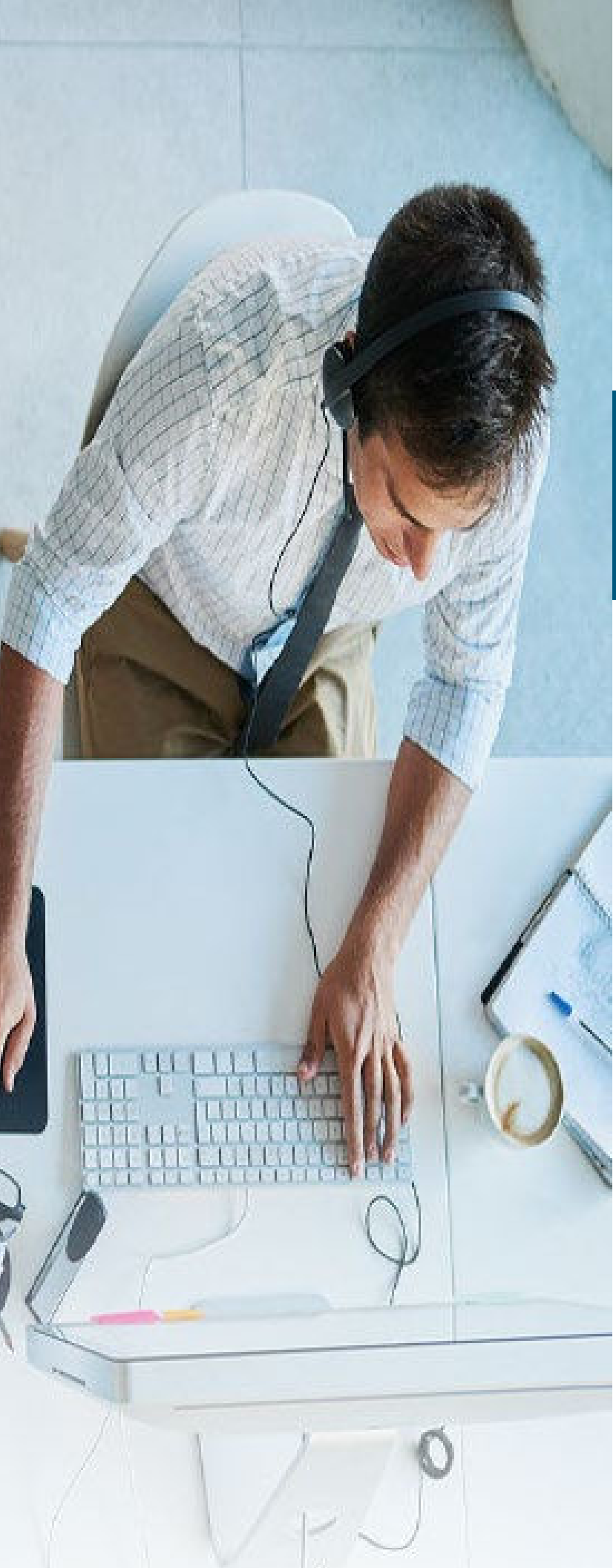


MOMENTUM CALL RECORDING

Portal Admin Guide

MOMENTUM TELECOM

Powered By: MiaRec

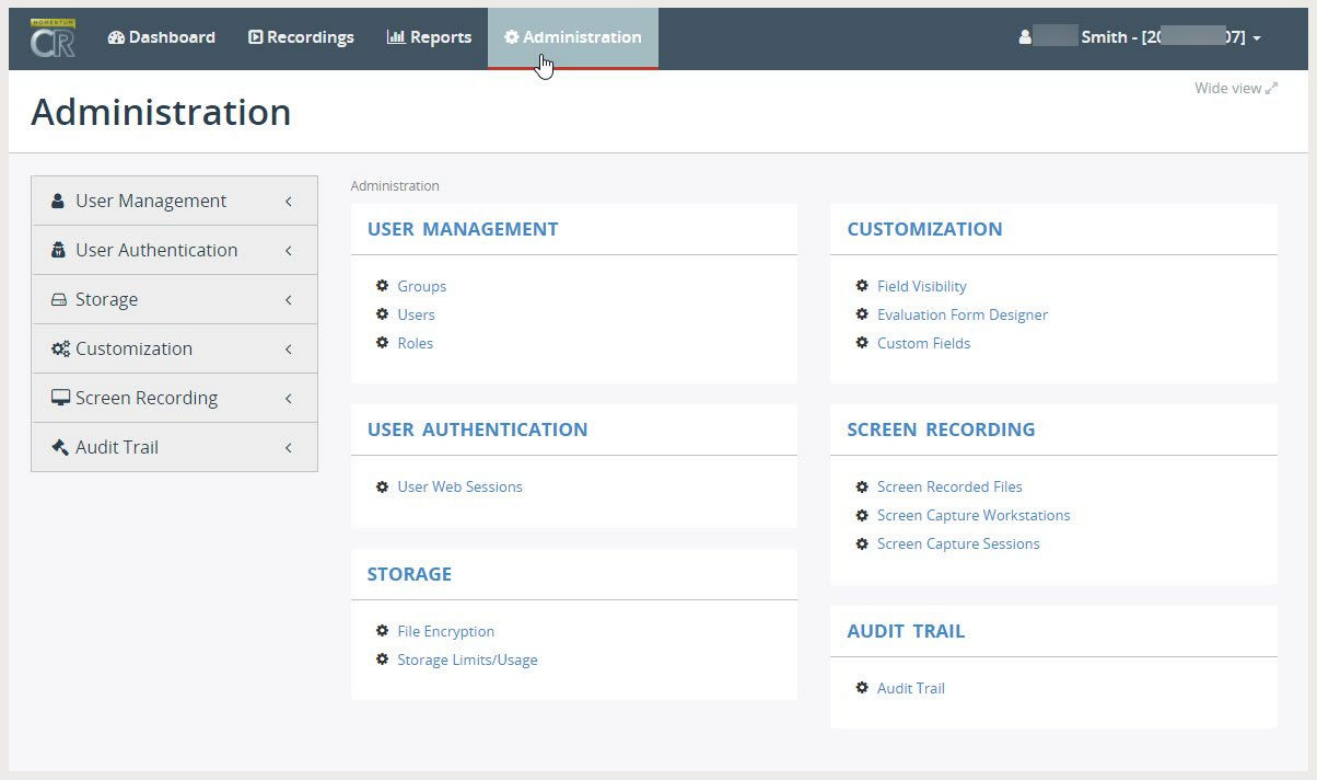
22Q4UC

Contents

ADMINISTRATION

For organizations who have purchased licenses for Call Recording (powered by MiaRec), Authorized Administrators may be setup to work in the Call Recording portal at the 'Tenant' level. This means that the Administrator has been granted permission to manage the groups, user assignments, and tools the organization has purchased for Call Recording only for their organization with enough access to perform tasks that pertain only to their enterprise (AKA: the Tenant).

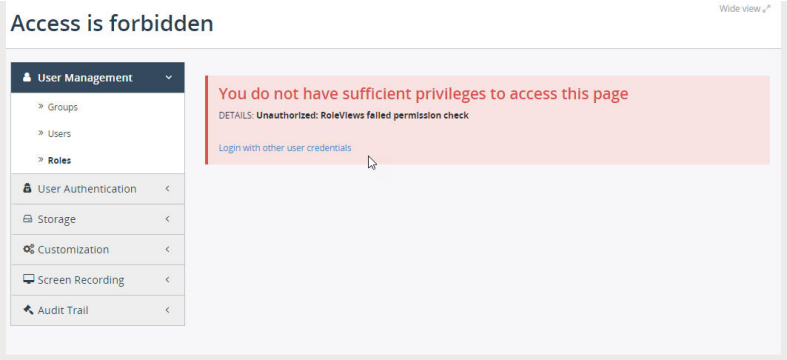
To view Administration tools, click on the Administration tab at the top of the portal view.



Each area shown within the Administration section offers information and helpful tools for Admins.

Access and Permissions

Please note, there are many areas in Administration where information may be displayed to the Administrator where it is helpful to see, but specific actions can remain locked and related tasks cannot be performed without additional access permissions. If an Administrator (or Supervisor) attempts to access areas or perform tasks that they have not been granted access to, the system will provide a notification to the user:

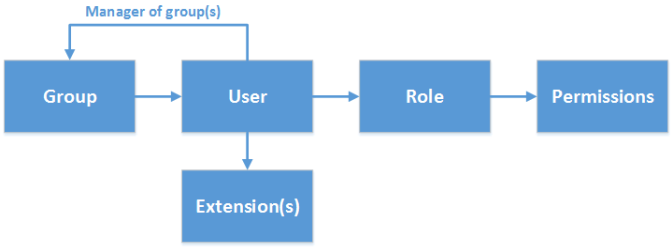


The way permissions are used for Roles, Groups, and Users at the organizational (AKA: Tenant) level is described in the sections below.

User Management

Roles

Call Recording software provides role-based access control features with granular permissions.
Each user account is associated with one role, and each role is pre-configured with a set of permissions.



Each licensed user in the Call Recording system needs to have an assigned **Role**. The role fundamentally defines which system resources are accessible to the user and what operations or tasks they are permitted to perform using the service resources they are licensed to use.

Roles may only be added or deleted by the Root Administrator and cannot be edited or added by a Tenant level Administrator. Permissions include such privileges like "Configure System", "Configure Users", "Playback calls", "Delete calls", set Screen Recording Settings", etc.

By default, the following roles are pre-defined in the Call Recording system. An authorized Root Administrator may create new roles or modify existing ones:

Root Administrator – (Service Provider) This role has unlimited access to the system to assist Tenant level Administrators with implementation and maintenance at the highest levels – this level is for service provider access.

Administrator – (Tenant Admin) Users assigned to this role have a useful set of permissions as configured by the Root Administrator to manage groups, users, and tools at the tenant or enterprise level. This type of Administrator is generally authorized to manage other user accounts for call recording access and usage within their organization.

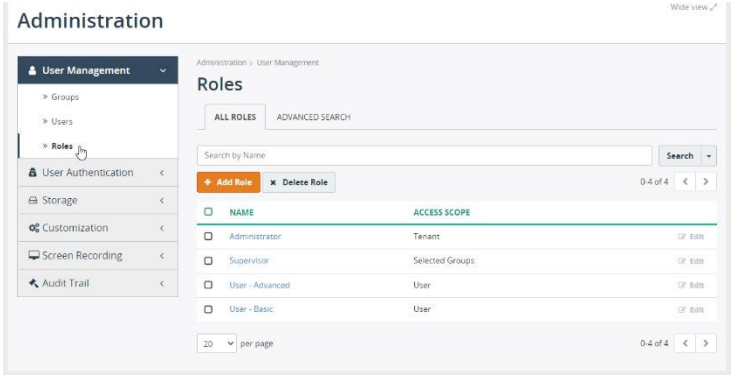
Supervisor – Supervisors are generally granted access to review and work with call recordings and possibly reports or other add-on tools that are associated with the users in his/her managed group(s). Supervisors are not granted permissions to create or delete other user accounts. A supervisor may be granted limited access to edit Agent/User accounts (to assist with password issues, etc.)

Users/Agents – This role is (and should be) limited in access. Most Users/Agents will not be granted permission to access the Call Recording portal or have access see or modify to their own call recordings. This role should be utilized for call center agents or employees who will just have calls recorded but will not manipulate those call recording files in any way. If there is a need for someone to review their call recordings (or the recordings of others), that user should be assigned to the Supervisor role and provided with access credentials to log into the portal. If permission is granted to a User/Agent to access the Call Recording portal and their recordings, the minimum level of access to specific tools should be enabled and caution should be used to ensure the organization clearly defines the amount of access each individual should have to delete, mark as confidential, or modify the information related to their call recordings.

List of Roles

Navigate to **Administration > User Management > Roles** to see a list of available roles in use within your enterprise.

During installation Call Recording automatically loads the default roles defined by your organization and the service provider. These are generally license-based and provide a specific set of features and tools for each user type by default. An Administrator may view the roles and their settings. Only the Service Provider may change Roles or their settings.



Note: In general it is best to edit feature or tool access permissions individually for each user rather than attempting to modify Roles.

Access Level / Scope

Access scope setting specifies which resources are accessible by a user assigned to a specific Role. An authorized Root Admin (the Service Provider) has access to define Roles and modify Access Level and Scope.

Tenant Admins may view the current access level / scope for each role by going to:

Administration > Roles > click on the desired Role name to review the currently defined settings.

Permissions

Permissions settings specify what operations are permitted on the accessible resources. These operations include view, edit, delete, playback etc. and permission at the Role level are defined at the Root Admin level by the Service Provider.

Tenant Admins may view the current permissions for each role by going to:

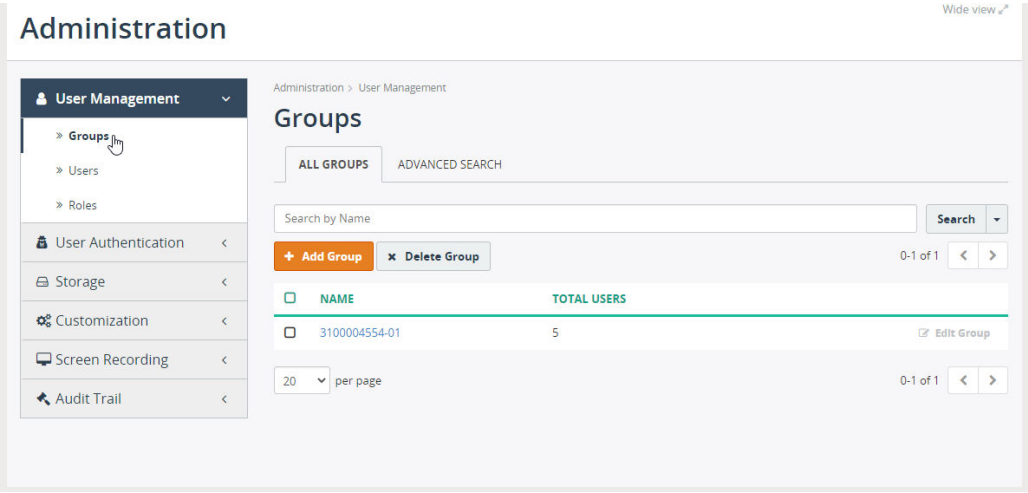
Administration > Roles > click on the desired Role name to review the currently defined settings.

Note: The organization's Call Recording Admin should contact the Service Provider for more information or assistance with Roles.

Groups

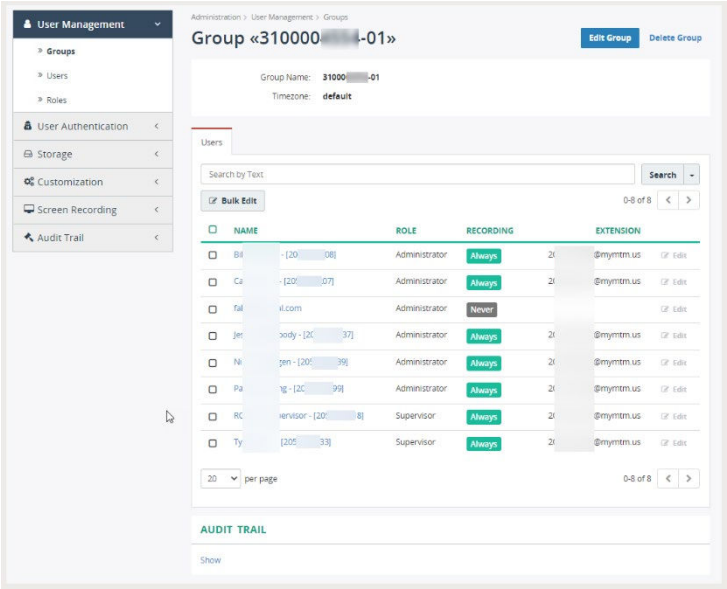
Each Call Recording license holder (user/supervisor/admin) will belong to at least one group by default, and can be re-assigned to different to a group by an Administrator. Most Call Recording license holders are just members of a group being recorded and *do not require or need access to the Call Recording portal* to perform tasks. But some Call Recording license holders may be assigned a Supervisor role, and they may also be allowed to manage call recordings for one or more groups. Each license holder will be assigned to one group - but may also be a member of multiple managed groups. An Admin may set Supervisors or Admins to manage one or multiple groups.

Navigate to **Administration > User Management > Groups** to see a list of available groups. During installation Call Recording automatically pre-creates a few sample groups. An authorized Administrator may create new groups or edit existing ones.



View Group Members

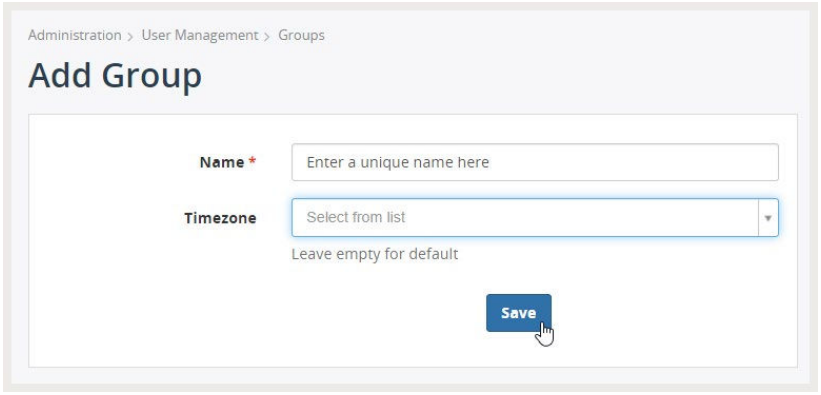
Click on the Group name in the list to view the group's profile page. This view displays a list of all users, who are currently assigned members of this group.



Add a Group

While viewing Groups, click on the **Add Group** button.

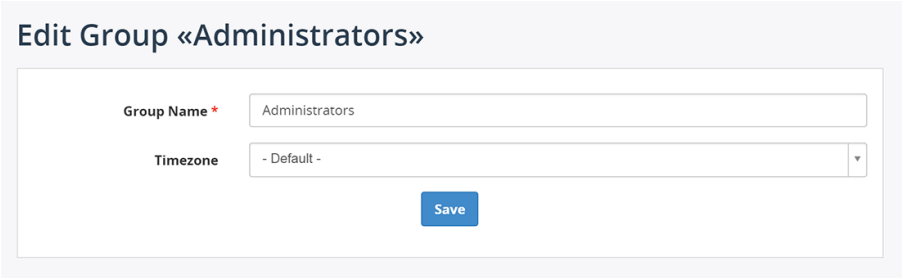
Enter a unique name and (optional) select a Timezone, then click Save.
This group will be available for selection when Adding or Editing Users.



Edit Group Settings

While viewing the profile, click on Edit group button. Configuration of group includes the following options:

- **Group Name**
- **Timezone**, which will be used by default for each user in this group. The timezone setting may be overridden on user's profile page.
- Click Save when finished.



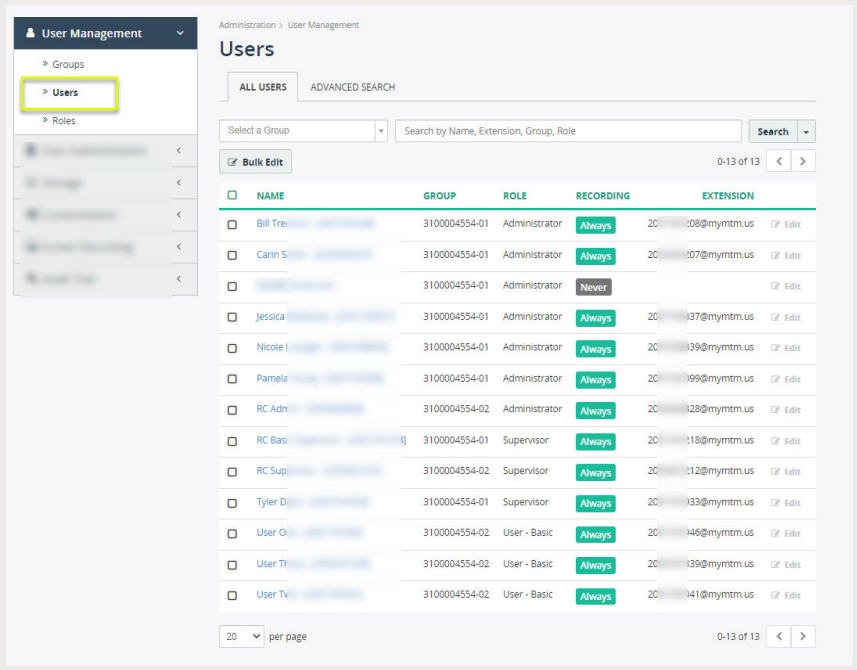
Add Users to a Group

See Add/Edit User

Users

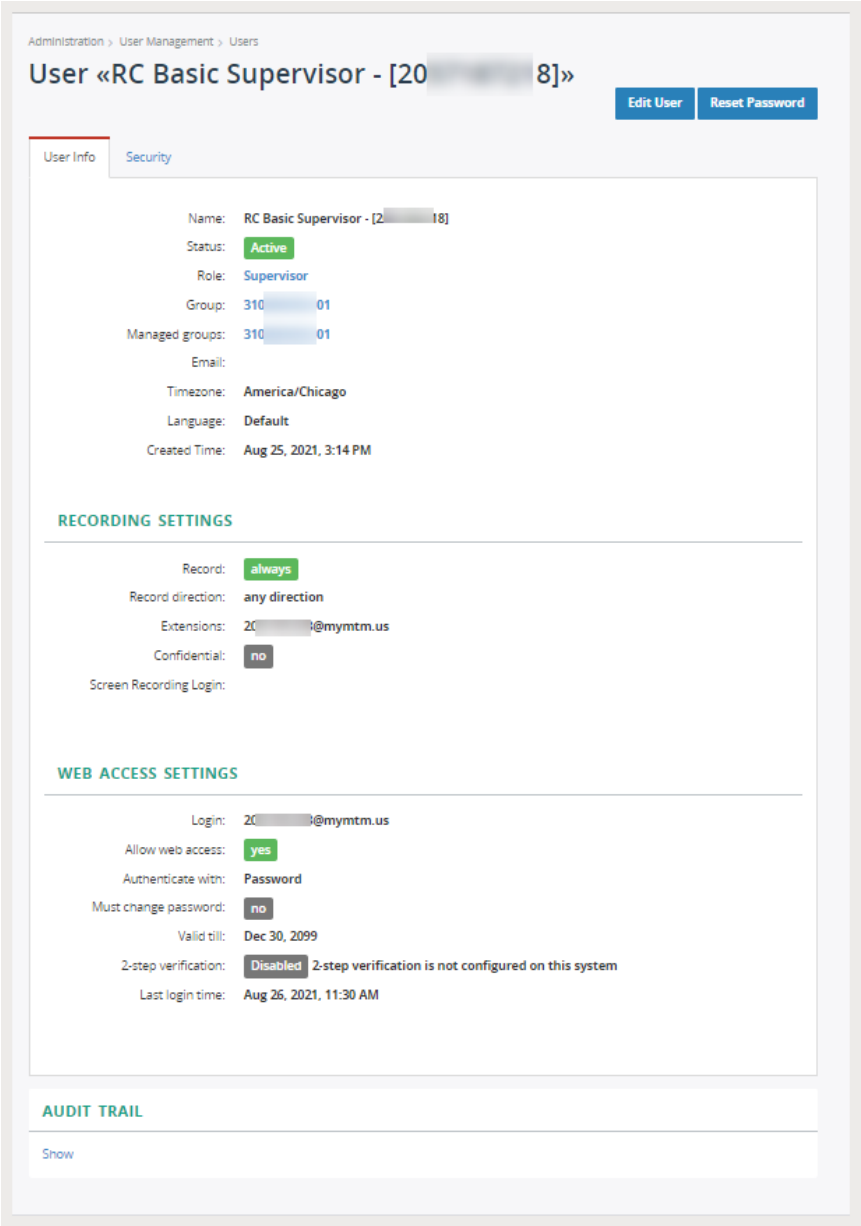
View List of Users

Navigate menu **Administration > Users Management > Users** to see a list of users. You can use the Search tool to find users by name, group, role, or extension.



View User Settings

While viewing the Users list, click on a user's name to open a view of the current settings.



Edit User Settings

Click on the **Edit User** button (top right) to review and manage the specific settings that are available be modified at the Tenant Level.

For example: In the Edit User view the selected license holder may be assigned to be a member of one or more **Groups**, and if a license holder assigned the Supervisor Role was selected, they may also be granted access to one or more **Managed Groups** (those groups containing a set of the users whose call recordings the Supervisor should be able to see and manage within the Call Recording Portal).

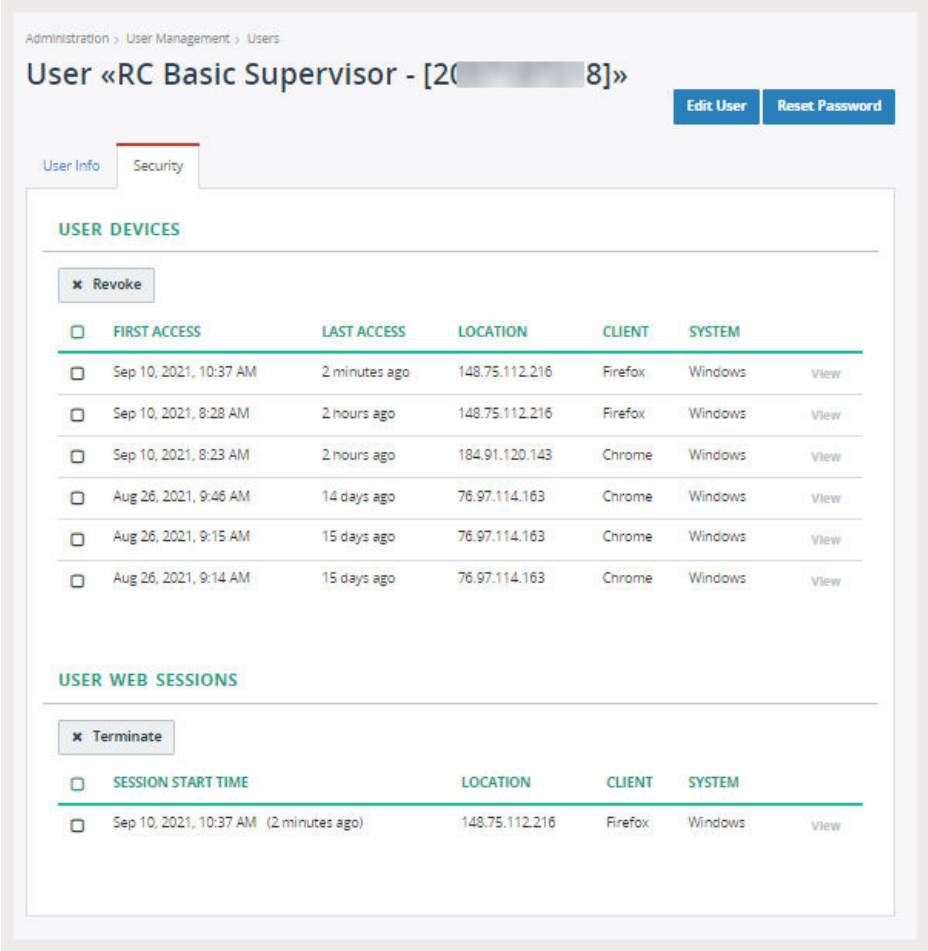
Additional editable settings shown in the *Edit User* view may include Recording Settings, Web Access Settings, etc.

View User Security Settings

While in the User setting dialog, click on the Security tab to review the latest access information.

The Admin can view information about devices used to access Call Recording and recent web sessions.

Tools may be provided to allow the Admin to Revoke device access or Terminate the current web session.



Revoke User Device Access

1. Click to place a check in the box adjacent to a listed user device to select it.
2. Click the Revoke button (above the User Device list) to disallow access by the selected device(s).

Terminate a User Web Session

1. Click to place a check in the box adjacent to a listed User Web Session to select it.
2. Click the Terminate button (above the User Web Session list) to end the session.

