

Grandstream Networks, Inc.

Grandstream Billing System Guide



INTRODUCTION

Grandstream IP PBX systems include a built-in billing solution that gives enterprises financial control over their VoIP communications. This native feature automatically calculates call costs based on configurable destination rates and call duration, eliminating the need for external billing software or manual tracking.

The system also integrates an intelligent Least Cost Routing (LCR) engine, which compares multiple carriers in real time to select the most cost effective route for each outgoing call, directly lowering operational expenses.

This guide provides a comprehensive overview of these capabilities along with step-by-step configuration instructions to help administrators implement, manage, and optimize the billing system for maximum cost efficiency.

CONCEPT

Call Billing

Grandstream IP PBX systems calculate call charges using prefix-based rates combined with a simple formula. This ensures that calls are billed accurately based on their destination.

When a user dials a number, the system first checks the dialed digits against a set of configured prefixes. Each prefix corresponds to a specific rate.

Example

Dialed Number: **0612345678** → Prefix Match: **"06"** (French mobile) → Rate: **£1.50/minute**

Once the applicable rate is determined through prefix matching, the IP PBX calculates the total charge using the following formula:

$$\text{Call Charge} = \text{Starting Cost} + (\text{Rate} \times \text{Amount of Time Exceeding Start Time})$$

In this formula:

1. **Starting Cost** is the initial fixed cost for the call.
2. **Rate** is the configured cost for the specific prefix, applied using the billing unit (*e.g., per 30 seconds*).
3. **Amount of Time Exceeding Start Time** is the portion of the call beyond the starting time, rounded up to the nearest billing unit (*For example, if the billing unit is 60 seconds and the call lasts 90 seconds (1.5 units), the system bills for 2 full units*).

Example:

A call lasts 1 minute 10 seconds (70 seconds) with the following configuration:

- **Starting Cost:** 0.20
- **Starting Time:** 30 seconds
- **Rate:** 2.00
- **Billing Unit:** 60 seconds

The starting cost covers the first 30 seconds of the call. The remaining time beyond the starting period is:

$$70 \text{ sec} - 30 \text{ sec} = 40 \text{ sec}$$

Since the billing unit is 60 seconds, the remaining time is divided by the billing unit to determine the number of units to charge:

$$40 \div 60 = 0.666... \text{ units}$$

Even though only 40 seconds remain after the starting time, the system **rounds up to 1 full billing unit**. This ensures that calls are always billed according to the configured billing unit, and partial units are never undercharged.

The total charge is calculated by multiplying the rate by the number of billing units and adding the starting cost:

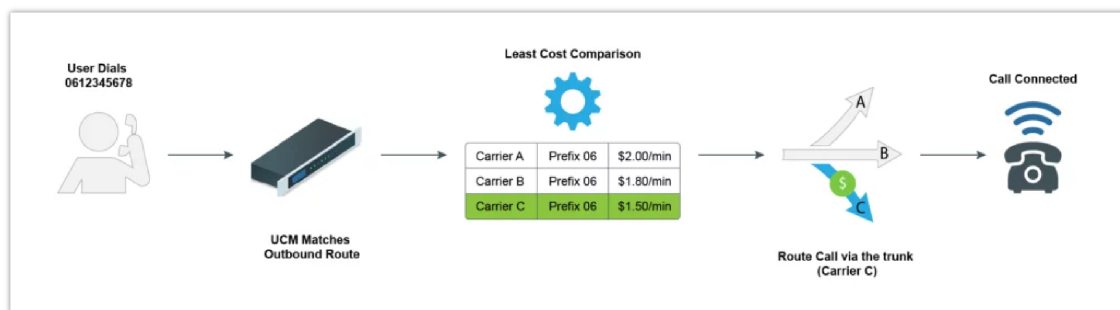
$$\text{Total Charge} = 0.20 + (1 \times 2.00) = 2.20$$

Least Cost Routing (LCR)

Grandstream IP PBX systems feature **Least Cost Routing (LCR)**, which automatically selects the most cost effective trunk for outgoing calls. This ensures that every call is routed through the carrier offering the lowest rate, reducing operational costs without manual intervention.

First, the outbound route matches the dialed number to a pattern. If the route destination is set to "LCR", the PBX checks all carriers that are marked as LCR-supported. Each trunk is linked to a single carrier, though a carrier can have multiple trunks. The PBX compares the rates for the dialed prefix across these carriers, selects the **lowest cost carrier**, and routes the call through one of its trunks.

