



Grandstream Networks, Inc.

UCM6xxx Series IP PBX

Lightweight Call Center Guide



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INTRODUCTION

Today, many small and medium sized businesses are choosing for on-premises IT solutions which will fit their special business needs. As for the telephony systems, VoIP (Voice over IP) has emerged in the last years as major technology providing all necessary features that enterprise grade PBXs can offer.

One of the major functionalities that a VoIP system must provide are call center features, allowing SMBs to implement their own local call center and better serve their customers by phone calls.

There are hundreds of different hardware/software providers across the globe that integrate call center functionalities into their solutions, and every call center system has its pros and cons. When selecting the right call center system for your business, contact center, or call center, it's important to decide which features you want your phone system to have.

Grandstream Networks, being the leading manufacturer of VoIP equipment, has built into its well-known UCM6XXX IP-PBX series many call center features that businesses are requesting and will continue to add more options to attend to its customer's needs. On the following guide, we will cover in detail all the major modules and features provided by UCM6XXX IP-PBX series that will help you run your own call center in the most possible efficient way.



UCM CALL CENTER FEATURES LIST

The UCM has most of the well-known features that are requested for call center implementations, the following sections will cover these modules and functionalities one by one in more detail.

Call Queues

UCM supports one of the fundamental building blocks of every call center system, that is call queues.

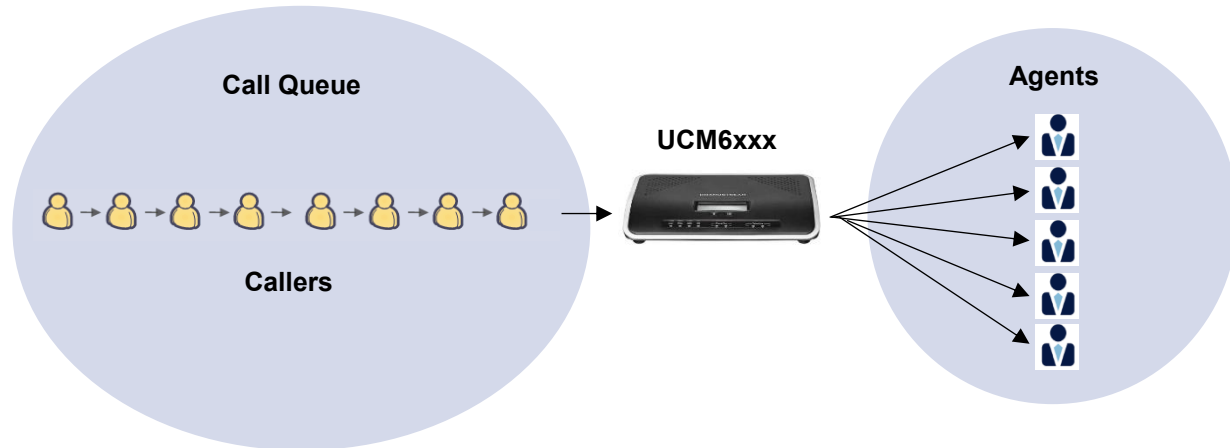


Figure 1: Call Queue Diagram

Typically, a call queue consists of:

- **Callers:** Sending incoming calls placed in the queue.
- **Agents:** Members defined to answer the queue calls. Agents can be either static or dynamic.
- **Call queue strategy:** A strategy that dictates how the PBX will distribute incoming calls to the agents.
- **Music on hold:** Music or advertisements played for callers while waiting in the queue.

Users can also set other useful features and options that we summarize on the following table:

Option	Description
Max Queue Length	Configure the maximum number of calls to be queued at once. This number does not include calls that have been connected with agents. It only includes calls not connected yet. The default setting is 0, which means unlimited. When the maximum value is reached, the caller will be treated with busy tone followed by the next calling rule after attempting to enter the queue. If a failover destination is configured, when the maximum value is reached, the following caller will be transferred to the failover destination directly.
Wrapup Time	Configure the number of seconds before a new call can ring the queue after the last call on the agent is completed. If set to 0, there will be no delay between calls to the queue. The default setting is 10 seconds.
Retry Time	Configure the number of seconds to wait before ringing the next agent.



Ring Time	Configure the number of seconds an agent will ring before the call goes to the next agent. The default setting is 30 seconds.
Max Wait Time	Configure the timeout after which users will be disconnected from the call queue. The default setting is "0" which means unlimited. Note: It is recommended to configure "Wait Time" longer than the "Wrapup Time".
Destination	With this feature, users can configure a failover destination to which send callers when the call timeout or when all agents are busy, there are two modes for this feature: <ul style="list-style-type: none"> • Failover destination after Max wait time: for this mode, users need to configure the Max Wait Time under call queue basic settings to set the call queue timeout and set the destination to where send callers after this timeout. • Triggered failover destination (configuration using the fields below): This mode is useful in case all agents are busy and you want to prompt periodically the caller to choose between stay waiting on the queue or press a button to be transferred to a failover destination (Ex: an IVR, another queue or an external number).
Destination Prompt Cycle	Configure the voice prompt cycle (in seconds) of the call queue. Once all agents are busy and the voice prompt will be played, and you can press the appropriate key to transfer to failover destination.
Custom Prompt	When playing a custom prompt, press 1 to transfer to failover destination.
Destination	Select failover destination to send callers after pressing 1 upon hearing the custom prompt.
Enable Agent Login	Enables agent login/logout feature for static agents (supported only on GXP21XX phones with fw higher than 1.0.9.18). refer to [Agent Easy Login] .
Leave When Empty	Configure whether the callers will be disconnected from the queue or not if the queue has no agent anymore. The default setting is "Strict". <ul style="list-style-type: none"> • Yes: Callers will be disconnected from the queue if all agents are paused or invalid. • No: Never disconnect the callers from the queue when the queue is empty. • Strict: Callers will be disconnected from the queue if all agents are paused, invalid or unavailable.
Dial in Empty Queue	Configure whether the callers can dial into a call queue if the queue has no agent. The default setting is "No". <ul style="list-style-type: none"> • Yes: Callers can always dial into a call queue. • No: Callers cannot dial into a queue if all agents are paused or invalid. • Strict: Callers cannot dial into a queue if the agents are paused, invalid or unavailable.