Reset Password

Important Note:

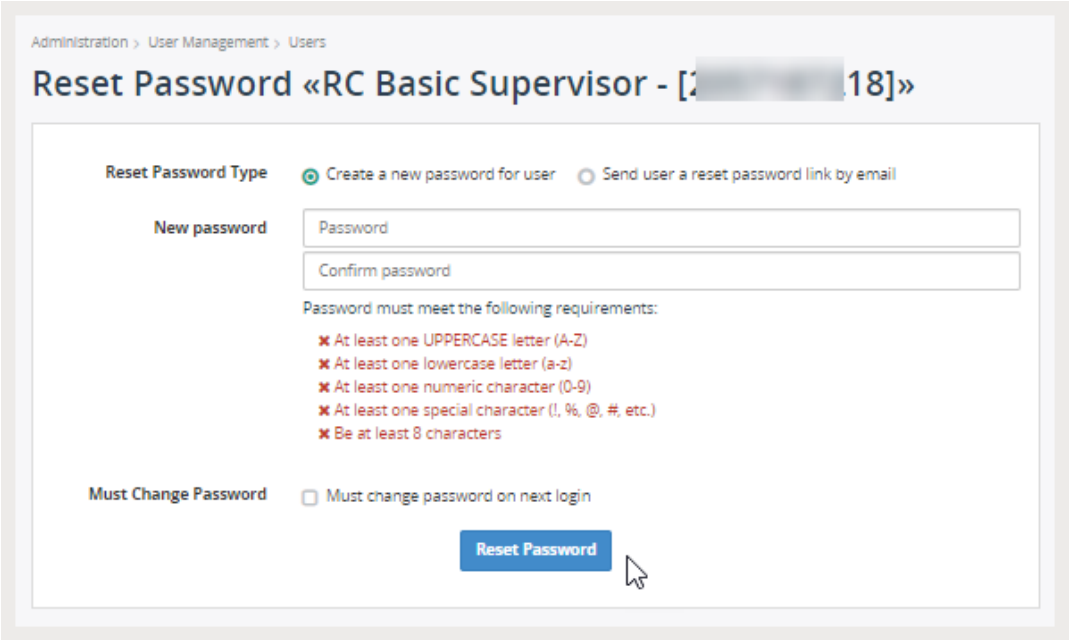
Use the following steps ONLY if SSO is not in use and direct login steps are used.

Where Single Sign On (SSO) protocols are in use for the organization, Admins should manage Password Credentials in the Cloud Services Portal. When Call Recording is accessed via the link in either the Dashboard Applications widget or the Call Recording section of the Cloud Services Portal, Reset Password in the Call Recording portal should not be used and may be disabled to ensure the SSO protocol is sustained.

Reset Password

While reviewing the User settings dialog, an Admin may have access to Reset a user's password.

1. Click on the **Reset Password** button (top right) to open the *Reset Password…* dialog.



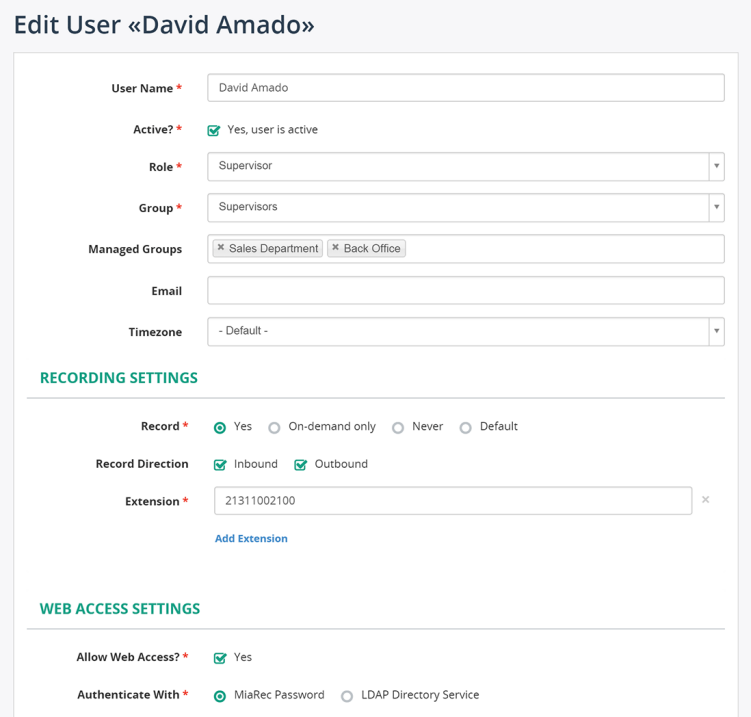
2. Select or define the following:
   - **Reset Password Type** – Pick the way the password will be updated:
     - Select ⊙ **Create a new password for user** and enter the New Password ensuring it meets all security requirements, OR…
     - Select ⊙ **Send user a reset password link by email** (recommended) to allow the user to securely create their new password.
   - **Must Change Password** (optional) – Click ☑ to enable the ***Must Change password on next login*** option to require the user to update the password the next time they sign in.
3. Click the Reset Password button to save and submit the new information.

Edit a User

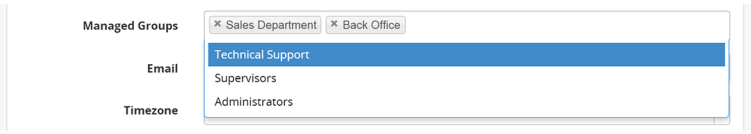
If the Administrator has access to perform this task while viewing the list, click on the **Edit** link adjacent to a user (far right), OR While viewing the User's settings, click on the **Edit User** button (top right). When finished making changes click **Save.**

User Profile Settings

The first section includes the following fields and settings:



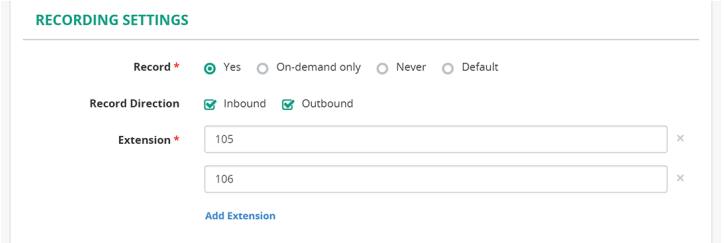
- **User Name** – Required. Enter a unique name.
- **Active** – Click to place a check next to Yes, user is active. Return here if there is a need to remove the check and make the user inactive, or to check to see if that permission needs to be re-enabled.
- **Role** – The role for the user is defined when the license is ordered and may be Supervisor, Admin, or User/Agent (not working in this portal).
- **Group** – Select the correct group(s) to which this user belongs. This could be set based on locations, departments, or any other useful grouping protocol. Each user may be assigned to one or to multiple groups.
- **Managed Groups** – If the user's role has access level Supervisor or Administrator, then you can select the group(s) that this user will manage (may see/access the audio/video recordings, make notes, and perform reporting tasks for the users assigned to the groups selected here). You may select one or more groups from the list for the Supervisor to see in the Call Recording portal.



- **Email** – Enter an email address for this user. This email will be used to send correspondence to the user for shared recordings or password updates (if these features are in use).
- **Timezone** – By default the timezone is derived from the host server's timezone setting, however it may be defined here. Please note, the user may also update this information in their profile.

User Recording Settings

- **Record – Define whether and when recordings will occur – Yes (always), On-demand only, Never, or Default (defined by the organization and set at the root level).**
- **Record Direction** – Define whether recordings will trigger on inbound only, outbound only or both.
- **Extension** - *Call Recording uses the extensions configuration to automatically associate call recordings with users.* If it is

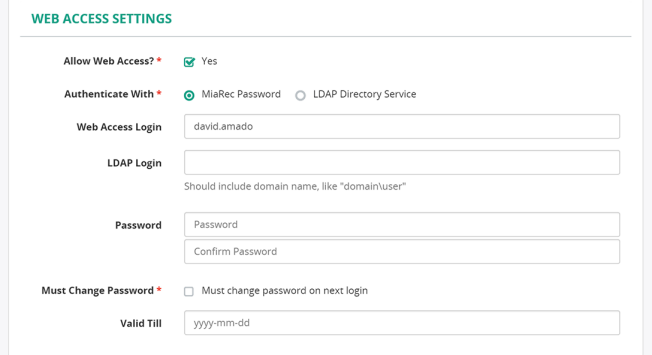


necessary to record the calls of a user or Supervisor, then all of the extensions that are assigned to this user must be specified. One user may have more than one extension. Tools are provided to include more extensions, as needed.

User Web Access Settings

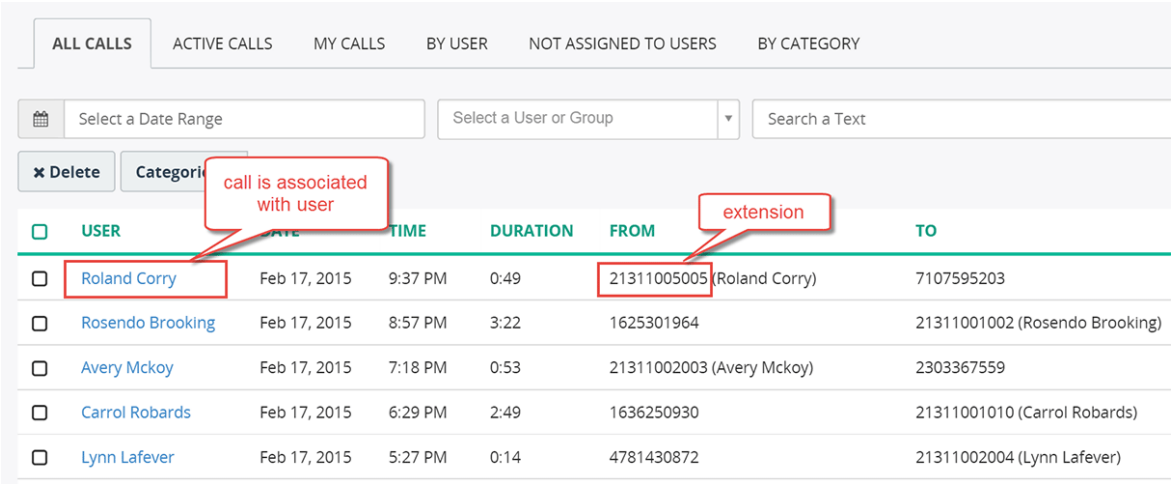
If the user needs access to Call Recording web portal, then administrator may create a login for him/her.

Note: For security it is recommended that only Supervisors and Administrators receive credentials to access to the portal.



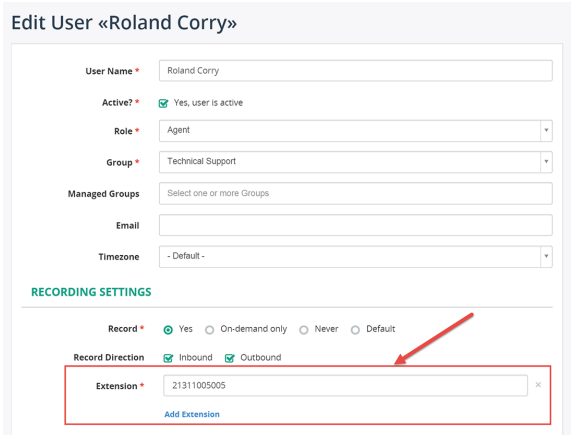
Associating Calls with Users

Call Recording automatically associates calls to users based on the extension(s) defined in the User's profile.



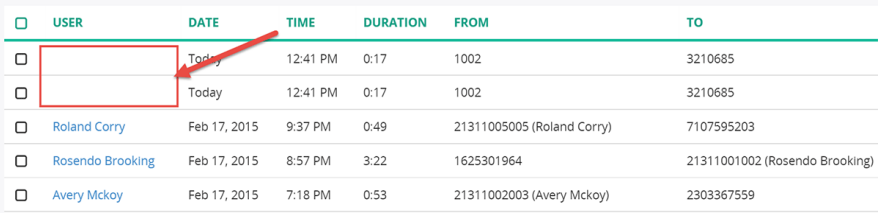
Administrator should configure extension on user's profile page. In below screenshot user "Roland Corry" is configured with extension "21311005005". When Call Recording recognizes a call with extension "21311005005", then the call is automatically associated with user "Roland Corry".

Such call association allows quick filtering of calls by user name. Also, this information is used when granting access to recordings. For example, Supervisor will be able to view only call recordings, which are associated with users in his/her group.



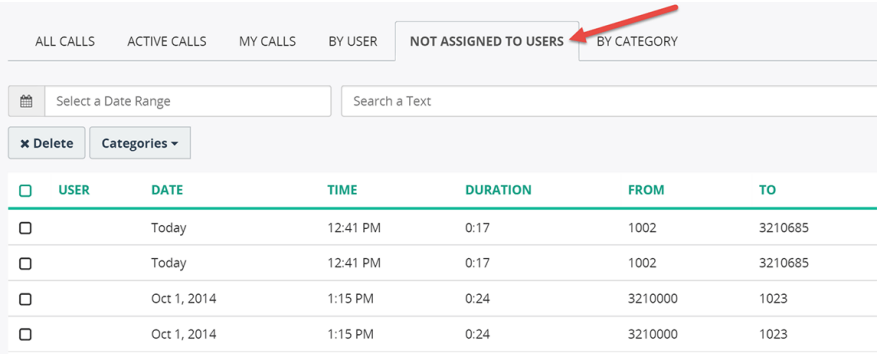
Manage Calls That Are Not Yet Assigned to Users

If Call Recording doesn't recognize an extension for a newly recorded call, **then a default recording rule applies for the call**. By default, Call Recording is configured to record such unknown calls that come into the system and display them to authorized Administrators, but this behavior may be changed by the Service Provider. Administrators may see that a call with an unknown extension is recorded in the Recordings list. The column "User" will be empty (as shown in below screenshot).



USER	DATE	TIME	DURATION	FROM	TO
	Today	12:41 PM	0:17	1002	3210685
	Today	12:41 PM	0:17	1002	3210685
Roland Corry	Feb 17, 2015	9:37 PM	0:49	21311005005 (Roland Corry)	7107595203
Rosendo Brooking	Feb 17, 2015	8:57 PM	3:22	1625301964	21311001002 (Rosendo Brooking)
Avery Mckoy	Feb 17, 2015	7:18 PM	0:53	21311002003 (Avery Mckoy)	2303367559

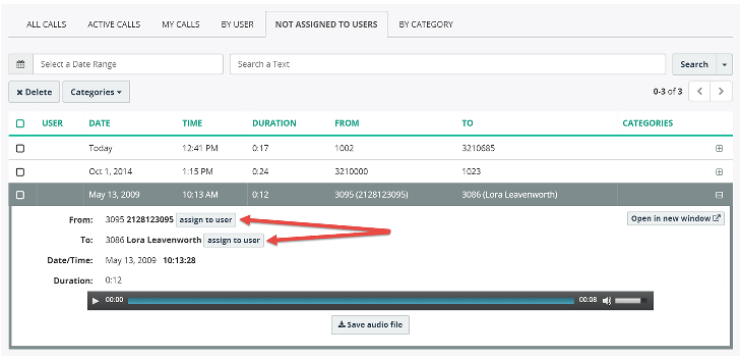
Also, these calls are displayed in the "Not assigned to users" view (visible only to Administrators).

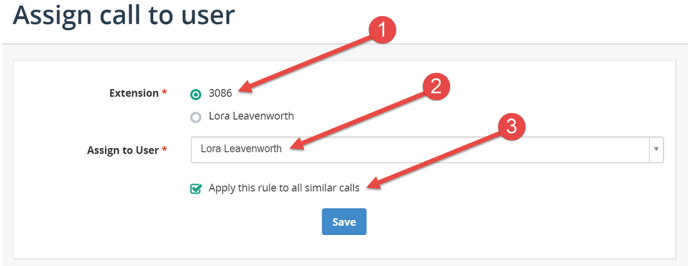


USER	DATE	TIME	DURATION	FROM	TO
	Today	12:41 PM	0:17	1002	3210685
	Today	12:41 PM	0:17	1002	3210685
	Oct 1, 2014	1:15 PM	0:24	3210000	1023
	Oct 1, 2014	1:15 PM	0:24	3210000	1023

An authorized Administrator can manually assign the call to one of existing users.

1. Click on a call to display call details.
2. Click on **Assign to user**.
   A new page displays the following options to review:
   Extension – Select the number/extension **or** the phone name to associate and display for calls in the lists.
   Assign to User – Select The user to associate this call with.
   Apply this rule to all similar calls - When checked, then other calls with the same extension will be automatically assigned to this user. Note, Call Recording will search only calls which are not assigned yet to any of the users.





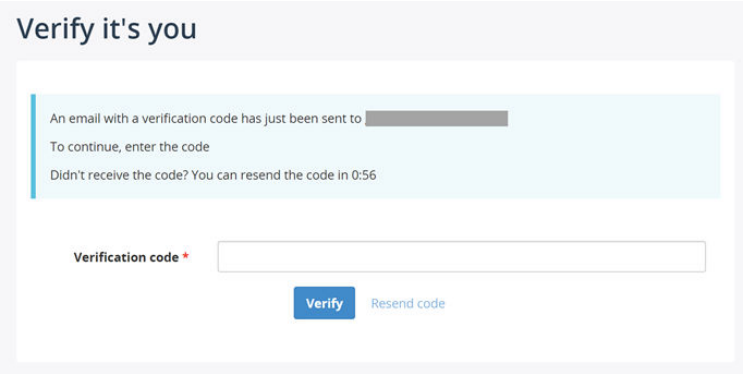
3. Click **Save** and the recorded calls will be searched and automatically assigned to the selected user. Additionally, the selected extension will be automatically added to user profile.

Impersonate a User

Call Recording offers authorized Admins a tool for viewing the portal the way another licensed user does. This is called **Impersonation**. This tool may be useful for seeing how a dashboard looks to a user with less access or to ensure a Supervisor can see all users they should manage. Please note that while in Impersonate mode, an Admin can only perform the level of tasks the user is permitted. Administration tasks should only be performed when NOT in Impersonate mode.

1. Navigate to **Administration > User Management > Users**
2. Click on the name of a licensed user in the list.
3. Click on the **Impersonate** button (top right) to begin reviewing Call Recording as though logged in as the person selected for impersonation.

   Please note, some organizations using SAML 2.0 access may require the Admin to *verify it's you* (if enabled on the tenant) to add another level of security when attempting to make changes while impersonating another user. Enter the verification code (sent via SMS or Email as defined by the organization) when prompted and click **Verify** to continue. A *Resend code* option is available, if needed.



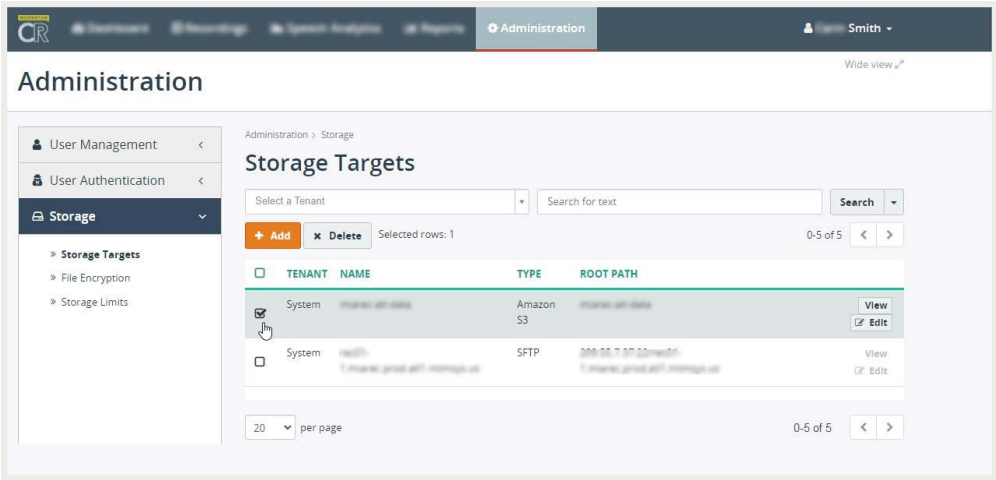
4. When you are finished reviewing the user's view of Call Recording and wish to return to view the portal using your own Administrator account credentials, click on the drop-down arrow next to the user's name being impersonated and select the **Exit user impersonation** option.

Storage

Click on Storage to view information about Storage Targets, File encryption and the Storage Limits/Usage.

Storage Targets

Click on **Storage Targets** (if available) to view or manage recording storage locations.



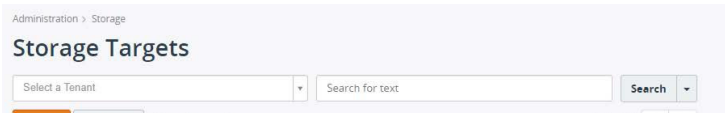
Call Recording provides helpful tools for Admins to manage recording storage. Tasks that can be made available to Administrators once a storage option is defined/purchased include the ability to view, test, add, edit, and delete storage targets.

Storage can be hosted ($) or non-hosted and the following storage target types are supported:

- Option 1 Non-Hosted - Audio and/or Video recordings are available in storage for 90 days. Customer can download recordings for archive at any time as desired for up to 90 days (from the date of recording).
- Option 2 Provider Hosted ($) - Purchase of license(s) required. Audio and/or Video of recordings are stored by the Service Provider for the amount of time purchased. Customer may download for archive at any time while the recordings are available in storage.
- Option 3 BYO Storage ($) - A fee for setup / implementation is required. Audio and/or Video recordings are stored to the customer's storage site.

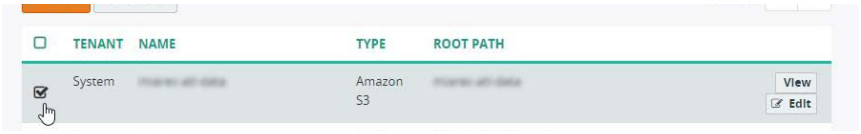
Search Storage Target List

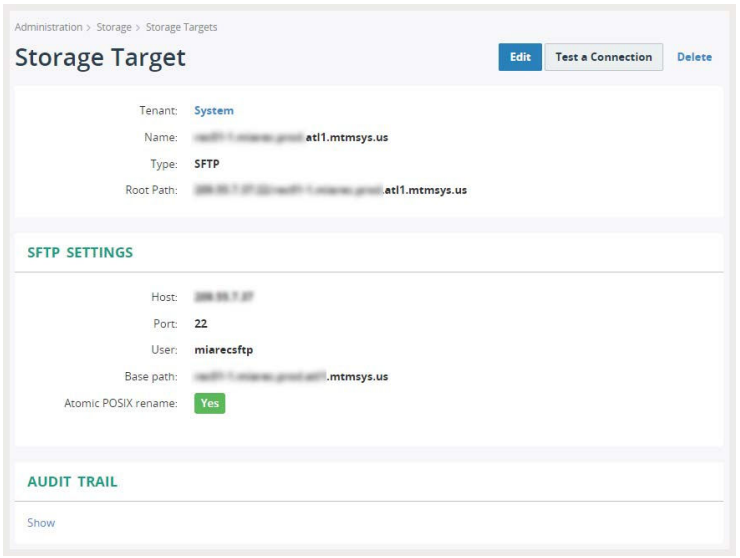
While viewing Storage Target list, the section above the list offers useful search tools. The Admin can use the Search by Tenant selection tool or enter text and then click the adjacent **Search** button to filter the list and locate the correct item(s).



View Storage Target Setup

While viewing the Storage Target list, an authorized Admin may click to place a check in the adjacent check box ☑ to select it and then click the listing's **View** button (far right) to open a dialog that displays the item's current setup.



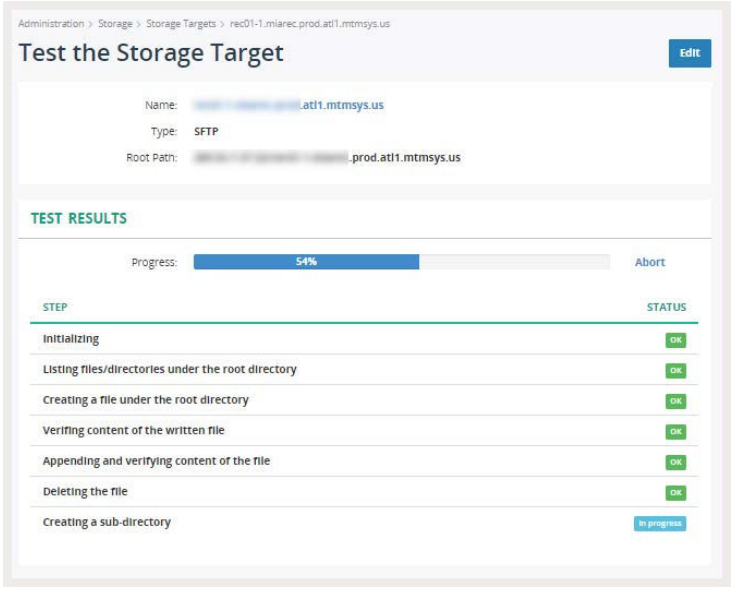


Test a Target Connection

Call Recording offers authorized Admins a tool to Test the connection to a Storage Target while viewing the Storage Target setup. Note: A similar test tool is also available when Editing or Adding a Storage Target.

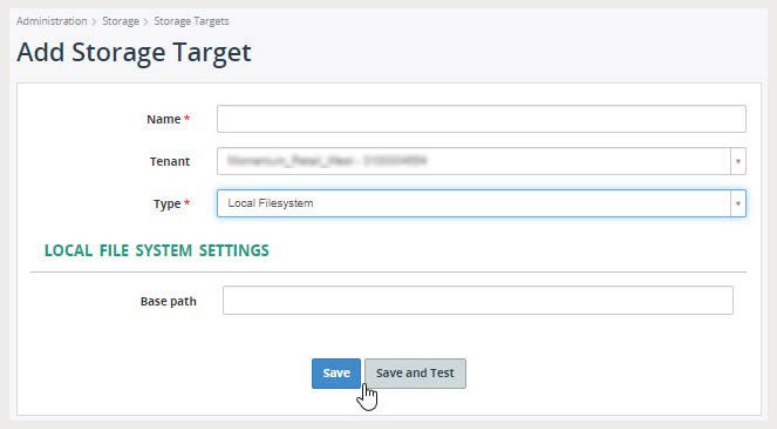
Click on the **Test a Connection** button in the dialog (or *Test and Save* in an Edit/Add dialog).

A new dialog displays which provides a dynamic view of the test process steps and color coded final results for review.

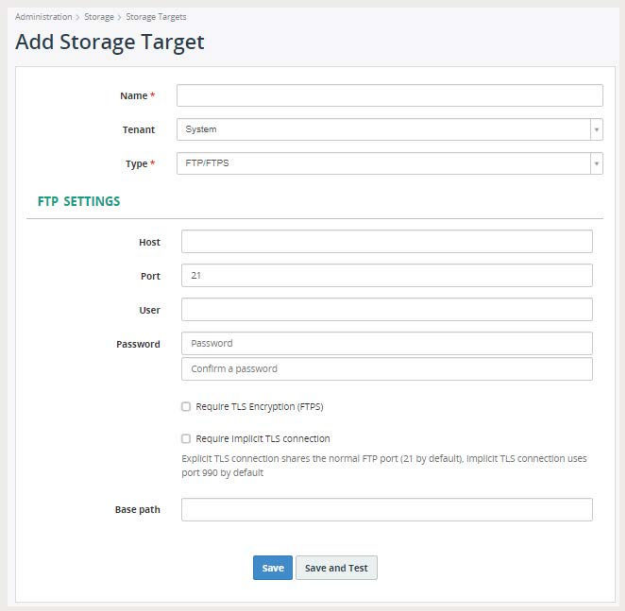


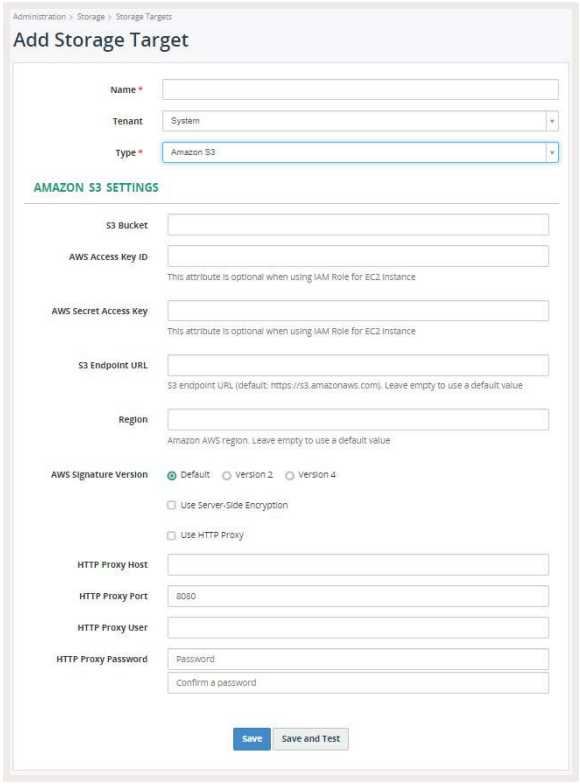
Add a Storage Target

1. While viewing the Storage Target list
2. Click on the + Add Add button to begin creating a new Storage target.
3. Enter a unique Name for the target.
4. Select the correct storage Type per your license agreement.
5. The dialog will dynamically display additional fields based on the selection made here to assist with setup.