Example Call Flow:



Least Cost Routing Flow

1. **User Dials Number:** 0612345678
2. **Pattern Matching:** The outbound route identifies the dialed pattern and forwards the call to the LCR destination.
3. **Carrier Rate Lookup:** The PBX checks all LCR-supported carriers for the prefix "06":
 - Carrier A: \$2.00/min
 - Carrier B: \$1.80/min
 - Carrier C: \$1.50/min
4. **LCR Comparison:** The PBX compares the rates returned for the prefix.
5. **Route Selection:** Carrier C is chosen as it offers the lowest cost.
6. **Call Connection:** The call is routed through Carrier C's trunk and connected to the destination.

CALL BILLING CONFIGURATION

Carrier Rates

Configuring Carrier Rates

Carrier rates are used for both LCR decisions and call cost calculations. Each trunk applies the rate of its associated carrier. All carrier rates must use the same global billing unit (*for example, 60 second intervals*) to ensure consistent calculations across carriers.

To configure a carrier rate, please refer to the steps below:

1. Navigate in the web UI to **Extension/Trunk → Outbound Routes → Carrier**.

Outbound Routes

① An outgoing calling rule associates an extension pattern with a trunk used to dial the pattern. This allows different patterns to be dialed through different trunks. A failover trunk can be set up to be used when the primary trunk fails.
Note: This panel only manages individual outgoing calling rules.

[Add](#)
[Scheduled Sync](#)
[Outbound Blocklist](#)
[PIN Groups](#)
[Failover Trunk Toggles](#)
[Carrier](#)
[Import](#)
[Export](#)
[All Levels](#)

Priority	Name	Outbound Number Matching Pattern	Privilege Level	Options
1	Rule_1	_xxxxxx.	Internal	

Total: 1 [<](#) [1](#) [>](#) 10 / page [Goto](#)

ExtensionTrunk → Outbound Routes

2. On this page users can click “**Add**” to create a new carrier entry or “**Global Billing Unit**” button.

Outbound Routes > Carrier

① If “Least Cost Routing” is selected as an outbound route main trunk, the destination number for the outgoing call will be matched according to the table below to find the carrier, trunk, and rate rules that are available and identify the trunk with the lowest cost. If rates are the same, use the preferred carrier.

[Add](#)
[Global Billing Unit](#)
[All](#)

Priority	LCR	Carrier	Number of Trunks	Options
No data				

Outbound Routes → Carrier

3. On the **Add/Edit Carrier** page, users can configure the following:

- **Carrier (Name):** Enter a descriptive name, e.g., *VoIP-Provider-A*.
- **Trunk:** Select one or more trunks for this carrier. Each trunk can only be associated with **one carrier**, but a carrier can have multiple trunks.
- **LCR Supported:** Enable this option if you want the carrier to be included in Least Cost Routing. If disabled, the carrier is ignored for LCR decisions.
- **Carrier Rates:** Add, delete, import, or export rate entries:
 - **Add:** Specify the Match Prefix, Rate, and optional Expiration Date.
 - **Delete:** Select one or more rates to remove.
 - **Import:** Upload Excel or CSV files (max 50 MB). Importing replaces all existing rates, so it is recommended to first export a template or backup.
 - **Export:** Download current rates as Excel or CSV files for backup or editing.

Note:

When multiple trunks are assigned to the same carrier, the trunk with the highest priority in the list will be used first.

Prefix Matching Logic

When configuring carrier rate prefixes, overlapping prefixes can exist (for example, +1 and +11).

- If Least Cost Routing (LCR) is used, the PBX compares the matching prefixes and selects the cheapest rate, regardless of which prefix is more specific.
- If LCR is not used, the PBX prioritizes accuracy, meaning the more specific prefix (e.g., +11) is selected even if its rate is higher.

Outbound Routes > Carrier > Add Carrier

* Carrier 2 - 64 characters, characters "' = # & \$ [, ; \ > < are not allowed.

* Trunk

☐ 0 Available

None

☐ 0 Selected

None

LCR supported ☒

Carrier Rates

☐ Match Prefix	Rate	Expiration Date
---------------------------------------	------	-----------------

Add Carrier

Add Carrier Rates

×

* Match Prefix
1 - 12 characters, Only numbers and plus sign (+) are supported

* Rate
1 - 12 characters, Please enter a number.

Expiration Date

-

Add Carrier Rate

- Once the carrier is saved successfully, navigate to **CDR → Call Rate** and enable **"Using Carrier Call Rates"**. When this option is turned on, the PBX will use the carrier's rate table for outgoing trunks to calculate call costs whenever a rate is available.