Report Hold Time	If enabled, the UCM will report (to the agent) the duration of time of the call before the caller is connected to the agent. This way the agent can answer the call with appropriate excuse in case the customer has been waiting for a long time.
Replace Display Name	If enabled, the UCM will replace the caller display name with the Call Queue name so that the caller knows the call is incoming from a Call Queue. This option can be useful when an agent is a member of multiple call queues and wants to see from which call queue is coming-in.
Enable Feature Codes	Enable feature codes option for call queue. For example, *83 is used for “Agent Pause”
Dynamic Login Password	If enabled, the configured PIN number is required for dynamic agent to log in. The default setting is disabled.
Alert-Info	This option can be used to set customized alert-info header when sending call signal from the PBX to agent’s phones, thus allowing to have distinctive ringtone for call queue calls.

➤ Call Queue Configuration

Below are the steps for basic creation and configuration of call queues from the UCM’s web GUI:

1. Access the UCM web GUI under **Call Features**→**Call Queue**.
2. Click on “Add” to create a new call queue.
3. Specify the call queue extension number under **Extension** field.
4. Define a name for this call queue.
5. Configure the call queue strategy under **Strategy**.
6. Go to “Agents” tab to select available agents to receive calls.
7. Press **Save** button and **apply** the new changes.

For Agents configuration and management, please check [**Agents Management**] for more details.

Virtual Queue

A new function named Virtual Call Queue has been added to the UCM’s call queue module, this allows customers to receive a callback instead of waiting in an ACD queue.

After a customer’s waiting time exceeds a configurable threshold, he/she will be prompted to choose between stay waiting on the queue or leave a call-back number without losing his position in the queue. When it’s his turn, the UCM will place automatically a call to the call-back number.

This feature can be enabled and configured under the advanced settings of each call queue, and it does support two modes:

- **Offer menu after timeout:** The caller will be prompted by a menu to set callback number or continue waiting after the virtual queue threshold period was exceeded.
- **Triggered on user request:** The menu will be prompted to the caller once he/she presses **2**.



Position Announcement

UCM supports also call queue position announcement, where the caller's position in the queue will be announced periodically within a configurable time frame.

This can help the callers to decide whether to wait more for an agent to answer the call, or leave a callback request or simply Hangup.



➤ Virtual Queue & Position Announcement configuration

In order to set virtual call queue and position announcement features under a specific call queue, users may follow the steps below:

1. Access the UCM web GUI under **Call Features**→**Call Queue**.
2. Edit the call queue and go to advanced settings.
3. Check “Enable Virtual Queue” and leave the mode set to be offered to the caller.
4. Set the “Virtual Queue period” (ex: 30s).
5. Set Virtual Queue Outbound prefix that will be used for outbound rule matching.
6. Enable position announcement.
7. Set the position announce period (ex: 30s).
8. **Save** and **apply**.

Music On Hold

UCM supports also Music on hold, which is largely used on call center systems. Once a call reaches the queue, the customer will be usually prompted with an IVR menu and listen to a music on hold while waiting for an agent to take the call.

The music on hold files are managed under **PBX Settings**→**Music On Hold** and once this is done, users can assign to each call queue a specific music on hold as desired.



Agents Management

Call center agents which handle incoming queue calls and outgoing calls with customers on a daily basis can be defined in two different ways:

➤ Static Agents

The administrator can assign static agents to a call queue using the following steps.

1. Access the web GUI menu **Call Features**→**Call Queue**→**Edit Queue**.
2. Click on **Agents** tab.
3. Select the static members (agents) of the queue.



Note: The maximum number of static agents for a queue depends on the UCM model as shown below:



Table 1: Max Static Agents in Call Queue

UCM Model	Max Static Agents in Call Queue
UCM6102	22
UCM6202	23
UCM6104	33
UCM6204	34
UCM6108 / UCM6116	45
UCM6208	75
UCM6510	150

➤ **Dynamic Agents**

The second method by which agents can be used is to give them the flexibility to dynamically login and logout from the call queue, this way the agent will log-in once arrived at the office and logout when leaving.

For this, the administrator needs to configure the login code by following below steps:

1. Access the web GUI menu **Call Features**→**Call Queue**→**Dynamic Agent Login** Settings.
2. Set the login/logout extension postfix (Ex: * for login and ** for logout).
3. **Save** and **Apply**.

Once this is done, the administrator can instruct the agents that they can use the queue extension number followed by the corresponding postfix in order to log in/out respecting working hours.

➤ **Agents Pause**

When an agent needs to take a break (for lunch as an example) they can simply dial the “agent pause” feature code *83 then when he/she is back they can change the status to available by dialing the “agent Unpause” code *84.

These codes can be customized under **Call Features**→**Feature Codes**→**Feature Codes** menu of the UCM’s web GUI.

➤ **Agent Easy Login**

This feature the static agents to easily login/logout from their call queues using a simple button press to either login or logout. From their phone they can see the list of call queue that they are members in, and once they are in office they can choose to which call queues to login and after the end of the day they can press a button again to logout, thus removing the pain to remember the dynamic login/logout code and the queue extension number.