Here are some examples of the dynamic views displayed to assist in the setup of storage target types:





7. Complete the required fields for the storage type selected, and include any additional information in the optional fields.
8. Recommended: Click **Save and Test** when finished to ensure the connection is good for the new target, or click the **Save** button.

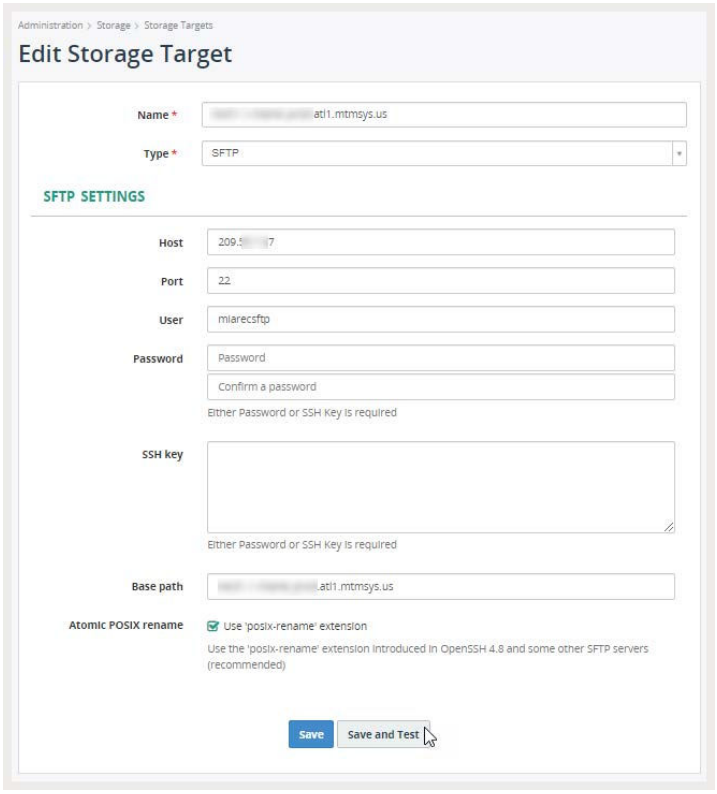
Note: To cancel without creating a new storage target, simply exit the dialog without clicking a Save option, or click the back button on the browser to return to the previous view.

Edit a Storage Target

1. While viewing the Storage Target list
2. Click on the adjacent Edit button (far right) to begin modifying a Storage target.

3. Edit the information or type for the target, as needed.
   The dialog will dynamically display any necessary fields based on the new selections made.
4. Recommended: Click **Save and Test** when finished to ensure the connection is good for the new target -
   Or click the **Save** button.

   Note: To cancel without making changes to the storage target, simply exit the dialog without clicking a Save option, or click the back button on the browser to return to the previous view.



Delete a Storage Target

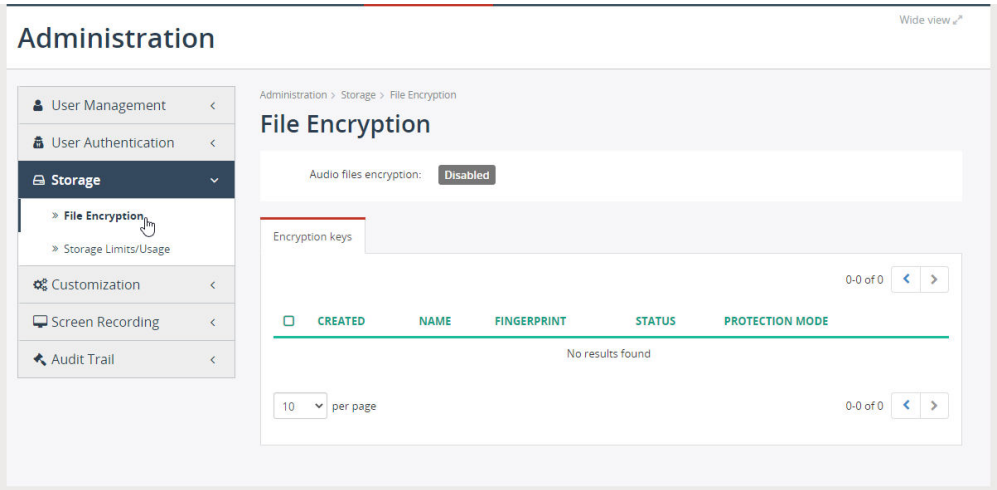
Use Caution. This action is performed immediately.

1. While viewing the Storage Target list
2. Click to place a check mark next to the desired item in the Storage Target list.
3. Click the **Delete** button displayed above the list.
   The storage target is immediately deleted, however an UNDO option displays to allow the Admin to reverse the action and return the storage target to the list.

Click the UNDO link above the list to keep the storage target and cancel the delete action.

File Encryption

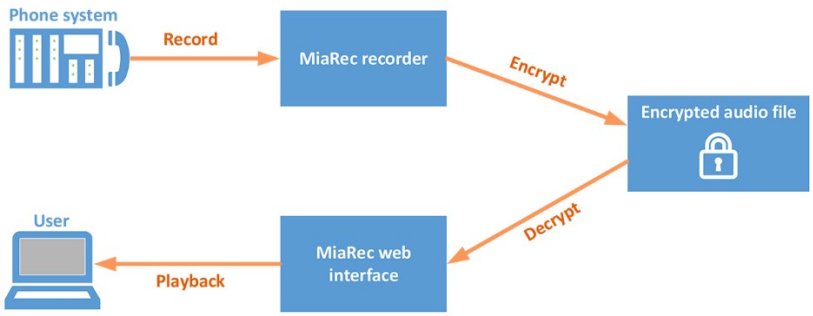
Click on **File Encryption** to review information about the configuration and encryption keys.



Call Recording provides rock-solid audio encryption functionality, ensuring all call recordings are securely stored. Call Recording encryption functionality helps companies confidently adhere to the highest corporate security standards and comply with legal regulations such as PCI-DSS, HIPAA, Dodd-Frank, and Sarbanes-Oxley.

Some key features of Call Recording audio file encryption:

- Asymmetric encryption, where a public key is used for encrypting and a private key is used for decrypting
- Administrator has control over who can play back (decrypt) the recordings
- In a multi-tenant mode, each tenant has it's own unique encryption key
- Encryption is applied to backup data, as well



Audio File Encryption vs Role-Based Access Control

Call Recording role-based access control system provides protection of data from unauthorized access to the Call Recording web-portal. Everyone accessing the system must be an authenticated user with associated set of permissions. Audio file encryption provides an additional layer of security over the role-based access control system in Call Recording. If encryption is enabled, then audio files are stored on a hard disk in encrypted format. This insures that even if unauthorized user gains physical access to the storage system, he/she has no ability to play back recordings because he/she doesn't have the private encryption key.

Download of Encrypted Recordings

When a user downloads individual call recordings through Call Recording portal, the file is **decrypted** during that process. The file is saved on the user's computer in unencrypted form and they can play the .wav file at will.

*However, when a user uses the **bulk download** feature to download multiple call recordings, then the downloaded files are retrieved in encrypted form in a ZIP archive. The user cannot play back such call recordings unless he/she imports them into the Call Recording system together with private encryption key.*

Encryption for Backups

Use of file encryption is beneficial for backup data, as well. All recordings in backup archive can be encrypted.

Encryption Algorithms

Call Recording encrypts every call recording with asymmetric encryption. For every recording, Call Recording generates a random AES encryption key. This symmetric encryption key is then encrypted using asymmetric encryption (one key for encryption - often referred to as the "public" key - and a different key for decryption - often referred to as the "private" key).

Call Recording uses Advanced Encryption Standard (AES) for symmetric encryption (256-bit key) and the Rivest-Shamir-Adleman (RSA) public key algorithm for asymmetric encryption (2,048-bit keys).

The details and theory behind the asymmetric encryption method is beyond the scope of this article. However, a good primer is available at https://en.wikipedia.org/wiki/Public-key_cryptography. In short, a public key is used for encrypting data and private key is used for decrypting it. The public key doesn't need to be stored securely. Anyone can access the public key, but no one can use the public key to decrypt the data that the public key encrypted. The only way users can decrypt data is with the private key.

User Access to Encryption Keys

The Service Provider must grant particular Administrators access to encryption key(s) before they can play back (decrypt) audio files. Note, the administrator may grant access only to those encryption keys which are granted to him/her. If administrator (even if he/she has role "Root administrator") has no access to the encryption key, then he/she cannot grant access to other users for the same key.

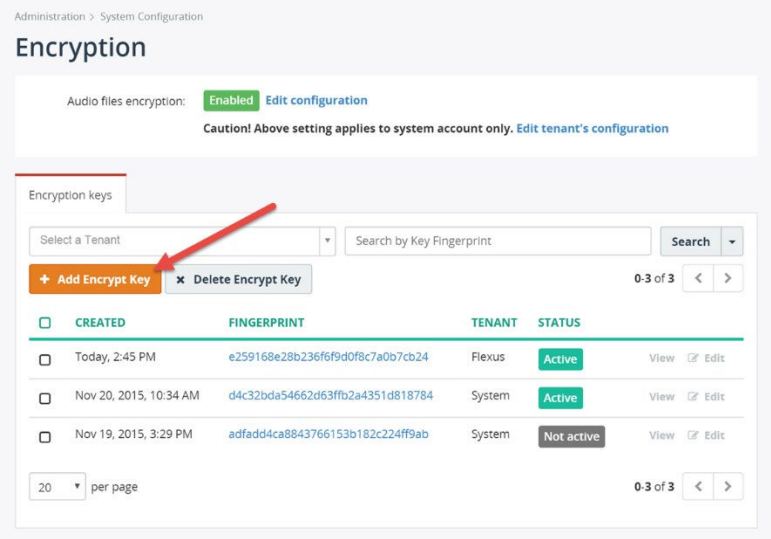
Call Recording software never stores encryption keys in the database in plain text for security reasons. Even if an unauthorized party gains access to database files, he/she could not retrieve the private keys because they are stored in encrypted format. There is no way to gain user's private key without knowing the user's password.

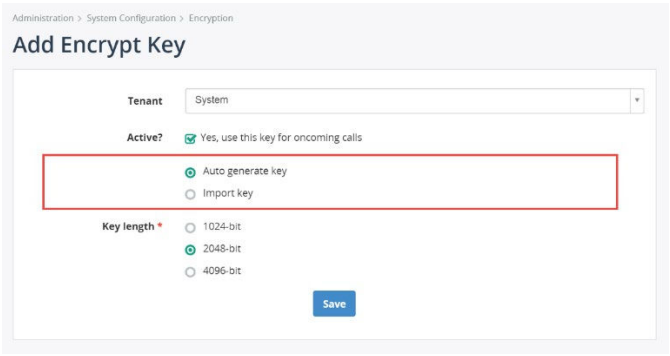
Encryption Key Configuration

These tasks require the Administrator to have permissions to access. Contact the Service Provider for assistance.

1. Create New Encryption Key

If authorized: Navigate to Administration > Storage > File Encryption to create new encryption key.

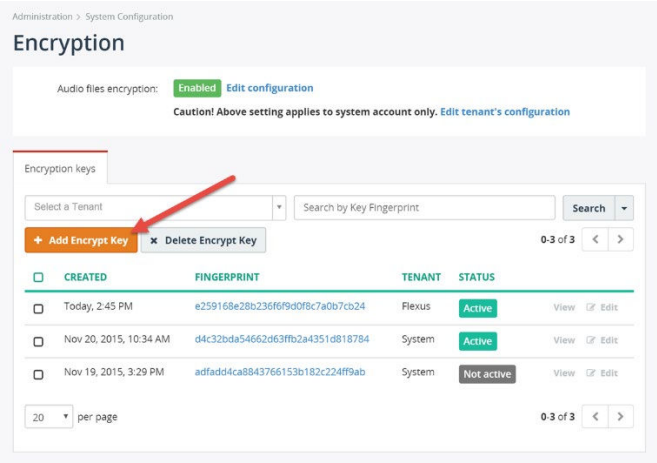


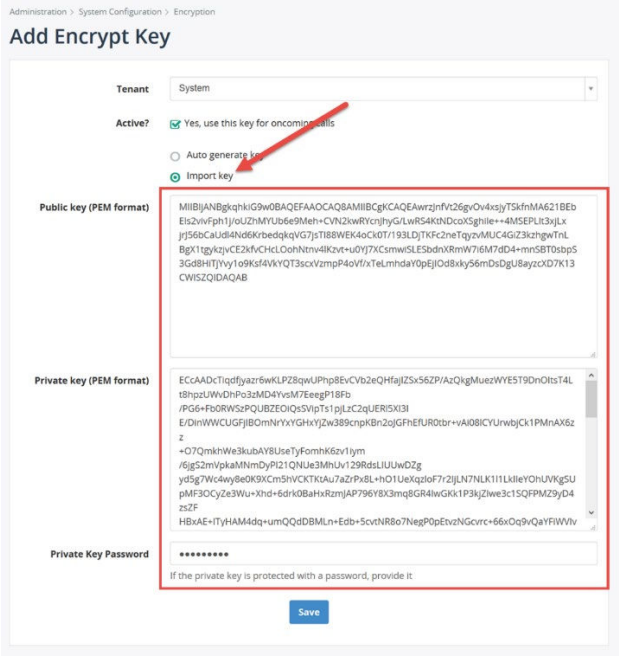


2. Import Encryption key

Encryption key can be imported from the existing key rather than generated from scratch.

Navigate to **Administration > Storage > File Encryption** to import the existing encryption key.

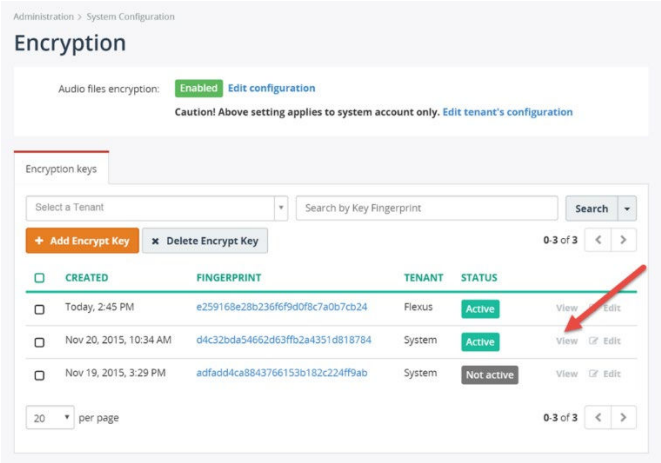


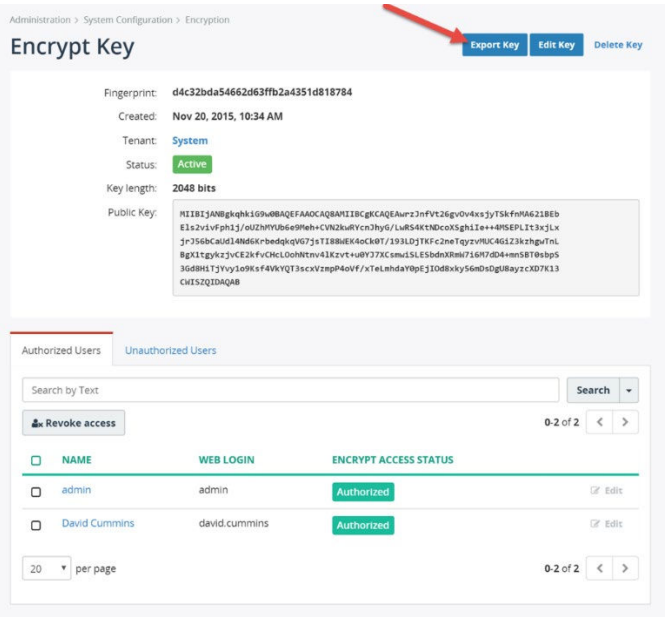


3. Export Encryption Key

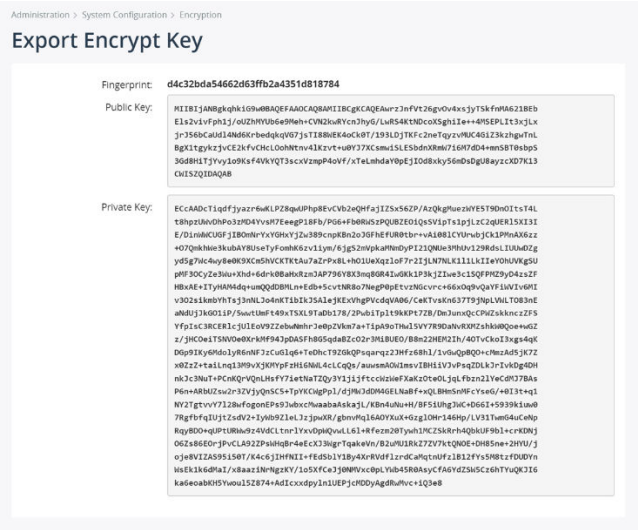
Navigate to **Administration > Storage > File Encryption** to export the existing encryption key.

It is highly recommended to export all existing keys and store them in secure place for backup purposes. You may need such backup copies when all authorized people forgot their passwords or database is destroyed and you need to recover the audio files from archive.


Administration > System Configuration
Encryption
Audio files encryption: Enabled Edit configuration
Caution! Above setting applies to system account only. Edit tenant's configuration
Encryption keys
Select a Tenant
Search by Key Fingerprint
Search
+ Add Encrypt Key
× Delete Encrypt Key
0-3 of 3
CREATED FINGERPRINT TENANT STATUS
Today, 2:45 PM e259168e28b236f6f9d0f8c7a0b7cb24 Flexus Active View Edit
Nov 20, 2015, 10:34 AM d4c32bda54662d63ffb2a4351d818784 System Active View Edit
Nov 19, 2015, 3:29 PM adfadd4ca8843766153b182c224ff9ab System Not active View Edit
20 per page
0-3 of 3

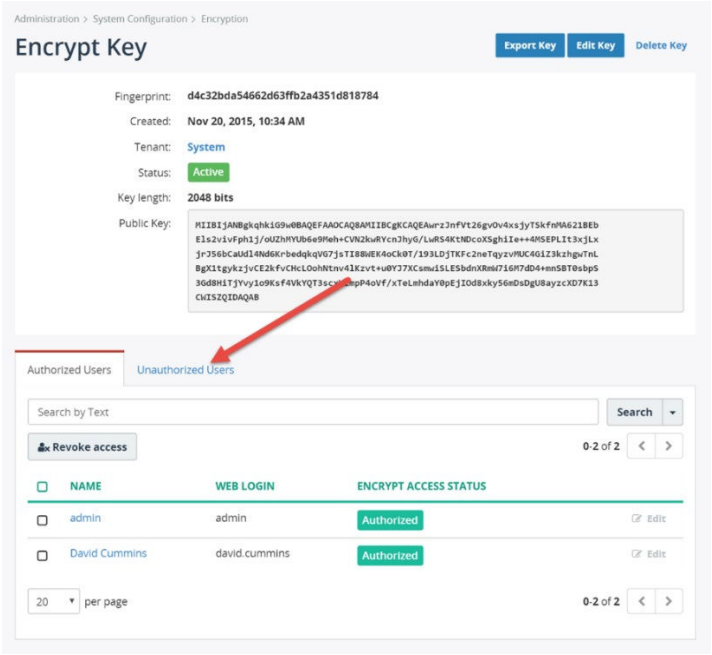

Administration > System Configuration > Encryption
Encrypt Key
Export Key
Edit Key
Delete Key
Fingerprint: d4c32bda54662d63ffb2a4351d818784
Created: Nov 20, 2015, 10:34 AM
Tenant: System
Status: Active
Key length: 2048 bits
Public Key:
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAwrzJnfVt2GgvOv4xsjyTSkfnMA621BEb
Els2vivFph1j/oUZhMYUb6e9Meh+CVN2kwRYcnJhyG/LwRS4KtNDcoXSghiIe++4MSEPlIt3xjLx
jrJ5GbCaUdl4Nd6Krbedqkq VG7jsTI88WEK4oCk0T/193LDjTKFc2neTqyzvMUC4GiZ3kzhgwTnL
BgX1tgykrjvCE2kfvChcLOohNtnv4lKzvt+u0YJ7XCsmwiSLESbdnXRmN7i6M7dD4+mnSBT0sbpS
3Gd8H1TjYvy1o9Ksf4VkYQT3scxVzmpP4oVf/xTeLmhdaY0pEjIOd8xky56mDsDgU8ayzcXD7K13
CWISZQIDAQAB
Authorized Users
Unauthorized Users
Search by Text
Search
Revoke access
0-2 of 2
NAME WEB LOGIN ENCRYPT ACCESS STATUS
admin admin Authorized Edit
David Cummins david.cummins Authorized Edit
20 per page
0-2 of 2

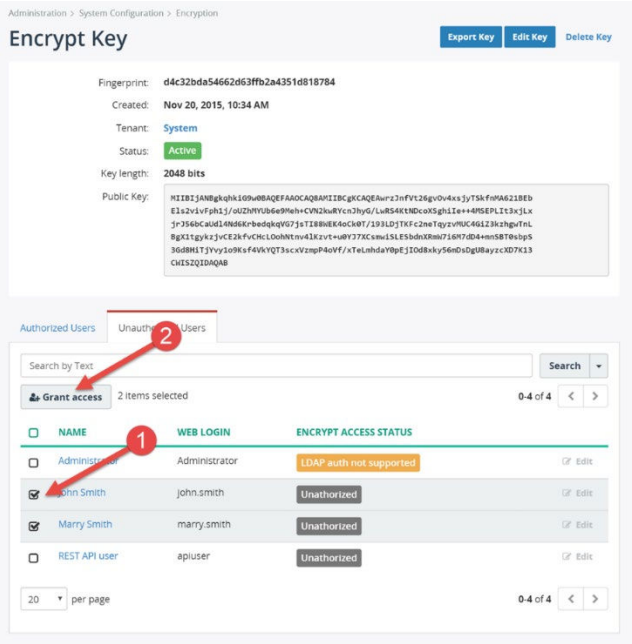

Administration > System Configuration > Encryption
Export Encrypt Key
Password (recommended)
strong
If specified, the private encryption key will be protected with a password
Export



4. Grant Access to Encryption Key

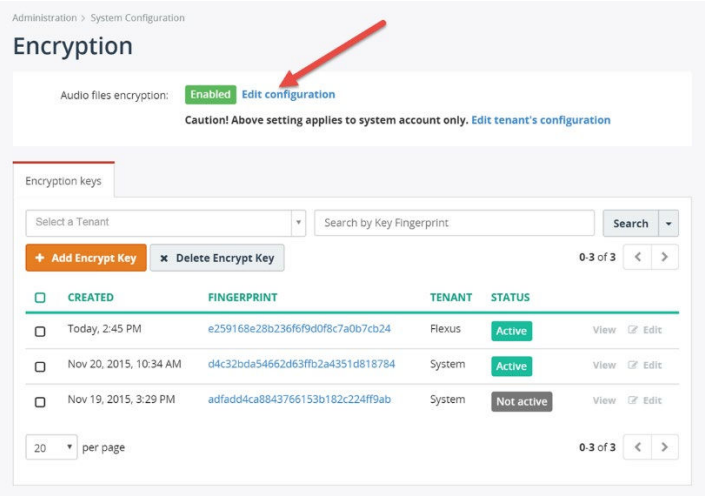
Navigate to **File Encryption**, select the appropriate key and authorize users to access the data encrypted with the same key. Administrators need to grant particular users the access to encryption key(s) before they can play back (decrypt) audio files. Note, the administrator may grant access only to those encryption keys which are granted to him/her. If administrator (even if he/she has role "Root administrator") has no access to the encryption key, then he/she cannot grant access to other users for the same key. Call Recording software never stores encryption keys in the database in plain text for security reasons. Even if an unauthorized party gains access to database files, he/she could not retrieve the private keys because they are stored in encrypted format. There is no way to gain user's private key without knowing the user's password.

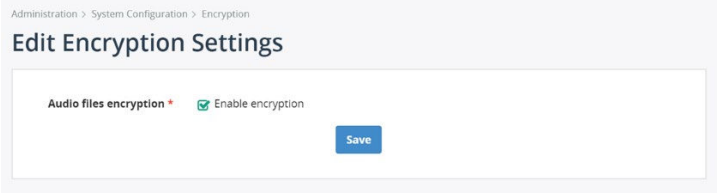




5. Enable File Encryption

If authorized - Navigate to **Administration > Storage > File encryption** and click "Edit configuration** to enable encryption for all data.



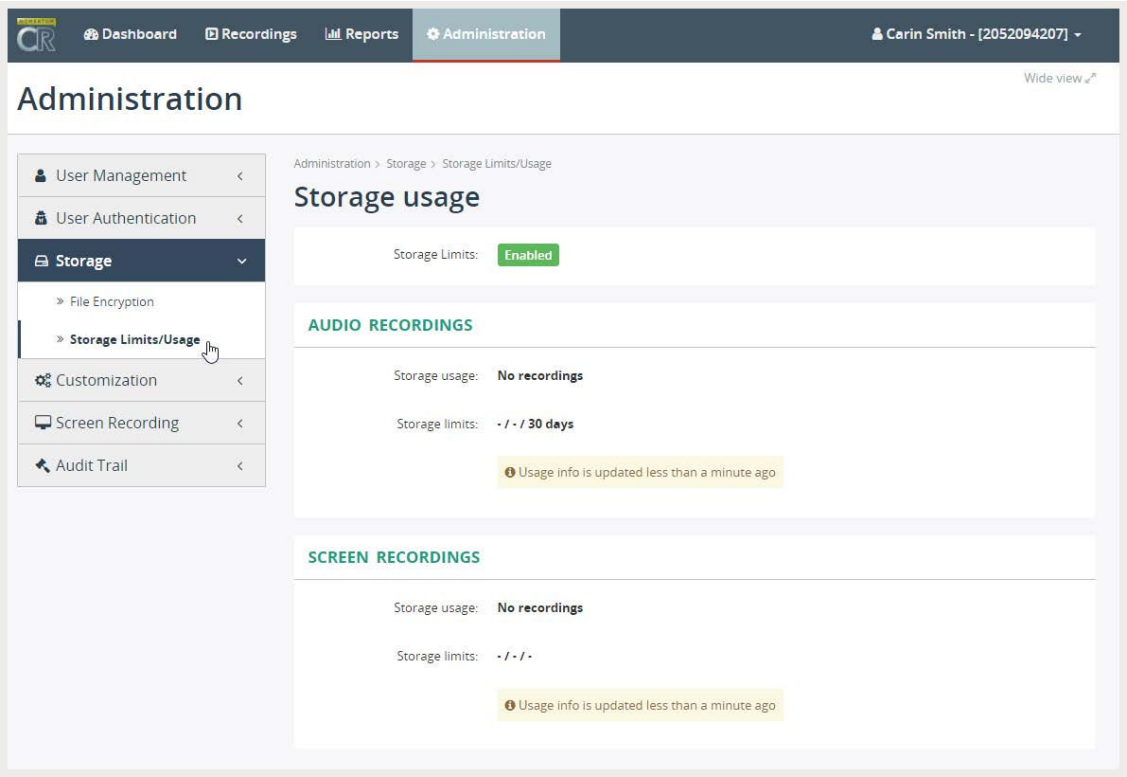


6. Export of the Encrypted Files

An important aspect of any file encryption facility's design is that file data is never available in unencrypted form except to users that access the file via the encryption facility. This restriction particularly affects backup process when data is exported to external storage. Call Recording addresses this problem by keeping files in encrypted form during backup process. The backup utility don't have to be able to decrypt file data before backup. It is safe to export encrypted files to backup archive. The backup archive may be imported back to the same system or to new system during recovery process. When importing data to new system, it is necessary to import old encryption key as well.