Call Rate

Carrier Call Rates

Using Carrier Call Rates ☒ Carrier

ⓘ When enabled, the outgoing trunk carrier rate table will be used for call cost calculation if available. Otherwise, the general rates will be used.

CDR → Call Rate

Verifying Carrier Rate Calculation

In this example, we will verify that a configured carrier rate is correctly applied to calculate the cost of an outgoing call.

Configuration:

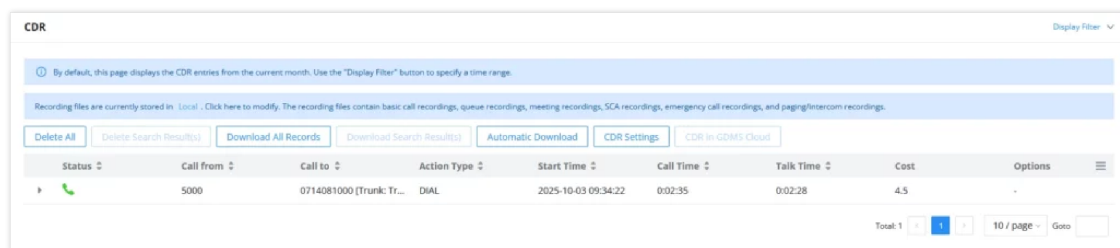
- **Carrier:** Carrier A
- **Trunk:** Trunk 1 → Carrier A
- **Prefix:** 07
- **Rate:** 1.50/min
- **Global Billing Unit:** 60 seconds

Test Steps:

1. The user dials **0714081000**, which matches the outbound route configured for this prefix.
2. The call is routed through **Trunk 1 (Carrier A)**.
3. The call duration is **2 minutes 28 seconds (148 seconds)**.

CDR Verification:

After the call ends, the CDR page shows:



The screenshot shows the CDR page with a table of call records. The first row shows a call from 5000 to 0714081000 (Trunk 1) with a status of DIAL, start time of 2025-10-03 09:34:22, call time of 0:02:35, talk time of 0:02:28, and a cost of 4.5. The page includes filters, download buttons, and a 'Display Filter' dropdown.

Status	Call from	Call to	Action Type	Start Time	Call Time	Talk Time	Cost	Options
DIAL	5000	0714081000 (Trunk 1)	DIAL	2025-10-03 09:34:22	0:02:35	0:02:28	4.5	

Test Call CDR Entry

After the call, the CDR confirms that the carrier rate was applied correctly. The call lasted 2 minutes 28 seconds (148 seconds) and the billing unit is 60 seconds. Dividing 148 by 60 gives 2.466..., which is rounded up to 3 units. Multiplying by the rate of 1.50 per unit gives a total cost of 4.50.

This shows the IP PBX correctly calculates call charges using the carrier rate and billing unit.

Other Call Rates

Configuring Other Call Rates

In addition to carrier rates, Grandstream IP PBX systems allow administrators to configure general call rates that apply system-wide. These rates provide a standard method for calculating call costs across the PBX, regardless of the trunk or carrier used.

To configure the **Other Call Rates** table, navigate to **CDR → Call Rate**. On this page, you can view, add, edit, delete, import, or export system-wide call rates.

Note:

- Importing replaces all existing rates, so it is recommended to first export a template or backup.
- Import and export are supported for CSV and Excel (XLS/XLSX) files only.

Call Rate

Carrier Call Rates

Using Carrier Call Rates

Carrier

When enabled, the outgoing trunk carrier rate table will be used for call cost calculation if available. Otherwise, the general rates will be used.

Cancel

Save

Other Call Rates

The system matches rates based on the prefix of the caller's number. After matching, the rates in the table below will be used to calculate the cost of the call. When more than one rate can be matched, the rate with the highest priority will be used.

Add Rate

Delete Selected Rate

Import

Export

Name/Match Prefix/Rate

☐	Priority	Status	Name	Match Prefix	Starting Cost	Starting Time (seconds)	Rate	Billing Unit (sec)	Valid Time	Options
☐	1	Available	International	+1			0.2	30	2025-10-03 15:44:22-2099-12-31 23:59:59	
☐	2	Available	National	06			0.1	30	2025-10-03 15:44:40-2099-12-31 23:59:59	

Total: 2

1

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Other Call Rate Table

To create a new general rate, please refer to the steps below:

- Click "Add" to create a new call rate entry.
- Configure the following fields:
 - Name:** Enter a descriptive name for the rate.
 - Match Prefix:** Number prefix to match (1–12 digits, and "+" supported).
 - Starting Cost:** Flat fee applied at the beginning of the call.
 - Starting Time (seconds):** Time period covered by the starting cost.
 - Rate:** Ongoing cost per billing unit after the starting time.
 - Billing Unit (sec):** Time interval for applying the rate (e.g., 60 seconds).
 - Start Time:** The date and time when this rate becomes active.
 - End Time:** The date and time when this rate expires.
 - Disable the rate:** Check this box to disable the rate without deleting it.
- Click "Save" to add the rate.

