

# ISDN Troubleshooting

All Mediatrix Units with ISDN cards

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# ISDN Troubleshooting

This document is destined to customers wanting to configure and troubleshoot Mediatrix ISDN gateways connected to a PSTN or a PBX ISDN Interface.

This document provides general tips on how to troubleshoot ISDN issues.

Different scenarios are analysed and suggestion of possible solutions are proposed.

# Protocols and Connection

The Mediatrix gateways support the following protocols:

- QSIG

**Note:** The support of the QSIG protocol is restricted to basic calls.

- DSS1
- DMS100
- NI2
- R2
- 5ESS

In the Europe, the DSS1 protocol is mainly used for interconnection with public carrier and QSIG is mainly used for connections with PBXs.

The R2 protocol is more specific to Central America / Latin America countries.

In North America, the most common protocols are DMS100 and NI2.

Note that the PSTN configuration can be different from carrier to carrier. Sometimes even the same carrier may have a different PSTN configuration. Connecting an ISDN gateway to a PBX can be done in point-to-point or point-to-multipoint mode. Please refer to the PBX to see if it is configured as point-to-point or point-to-multipoint.

The Mediatrix unit can be set in TE or NT mode:

- User side (TE): implemented in ISDN terminals (phones, terminal adapters, etc.).
  - Generally, use TE when the Mediatrix unit is used to connect to the PSTN or is replacing ISDN phones.
- Network side (NT): implemented in the exchange switches of the network operator.
  - Generally, use NT when phones are plugged into the Mediatrix unit or when the Mediatrix unit replaces the PSTN.

Again this configuration will depend on the configuration of the PBX. If the PBX is configured as NT, the Mediatrix unit must be configured as TE. If the PBX is configured as TE, the Mediatrix unit must be configured as NT.

PRI cards can be configured as E1 or T1 line. Generally, E1 are available in Europe and T1 in America

# Troubleshooting Tools

## Troubleshooting

The Mediatrix CPE provides several troubleshooting features such as notification messages, diagnostic traces and SIP signalling logs.

The Syslog daemon is a general purpose utility for monitoring applications and network devices with the TCP/ IP protocol. With this software, you can monitor useful messages coming from the Mediatrix CPE.

- **Diagnostic Traces** are sent using the Syslog to the Technical Assistance Centre to further assist in resolving some issues such as Interoperability.
- **PCM traces** are two different RTP streams made specifically to record all analog signals that are either sent or received on the analog or ISDN side of the Mediatrix device. PCM traces are an efficient tool to identify problems with:
  - Echo in your network
  - DTMF signals
  - Caller ID signals
  - Fax signals or false Fax detection
  - Message Waiting Indicator signals
  - Any other analog or digital signal
- **Statistics** are collected on each port of the PRI card, on Ping/Pingv6 on the CLI or on Media. Statistics are collected on:
  - Packet loss
  - Jitter
  - Latency
  - Packet count
  - Octet count
- **Live Network Captures** can be taken with the pcap command and sent to Wireshark located on a separate terminal. The SBC can also capture the SIP/RTP traffic of a specific call, selected by rules. The Network Capture will gather information on:
  - Interoperability
  - Timing issues
- **Configuration scripts** can be generated from the configuration running on the Mediatrix CPE. This provides the content of your configuration that can be used by technical support to troubleshoot your faulty configuration.

## Capturing a Trace Using Wireshark

### Before you start

You must have downloaded Wireshark at the following link <https://www.wireshark.org/> (Wireshark is a network protocol analyzer. It is an Open Source software released under the GNU General Public Licence. It can decode most VoIP protocols: SIP, MGCP, H.323, RTP, etc.). Select the Windows version. Make sure to install winpcap and read the instructions.

If you are taking a trace on a switch, the port of the switch connected to the PC must be configured to mirror the port connected to the Mediatrix unit. Alternatively, you could use a hub, which should be connected to both the PC running Wireshark and the Mediatrix unit.

Otherwise you will not capture the packets from the unit.