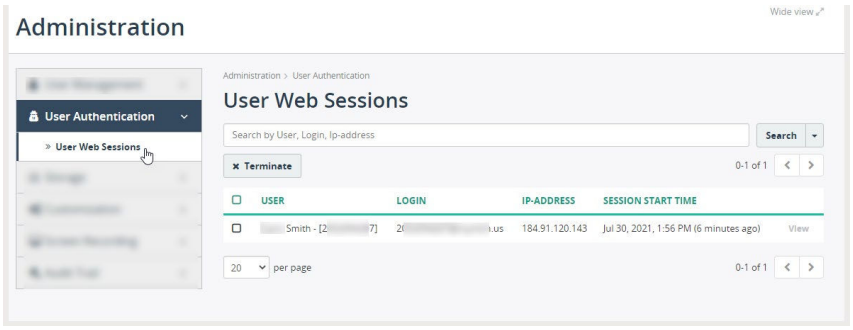
Storage Limits/Usage

Click on **Storage Limits/Usage** to review information about the current settings for audio and (where in use) screen recordings. Management is performed at the root level. Contact the Service Provider for assistance.



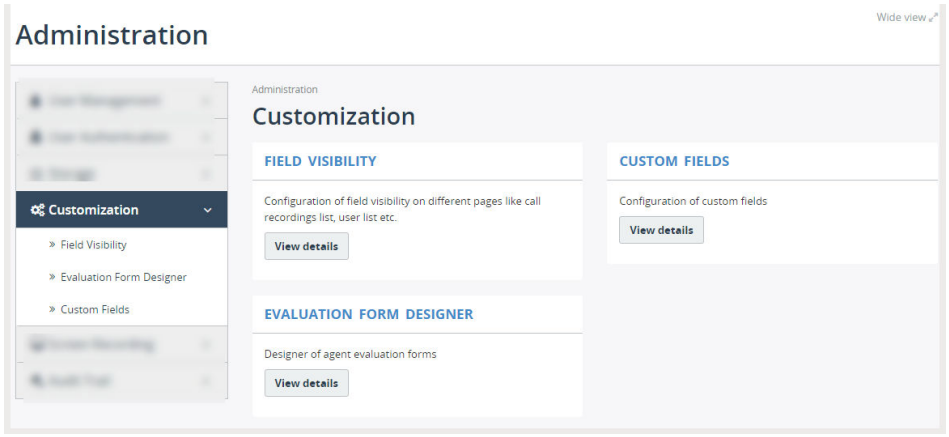
User Authentication

This area in Administration allows authorized Admins to review the current User Web Sessions and terminate a session as needed.



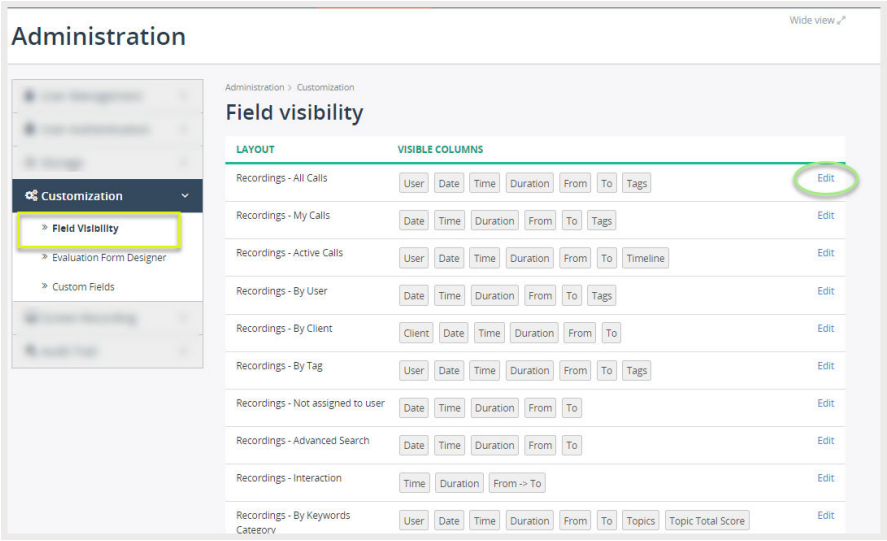
Customization

Click on **Customization** in the Administration section to view information about Field Visibility, Custom Fields, and (if in use) the Evaluate add-on Evaluation Form Designer.



Field Visibility

Click On the View Details button (or the *Field Visibility* left menu option) to open the list of fields shown in each view within Call Recording. The tools here allow an authorized Admin to define which fields are visible in the layout and what columns display in each view.



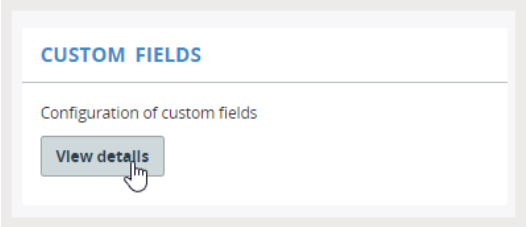
1. Click Edit next to a Layout in the list to review all possible fields/columns for the selected view.
2. Click Hide on an item to remove and click Show on an item to make the item visible in the view.
3. Click **Save** when finished to update the selected view. Repeat as necessary for other views.

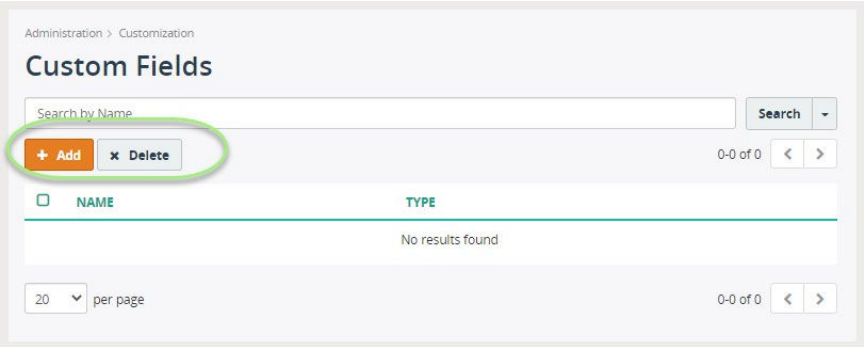
Custom Fields

Authorized Administrators may create special fields that can be used to add more information or identify calls for reporting or in searches.

Go to **Administration > Customization > Custom Fields**.

Click on the View Details button under Custom Fields to open the Custom Fields dialog. This area allows the Admin to Search and Edit any Custom fields already created, Add Custom Fields, and Delete Custom Fields.

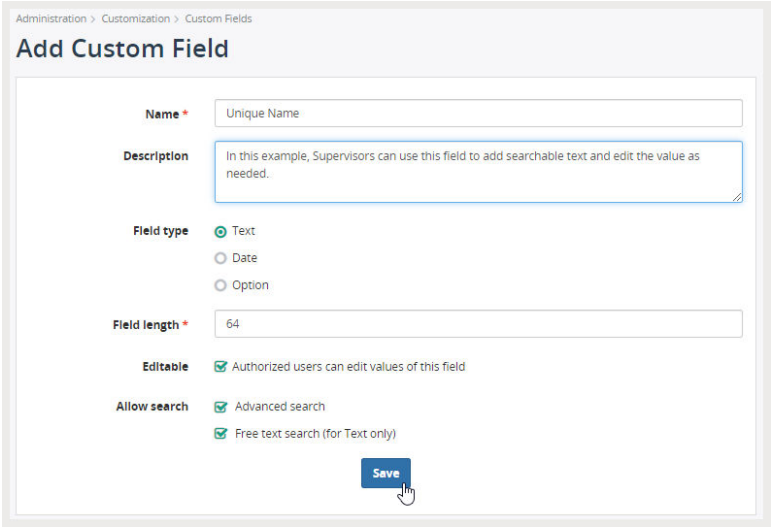




To Add a Custom Field

While viewing Custom Fields

1. Click + **Add**.
2. Enter or select the following:
   - **Name** – Required.
   - **Description** - Optional
   - **Field Type** – Choose from the following:
     - **Text:** Provide a text field for data entry.
     - **Date:** Allows entry or selection of a date.
     - **Option:** Opens fields to type one or more options that can be selected when this field is in view. Click on Add Option to create multiple options.



   - **Field length** – Enter the number of characters and spaces allowed for the field.
   - **Editable** – Click to enable if you wish to have Authorized users edit the field.
   - **Allow Search**: Options here that can be enabled include adding the field as a filter in Advanced Searches and allowing the use of free text searches of the field entries.
3. Click **Save** when finished.

To Edit a Custom Field

When a Custom Field has been created it may be edited by authorized Admins.

Click the **Edit** link next to the desired field, make changes to the text or settings, and click **Save**.

To Delete a Custom Field

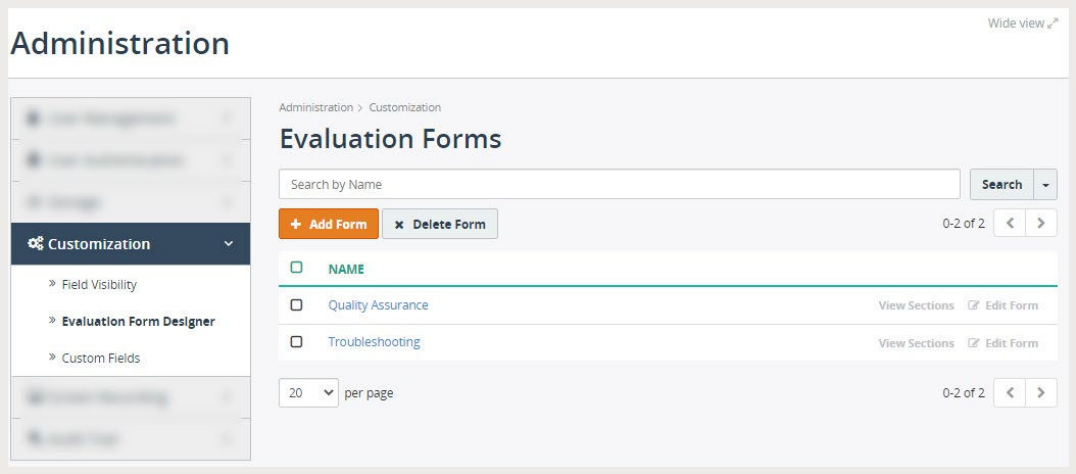
Click to place a check ☑ in the box next to a Custom Field in the list to select it and click **Delete**.

Note: This action is immediate, however the system offers the option to Undo.

Evaluate Form Designer

Authorized Administrators (or supervisors) may have access to add and manage the Evaluate forms used when evaluating agents' call recordings for performance evaluations and call quality assurance.

Note: Evaluate is an add-on license that must be assigned to each agent/user who will be evaluated.



Add Form

Click on **Add Form** button to create a new evaluation form. And then use the Edit tools to create sections with questions and answers, set the way it will display when used, define scores for each question (totaling 100% for all) and **Save**.

More tools may be available (authorization required) and can include:

View Sections – Click this button adjacent to the desired listing to review or edit each form section.

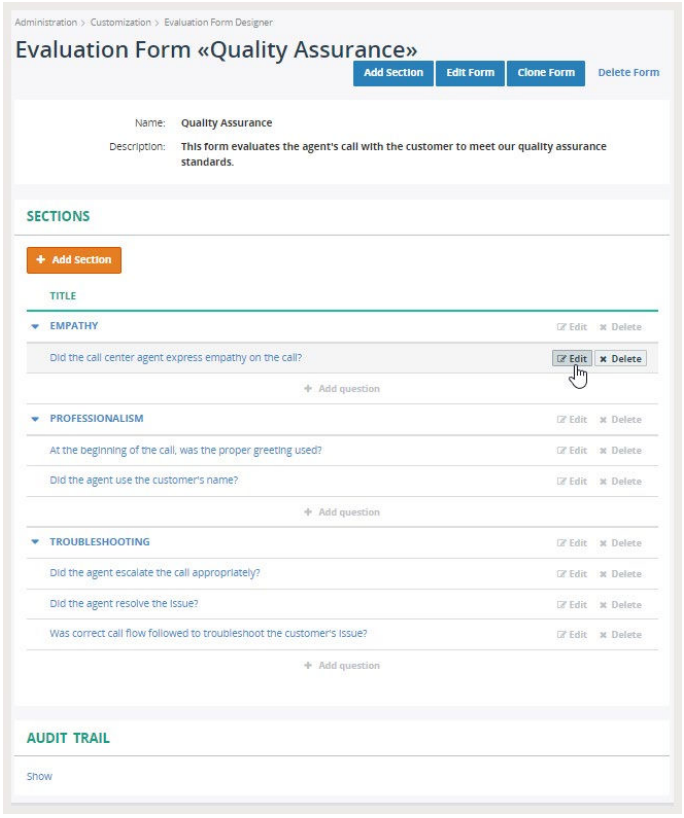
Add Section – Allows the Admin to create additional sections and the questions used in the evaluation.

Edit Form – Click this button to open the Edit dialog and modify the form as needed. Click Save when finished.

Clone Form – Click this button to use the current form as a template for creating another. Modify to give it a unique name, redefine or add sections, adjust scoring as desired, and click Save when finished.

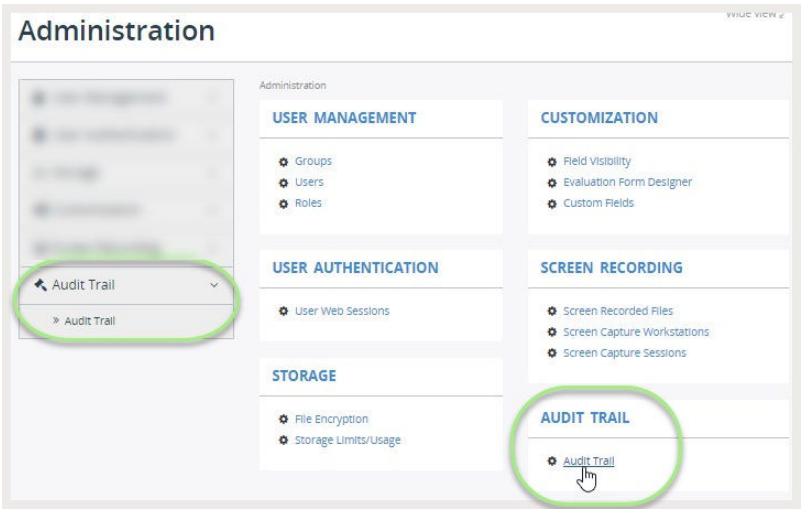
Delete Form – Click within the check box next to an item in the list to select it and click Delete Form. This action is immediate; however the system offers an Undo option.

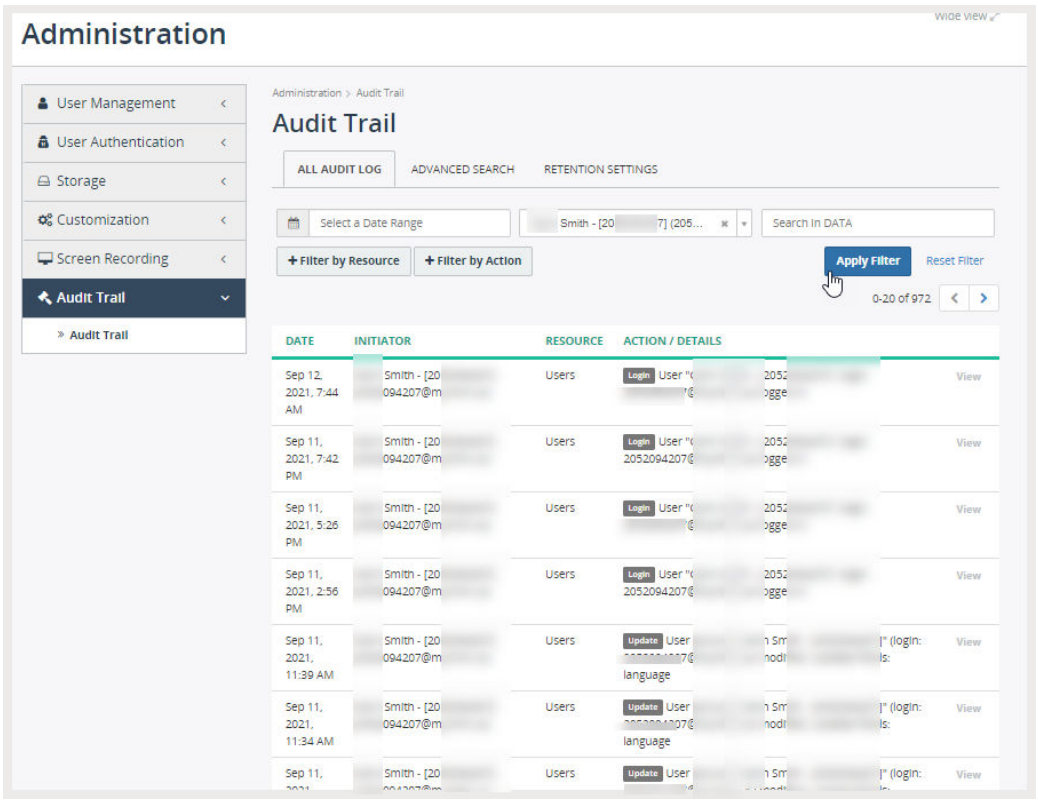
Audit Trail – Click to see the latest information about edits to or creation of Evaluation forms.



Audit Trail

Authorized Admins may click on the link under the Audit Trail menu option to review or manage portal activity.



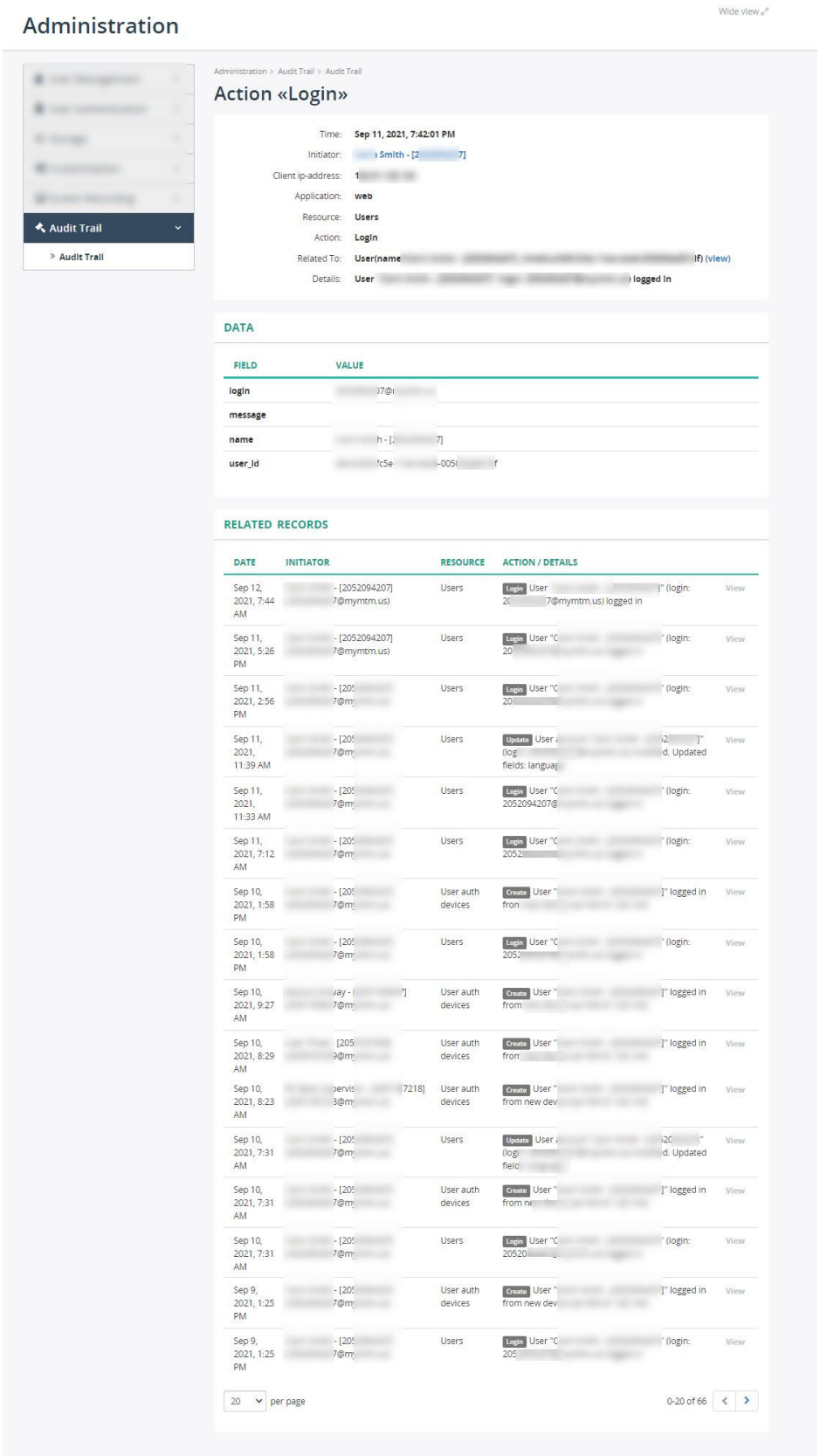


Tabs across the top of the Audit Trail dialog offer access to the full Audit log of activity, Advanced Search tools, and (where authorized to view) the Retention Settings (Service Provider access).

The list may be filtered or searched, and each listing may be reviewed in more detail using the adjacent View link (far-right on an individual line in the table).

Opening a single listing displays the access information, along with the User's ID and basic profile data, the activity, and the areas or tools that were accessed. Links to other views, such as the User's Profile are provided here as well.

The Related Records section offers a link to review similar access patterns, as well.



Speech Analytics

How it works - Speech Analytics

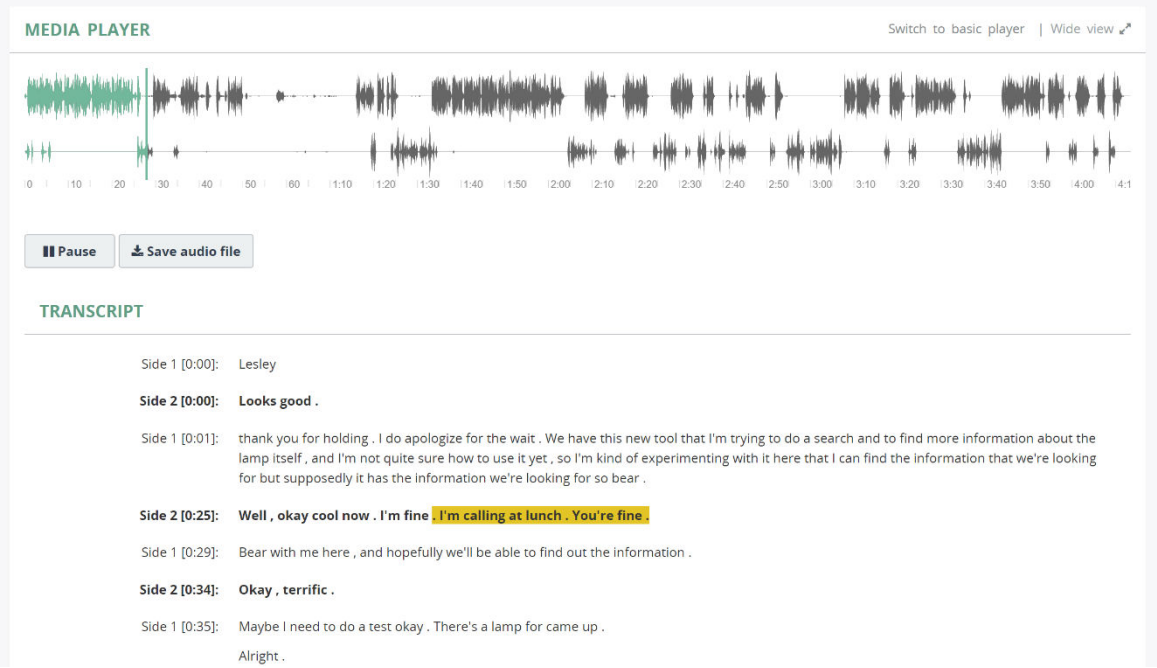
Where licensed, enabled and implemented:

Call Recording automatically uploads audio files to the Google Cloud Speech service for transcription.

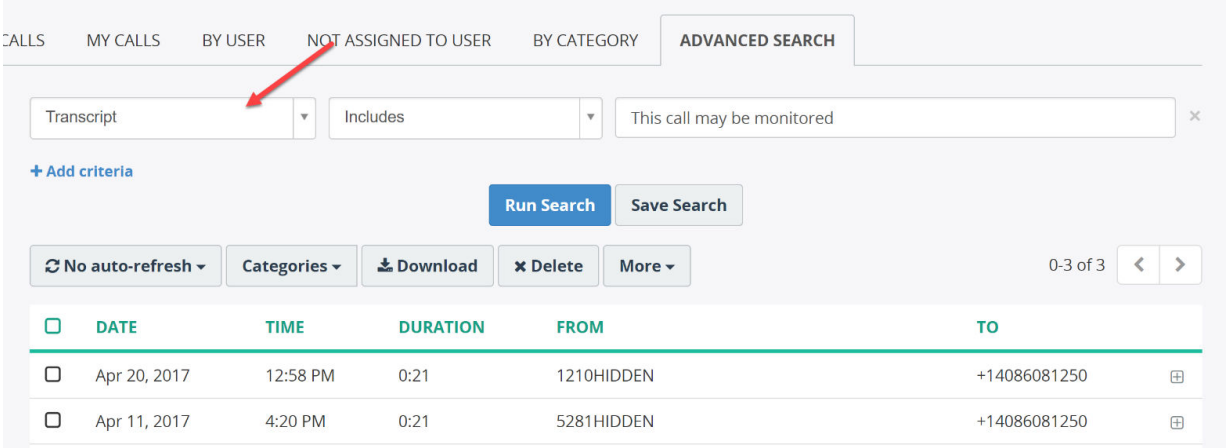
Once transcription is completed, the results are shown in the call details view.

The screenshot below shows the transcription in a textual representation of the conversation below the audio representation.

When you play back the recording, the transcript is automatically highlighted at that position (see the yellow background in the following screenshot). Click on any word in the transcription and the audio player will fast forwarded to that location.



You can use "Advanced Search" page to locate recording with a particular keyword or transcription text.



Set up Google Cloud Speech API

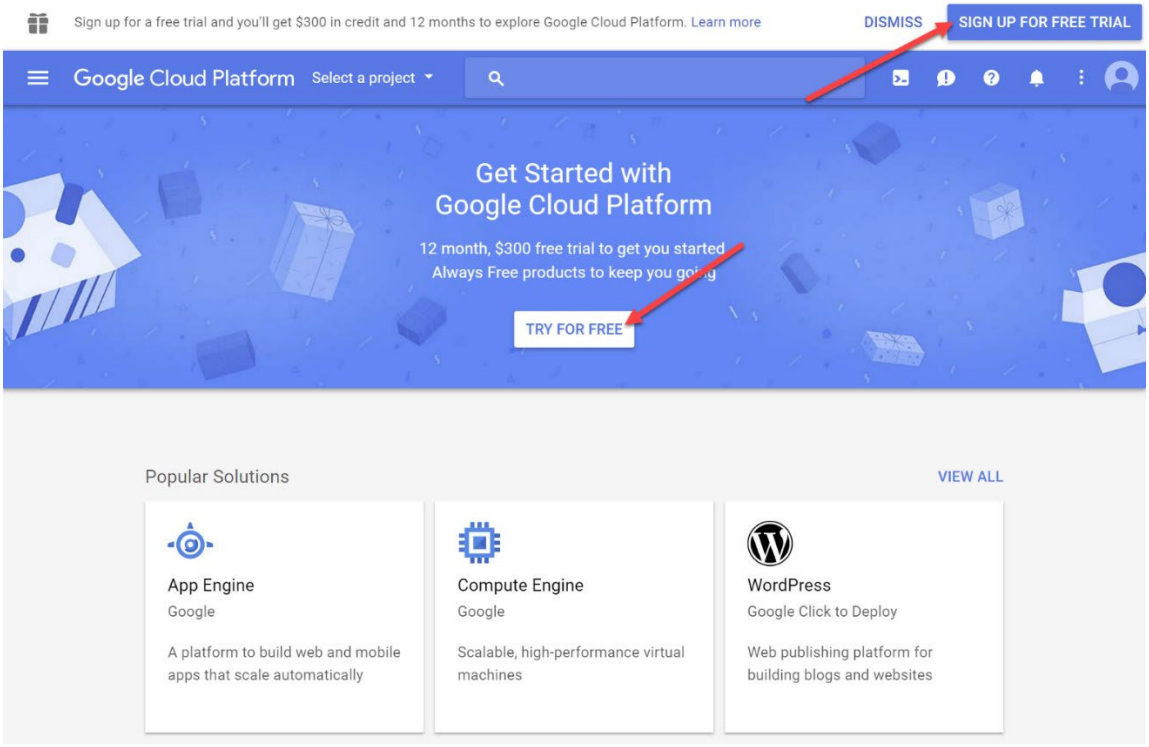
This section provides step-by-step instruction for configuring the **Google Cloud Speech API**, a speech to text conversion powered by machine learning.