Notes:

- Once multiple rates are created, you can use the up/down arrows to adjust their priority. When a dialed number matches more than one rate, the PBX applies the **first matching prefix** based on the **priority order**. Prefix **accuracy or cost** does not affect this selection.
- If the option "Using Carrier Call Rates" in **CDR → Call Rate** is enabled, the PBX will attempt to first use the outgoing trunk's carrier rate table if a matching rate is available. Otherwise, the system falls back to the general rates.

Call Rate > Add Other Call Rates

Call Charge = Starting Cost + Rate x Amount of Time Exceeding Start Time

* Name

Match Prefix

Starting Cost

Starting Time (seconds)

* Rate

* Billing Unit (sec)

Start Time

End Time

Disable the rate ☐

Add Other Call Rate

Verifying General Rate Calculation

This test demonstrates how the PBX applies general system-wide call rates when no matching carrier rate exists and ensures that the highest priority rate is used when multiple general rates match the dialed prefix.

Configuration:

For demonstration, we will enable the “**Using Carrier Call Rates**” option (CDR → Call Rate) and configure the following rates under the **Other Call Rates** table (*No carrier rates are configured for the test prefixes*).

- **Rate 1:** Prefix 07, Rate 1.00 per 60 second billing unit.
- **Rate 2:** Prefix 071, Rate 2.00 per 60 second billing unit.

We will also ensure that **Rate 1** is at the top of the list by using the up/down arrows in the table to set its priority.

Call Rate

Carrier Call Rates

Using Carrier Call Rates ☒ Carrier

When enabled, the outgoing trunk carrier rate table will be used for call cost calculation if available. Otherwise, the general rates will be used.

Name	Match Prefix	Starting Cost	Starting Time (seconds)	Rate	Billing Unit (sec)	Valid Time	Options
No data							

Other Call Rates

The system matches rates based on the prefix of the caller's number. After matching, the rates in the table below will be used to calculate the cost of the call. When more than one rate can be matched, the rate with the highest priority will be used.

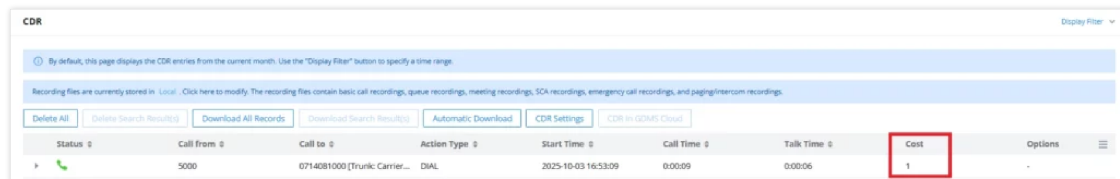
Priority	Status	Name	Match Prefix	Starting Cost	Starting Time (seconds)	Rate	Billing Unit (sec)	Valid Time	Options
1	Available	Rate 1	07			1.00	60	2025-10-03 16:30:20-2099-12-31 23:59:59	Edit Delete Up Down
2	Available	Rate 2	071			2.00	60	2025-10-03 16:30:47-2099-12-31 23:59:59	Edit Delete Up Down

Test Configuration for Other Call Rates

Test Steps:

1. Dial 0714081000, which matches both general rates prefixes (07 and 071).

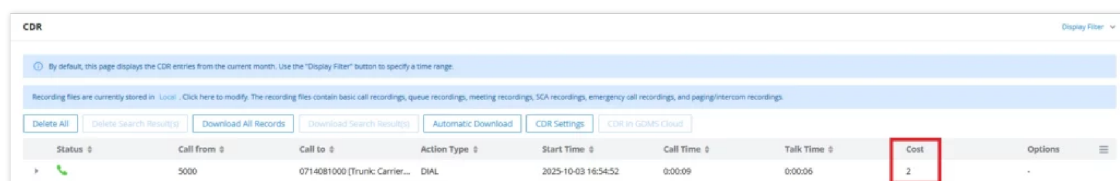
2. Since no carrier rate exists for this prefix, the highest priority general rate (Rate 1) is applied.
3. End the call shortly after. In this example, the call lasted 6 seconds, which is billed as 1 full unit.
4. Check the CDR to verify the call cost: 1.00 (Rate 1).