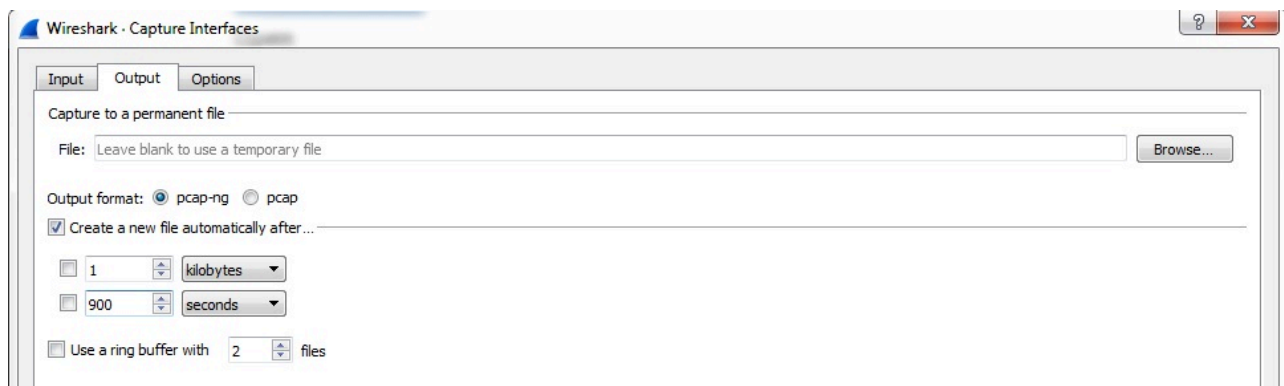
### Steps

- 1) In the **Capture** menu, select **Capture Options**.
- 2) In the **Capture** selection list, select the Ethernet network adapters to use.
- 3) In the **(Display) Options** section, select the **Update list of packet in real time** check box.
- 4) Select the **Automatic scrolling in live capture** check box.
- 5) If troubleshooting a random problem happening weekly, select the **Use multiple files** check box.

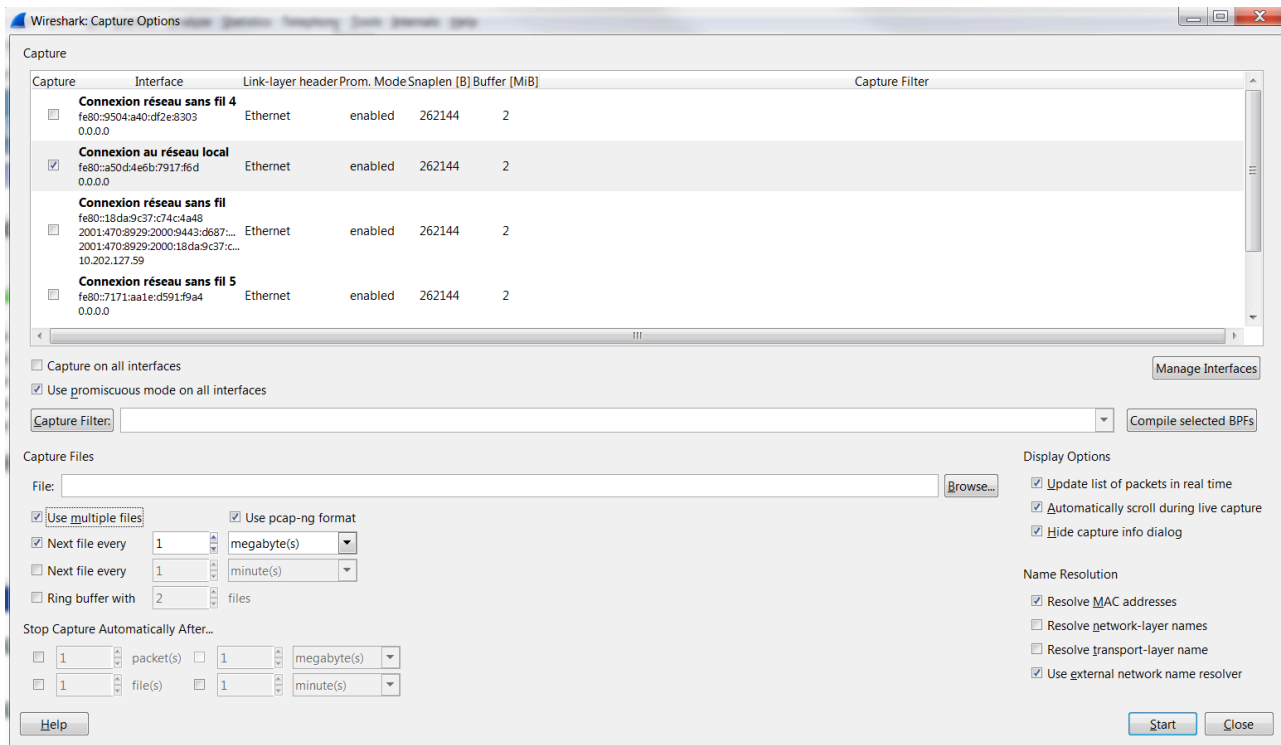
**Note:** For the latest Wireshark release, this can be configured via **Capture/Options/Output/Create a new file automatically after...**

### Result

In Wireshark release 2.2.0



In older Wireshark releases



## Enabling Syslog Menu

### Steps

- 1) Go to **System/Syslog**.
- 2) In the **Remote Host** field, set the IP address of the PC running the syslog daemon or Wireshark.
- 3) In the **Syslog Configuration** table, set **Diagnostic Traces** to **Enable**.