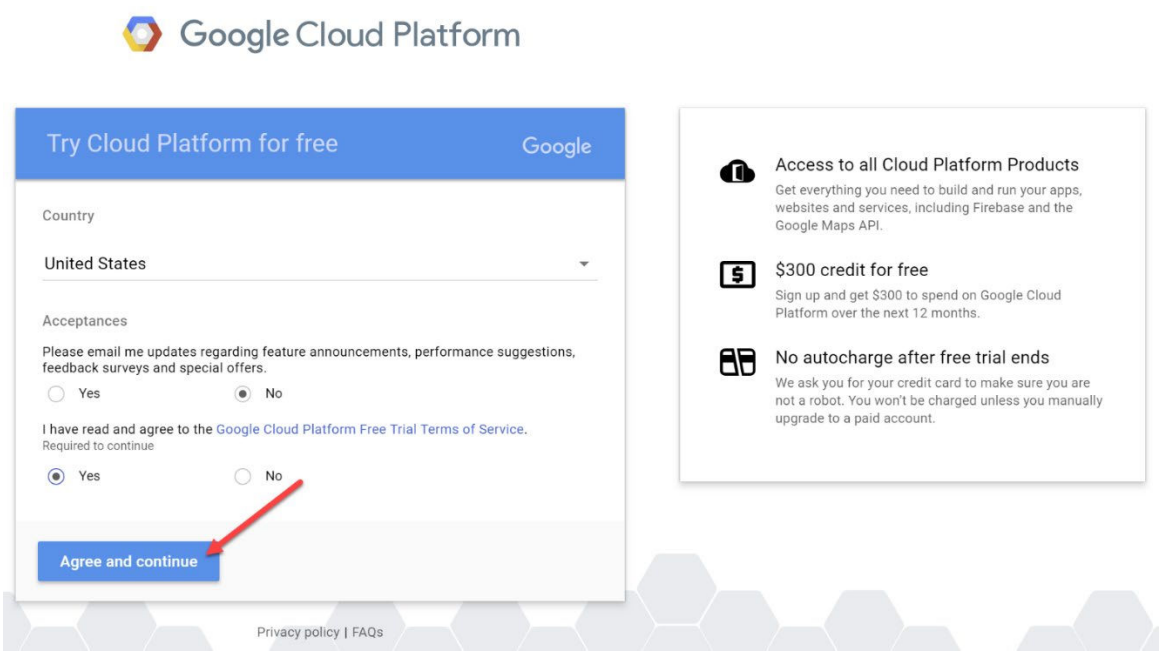
Call Recording uses the Google Cloud Speech API to transcribe voice recordings to text. A transcribed text is used further for speech analytics in Call Recording application.

The Google Speech API recognizes over 110 languages and variants. Call Recording application automatically upload audio to Google Cloud for transcription and retrieves the results back into the application.

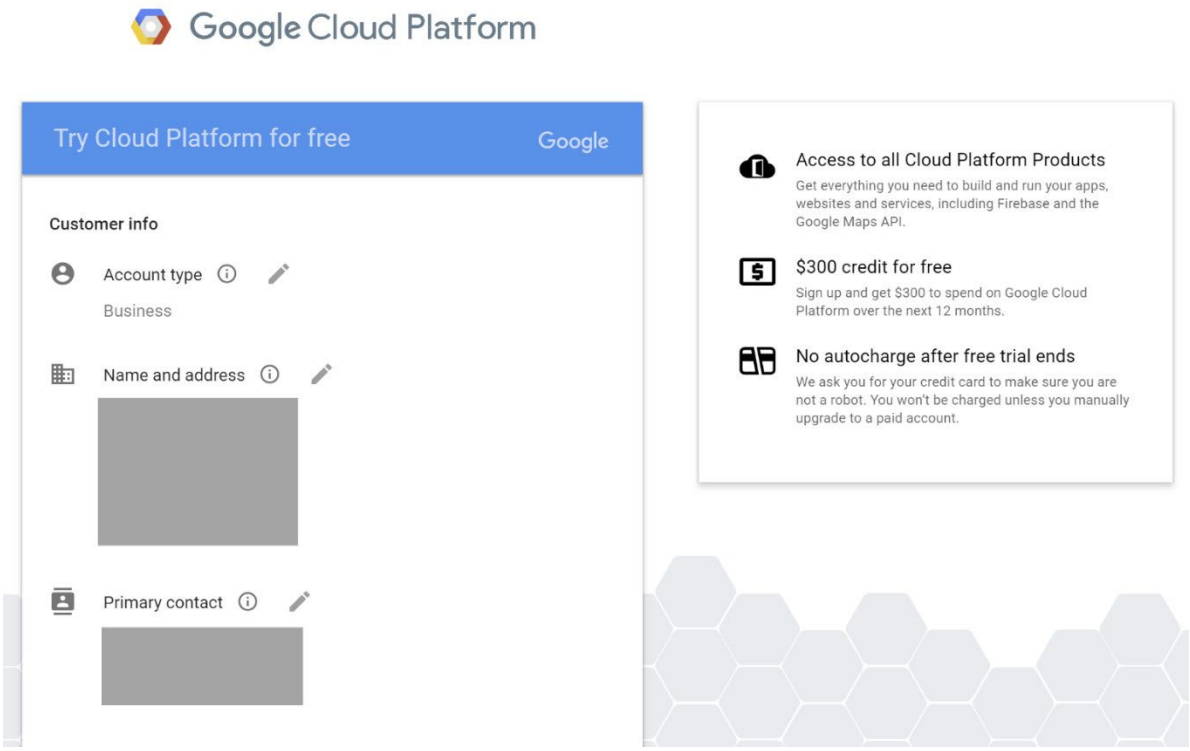
A. Create a Google Cloud Platform account

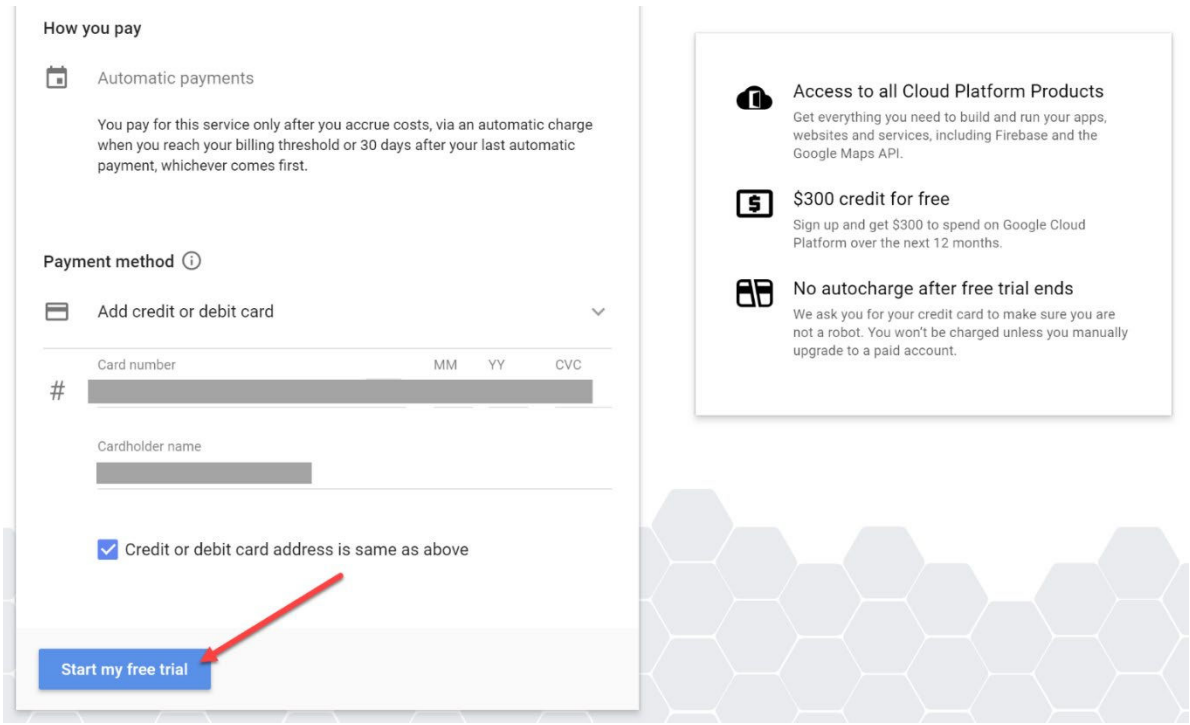
1. Sign in to your Google account. If you don't already have one, sign up for a new account.
2. Open **GCP Console** at console.cloud.google.com
3. If you were not using Google Cloud Platform before, then click **Sign up for a free trial** button in the top of page or **Try for free** in the middle of screen.



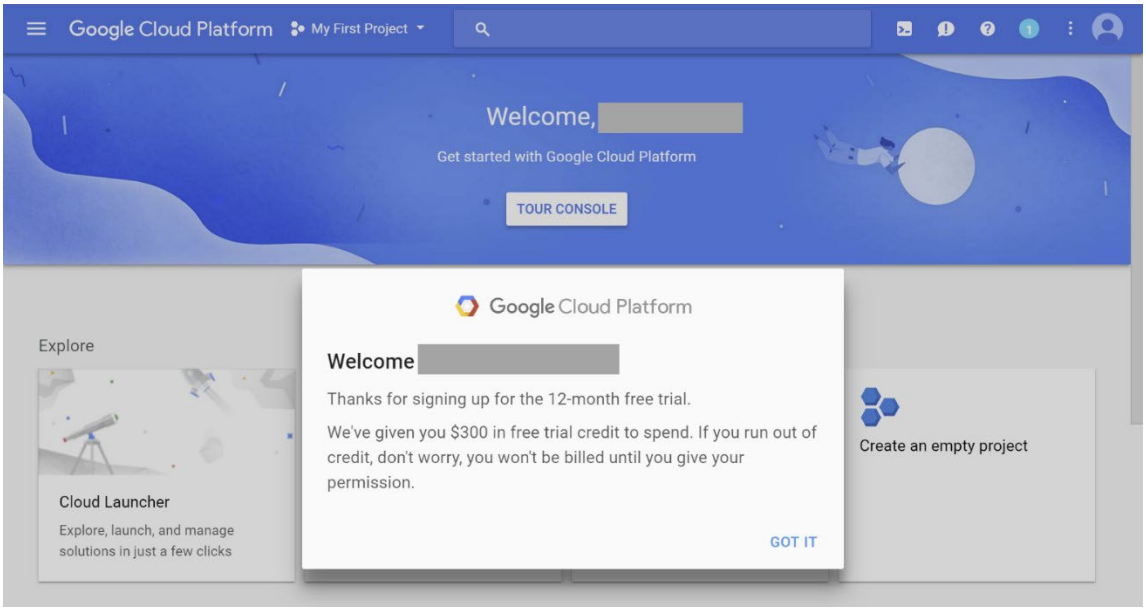


4. Provide **Customer info** (address, primary contact and payment method / credit card or bank account).



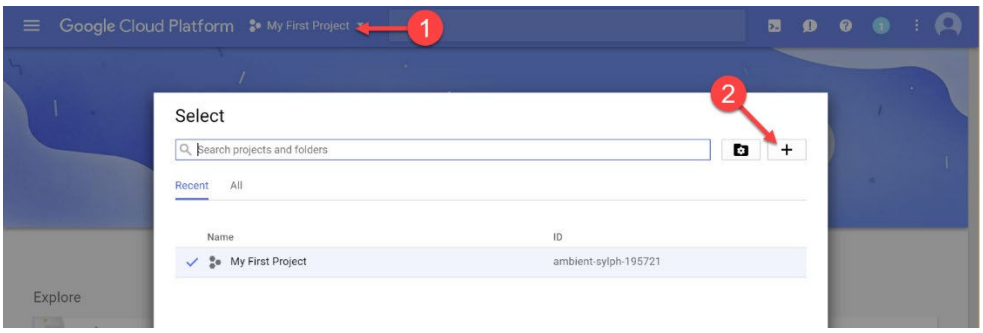


5. The **Welcome screen** is displayed when account is activated.

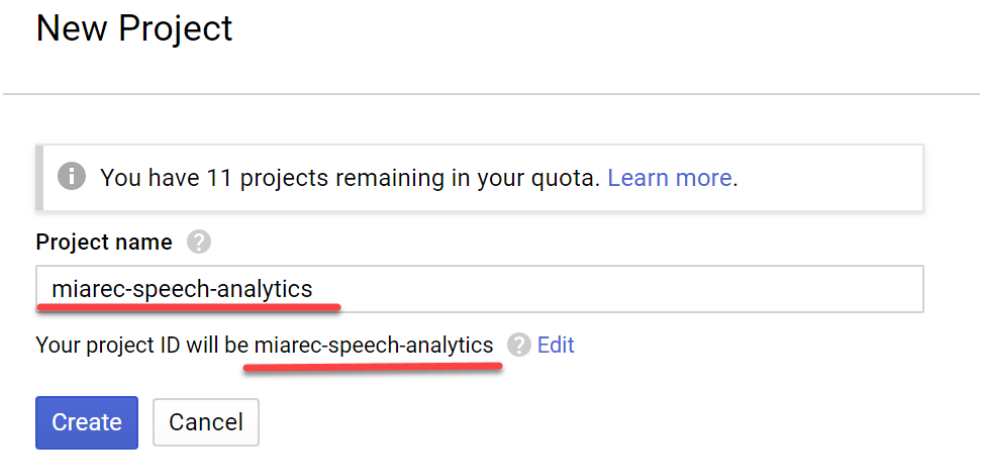


B. Create New Project

1. Create new project by clicking on **My First Project** in the top menu and then clicking **+** button.

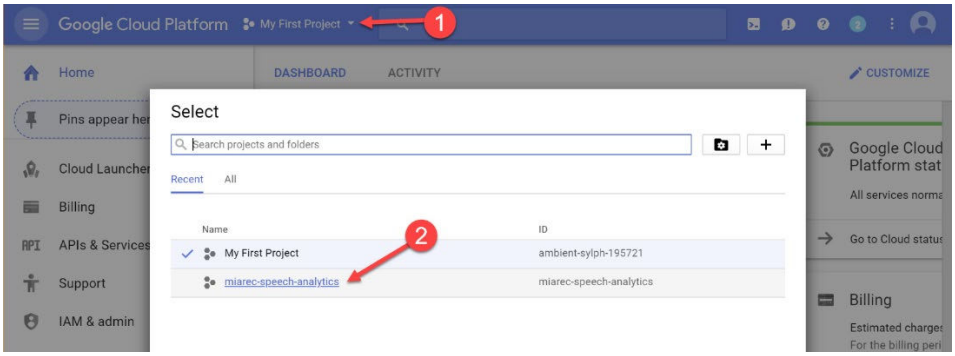


2. Choose the name for the project. In our example, we choose Call Recording-speech-analytics. Note the **Project ID** for your project. Google requires the project ID to be a globally unique identifier.

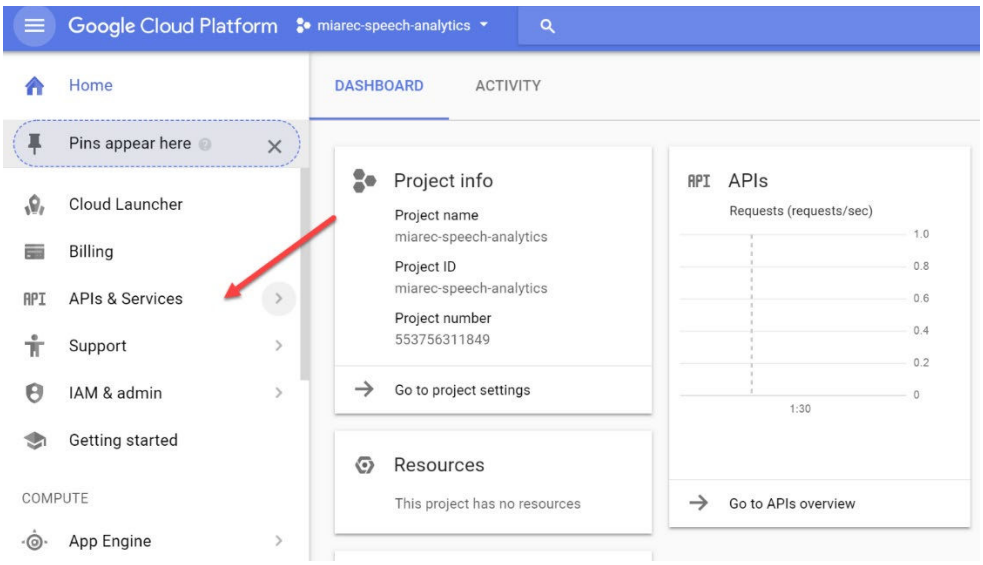


C. Enable Google Cloud Speech API for your project

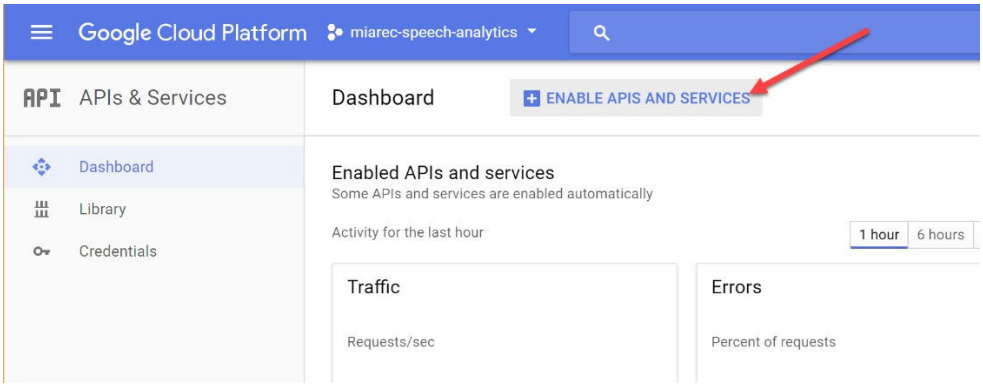
1. Select the newly created project from the list.



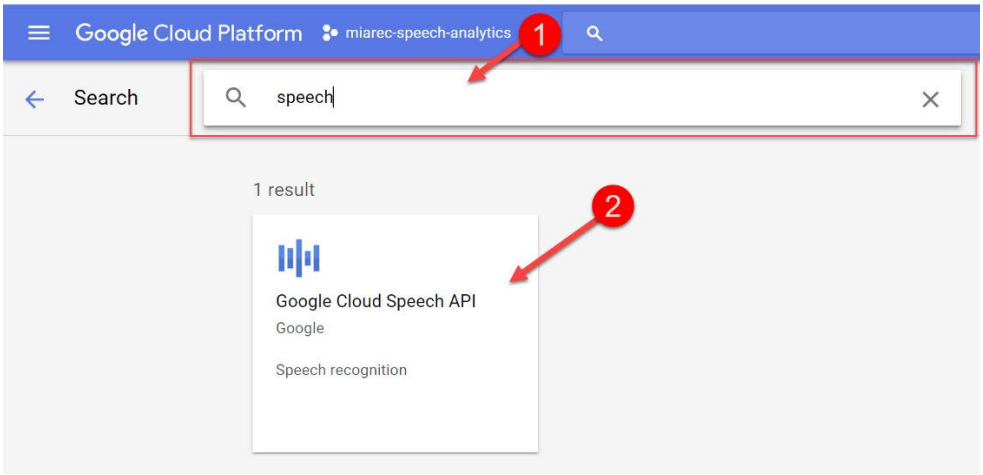
2. Navigate to **APIs & Services**.



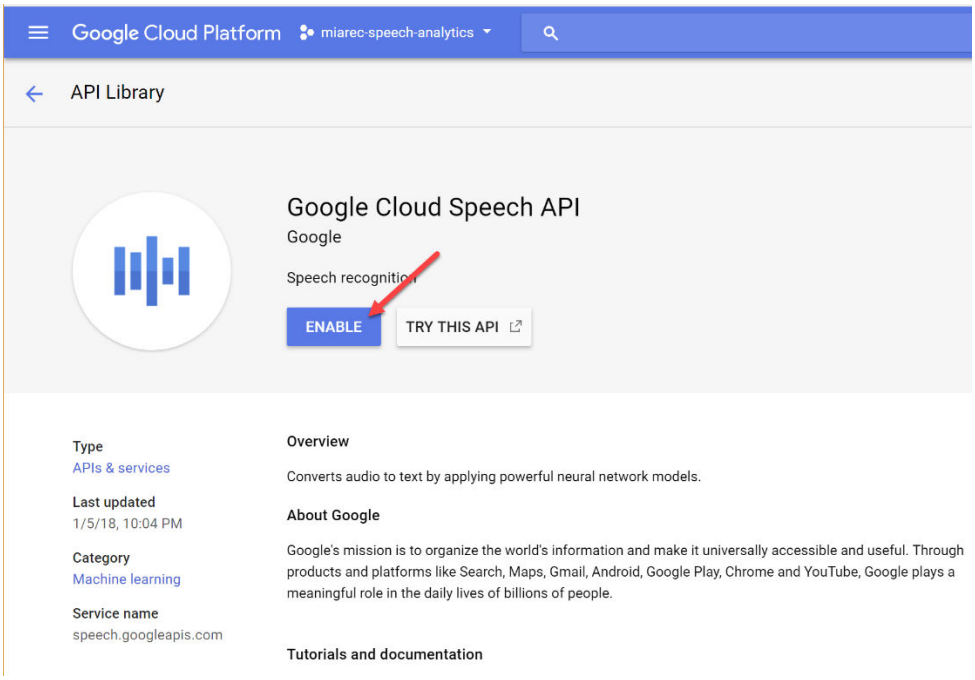
3. Click **Enable APIs and Services**



4. Type speech in the **Search box** to and click on **Google Cloud Speech API**

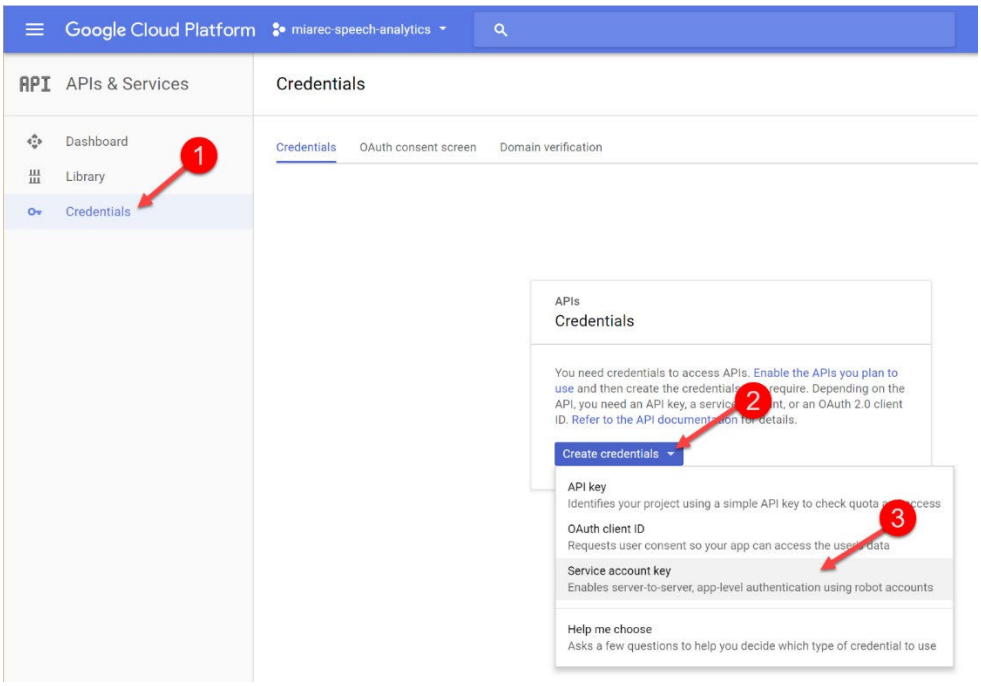


5. Click **Enable** button for **Google Cloud Speech API**

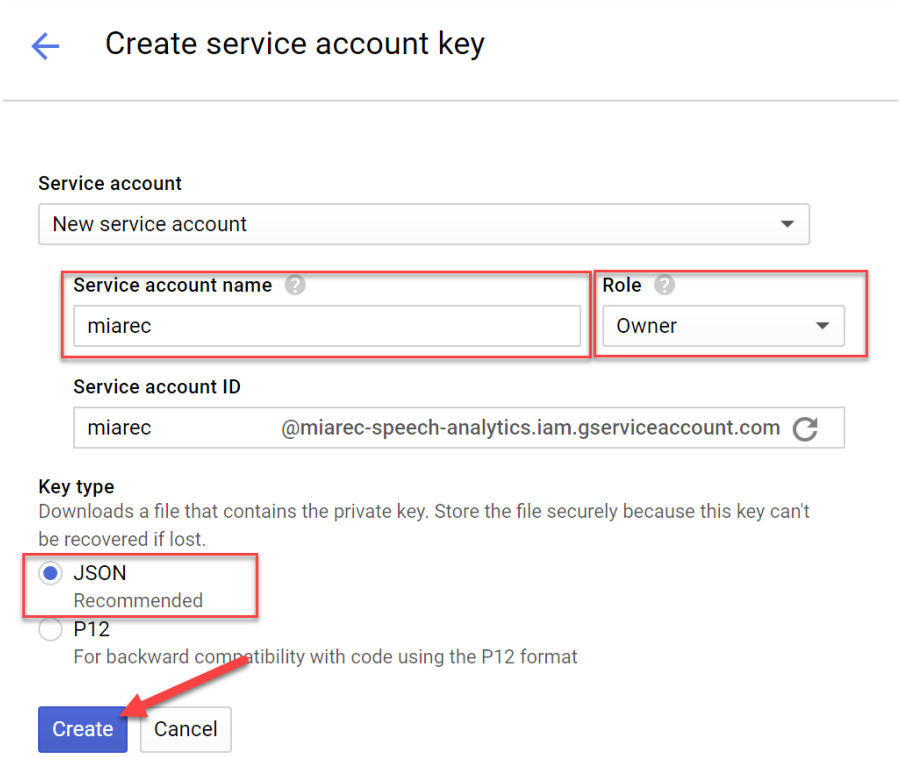


D. Create a Service Account Key

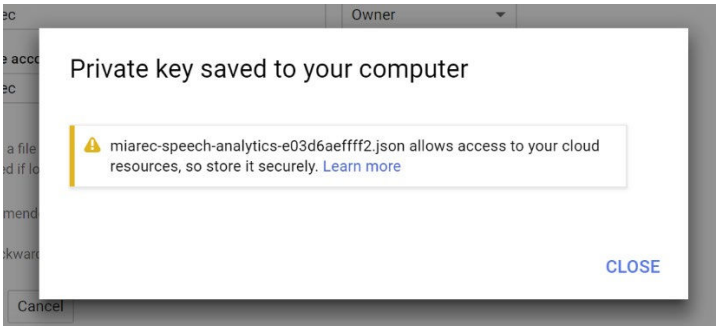
1. Navigate to **Credentials** in the left pane and click **Create credentials** button. Choose **Service account key** from the drop-down menu.