Status	Call from	Call to	Action Type	Start Time	Call Time	Talk Time	Cost	Options
✓	5000	0714081000 (Trunk: Carrier...	DIAL	2025-10-03 16:53:09	0:00:09	0:00:06	1	-

CDR Entry for Test Call 1

5. Use the up/down arrows in the Other Call Rates table to make Rate 2 the highest priority rate.
6. Make another call to the same number (0714081000) and hang up after the same duration (6 seconds which is billed as 1 unit).
7. Check the CDR to verify the call cost: 2.00 (Rate 2).



Status	Call from	Call to	Action Type	Start Time	Call Time	Talk Time	Cost	Options
✓	5000	0714081000 (Trunk: Carrier...	DIAL	2025-10-03 16:54:52	0:00:09	0:00:06	2	-

CDR Entry for Test Call 2

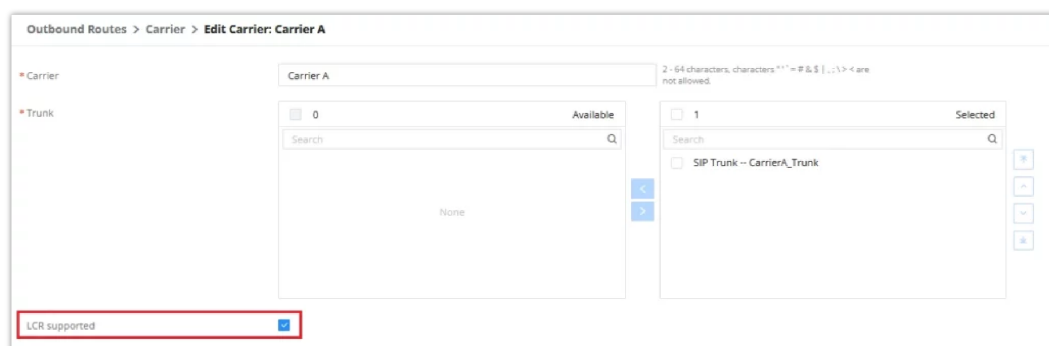
Least Cost Routing

Configuring Least Cost Routing

Least Cost Routing (LCR) allows the PBX to automatically select the cheapest carrier when making outbound calls. When a call matches an outbound route set to Least Cost Routing, the PBX compares the rates of all carriers that are marked as LCR Supported and selects the carrier offering the lowest cost for the dialed prefix.

Before configuring LCR, ensure that your carriers and rates are already set up as described in the [Configuring Carrier Rates](#) section.

Each trunk can be associated with only one carrier, but a carrier can have multiple trunks. Only carriers marked as **LCR Supported** will be considered during least cost routing decisions.



Outbound Routes > Carrier > Edit Carrier: Carrier A

Carrier: Carrier A

Trunk: 0 (Available) | 1 (Selected)

Search: SIP Trunk -- CarrierA_Trunk

LCR supported: ☒

Carrier LCR Supported Checkbox

On the Carrier page, you can use the up/down arrows to adjust the carrier priority. This order acts as a tiebreaker when two or more carriers have the same rate for a matching prefix.

Note:

For LCR, when rates differ, the lowest rate always takes precedence regardless of priority order.

Outbound Routes > Carrier

If "Least Cost Routing" is selected as an outbound route's main trunk, the destination number for the outgoing call will be matched according to the table below to find the carrier, trunk, and rate rules that are available and identify the trunk with the lowest cost. If rates are the same, use the preferred carrier.

Priority	LCR	Carrier	Number of Trunks	Options
1	Supported	Carrier B	2	  
2	Supported	Carrier A	1	  

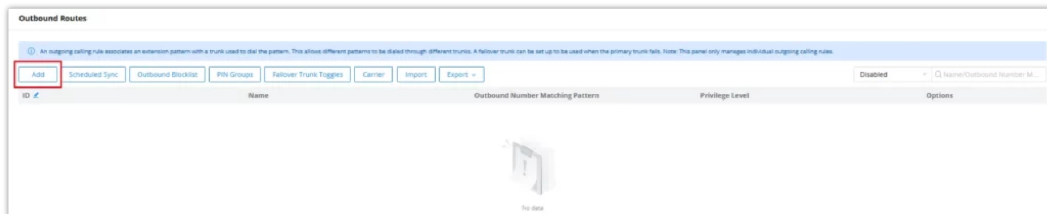
Total: 2 10 / page

Carrier List Priority

Since an outbound route defines which numbers should be routed through which trunks. By setting a route's Trunk to Least Cost Routing, the PBX knows to dynamically select the lowest cost carrier trunk whenever a call matches the route pattern.