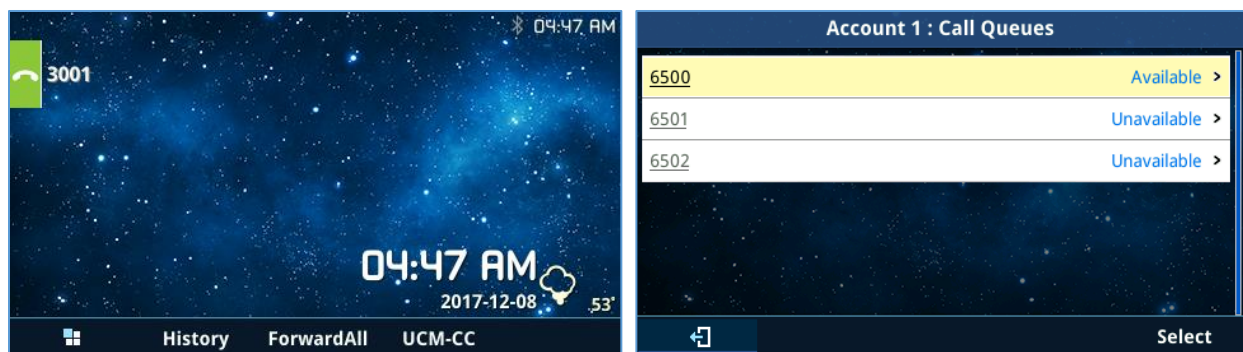


Figure 2: UCM CC Feature on GXP21XX phones



Notes:

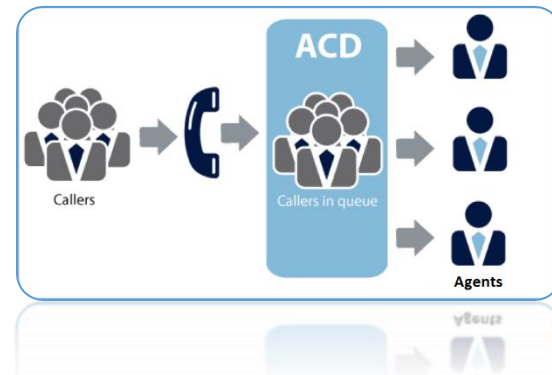
- This feature is only compatible with GXP21XX phones on the latest firmware version.
- Once this option is enabled, dynamic agent login will be disabled.

Incoming Calls Distribution

UCM supports automatic call distribution with many different strategies that can be set under basic options of each call queue separately.

Below are the descriptions of each strategy implementation:

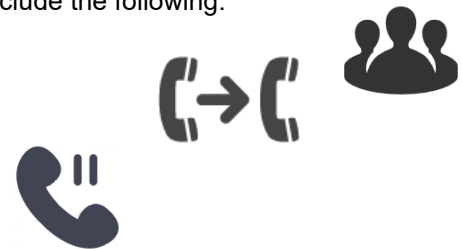
- **Ring All**
Ring all available agents simultaneously until one answers.
- **Linear**
The calls will ring at agents' phones following an order previously configured. Only for static agents.
- **Least Recent**
The system selects the agents who have not answered the phone for the longest period.
- **Fewest Calls**
The system assigns the call to the agent with the lowest number of calls answered so far.
- **Random**
Ring a random agent.
- **Round Robin**
Ring the agents in Round Robin scheduling with memory.



Call Control

Agents have full control over the calls with the support of almost all known features that are needed within a call center system for day to day operations, these features set include the following:

- Putting calls on Hold.
- Call transfer
- 3-way conference
- Call park



To use these features, the users have two options.

Using Standard Feature Keys or Codes on the Phones

For example, the agent can use "Transfer" button on his phone in order to transfer call or use the UCM's corresponding feature code for call hold in order to put a call on hold.

Note: For this first option, make sure to **Enable Feature Codes** under Call Queue Advanced settings.



Using Switchboard

The Agent can access to his/her user portal under call queue CTI where they can see active calls and have option buttons to operate and control the call, more details will be provided later on this document.

Monitoring

UCM supports some of the interesting monitoring features that are usually used within call center systems by supervisor and coaching personnel to assist agents during critical situations. These features can be used either via specific features codes or using CTI interface.

Call Barging

With call barging, supervisors can use feature codes after enabling the Spy option under **Call Features**→**Feature Codes** page to do the following operations:

- **Listen**
In “Listen” mode, the extension monitoring the call can hear both parties in the active call but the audio of the user on this extension will not be heard by either party in the monitored active call.
- **Whisper**
In “Whisper” mode, the extension monitoring the call can hear both parties in the active call. The user on this extension can only talk to the selected monitored extension and he/she will not be heard by the other party in the active call. This can be usually used to supervise calls.
- **Barge**
In “Barge” mode, the extension monitoring the call can talk to both parties in the active call. The call will be established similar to three-way conference.

Same operations can be performed using the web GUI of the UCM from call status page and switchboard.

Whisper Coaching

As mentioned above, one of the three modes for call barging in UCM is the **Whisper** mode. This mode allows supervisors and coaching personnel to assist agents during critical situations which require intervention. Whenever the agent answers a call, the call conversation audio will be forwarded to the supervisor, and the supervisor's audio will be forwarded to the agent for instructions but not to the customer.



Statistics

UCM has also built-in call queue statistics for performance measurement and agent's evaluation, thus helping managers and supervisors making the right decision to improve the call center day to day operations. The call queue statistics provided by the UCM have some amazing filtering options which can be used to get every detailed information about the performance of each queue separately or the full system.



Using these filters, the supervisor can get the following information and more:

- Call distribution by Agent.
- Call distribution by time unit (hours, days, weeks and months).
- Call distribution by queue.
- Filter by start time and end time.
- Virtual queue total information.
- Virtual queue distribution by agent.

The following figure shows a sample of statistics which lists the average unanswered and abandoned calls, as well as the average call and waiting time.