2. Choose the **Service account name** and set **Role** to **Project > Owner** and click **Create** button.



1. Save the **JSON** file to secure place. You will need to import this file into Call Recording application.



JSON file looks like (the private key is stored in the `private_key` attribute):

```
{
  "type": "service_account",
  "project_id": "Call Recording-speech-analytics",
  "private_key_id": "123456789f276ed94a5bd2a11ee645678945679",
  "private_key": "-----BEGIN PRIVATE KEY-----\nMIIEvAIBA...
  "client_email": "Call Recording@Call Recording-speech-
analytics.iam.gserviceaccount.com",
  "client_id": "123456789456789456l3",
  "auth_uri": "https://accounts.google.com/o/oauth2/auth",
  "token_uri": "https://accounts.google.com/o/oauth2/token",
  "auth_provider_x509_cert_url":
"https://www.googleapis.com/oauth2/v1/certs",
```

```
  "client_x509_cert_url":
"https://www.googleapis.com/robot/v1/metadata/x509/Call Recording%40Call
Recording-speech- analytics.iam.gserviceaccount.com"
}
```

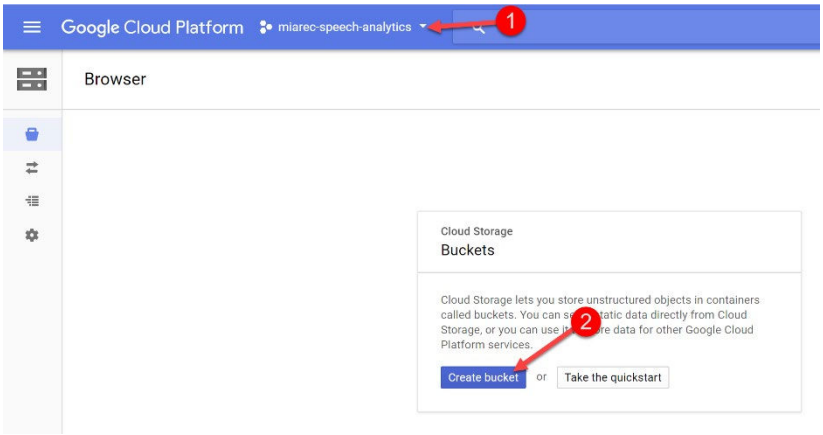
E. Create Google Cloud Storage Bucket

This guide provides step-by-step instructions for configuring Google Cloud Storage bucket.

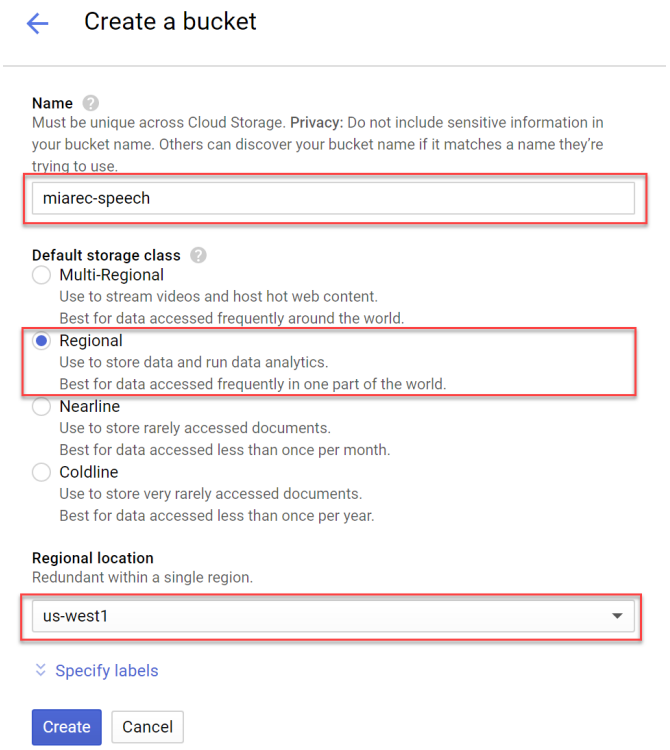
Call Recording needs to upload the audio file to Google Cloud Storage bucket before it is submitted to the Speech API service for transcription.

1. Create Bucket

1. Navigate to Google Cloud Storage console at https://console.cloud.google.com/storage
2. Make sure the previously created project is selected. Then click **Create bucket**.



3. Choose a globally unique name for the bucket, set **Default storage class** to **Regional** and choose a region closer to your datacenter (in our example, we choose **us-west1**.

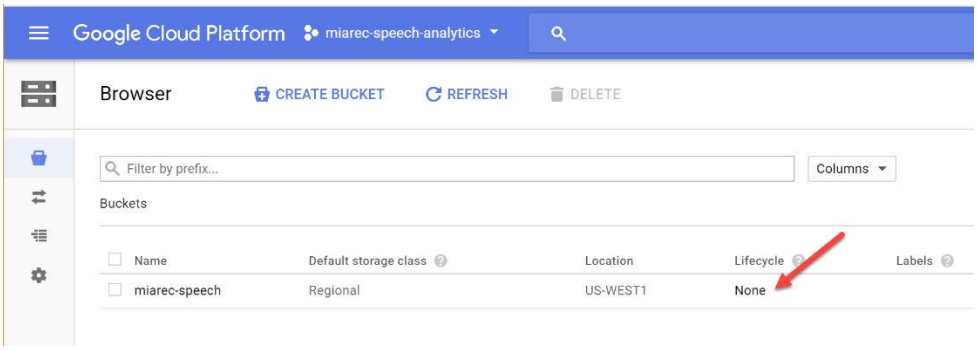


2. Create Lifecycle Rule

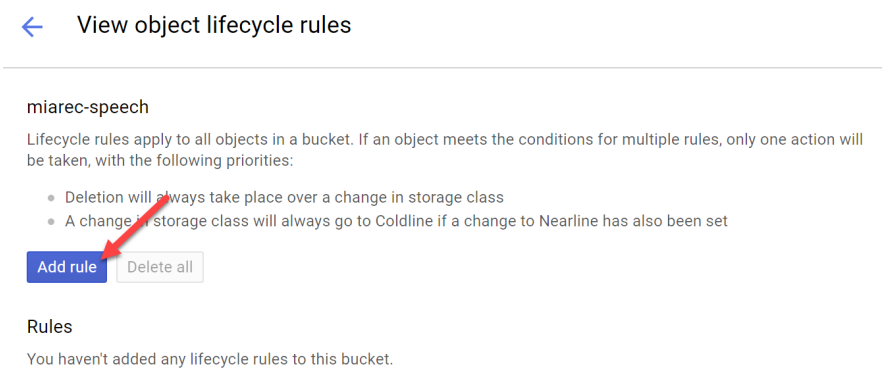
The Cloud Storage bucket is used only for a temporary storage of audio files. Call Recording application uploads the files to this bucket and instructs the Speech API to take the file from there for transcription. Once the transcription is completed, the file can be deleted from the bucket.

In this step, we will configure automatic deletion of audio files after 24 hours.

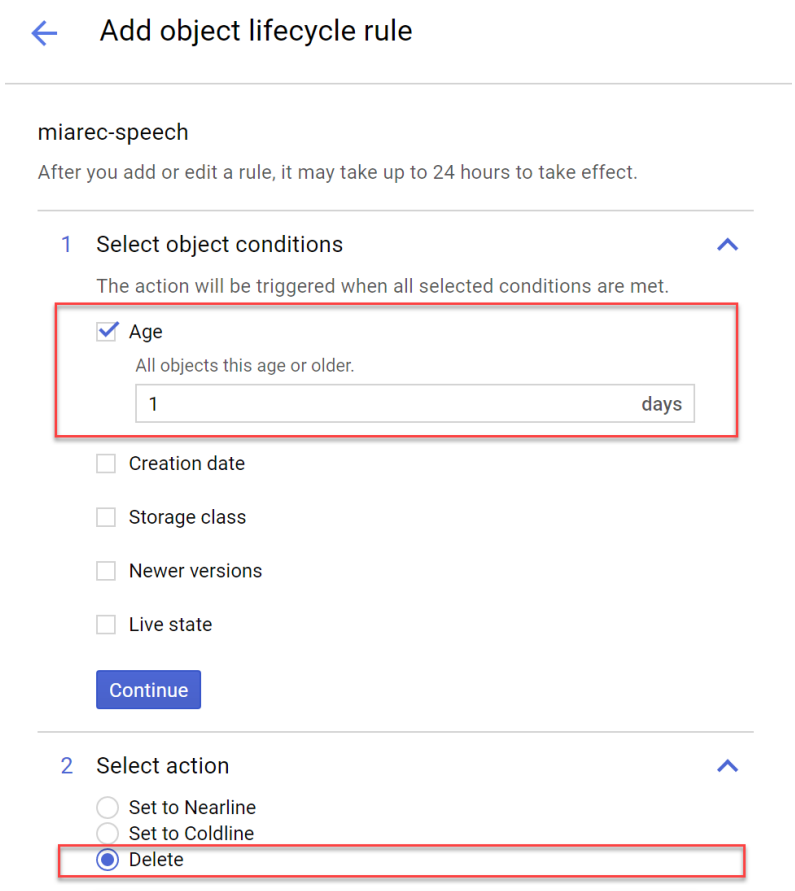
1. In the browser page, click on **None** in the **Lifecycle** column for the previously created bucket



2. In the new window, click **Add rule**



3. Select **Object condition** to **Age 1 days** and **Action** to **Delete**. Click **Continue** buttons and then **Save**

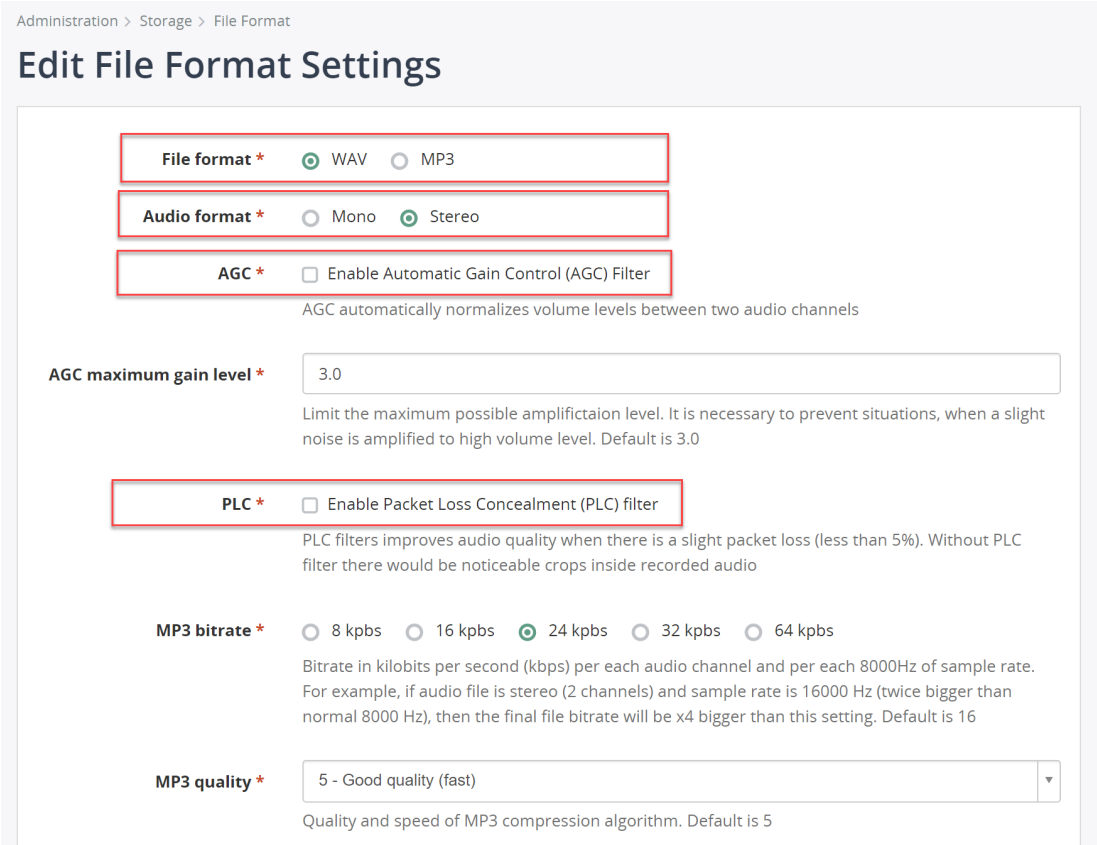


Call Recording Configuration

1. Configure Audio File Format

First, you need to change the audio file format settings to increase transcription accuracy. Navigate to **Administration > Storage > File format** and apply the following changes:

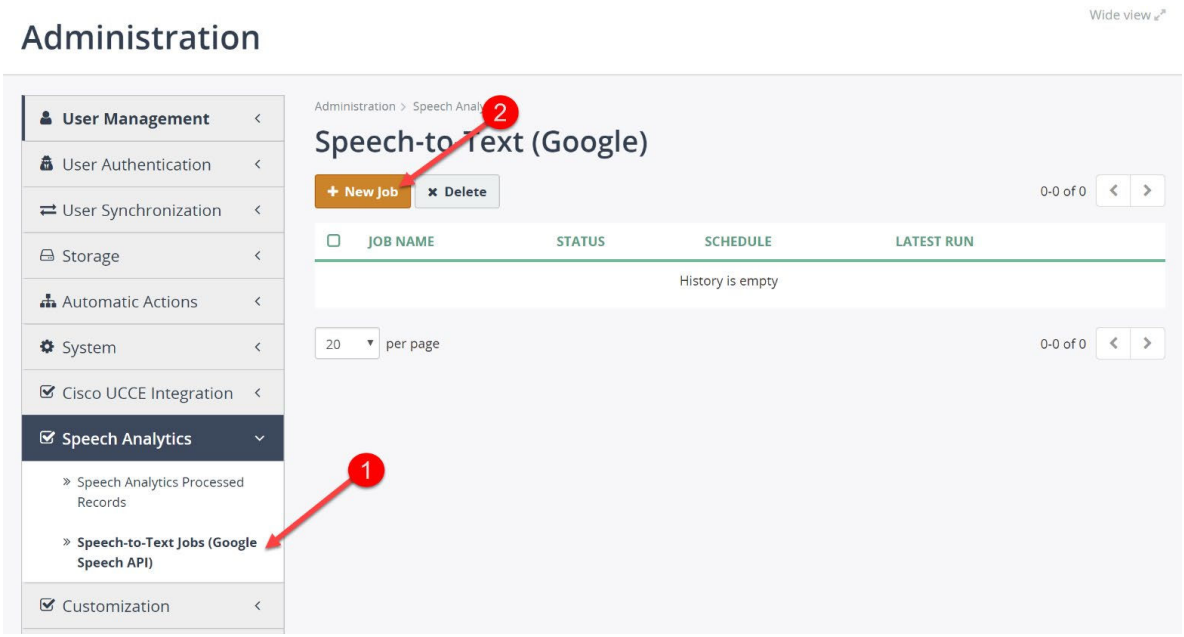
- Set **WAV** file format
- Set **Stereo** format
- Disable **Automatic Gain Control (AGC) filter**
- Disable **Packet Loss Concealment (PLC) filter**



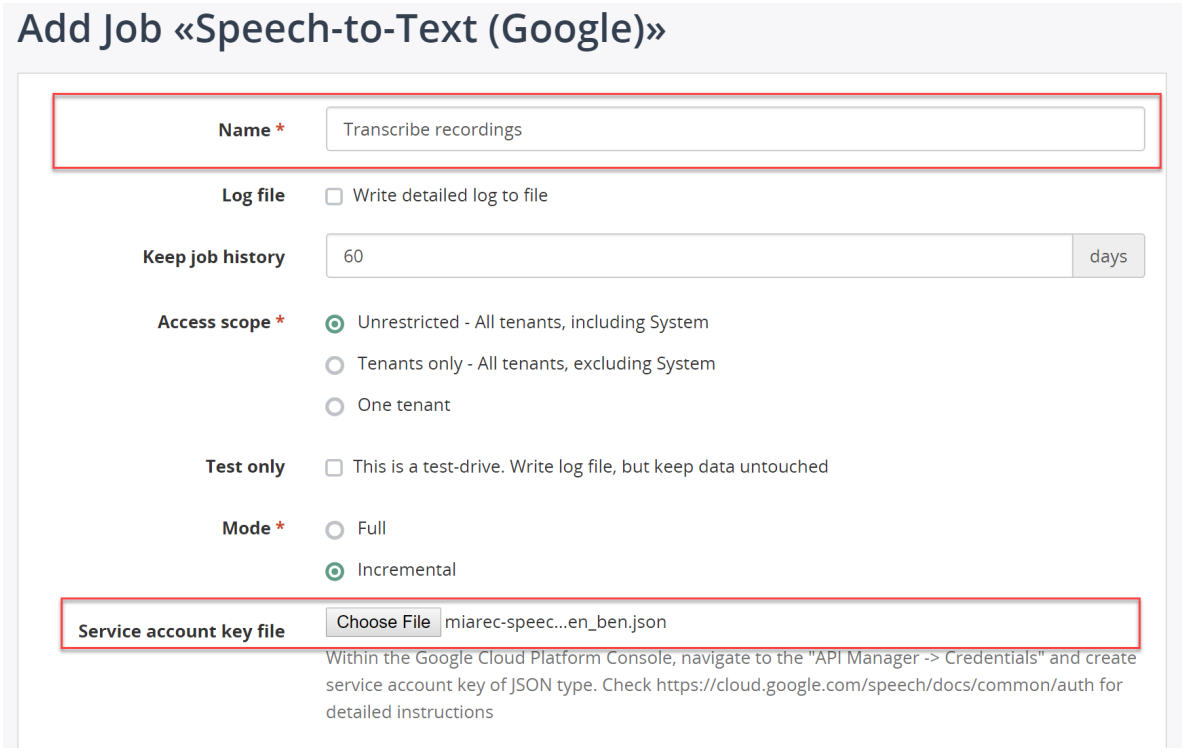
2. Configure Speech Recognition Job

The speech recognition job automatically uploads audio recordings to the cloud service for transcription and then retrieves back the transcription results. Multiple jobs can be created with unique settings, for example, one job processes recordings in English and the second in Spanish.

1. Navigate to **Administration > Speech Analytics > Speech-to-Text Jobs**, click **"New Job"**.



2. Choose a descriptive name for this job. Upload the Google Cloud Service Key JSON file, created in previous steps. Set the **Mode** to **Incremental**.



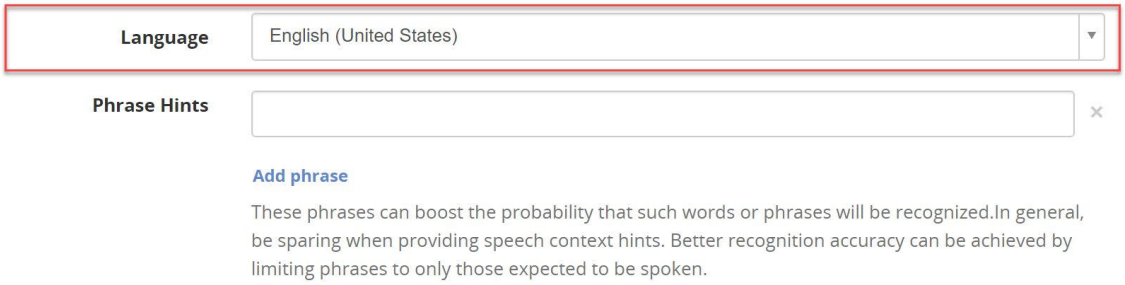
3. Set **Language**.

Optionally, provide the **Phrase hints**. You may use these phrase hints in a few ways:

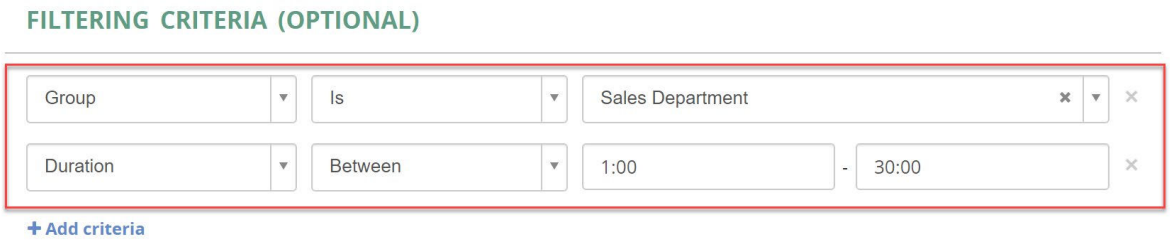
- Improve the accuracy for specific words and phrases that may tend to be overrepresented in your audio data. For example, if specific commands are typically spoken by the user, you can provide these as phrase hints. Such additional phrases may be particularly useful if the supplied audio contains noise or the contained speech is not very clear.
- Add additional words to the vocabulary of the recognition task. The Cloud Speech API includes a very large vocabulary. However, if proper names or domain-specific words are out-of-vocabulary, you can add them to the phrases provided to your requests's speechContext.

Phrases may be provided both as small groups of words or as single words. When provided as multi-word phrases, hints boost the probability of recognizing those words in sequence but also, to a lesser extent, boost the probability of recognizing portions of the phrase, including individual words.

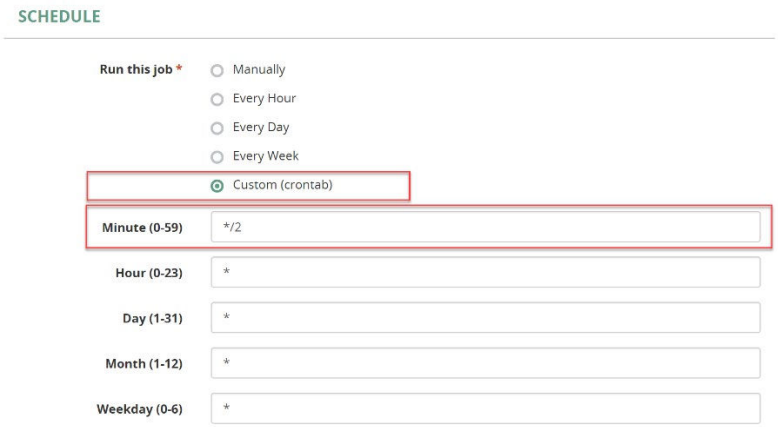
In general, be sparing when providing speech context hints. Better recognition accuracy can be achieved by limiting phrases to only those expected to be spoken. For example, if there are multiple dialog states or device operating modes, provide only the hints that correspond to the current state, rather than always supplying hints for all possible states.



4. Specify **Filtering criteria** for recordings. For example, you can limit transcription to specific group, duration, date, etc.

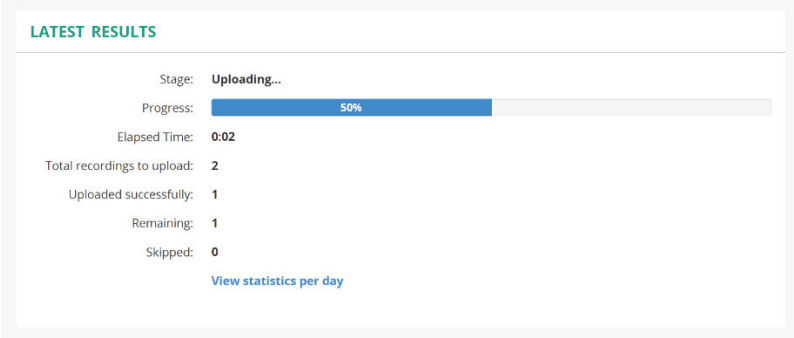


5. Configure a **Schedule** for transcription job. The job can be run either manually or by schedule (every hour/day/week or more often). In the example below, the transcription job will run every 2 minutes.



3. View results

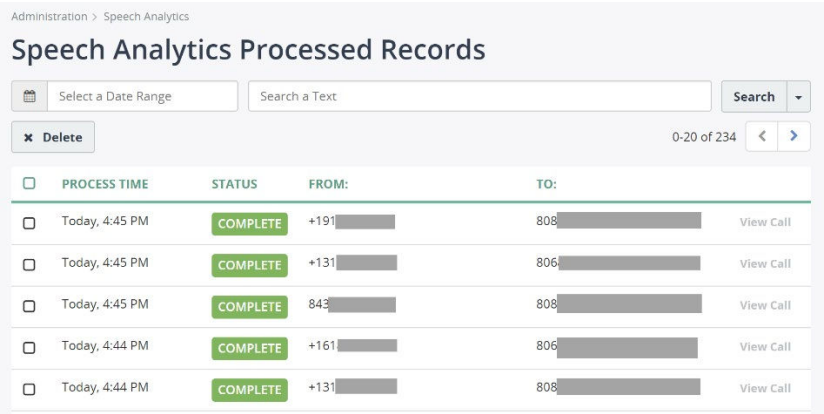
If you run the job manually, then you can see the progress of uploading process:



It takes some time for the cloud service to complete transcription and return results. Usually, the results are available in a couple of minutes after upload.

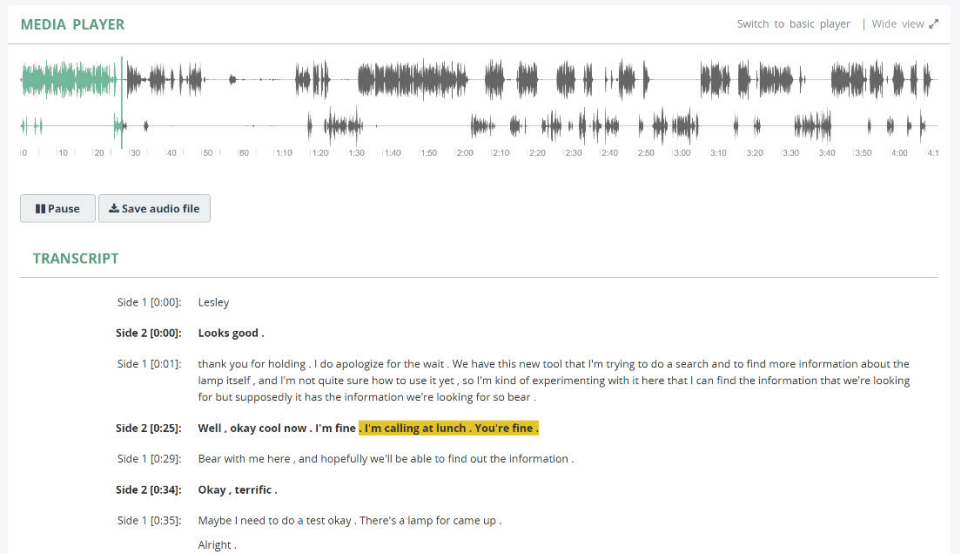
You can check the status of the recently uploaded files via menu **Administration > Speech Analytics > Speech Analytics Processed Records**.

After the status changes to **"COMPLETE"**, you can view the call details and transcription by clicking **"View call"** right on this page. Or you can open the call details from **"Recordings"** page as usual.



The screenshot below shows the example of transcription.

When you playback the recording, the transcript is automatically highlighted at that position (see the yellow background in the following screenshot). Click on the interesting word in transcription and the audio player will be fast forwarded to that location



Screen Recording

Architecture

Call Recording solution relies on Screen Recording Client running on agent desktops to perform screen captures during a call.

The controller application is responsible for authentication of clients and initiating capture process when agent handles new call.

The following diagram illustrates a high-level architecture of Call Recording screen recording solution. The next chapters cover the architecture in more details.

Components:

- The **Screen Recording Client** runs on the Agent's workstations as a Windows Service.
- The **Screen Recording Controller** authenticates all clients and controls a recording process, i.e. starts/stops screen capturing when agents receive/make calls.
- When the call ends, the **Client** uploads the video file to the server for storage and playback.

Authorization Phase

When the Client application is deployed on new computer, it has to be authorized first by system administrator (menu **Screen recording > Screen recording workstations**).

The following diagram illustrate the authorization phase.

Recording Phase

Once the Screen Capture Client is authorized and associated with the corresponding agent profile, it automatically starts screen recording when agent receives/makes calls.

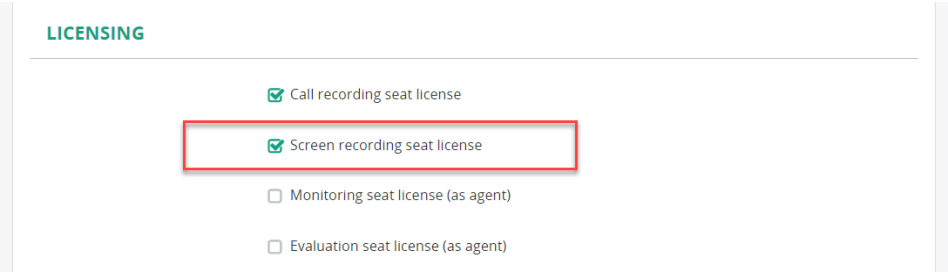
The following steps illustrate a recording process in detail:

1. The Call Recording **Call Recorder** detects new call from the **Phone System**.
2. The **Call Recorder** notifies the **Screen Recording Controller** about the particular agent has new call
3. The **Screen Recording Controller** locates the active session for that agent and sends **Start capturing** command to the **Capture Client**
4. Both **Call Recorder** and **Screen Recording Controller** save metadata in **Database**, so users can playback audio and video recordings using the **Web Portal**.
5. The **Call Recorder** detects call end event.
6. The **Call Recorder** saves the recorded audio file to the **File Storage**.
7. The **Call Recorder** notifies the **Screen Recording Controller** about call end.
8. The **Screen Recording Controller** sends **Start capturing** command to the **Capture Client**. If wrapup recording is enabled, then screen capturing process continues for a pre-defined amount of time, usually for a couple of minutes. Otherwise, a screen capturing is completed immediately.
9. The **Capture Client** uploads the recorded video file to the **Web portal**.
10. The **Web Portal** service stores the file to the **File Storage**

Configure Licensing

Assign Licenses to Users

Navigate to **Administration > User Management > Users**. On user profiles, check the **Screen recording seat license** for each of eligible users.