To configure LCR in an outbound route:

1. Navigate to **Extension/Trunk** → **Outbound Routes** and click **Add**.



Add New Outbound Route

2. Define a **Dial Pattern** that matches the type of outbound call (for example, +1123xxxxxx).
3. In the **Trunk** field, select **Least Cost Routing** as the destination.

Outbound Routes > Create New Outbound Rule

Main Trunk

* Trunk: Least Cost Routing

[Go to Carrier to set rates for each route.](#)

Strip: 0 - 2 characters, please enter only digits.

Prepend: 0 - 20 characters, allow digits, letters and +/# only.

Outbound Rule Trunk Configuration

4. Click **Save** and apply the changes.

Once configured, any outbound call matching this pattern will trigger an LCR comparison across all LCR-supported carriers with a matching prefix.

Note:

If multiple outbound routes match a dialed number, a higher priority route without LCR may be selected first, preventing the PBX from using the lowest cost carrier. To avoid this, consider using **"Accuracy First"** in the **Outgoing Routing Priority Policy**.

X

Outgoing routing priority policy

Priority Strategy

Accuracy First

List Sorting Priority

Matches outgoing routes from top to bottom by list priority.
For example: For calls that start with 137, because the priority of _1 is above _137, the outgoing call is routed through the route _1.

Priority	Name	Outbound Number Matching Pattern	Privilege Level
1	...	_1	...
2	...	_137	...

Accuracy First

The outgoing route with more specific number matching is preferred. For example: For calls starting with 137, _137 is preferred because it is more specific than _1.

ID	Name	Outbound Number Matching Pattern	Privilege Level
1	...	_1	...
2	...	_137	...

Cancel

OK

Outgoing Routing Priority Policy

Verifying Least Cost Routing

This test demonstrates how the PBX selects the lowest cost carrier for an outbound call when Least Cost Routing is enabled, and how carrier priority acts as a tiebreaker when multiple carriers have identical rates.

Configuration:

For this demonstration, we configure two carriers with the following settings:

- **Carrier A** is linked to **Trunk 1**, and has a rate of **0.10 per minute** for the prefix **+1**.
- **Carrier B** is linked to **Trunk 2**, and has a rate of **0.08 per minute** for the prefix **+1**.
- Both carriers are marked as **LCR Supported**.
- The outbound route for the dial pattern **+11234567890** is configured with **Trunk = Least Cost Routing**.
- Initially, we set **Carrier B** (the cheaper carrier) to **lower priority** than Carrier A to demonstrate that the PBX still selects the lowest cost option regardless of priority.

Outbound Routes > Carrier

ⓘ If "Least Cost Routing" is selected as an outbound route main trunk, the destination number for the outgoing call will be matched according to the table below to find the carrier, trunk, and rate rules that are available and identify the trunk with the lowest cost. If rates are the same, use the preferred carrier.

Add

Global Billing Unit

All

Q Carrier

Priority	LCR	Carrier	Number of Trunks	Options
1	Supported	Carrier A	1	⚙️ ⚠️ ⏏️ ⏏️ ⏏️ ⏏️
2	Supported	Carrier B	1	⚙️ ⚠️ ⏏️ ⏏️ ⏏️ ⏏️

Total: 2

1

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Carrier B Priority

Test Steps:

1. Dial **+11234567890**, which matches both carriers' prefix **+1**.
2. End the call shortly after. In this example, the call lasts **6 seconds**, which is billed as **1 full unit**.
3. Check the **CDR** to verify the call cost and the selected carrier. Even though **Carrier B** has a lower priority, it offers the lowest rate (0.08/min), so the call is routed through **Trunk 2**.

CDR

Display Filter

By default, this page displays the CDR entries from the current month. Use the "Display Filter" button to specify a time range.

Recording files are currently stored in Local. Click here to modify. The recording files contain basic call recordings, queue recordings, meeting recordings, SCA recordings, emergency call recordings, and paging/intercom recordings.