➤ Supervisor configuration

To setup and give special permissions for monitoring and control to the supervisor account, following steps can be followed:

1. Access the UCM web GUI under **Extension/Trunk→Extensions** and edit the agent’s extension.
2. Go to features Tab and under “Monitor Privilege Control” select the extension of the supervisor.
3. Press **Save** and go under **Call features→Feature Codes** then “Enable Spy”.
4. Go under **Call Features→Call Queue→Advanced settings** and select the supervisor’s extension under Queue Chairman option, this will give the supervisor control through the switchboard.
5. **Save** and **apply** the changes.

The following figure shows a sample view of the call queue statistics page.

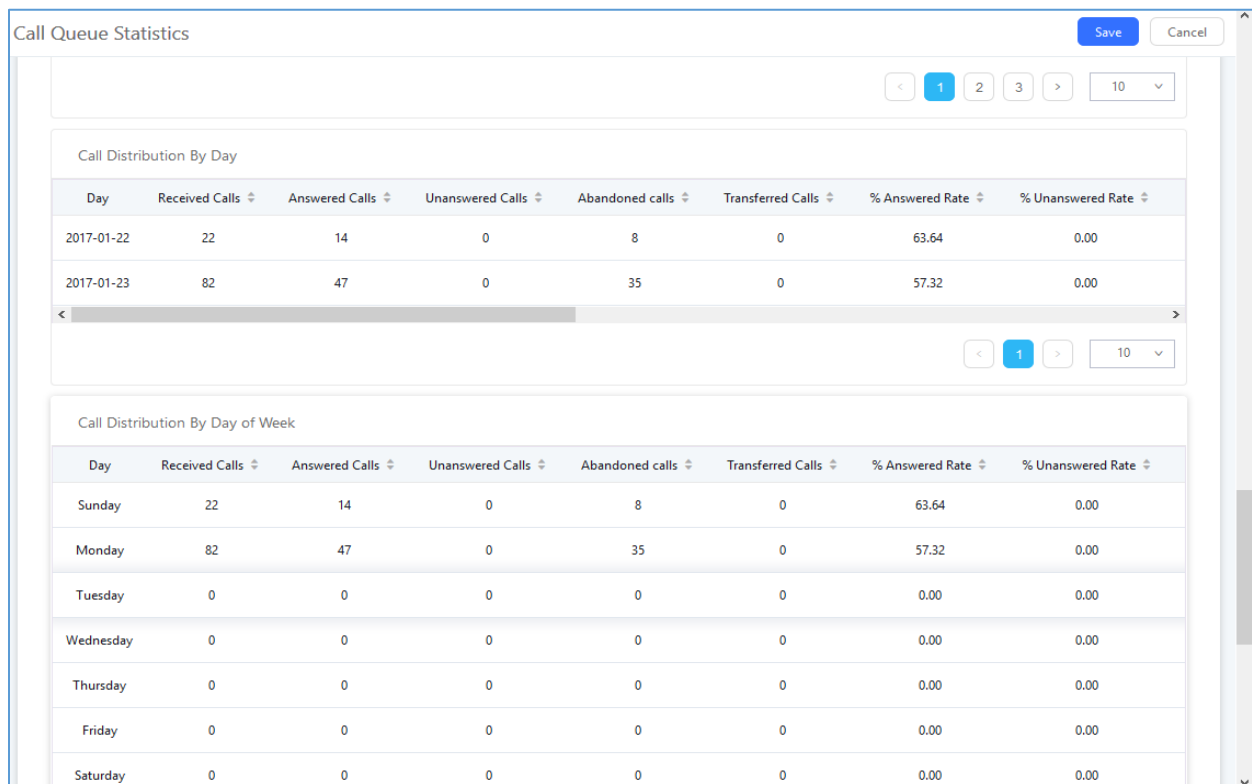


Figure 3: Call Queue Statistics



CTI (Computer Telephony Integration)

CTI, or Computer Telephony Integration refers to any technology or solution that allows the interaction between the telephone and the computer networks. This functionality is an important building block of any call center solution since it gives agents much more flexibility on handling high volume of calls in the most efficient way, allowing them to perform most call control operations in just few clicks.

Grandstream proposes two CTI solutions that are designed to ease the work load of your agents, the first one (GS Affinity App) requires integration with our enterprise grand IP-Phones and the second option is web based switchboard.



GS Affinity

Grandstream Affinity is an easy to use CTI application allowing interaction with Grandstream **GXP17xx/GXP21xx** IP Phones series. GS Affinity provides a smooth call management and control interaction between phones and computers running the application. Using GS Affinity CTI application, users will be able to get benefits from following major features:

- Complete call control (call answer, call hold, DND, call forward, conference, call transfer etc....).
- Incoming calls notifications on desk computer allowing caller numbers to be screened against a database to collect or provide more information related to caller.
- Initiate outbound calls from computer directly.
- Discovering phones with CTI feature enabled and communicate with the UCM6xxx directly to execute specific actions.
- Contacts management from computer and synchronization with connected hosts.
- Manage call history of connected hosts from computer.

Click [here](#) for more information about GS affinity.

The second way Grandstream provides CTI solution the web based switchboard under call queue, following section will give more details about this option.

Switchboard

UCM has a simple and easy to use switchboard for real time monitoring of call queues and performing different operations which include:

- List the waiting calls.
- List the proceeding calls.
- Manipulate proceeding calls.
- List agent's status.