Configure Storage

Generally handled by the Root Administrator.

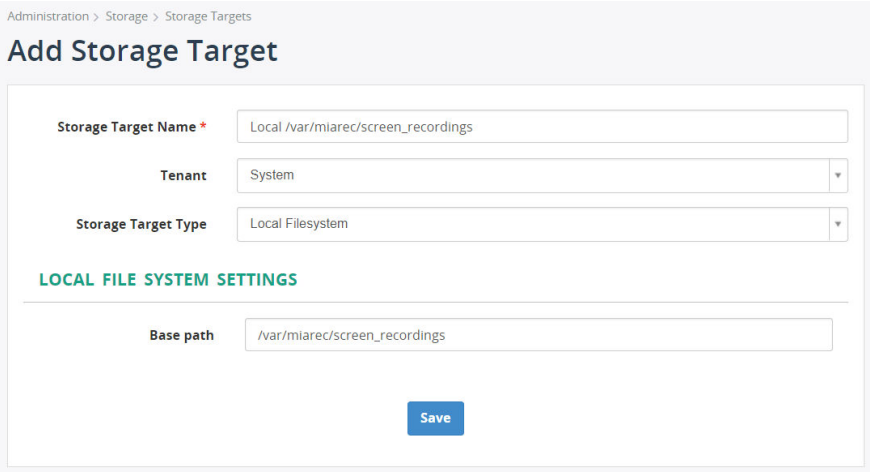
Navigate to menu **Administration > Storage > Storage Targets**.

Click **Add** to create a storage target for screen recording files (*.mp4).

Files can be stored:

- Locally on the same server as the Call Recording web application
- Remotely on FTP, SFTP server
- Remotely in Amazon S3 bucket

The following screenshot demonstrates configuration of local storage in directory /var/Call Recording/screen_recordings.



On Linux system, configure folder permissions

For local storage target, configure permissions for the directory. This directory should be writable by Apache web server process. On Centos 6/7, execute the command:

chown -R apache:apache /var/Call Recording/screen_recordings

On Ubuntu:

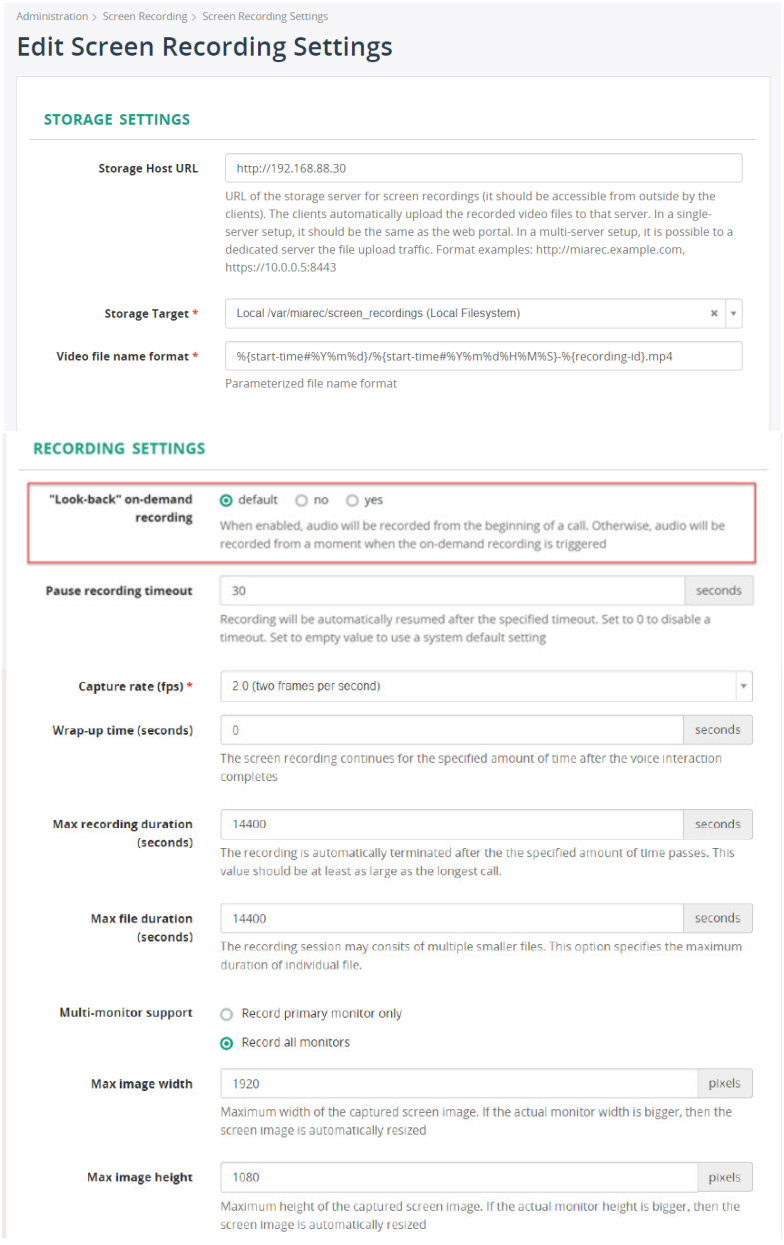
chown -R www-data:www-data /var/Call Recording/screen_recordings

On Windows, there is no need to configure permissions for folder.

Configure Screen Recording Settings

Navigate to menu **Administration** > **Screen Recordings** > *Screen Recording Settings*.
Click as needed:

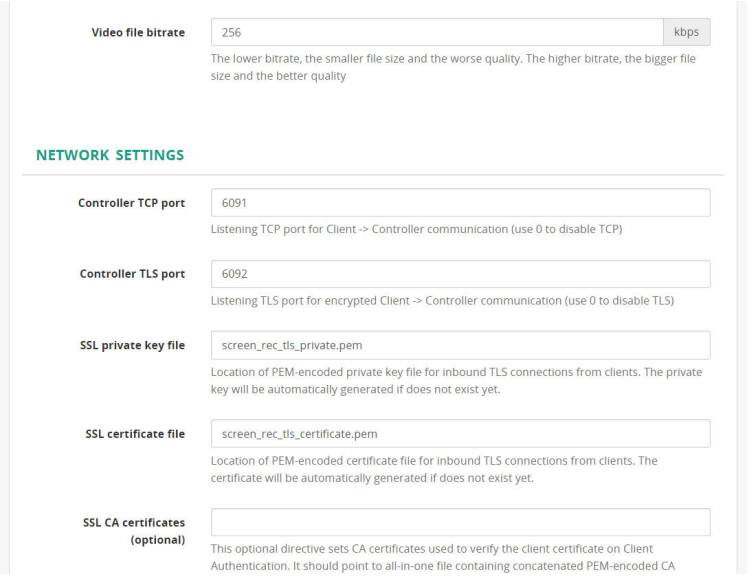
- **Storage Target*** - Enter the URL defined for screen recordings in *Storage Targets*
- **Video file name format*** - Enter the parameterized file name format.
- **Look-back" on-demand recording** - Set to **Yes** to enable and record the full call from the start when On Demand recording is triggered; set to **NO** to only record the call from the time On Demand recording is triggered.
- **Pause recording timeout** - Define the number of seconds allowed before automatically resuming recording if paused. Set to 0 to disable this timeout. Leave empty to use a BroadSoft system default setting for pause timeouts.
- **Capture rate (fps)** - Define how often to capture the screen (frames per second)
- **Wrap-up time** - Define a number of seconds to continue screen recording after voice interaction (call) completes.
- **Max recording duration** - Set a number of seconds to allow screen recording to take place. (limits maximum size of video file).
- **Max file duration** - Set a number of seconds to allow for each file duration (applies to each related recording for a session)
- **Multi-monitor support** - Select ***Record Primary monitor only*** or *Record all monitors*.
- **Max width/height** - Define the size parameters of the captured image(s). Call Recording automatically resizes the image. This setting is per-monitor, that is, multi-monitor configuration, the picture is downsized only when either of the monitors has larger resolution size.



- **Video file bitrate** - type the kbps needed for screen recordings.

Network Settings

- **Controller TCP port** - Set the listening port for client controller communication or 0 to disable
- **Controller TLS port** - set the TLS listening port for encrypted client controller or set to 0 to disable.
- **SSL private key file** - Set the location private key file for inbound TLC connections from clients.
- **SSL certificate file** - Set the location of PEM encoded certificate file for inbound TLC connections from clients.
- **SSL CA certificates** - Set the CA certificate used to verify the client certificate on client authentication. (all in one file | concatenated)



Important! If Call Recording is deployed on Linux, then make sure the Apache process has write permissions to the storage target directory.

On Centos, run as an example:
```
chown -R apache:apache /var/Call Recording/screen-recordings
```

On Ubuntu, run:
```
chown -R www-data:www-data /var/Call Recording/screen-recordings
```

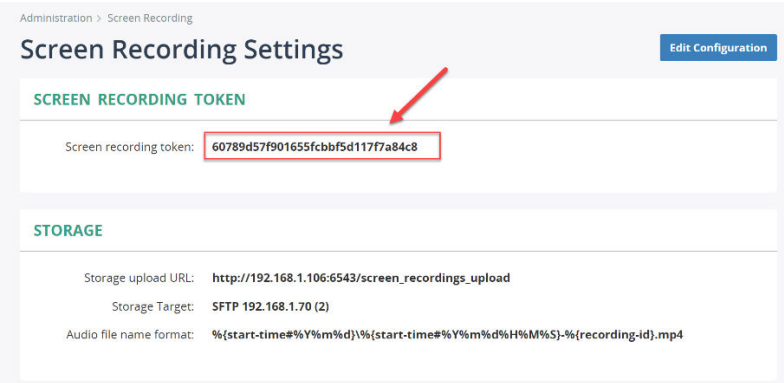
Assuming that directory `/var/Call Recording/screen-recordings` is used for storing of uploaded video files.

Generate Secure Token

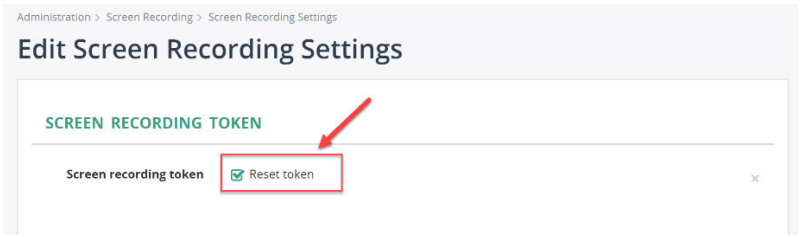
Single Tenant:

Navigate to **Administration > Screen Recording > Screen Recording Settings** to view the current **Screen recording token** (see below screenshot).

This token should be used during installation of the Screen Recording Client application.



To generate new token, click **Edit Configuration** button and check **Reset token** option.



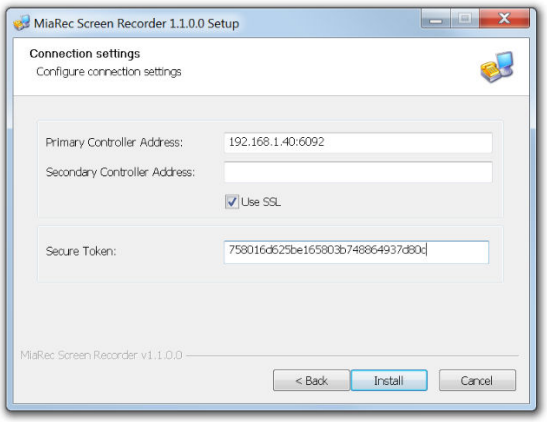
Install Client Application

Download Call Recording Screen Capturing application and install on agent desktops.

Supported operating systems: Windows 7, 8, 10, Server 2008/2012/2016 with the latest windows updates installed.

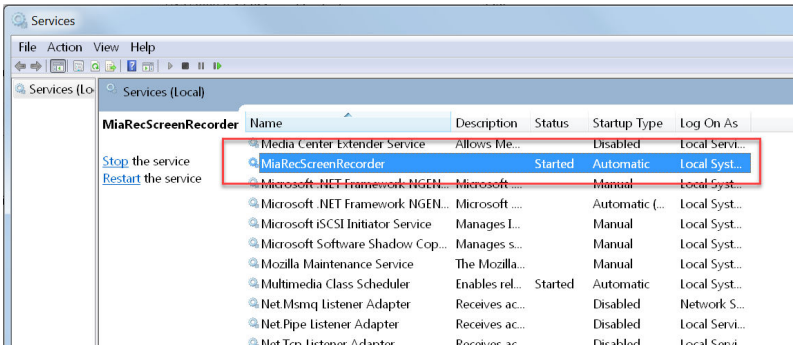
During installation, provide the address of the Call Recording Screen Controller server and "Secure Token". You can retrieve the secure token on the tenant profile page (see above).

Enter the IP-address or DNS name of Call Recording server in the **Primary Controller Address** field. By default, port **6092** is used for SSL connection and **6091** for non-SSL connection (see **Administration > Screen Recording > Screen Recording Settings** for exact port values).

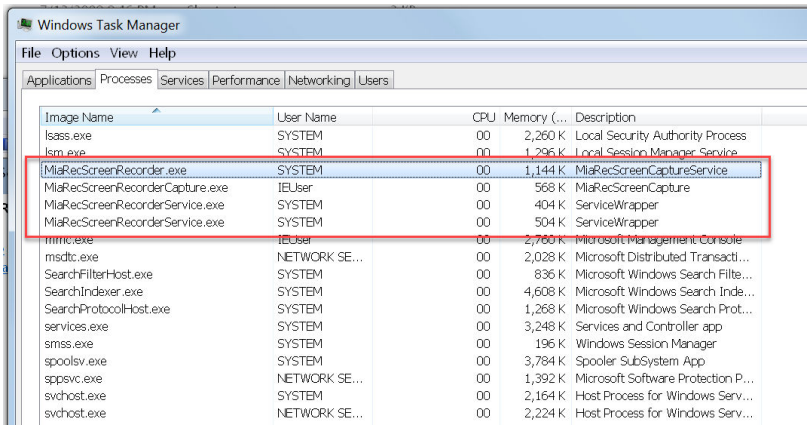


Verify Installation

Call Recording Screen Recording Client silently works in background.
It is visible in **Control Panel > Services**.



Also, you can see the application in the list of running processes.

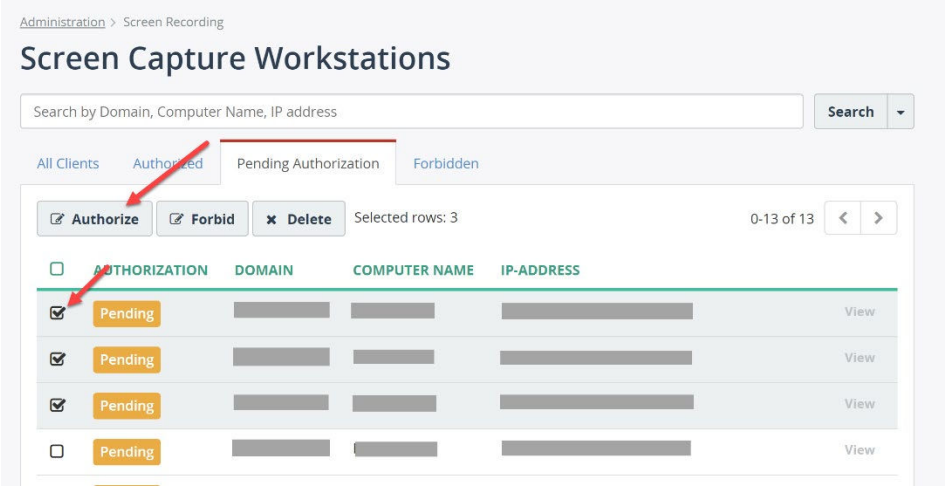


Authorize New Workstations

The capturing client application automatically establishes a network connection with the Call Recording screen recording controller. New workstation requires authorization before it can record screen. Every workstation is uniquely identified using the automatically generated secure workstation token. The administrator can authorize new workstations using Call Recording Web UI. Navigate to menu **Administration > Screen Recording > Screen Capture Workstations**.

New workstations are shown in the **Pending authorization** tab.

Select the corresponding workstation(s) and authorize them.

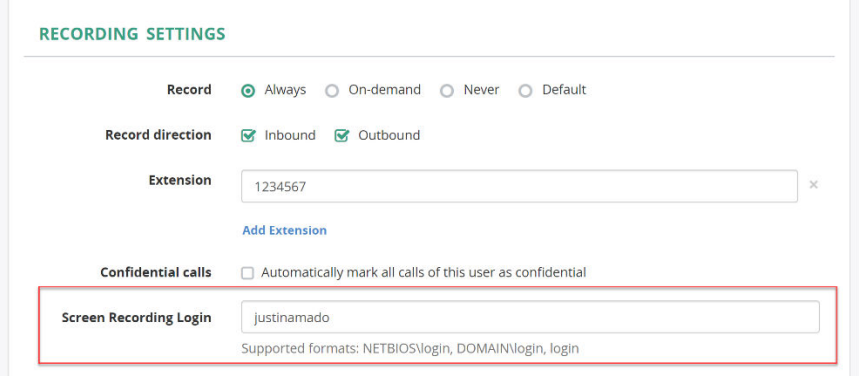


Configure Users for Screen Recording

Navigate to **Administration > User Management > Users** and click **Edit** for the corresponding user profile.

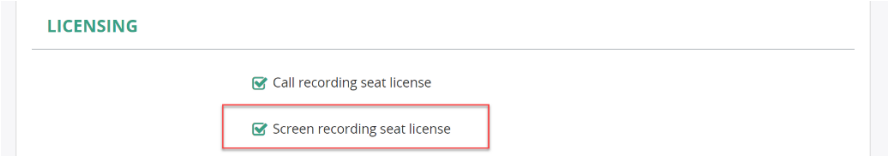
Step 1. Configure Screen Recording Login

Under **Recording settings**, configure the Windows login name in the **Screen recording login** attribute. This value should match to username, the user is using to login to Windows machine. Optionally, you can specify a domain name if your organization has multiple domains.



Step 2. Assign Screen recording license

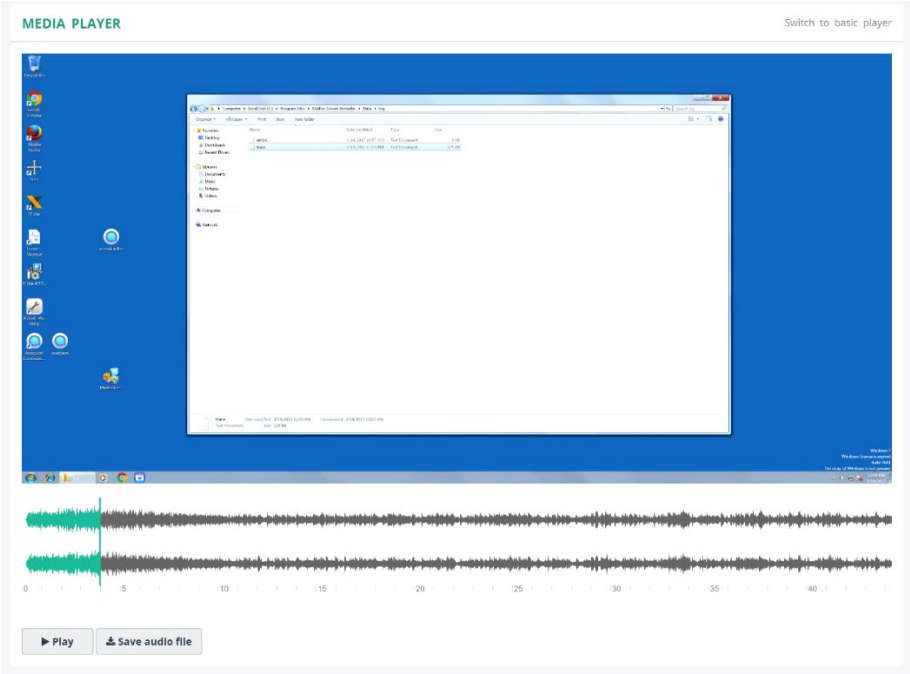
Under Licensing, assign the Screen recording seat license to user.



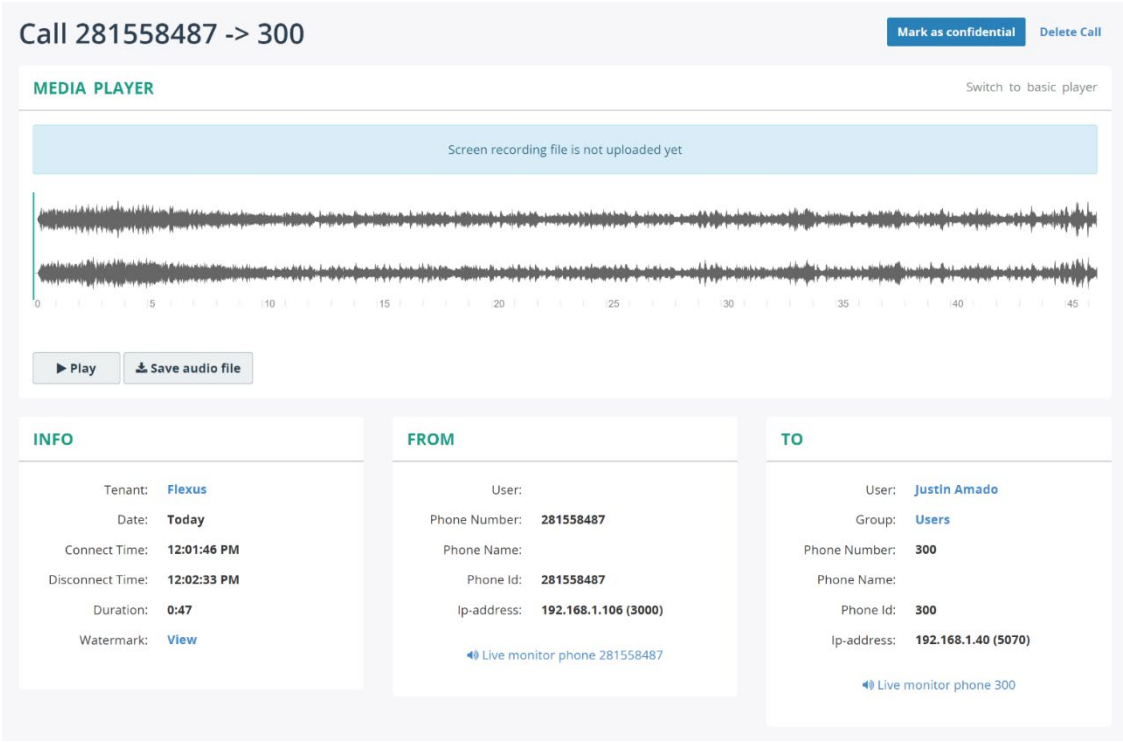
If user logs into to the authorized workstation using the configured login name, a screen capture will be activated automatically.

Verify Screen Recording

Make a test call to verify screen recording. Once a call is completed, the video file should be automatically uploaded to the central storage server. You will be able to playback both audio and screen recordings simultaneously.



Upload process may take some time depending on network speed between client and server. The message **Screen recording file is not uploaded yet** is shown when upload is not completed yet:



Troubleshooting Screen Recording

Client Side

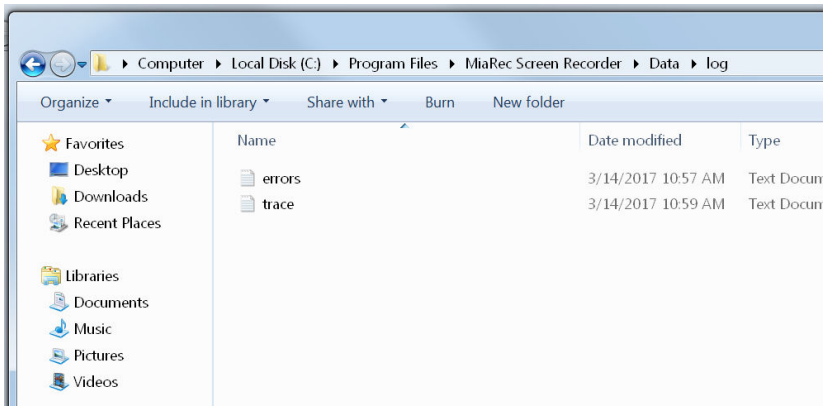
Enable Logging for Service Application

By default, client application doesn't write logs. Navigate to **INSTALL-FOLDER\Bin** and edit file Call RecordingScreenRecorder.ini Change **Enable** to **1** in the section **[Trace]**:

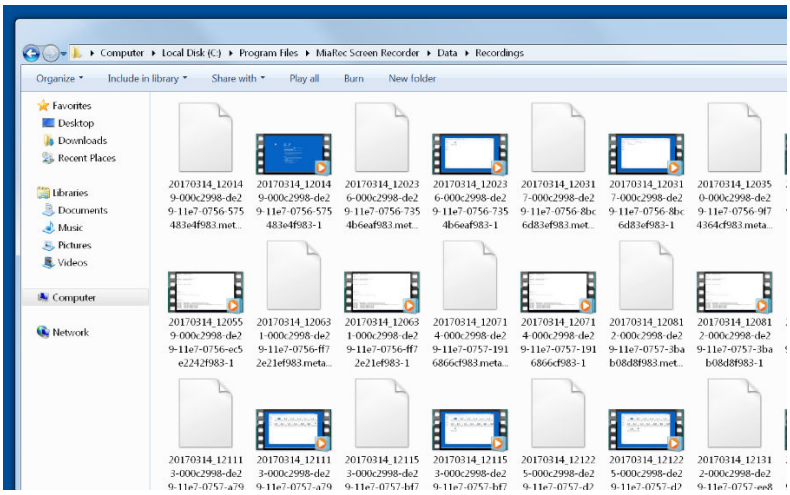
```
[Trace]
Enable=1
File=<INSTALL-FOLDER>\Data\log\trace.log
```

Restart service **Call Recording Screen Recorder**.

Once enabled, the logs are written into **INSTALL-FOLDER\Data\log\trace.log** file. Optionally, you can change a location of log file by editing File parameter in the INI file.



The video files are stored temporary in directory **INSTALL-FOLDER\Data\Recordings**. The client application automatically uploads the recorded files to the central storage server after call completion. Once uploaded, the files are removed from local storage. You can verify if any of files are recorded by the client but not uploaded yet.



Enable Logging for Desktop Capturing Process

To enable logging for the capturing process, first create new directory on computer where non-privileged users can write files. It should be outside of **C:\Program Files**. For example, create directory C:\Call RecordingLogs

Then, navigate to **INSTALL-FOLDER\Bin** and edit file Call RecordingScreenRecorder.ini

Under section **[Recording]** edit the parameter **CaptureProcessArgs**. Change it to:

CaptureProcessArgs = -ttttt -o C:\Call RecordingLogs\ScreenRecDesktop.log

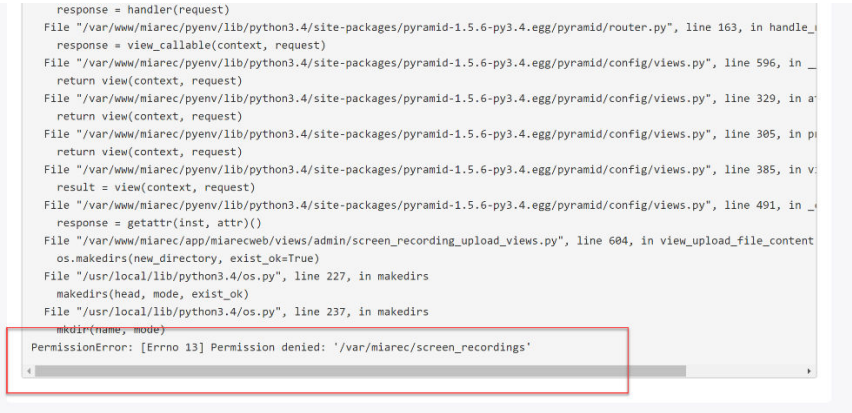
Note, the directory **C:\Call RecordingLogs** should exists and it should be writteable by non-privileged users.