Delete All

Delete Search Results

Download All Records

Download Search Results

Automatic Download

CDR Settings

CDR in GDMS Cloud

Status	Call from	Call to	Action Type	Start Time	Call Time	Talk Time	Cost	Options
	1000	+11234567890 [Trunk: ...] +11234567890 [Trunk: Trunk 2]	DIAL	2025-10-06 11:55:27	0:00:25	0:00:06	0.08	1

Total: 110 / pageGoto

CDR Entry for LCR Test Call 1

1. Create a tie, by setting both carriers' rates to **0.10/min**.
2. Dial +11234567890 again and hang up after 7 seconds (billed as 1 unit).
3. Check the CDR to verify the selected trunk. With identical rates, the PBX selects the higher priority carrier (Carrier A), which corresponds to **Trunk 1**.

CDR Display Filter

By default, this page displays the CDR entries from the current month. Use the "Display Filter" button to specify a time range.

Recording files are currently stored in Local. Click here to modify. The recording files contain basic call recordings, queue recordings, meeting recordings, SCA recordings, emergency call recordings, and paging/Intercom recordings.

Delete All

Delete Search Results

Download All Records

Download Search Results

Automatic Download

CDR Settings

CDR in GDMS Cloud

Status	Call from	Call to	Action Type	Start Time	Call Time	Talk Time	Cost	Options
	1000	+11234567890 [Trunk: ...] +11234567890 [Trunk: Trunk 1]	DIAL	2025-10-06 12:01:18	0:00:16	0:00:07	0.1	1

Total: 1

1

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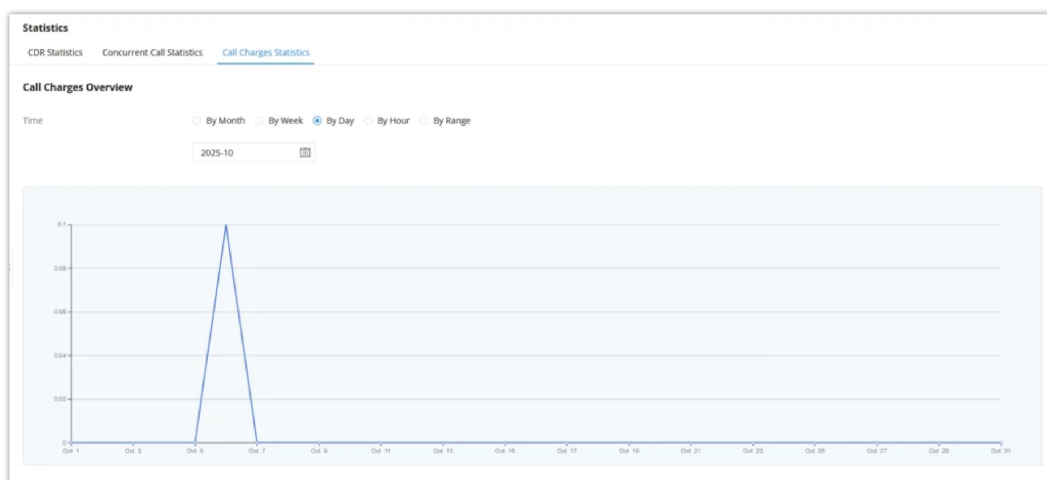
CDR Entry for LCR Test Call 2

CALL BILLING STATISTICS

The Call Charge Statistics page in the IP PBX Web UI (CDR → Statistics) provides a comprehensive overview of call costs and usage, helping administrators analyze expenses and call patterns over time. The page is divided into three main sections: **Call Charges Overview**, **Call Charges Statistics**, and **Statistics Report**.

Call Charges Overview

This section provides a graphical summary of call charges over time. Users can choose the interval for the chart By Month, By Week, By Day, By Hour, or By Range.



Call Charges Overview

Call Charges Statistics

This section allows users to filter and narrow down the data before generating the report by selecting the following options:

- **Start Time / End Time:** Specify the date and time range for the statistics.
- **Caller:** Filter by Extensions, Extension Groups, or Departments.
- **Destination Trunk Name:** Select one or more trunks to focus on specific call routes.
- **Filter / Reset Buttons:** Apply the selected criteria in the report, or clear all filters.

Note:

This section only sets the filters and does not display the report results directly.