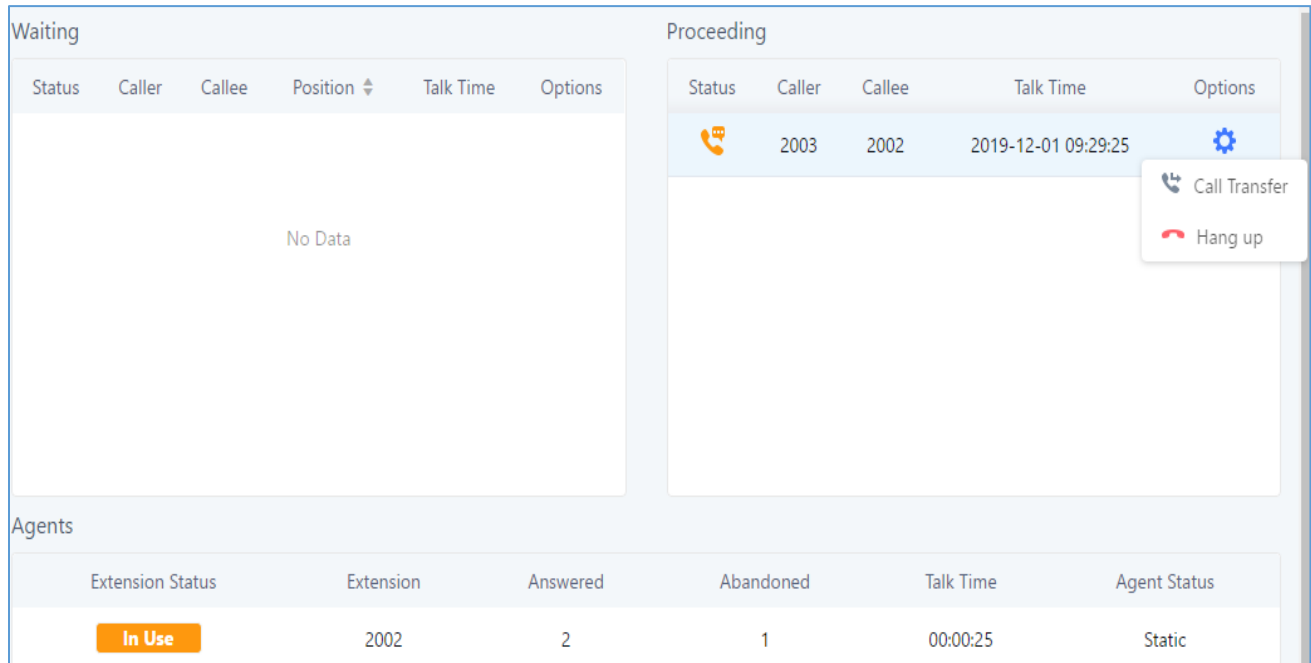
Users can access to call queue switchboard via two different methods that we will be discussing next.



User Portal

Users could log into their web GUI portal using the extension number and user password. When an extension is created in the UCM6XXX, the corresponding user account for the extension is automatically created. The user portal allows access to a variety of features which include user information, extension configuration and CDR as well as settings and managing value-added features like webRTC, Fax Sending, Call Queue, Wakeup Service and CRM.

Each agent can log into his/her user portal account and access to the switchboard of the call queue(s) where he belongs, below figure is an example:



Status	Caller	Callee	Position	Talk Time	Options
No Data					

Status	Caller	Callee	Talk Time	Options
	2003	2002	2019-12-01 09:29:25	<ul style="list-style-type: none"> Call Transfer Hang up

Extension Status	Extension	Answered	Abandoned	Talk Time	Agent Status
In Use	2002	2	1	00:00:25	Static

Figure 4: Switchboard from User Portal

From the command button on the proceeding call, the agent has the ability to transfer the call or Hangup using a simple click.

Queue Chairman

Another way to access to switchboard is to design under the advanced settings of the call queue a “queue chairman” which will provide a CTI interface for supervisor while logging using their user portal.

From the switchboard, the queue chairman has more advanced features and control over the call queue, which include the following:

- List the waiting calls with the ability to hang-up.
- List the proceeding calls.
- Transfer proceeding calls.
- Hang-up calls.
- Call barging (see **Whisper Coaching**).
- Call insert (for 3-way conference).



- List the agent’s status which are members of the call queue.
- Get some basic statistics over the call queue.

You can see from below figure a sample switchboard of a call queue chairman or “supervisor” and which obviously has more advanced control over the call queue than the normal agent user portal access as discussed on the previous section.

