
2. Click **Add Mapper**.

Step 2: Configure Group Mapper

Fill in the following fields:

Category	Field	Value to enter
Basic Settings	Name	Enter a descriptive name. Example: "Admin Mapper", "AdminMapper"
	Mapper Type	Select group-ldap-mapper .
LDAP Group Settings	LDAP Groups DN	Base DN where groups are located - distinguishedName Example: OU=Groups,DC=company,DC=com
	Relative creation DN	(Should be empty)

Category	Field	Value to enter
	Group Name LDAP Attribute	CN This is the common name of the group.
	Group Object Classes	Group (for Active Directory)
	Preserve Group Inheritance	On This option is to save the hierarchical AD groups and depends on the AD structure.
	Ignore Missing Groups	Off
	Membership LDAP Attribute	Member
	Membership Attribute Type	DN
	Membership User LDAP Attribute	CN (the user ID attribute)
	LDAP Filter	(&(objectClass=group)(cn=<group name>))
	Mode	Choose based on your needs: <ul style="list-style-type: none"> ■ READ_ONLY: Groups are imported but cannot be modified in Keycloak ■ LDAP_ONLY: Groups are stored only in LDAP
	User Groups Retrieve Strategy	Select LOAD_GROUPS_BY_MEMBER_ATTRIBUTE (recommended for Active Directory).
	Member-Of LDAP Attribute	memberOf
	Mapped Group Attributes	(Should be empty) This defines which LDAP group attributes are copied into Keycloak group attributes.
	Drop non-existing groups during sync	Off If turned on, this option deletes Keycloak groups that no longer exist in LDAP during sync.
	Groups Path	Define the Keycloak group path under which LDAP groups are created (/monitor/operator/admin).

Step 3: Save and Synchronize

1. Click **Save** to store the configuration.
2. Enter the created mapper.
3. Click **Action**.
4. Sync Ldap groups with Keycloak.

Step 4: Verify AD Groups access via Keycloak

1. Navigate to **Groups** in the left sidebar.
2. Search the group name <group name>.
3. Click the selected group.

4. Navigate to the **Members** tab to verify the group's users display.

Step 5: Repeat this part for operator and monitor groups.

D.6 Configure User Attribute Mapper

User attribute mappers allow you to map user attributes from AD to Keycloak. In our setup, this is used to create three mappings for phone number attributes.



This mapping must be created three times, one for each extension number: office, home, and mobile.

Step 1: Access Mappers

1. In the LDAP provider configuration page, navigate to the **Mappers** tab.
2. Click **Add Mapper**.

Step 2: Configure Group Mapper

Fill in the following fields:

Category	Field	Value to enter
Basic Settings	Name	Enter a descriptive name. Example: "ExtensionNumber-home"
	Mapper Type	Select user-attribute-ldap-mapper .
	User Model Attribute	The user property in Keycloak where the LDAP attribute will be mapped (miaop_extension.office, miaop_extension.mobile, miaop_extension.home)
	LDAP attribute	Name of mapped attribute on LDAP object. Example: homePhone
	READ ONLY	On
	Is Mandatory in Ldap	Off
	Attribute default value	(Should be empty)
	Force a default value	On
Is Binary Attribute	Off	

Step 3: Save

Click **Save** to store the configuration.

Step 4: Verify AD Attribute users synchronize in Keycloak

1. Navigate to **Users** in the left sidebar.
2. Search for the user or search * to get a full user list.
3. Select the user with the value in the extension number.
4. Check the value of the extension number.

Step 5: Repeat this section for other extension numbers.

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