Server Side

If the screen recording doesn't appear on the server for too long, then you need to check logs on both the server and client.

First, check, System Log on the server (menu **Administration > Maintenance > System Log**).

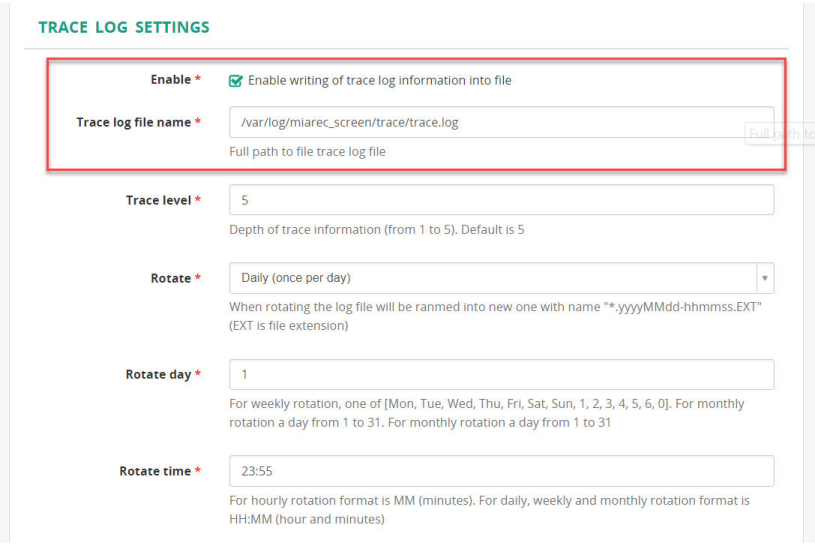
One of the common issues is insufficient permissions to the upload directory. The following screenshot shows one of such cases.



In this case, you just need to grant the **write** permission on that folder to the Apache web server user account:

```
mkdir -p /var/Call Recording/screen_recordings
chown apache:apache /var/Call Recording/screen_recordings
```

Additionally, you can enable trace on server side. Navigate to menu **Administration > Screen Recording > Screen Recording Settings** and enable detailed trace logging.


TRACE LOG SETTINGS
Enable *
Enable writing of trace log information into file
Trace log file name *
/var/log/miarec_screen/trace/trace.log
Full path to file trace log file
Trace level *
5
Depth of trace information (from 1 to 5). Default is 5
Rotate *
Daily (once per day)
When rotating the log file will be ranmed into new one with name "*.yyyyMMdd-hhmmss.EXT" (EXT is file extension)
Rotate day *
1
For weekly rotation, one of [Mon, Tue, Wed, Thu, Fri, Sat, Sun, 1, 2, 3, 4, 5, 6, 0]. For monthly rotation a day from 1 to 31. For monthly rotation a day from 1 to 31
Rotate time *
23:55
For hourly rotation format is MM (minutes). For daily, weekly and monthly rotation format is HH:MM (hour and minutes)

Hardware | Storage | Configuration Requirements

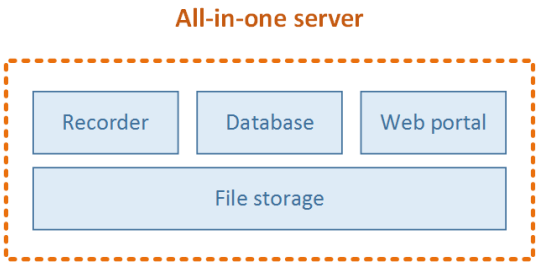
Call Recording solution has flexible architecture supporting various deployment scenarios depending on number of users and requirements to high availability and redundancy.

- All-in-one server. All components (recorder, database, web portal, storage) are deployed to a single server.
- **Decoupled architecture (multiple servers)**. Each component is deployed to a dedicated server for redundancy and load balancing purposes.
- "All-in-one" configuration is recommended for up to 2,000 users.
- The distributed configuration is recommended for more than 2,000 users (more details here)

All-In-One Server

This article provides hardware recommendations for "all-in-one" setup, where all software components (recorder, database, web portal and storage) are deployed in a single server.

"All-in-one" configuration is recommended for deployments up to 2,000 users. For larger deployments we recommend the use of decoupled architecture (multiple servers).



Recommended Hardware Configurations

For Recording 50-500 Users

Physical or virtual server with the following minimum hardware specification:

CPU	Intel CPU quad-core or better. Frequency at least 2.0GHz.
Memory	16 GB or more
Storage	• Two high speed disks (at least 10,000 rpms HDD or preferably SSD) in RAID 1 configuration for storing operating system, program files and database data. Disk space requirements - at least 300GB. • High capacity disk array (local or NAS/SAN) in RAID 5/6 configuration for storing audio mp3 files and, optionally, log files. Disk space requirements - 0.24 MB/minute of recording For example, in average a business user makes 10 calls per day with a duration 5 minutes. This will end up to 1,000 minutes per user per month (assuming 20 working days). One month of storage for 500 users will require 120 GB of disk space.
OS	Windows Server 2012, 2016 (64-bit) or Linux RedHat/Centos 7.x

For Recording 500-1,000 Users

Physical or virtual server with the following minimum hardware specification:

CPU	Intel CPU six-core or better. Frequency at least 2.3GHz.
Memory	32 GB or more
Storage	• Two high speed disks (at least 10,000 rpms HDD or preferably SSD) in RAID 1 configuration for storing operating system, program files and database data. Disk space requirements - at least 600GB.

- High capacity disk array (local or NAS/SAN) in RAID 5/6 configuration for storing audio mp3 files and, optionally, log files. Disk space requirements - 0.24 MB/minute of recording

  For example, in average a business user makes 10 calls per day with a duration 5 minutes. This will end up to 1,000 minutes per user per month (assuming 20 working days). One month of storage for 1,000 users will require 240 GB of disk space.

OS Windows Server 2012, 2016 (64-bit) or Linux RedHat/Centos 7.x

For Recording 1,000-2,000 Users

Physical or virtual server with the following minimum hardware specification:

CPU Intel CPU hex-core or better. Frequency at least 2.3GHz.

Memory 64 GB or more

Storage

- Two high speed disks (at least 10,000 rpms HDD or preferably SSD) in RAID 1 configuration for storing operating system, program files and database data. Disk space requirements - at least 1,000 GB.
- High capacity disk array (local or NAS/SAN) in RAID 5/6 configuration for storing audio mp3 files and, optionally, log files. Disk space requirements - 0.24 MB/minute of recording.

  For example, in average a business user makes 10 calls per day with a duration 5 minutes. This will end up to 1,000 minutes per user per month (assuming 20 working days). One month of storage for 2,000 users will require 480 GB of disk space.

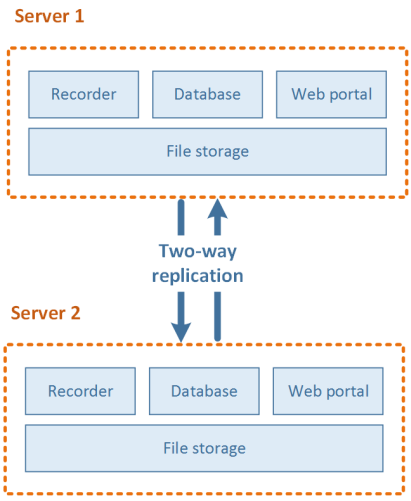
OS Linux RedHat/Centos 7.x

More Than 2,000 Users

For larger deployments we recommend the use of decoupled architecture (multiple servers).

High Availability and Redundancy

Call Recording supports High Availability setup using advanced multi-master asynchronous replication between multiple "all-in-one" servers.



Decoupled Architecture

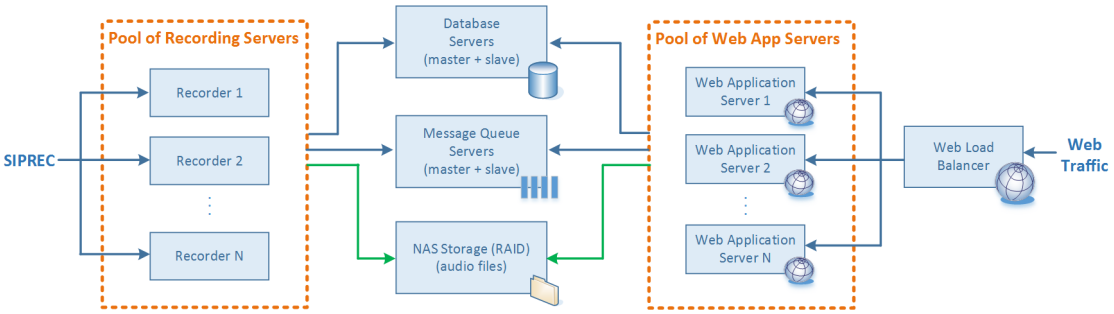
Within Call Recording's decoupled architecture, each software component (recorder engine, database, web portal, storage) is deployed on a dedicated server. As an option, the components may be duplicated to achieve full redundancy and/or scalability.

Decoupled architecture is recommended for recording 2000 or more users.

The following diagram shows the extreme case when at least two copies of each component are deployed on their own dedicated server (master/slave or multi-master) to achieve full redundancy.

Besides such extreme cases, Call Recording supports other configurations with a partial share of hardware resources with some other components. For example, for a small-scale deployment in a hosted environment we recommend you isolate a recording server as the minimum requirement. The rest of the components may share hardware resources on the second server. This two-server setup provides a good balance between security (isolation of a critical recording server) and cost (sharing of hardware resources by other components).

Nowadays a virtualization is a preferred deployment method for new software. In a virtual environment it is significantly cheap to spin up additional VMs and isolate components from each other to achieve reliability, security, and scalability.



Such architecture allows you to achieve the following goals:

- **Redundancy**: All components are duplicates to eliminate single-point-of-failure issues. Some of these components support master/master, others support master/slave configuration with a floating ip-address mechanism.
- **Performance**: The software components do not intend for the same server resources (CPU, Memory, I/O, etc.)
- **Scalability**: Multiple recording and web servers can be deployed for load balancing purposes. Additional server could be easily added to the solution to cover customer growth. Call Recording software architecture provides an almost linear scalability of individual components. For example, if the bottle-neck is a web portal, then you just need to spin up an additional VM with web application.
- **Reliability**: The components are isolated from each other. In a hosted environment, it is important to isolate recording servers from web servers in order to prevent potential disruption of service due to occasional spikes in web traffic. With such architecture, the issues with some of components are not propagated to other components. In the worst case, you may have slowdown of the web portal, but the recording process will not suffer from such issues, and you will not lose any recordings due to CPU/disk/network overload.
- **Security**: In a hosted environment, it is important to keep recording and database servers in a private network isolated from end-user facing web servers. A potential breach of the web server will not spread to other servers.

Hardware Specification Recommendations

Different components have different requirements to hardware. For example, Call Recording recording server benefits the most from multiple CPU cores and does not benefit at all from additional memory (for example, recording of 500 concurrent sessions consumes less than 1GB of memory, but requires 16-core CPU). The database server benefits the most from SSD disks with a high speed random access. The web portal doesn't benefit from SSD disks, but it benefits from additional memory.

Below you will find recommendations on the hardware specification of each individual component.

Recording Server Hardware Requirements

We recommend one recording server (or virtual machine) for each 500 concurrently recorded session (equivalent to approximately 5,000 users in a Hosted PBX environment). Call Recording recording engine has exceptional performance and can record 1,000 and more concurrent session on a single server; we recommend you keep an average load of 500 concurrent sessions per server in order to have enough room for potential spikes in load.

When using audio file encryption, the recommendations are one server per 250-300 concurrently recorded session.

Small Server Configuration

(About 1,000 users per recorder server)

CPU	4 cores or more. Frequency of at least 2.26GHz.
Memory	16 GB or more
Storage	• 2 hard disks using RAID 1 for storing OS, binary files, and log files. Minimum free disk space is 300GB (for log files). • 2 high speed hard disks (10K or 15K RPM) using RAID 1 for temporary storage of audio files for in-progress calls. Minimum free disk space is 300GB. (*)

Large Server Configuration

(About 10,000 users per recorder server)

CPU	12 cores or more. Frequency of at least 2.26GHz.
Memory	32 GB or more
Storage	• 2 hard disks using RAID 1 for storing OS, binary files, and log files. Minimum free disk space is 300GB (for log files). • 2 high speed hard disks (10K or 15K RPM) using RAID 1 for temporary storage of audio files for in-progress calls. Minimum free disk space is 300GB. (*)

(*) - For performance reasons it is recommended that you store audio files for in-progress calls locally on the server. The audio file will be moved to the network attached storage at the end of each call.

In addition to performance reasons, this solution provides another layer of protection to prevent network failures. In case there are network connection issues due to the NAS, the recorder process may continue to record calls, and store audio files locally till the connection to the NAS server is recovered.

Database Server Requirements

One or two database servers (PostgreSQL) in master/slave configuration using floating ip failover mechanism.

CPU	2 cores or more. Frequency of at least 2.26GHz.
Memory	32 GB or more
Storage	Solid state drives (SSDs) using RAID 1 or RAID 10 with free space 3GB for each 1M records stored in database

Web Application Server Requirements

One or more web application servers are required for load balancing and redundancy purposes.

Each of the servers host web portals as well as worker processes for task manager. The task manager is used to execute various maintenance tasks like export, backup, replication, retention, etc. The workers on multiple web application servers form the pool of workers, i.e. the tasks are automatically distributed over multiple application servers for redundancy and load balancing purposes.

The recommended number of web servers depends on anticipated pages/s web requests load.

For a hosted PBX environment, a rough estimate is one web server per 5,000 users.

CPU	4 cores or more. Frequency of at least 2.26GHz.
Memory	16 GB or more
Storage	2 hard disks using RAID 1 for storing OS, binary files and log files. Minimum free disk space is 150GB (for log files).

Web Load Balancer Requirements

The web load balancer (HAProxy) is required when two or more web servers are deployed.

The load balancer server itself may be duplicated to eliminate a single point of failure situation. Switchover between load balancing servers is implemented using floating ip mechanism.

CPU	2 cores. Frequency of at least 3.00GHz.
Memory	4 GB
Storage	Storage is not critical because HAProxy is mostly CPU consuming process (single thread). 64GB of disk storage for OS, application binary files and logs should be enough.

Message Broker Server Requirements

One or two servers in master/slave configuration for message queue system. The message queue system is used for internal communication between various components of Call Recording solution.

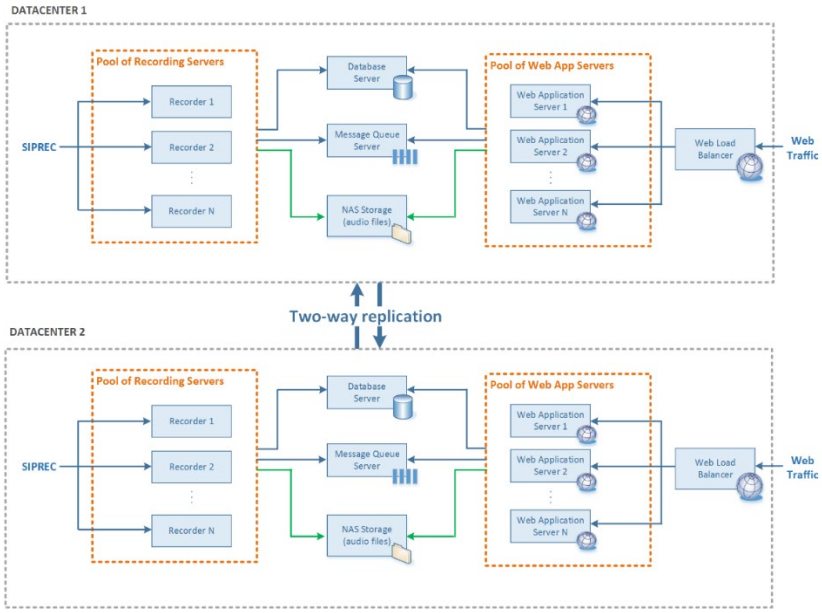
CPU	2 cores or more. Frequency of at least 2.26GHz.
Memory	16 GB or more
Storage	• 2 hard disks using RAID 1 for storing OS and binary files (64GB) • 2 high speed hard disks (10K or 15K RPM) using RAID 1 for persistent storage of messages with free space at least 64GB.

Network Attached Storage (NAS) for Audio Files

Call Recording stores audio files in compressed MP3 format. Default compression settings are 0.24MB/minute of recording.

Decoupled with GEO-Redundancy

Call Recording supports advanced multi-master asynchronous application-level replication between datacenters. It is quite unique on the market because other vendors mostly support either master/slave or master/master synchronous or SAN-based replication (expensive and not suitable for GEO-redundancy).



Disk Space Requirements

Call Recording supports following formats for audio files:

Format	Size per minute	Hours per TB
MP3 (stereo 32kbps) - default	**0.24** MB/minute	**72,818** hours/TB
MP3 (mono 16kbps)	**0.12** MB/minute	**146,636** hours/TB
WAV (stereo)	**1.92** MB/minute	**9,102** hours/TB
WAV (mono)	**0.96** MB/minute	**18,204** hours/TB

Format of audio file and MP3 bitrate settings are configurable.

Example of disk space requirements calculations

Assumptions:

- In average, a business user makes 10 calls per day with a duration 5 minutes. This results into 1,000 minutes per user per month (assuming 20 working days).
- File format is MP3 stereo 32kbps, i.e. 0.24MB/minute

Approximate disk space requirements (see assumptions):

Total users	30 days storage	1 year storage	3 year storage	7 year storage
50	12 GB	144 GB	432 GB	1,000 GB
100	24 GB	288 GB	864 GB	2,000 GB
200	48 GB	576 GB	1,728 GB	4,000 GB

Total users	30 days storage	1 year storage	3 year storage	7 year storage
500	120 GB	1,440 GB	4,320 GB	10,000 GB
1,000	240 GB	2,880 GB	8,640 GB	20,000 GB
2,000	480 GB	5,760 GB	17,280 GB	40,000 GB

Screen Recording Storage Requirements

Screen recording compression is configurable under **Administration > Screen Recording > Screen Recording Settings**.

A default bitrate is 256kbps, which is the best balance between video quality and file size.

Bitrate	Size per minute	Hours per TB
256kbps	**1.92** MB/minute	**9,102** hours/TB

Firewall Configuration

Ensure the firewall ports are open, which are used for accessing Call Recording from other computers on the network/Internet.

Open Ports for Call Recording

Call Recording uses following ports, which should be opened on firewall:

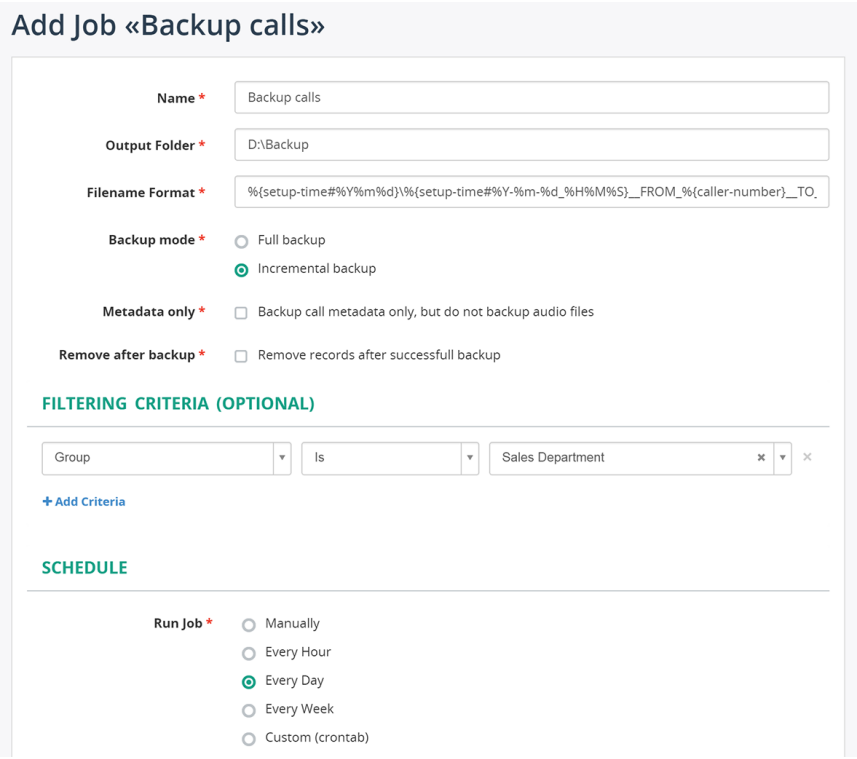
Port	Description
80 (TCP)	Call Recording Web-portal (HTTP protocol) It is possible to change this port to other value during installation (for example, to 8080).
443 (TCP)	Call Recording Web-portal (HTTPS protocol)
6554 (TCP)	Live monitoring (RTSP signaling). If live monitoring is not used, then this port can be closed on firewall.
7000 - 7999 (UDP)	Live monitoring (RTP audio). If live monitoring is not used, then these ports can be closed on firewall.
5070 (TCP)	Cisco SIP trunk recording signaling (SIP protocol) - for Cisco UCM only
20000 - 21999 (UDP)	Cisco SIP trunk recording media (RTP protocol) - for Cisco UCM only
5080 (TCP, UDP)	SIPREC recording signaling (SIP protocol) - for SIPREC recording only
22000 - 23999 (UDP)	SIPREC recording media (RTP protocol) - for SIPREC recording only
32000 - 33999 (UDP)	Avaya DMCC recording media (RTP protocol) - for Avaya DMCC recording interface only
6091 (TCP)	Screen recording controller, unencrypted (optional)
6092 (TCP)	Screen recording controller, encrypted (TLS)

BACKUP AND RESTORE

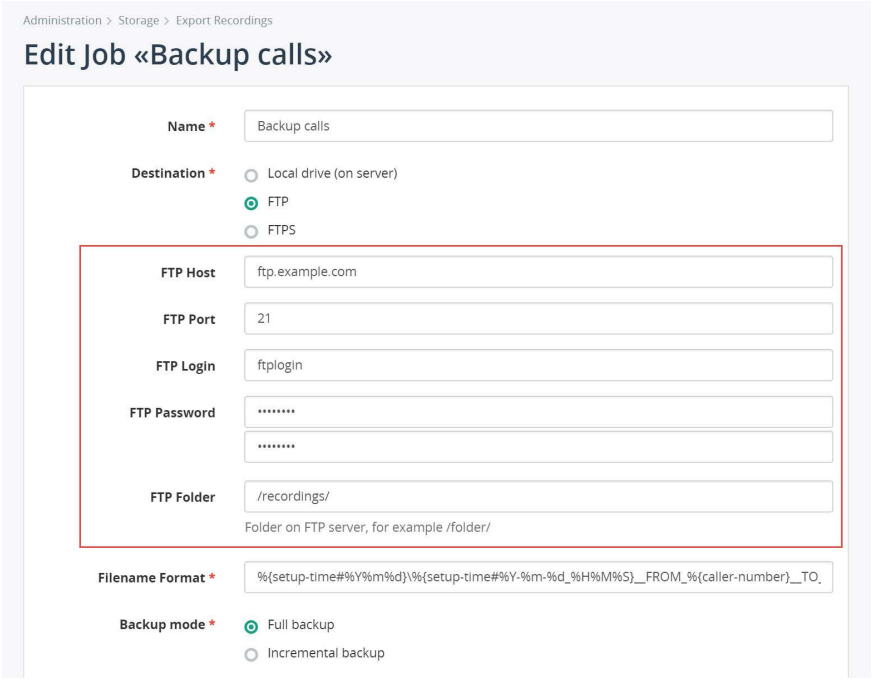
Backup Call Recordings

Authorized Administrators may have access to navigate to **Administration** > **Storage** > **Export Recordings** to review or manage backup jobs.

A backup job may be started manually or scheduled as needed (for example, nightly, weekly, every other week, etc.).

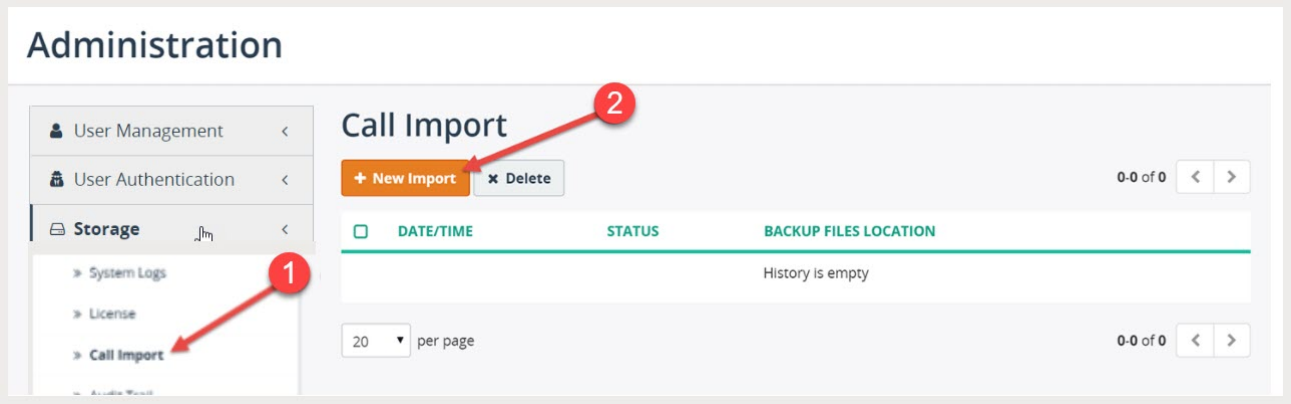


Example when exporting to an FTP server:

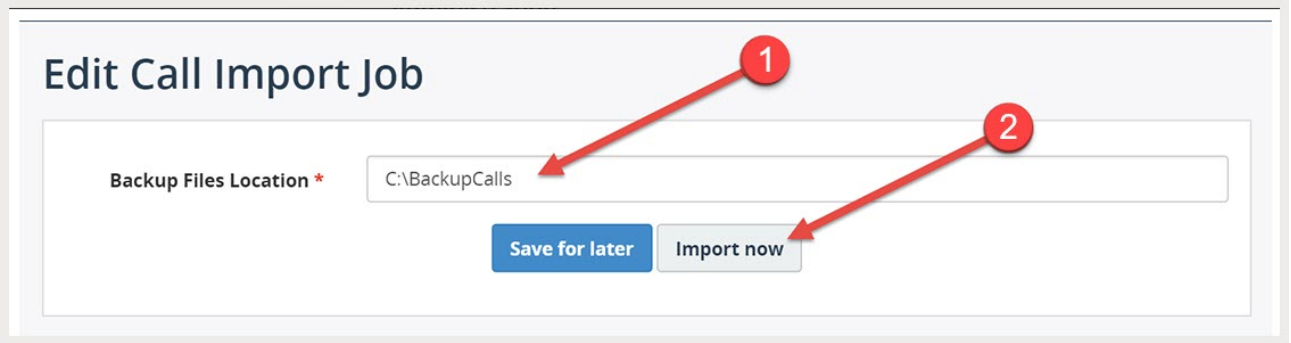


Restore Call Recordings

Authorized Administrators may navigate to **Administration** > **Storage** > **Import Recordings** to access restore tools. Contact the Service Provider for assistance with these tools if your credentials do not allow access.



In "Edit Call Import Job" form specify the location of backup files and click on "Import now" button.



Additional steps in case the backup files are located on network share:

It is important to note, that backup files will be accessed by a program application running on MiaRec server rather than from the computer on which you open MiaRec web portal. This means that even if you can access backup files from your own computer, the same files may be unaccessible from MiaRec server.

If backup files are stored on a network share, then on Windows servers you should use correct UNC path like \server\dir, on Linux servers you should mount the network share to a local file system, for example, /mount/backup.

When using UNC path on Windows, take into account that such path will accessed by a process running as a Windows service application. By default service applications are running under credentials of LOCAL_SYSTEM user account. This is internal user account, which has no access to network. To solve this issue, you would need to change parameters of "MiaRec Celery" service and run it under credentials of some user account, which can access the backup network share.

MORE RESOURCES

The application developer also provides a more generic set of documents and related resources that are available online.

All Documentation:

www.miarec.com/documentation

Administration Guide

www.miarec.com/doc/administration-guide

Supervisor (User) Guide

www.miarec.com/doc/user-guide

Momentum Telecom offers a library of documentation and resources for all products at **Momentum University**

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