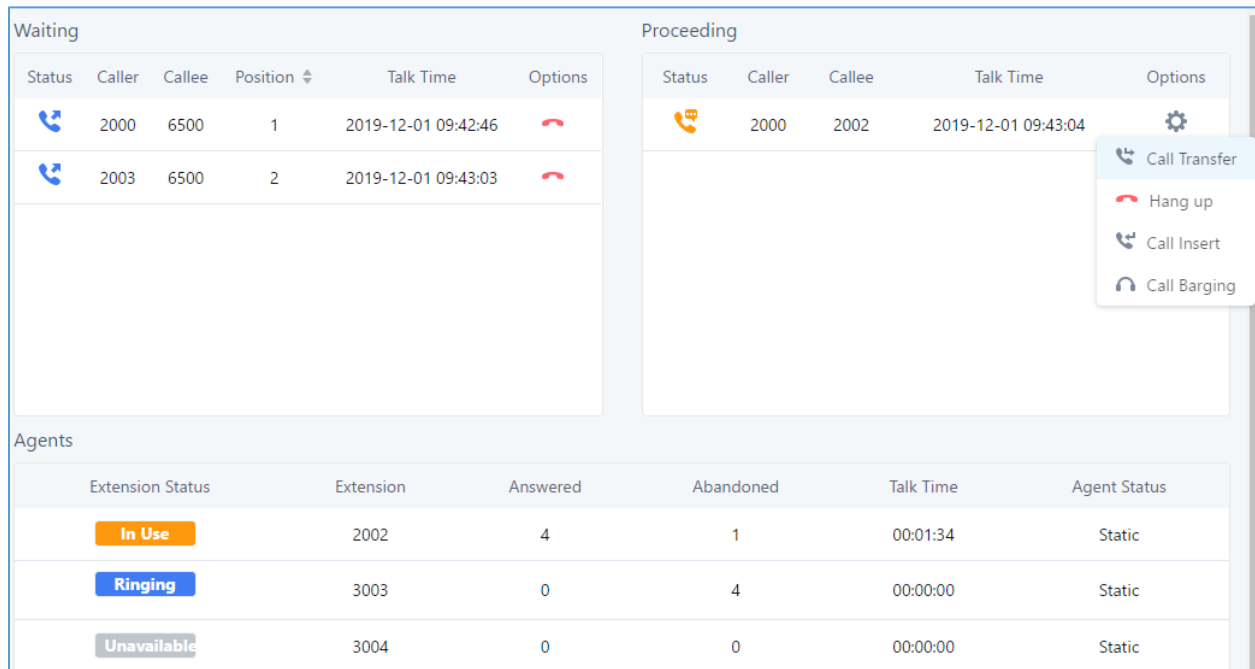


Figure 5: Switchboard from Chairman Account

Note:

The administrator account has also full access to all operation on switchboard for all queues using the web GUI admin account. It can be accessed from the menu **Call Features**→**Call Queues**→**Edit**→**Switchboard**.

CRM

Customer relationship management (CRM) is a term that refers to practices, strategies and technologies that companies use to manage and analyze customer interactions and data throughout the customer lifecycle, with the goal of improving business relationships with customers.

The UCM support CRM API for two well-known CRM solutions, SugarCRM and Salesforce, this allows users to look for contact information in the Contacts, Leads and / or Accounts tables, shows the contact record in CRM page, and saves the call information in the contact’s history.

CRM Interaction gets more interesting as well if we consider the integration with CTI app developed by Grandstream [**GS Affinity**]. Where the agents will get contact, information displayed on their screen and get a link to go directly to the contact’s CRM page, allowing them to handle the call ins more customized way and give the client better experience.



Click on the following links for more information about [SugarCRM](#) and [Salesforce](#) integration with UCM.

➤ CRM Configuration

To setup connection between UCM and CRM, please follow below steps:

1. Access the UCM web GUI under **Value Added Features→CRM**.
2. Set CRM server address (ex: 192.168.1.3) “only for SugarCRM”.
3. Set “Add Unknown Number” to Contacts.
4. Select from which tables to do the lookup. (contacts, accounts and leads).
5. **Save** and **Apply**.

After this, each agent should log into his/her user portal to enable CRM connection and login via their credentials. Steps should be as following:

1. Access the UCM user portal and navigate to **Value Added Features→CRM**.
2. Enter connection credentials Username, Password and security token.
3. **Save** and **Apply** and confirm login status.

IVR and Call Recordings

IVR

The UCM has support for a full built-in IVR (auto-attendant) module which is required by every call center telephony system. Users could create up to 5-level IVR system to customize callers experience with key-pressing events to be directed to the right customer service (sales, marketing, tech support ...)

All IVR settings are centralized and can be managed under the menu **Call Features→IVR**.

Users could achieve the following:

- Record custom prompts for the auto-attendant.
- Enable key-pressing events to guide callers through the IVR system.
- Set multi-layer IVR (up to 5-layer).
- Choose the language and customize system prompts.
- Setup blacklist/whitelist filtering.



➤ Key Pressing Configuration

Users could follow below steps in order to setup key pressing events for IVR cascading:

1. Access the UCM web GUI under **Call Features→IVR** then edit the main IVR.
2. Navigate to the Key Pressing Events tab.
3. Select a key, then select one of the available destinations (You can select another IVR to set multi-layer IVR).



Call Recording

Another feature that is considered major for any call center system, is call recording. The UCM has support for call recording either to be enabled automatically on the call queue settings or via feature codes during the active calls. The admin can enable auto recording under each call queue to keep track of call records under the system for later agent monitoring, assessment and verification usage.

Once the auto record feature has been enabled on a call queue, the system will start recording all calls that are received on the specific queue in wav files which can be accessed from the following path:

Call Features→Call Queues→Queue Recordings.

Then the user can:

- Download batch or single files to listen to the recording.
- Delete batch or single files to free recording space.
- See the caller number, the queue that has received the call.
- See the timestamp which indicates the date and time of the call.



After we have presented the call center features that are supported on the UCM, we will move on the next part of this document to cover a sample scenario and step by step configuration of these features from the web GUI.



Typical configurations of UCM call center and CRM solution

Centralized Mode

Scenario Overview

The company ABC has different departments (Sales, Marketing, Support...) and needs to manage incoming calls per department.

In this scenario, we will assume the following:

- Inbound route is configured to redirect all the incoming calls to a main IVR and caller needs to specify which department to reach by pressing corresponding key (We assume IVR already created).
- Sales department has 5 members with extensions: 1000, 1001, 1002, 1003, 1004.
- Incoming calls to Sales department should ring all Sales agents.
- Marketing department has 3 members with extensions: 1005, 1006, 1007.
- Incoming calls to Marketing department should ring in order.
- Support department has 10 members with extensions: 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017.
- Agents 1015, 1016 and 1017 are dynamic agents which log in and logout depending on their availability.
- UCM has integration with company CRM sever (SugarCRM).
- A supervisor is responsible to monitor and assist the tech support agents: extension 2000.
- Only the supervisor has permission for call barging on all agents calls.
- Callers to tech support should be allowed to know their position in the waiting queue and prompted on an interval of 30 seconds if they wish to stay waiting or leave a callback number to get connected once an agent is free.
- All extensions are already created, configured and registered to the corresponding end points.