Statistics

CDR StatisticsConcurrent Call StatisticsCall Charges Statistics

Call Charges Statistics

Start Time

2025-10-01

00:00

End Time

2025-10-06

12:04

Caller

By Extensions

By Extension Group

By Department

Caller Number

1000

Caller Name

Destination Trunk Name

Trunk 1

Filter

Reset

Call Charge Statistics Filter

Statistics Report

After applying filters in the **Call Charges Statistics** section, the **Statistics Report** displays the filtered results with the following metrics:

- **Total Calls:** Number of calls matching the filters.
- **Total Talk Time:** Combined duration of all calls.
- **Average Talk Time:** Average call duration.
- **Total Costs:** Total cost of all calls in the selected range.

Statistics

CDR StatisticsConcurrent Call StatisticsCall Charges Statistics

Start Time

2025-10-01

00:00

End Time

2025-10-06

12:04

Caller

By Extensions

By Extension Group

By Department

Caller Number

1000

Caller Name

Destination Trunk Name

Trunk 1

Filter

Reset

Statistics Report

Download Search Results

Call Details

Total Calls: 1

Total Talk Time: 00:00:07

Avg Talk: 00:00:07

Total Costs: 0.1

Caller	Number of Calls	Talk Time	Avg Talk	Cost
1000	1	00:00:07	00:00:07	0.1

Total: 1

10 / page

Go

Call Charge Statistics Report

Users can click the **“Download Search “Results”** button to export the filtered statistics for offline analysis, or use the **“Call Detail”** button to navigate to the CDR page, where individual call records matching the applied filters are displayed.

TROUBLESHOOTING COMMON ISSUES

This section helps administrators identify and resolve common problems related to call billing, carrier rates, and Least Cost Routing (LCR).

Calls Not Using the Expected Cheaper Carrier

When a call is routed through a trunk or carrier that is more expensive than expected, it may indicate misconfiguration in LCR or carrier rates.

Verify LCR Support:

- Ensure the "LCR Supported" checkbox is enabled for all participating carriers.
- Confirm that the carrier and its associated trunk are Enabled.

Check Rate Configuration:

- Verify that the dialed prefix exists in the carrier's rate table.
- Ensure there are no overlaps in prefixes causing conflicts. For carrier rates, overlapping prefixes (e.g., +1 and +11) are resolved differently:
 - With LCR, the PBX selects the cheapest matching rate, regardless of prefix specificity.
 - Without LCR, the PBX selects the most specific prefix, even if its rate is higher.

Validate Outbound Route:

- Confirm the outbound route Trunk is set to "Least Cost Routing".
- Verify that the dial pattern matches the test number.
- Check for time based restrictions or failover trunk configuration on the outbound route.

Understand Carrier Priority vs Cost:

- PBX always selects the lowest cost carrier, even if it has lower priority.
- Priority only acts as a tiebreaker when two carriers have the same rate for the prefix.

Check Outbound Route Priority Strategy:

- If the PBX outbound routes use "List Sorting Priority", the first matching route in the outbound routes list may override a more specific route.
- Use "Accuracy First" to ensure the PBX selects the most specific outbound route for the dialed number.

Call Costs Not Appearing in CDR

If calls are successfully connected but the cost column is empty or shows zero, billing may not be applied correctly.

Enable Carrier Rate Usage:

- Navigate to **CDR** → **Call Rate** and enable "Using Carrier Call Rates".

Verify Prefix Matching:

- Test calls with numbers matching configured prefixes.
- Ensure the dialed number format matches the prefix in the rate table.
- Confirm no rates are disabled for the tested prefix.

Check CDR Display Settings:

- Ensure the Cost checkbox in the CDR page's Options menu is checked to display call costs.

- Confirm the selected date/time range includes test calls.

Incorrect Call Cost Calculations

When the calculated cost of a call does not match the expected value based on the configured rates and billing formula, please check the following.

Verify Billing Parameters:

- Ensure Starting Cost, Starting Time, and Billing Unit are configured correctly.
- Confirm Rate matches the prefix of the dialed number.
- Check for competing rates that might match the same prefix.

Understand Call Billing Calculations:

- Remember that partial billing units always round up.
- Verify the Starting Cost is applied correctly for the initial period.
- Use the formula: $\text{Call Charge} = \text{Starting Cost} + (\text{Rate} \times \text{Amount of Time Exceeding Start Time})$.

Time-Based Rate Issues:

- Ensure any time-based rates are active during the test call.

SUPPORTED MODELS

The table below lists the supported Grandstream IP PBX models that include the Call Billing feature, along with the minimum firmware version that introduced support for each model.

PBX Model	Minimum Firmware Version
UCM630x	1.0.29.11+
UCM630xA	1.0.29.11+
CloudUCM	1.0.29.7+
SoftwareUCM	1.0.33.7+