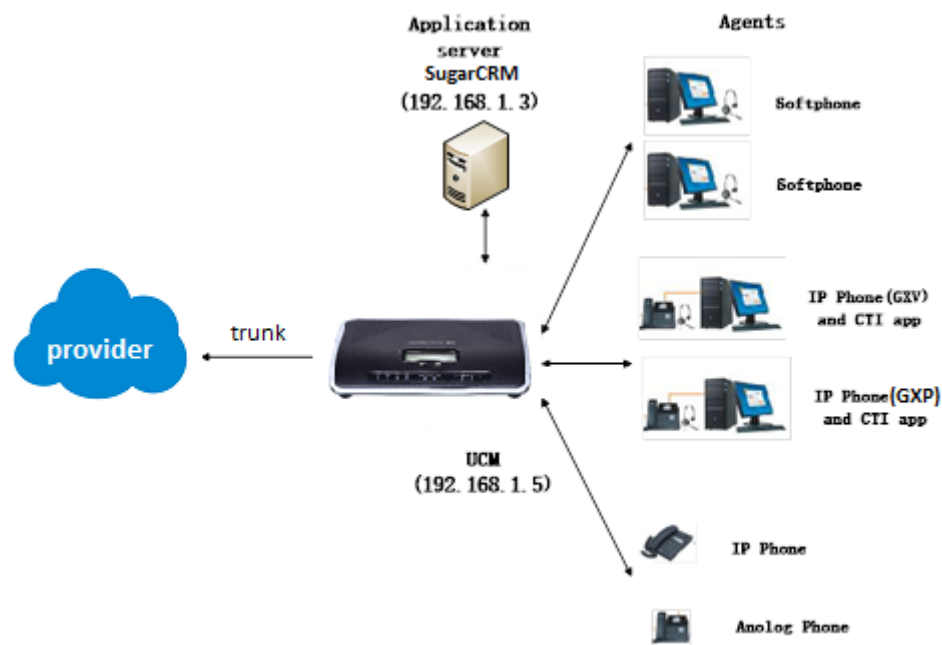


Figure 6: Call Center Network Architecture



Configuration Steps

In order to implement the described scenario, users can follow the below procedures:

1. Create three call queues named sales, marketing and support and make sure to set the correct ring strategy. → **[Call Queue Configuration]**

The following table summarizes required settings for each queue respecting the requirements.

Table 2: Call Queue Basic Settings

Call Queue Extension	Call Queue Name	Strategy	Static agents
6500	Sales_queue	Ring All	1000, 1001, 1002, 1003, 1004
6501	Marketing_queue	Linear	1006, 1005, 1007
6502	Support_queue	Round Robin	1008, 1009, 1010, 1011, 1012, 1013, 1014

2. Create the main IVR and set the key pressing events as below → **[Key Pressing Configuration]**

Press 1:	Queues	Sales
Press 2:	Queues	Marketing
Press 3:	Queues	Support

Figure 7: Key Pressing Events Configuration

3. Enable dynamic agent login for tech support personal 1015, 1016 and 1017 → **[Dynamic Agents]**
4. Configure extension 2000 as the queue chairman → **[Supervisor configuration]**
5. Configure the virtual queue and enable position announcement on each queue → **[Virtual Queue & Position Announcement configuration]**
6. Setup outbound rule for client's callback feature, as followed:
 - Access the UCM web GUI under **Extension/Trunk→Outbound Routes**.
 - Add new outbound rule and name it (you can name if for ex: call center callback).
 - Set pattern as **_0X**. assuming 0 was the prefix configured on call queue advanced settings.
 - Set Strip to **1** digit. This to remove the prefix from the number that the customer left.
 - Select through which trunk you want to callback the customers.
 - **Save** and **Apply**.
7. Setup UCM to SugarCRM connection → **[CRM Configuration]**



The following figure shows company ABC call queue flow:

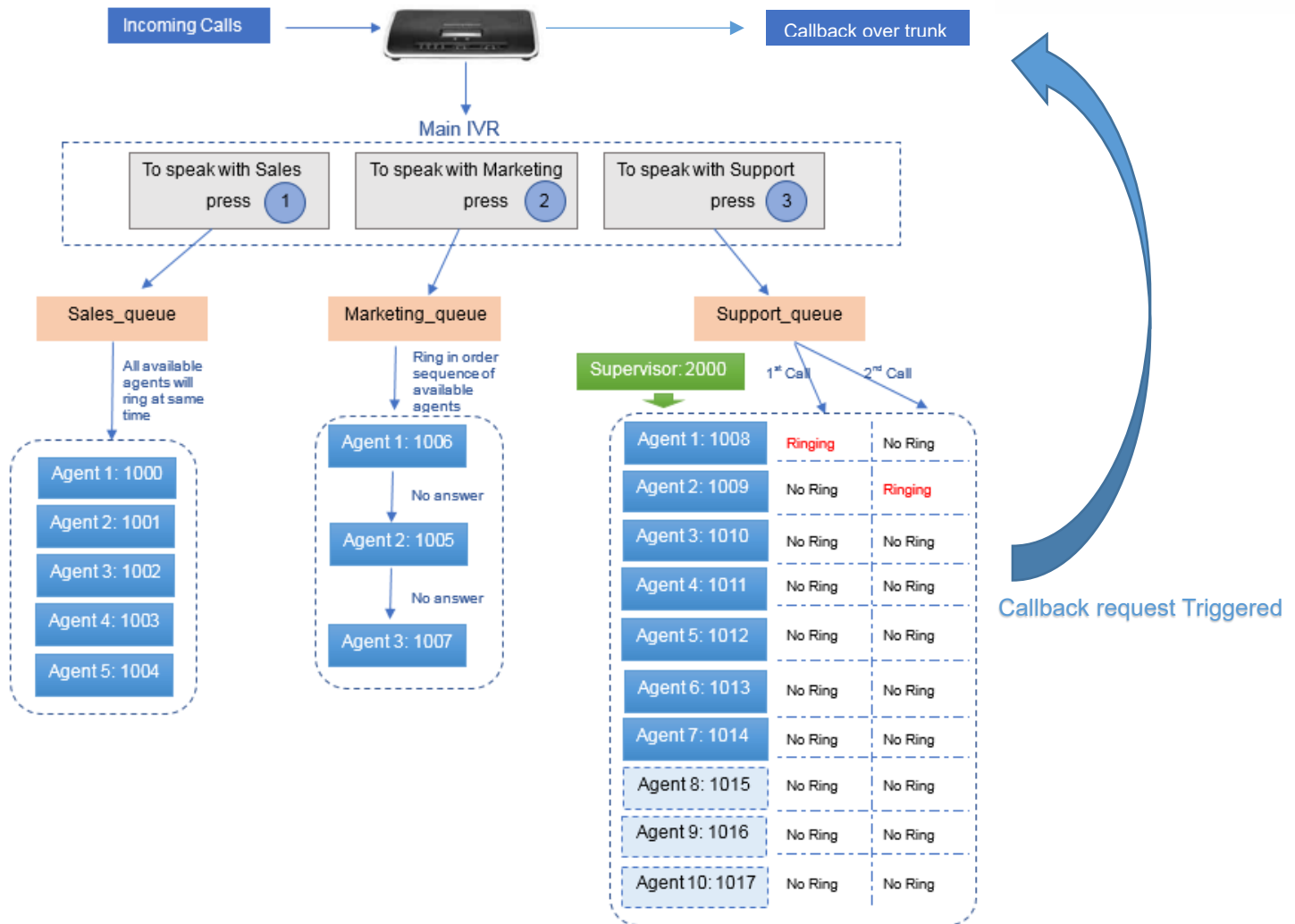


Figure 8: Call Queue flow example

Distributed Call center mode

Scenario overview

Company ABC has been successful and expanded its existence with two additional branch offices for customer technical support, in this case the headquarter office UCM still maintain centralized CRM integration services and call distribution to branch offices where each UCM runs its own branch sub-call center for technical support.

Once an incoming call reaches the main UCM, users will be asked to select from which region they are calling to be directed to the correct technical support office. The following figure shows the new distributed call center architecture of the enterprise.

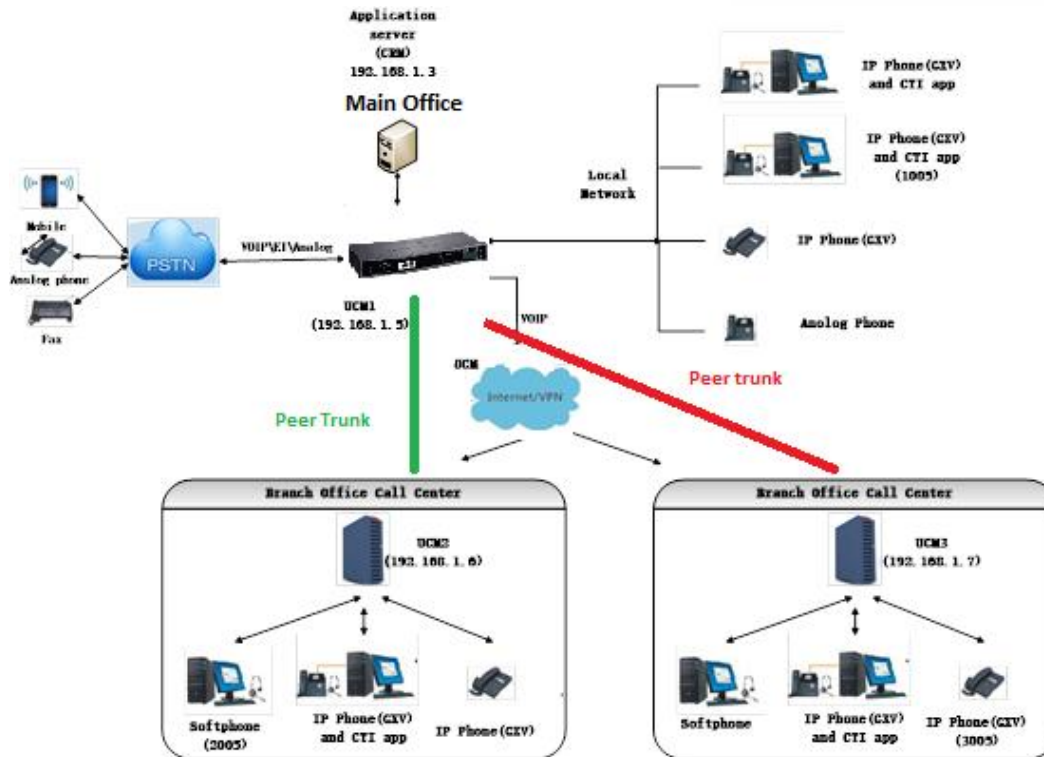


Figure 9: Distributed Call Center

Configuration steps

Following steps can be followed in order to meet the new company requirements:

1. Make sure that UCM for Branch 1 and 2 have separate extension range than headquarters UCM.
 - Headquarter UCM extension range: **1XXX**
 - Branch1 UCM extension range: **2XXX**
 - Branch2 UCM extension range: **3XXX**
2. Configure peer trunk between headquarter and branch offices for site to site connectivity, please follow this [guide](#) in order to setup the trunk.
3. Edit the main IVR to add new options for regional office redirection under key pressing events. → **[Key Pressing Configuration]**

Note: You can add local IVR for each branch office in order to set customized regional prompt.
4. Create call queues for each branch office where you put the corresponding agents extensions. And choose the adequate ring strategy (i.e. Ring All). → **[Call Queue Configuration]**
5. Setup virtual queue and position announcement on each queue → **[Virtual Queue & Position Announcement configuration]**
6. Configure the outbound routes on each branch office in order to route callback calls through the SIP peer trunk to the main UCM which will reroute over

Note: The number from branch UCM should stay with the callback prefix so that when it reaches the main UCM, it can match the outbound rule that routes call back requests.