## Result

|                                    |        |   |
|------------------------------------|--------|---|
| <b>Technical Assistance Centre</b> |        |   |
| Diagnostic Traces:                 | Enable | ▼ |
| Filter:                            | Edit   |   |

## Enabling Syslog Filters

### Before you start

Must have completed the task [Enabling Syslog Menu](#) (p.8)

### Steps

- 1) Go to **System/Syslog**.
- 2) In the **Syslog Configuration** table, click **Edit** next to **Filter**
- 3) In the **Module** table, set each module's type of syslog traces you want to receive.

## Result

| Module                          | Traces |      |         |       |          |         |
|---------------------------------|--------|------|---------|-------|----------|---------|
| - Call Router                   | All    | Info | Warning | Error | Critical | Disable |
| Call Manager                    | All    | Info | Warning | Error | Critical | Disable |
| Call Table                      | All    | Info | Warning | Error | Critical | Disable |
| Call Router                     | All    | Info | Warning | Error | Critical | Disable |
| Call Route Table                | All    | Info | Warning | Error | Critical | Disable |
| Call Hunt Table                 | All    | Info | Warning | Error | Critical | Disable |
| Call Mapping Table              | All    | Info | Warning | Error | Critical | Disable |
| Call Signaling Properties Table | All    | Info | Warning | Error | Critical | Disable |
| + POTS                          | All    | Info | Warning | Error | Critical | Disable |
| + ISDN                          | All    | Info | Warning | Error | Critical | Disable |
| + CAS                           | All    | Info | Warning | Error | Critical | Disable |
| - Line                          | All    | Info | Warning | Error | Critical | Disable |
| Command Digit                   | All    | Info | Warning | Error | Critical | Disable |
| Line Engine                     | All    | Info | Warning | Error | Critical | Disable |
| DSP                             | All    | Info | Warning | Error | Critical | Disable |
| ISDN Endpoint                   | All    | Info | Warning | Error | Critical | Disable |
| POTS Endpoint                   | All    | Info | Warning | Error | Critical | Disable |
| PSTN Endpoint                   | All    | Info | Warning | Error | Critical | Disable |
| + SIP                           | All    | Info | Warning | Error | Critical | Disable |
| + Stream                        | All    | Info | Warning | Error | Critical | Disable |
| + System                        | All    | Info | Warning | Error | Critical | Disable |

# Physical Link Down

## Auto-Detecting and Auto-Configuring ISDN Interfaces

### Information

**Note:** Some parameters cannot be auto configured. For example, the clock mode is configured according to the endpoint type, master for NT and slave for TE.

### Steps

- 1) Go to **ISDN/Status**.
- 2) In the **Automatic Configuration** table, from the selection list, choose the interface you wish to auto configure or select all interfaces.
- 3) Click **Start Sensing**.

**Note:** Launching the Automatic Configuration may terminate abruptly all ongoing ISDN calls. The auto-configuration may take some time to complete and some of the current ISDN configuration settings might be replaced by new values.

### Result

Under **ISDN/Status**, the **Physical Link** and **Signaling** fields of each interface should indicate **Up**.

| Automatic Configuration |                                                 |
|-------------------------|-------------------------------------------------|
| Status:                 | <div>--- All ---</div> <div>Start Sensing</div> |
| Last Result:            | None                                            |

| Slot5/BRI1 [Configure] |                 |
|------------------------|-----------------|
| Physical Link: Up      |                 |
| Signaling: Up          |                 |
| <b>Bearer Group</b>    |                 |
| Channel 1: Idle        | Channel 2: Idle |

| Slot5/BRI2 [Configure] |                 |
|------------------------|-----------------|
| Physical Link: Up      |                 |
| Signaling: Up          |                 |
| <b>Bearer Group</b>    |                 |
| Channel 1: Idle        | Channel 2: Idle |

| Slot5/BRI3 [Configure] |                 |
|------------------------|-----------------|
| Physical Link: Up      |                 |
| Signaling: Up          |                 |
| <b>Bearer Group</b>    |                 |
| Channel 1: Idle        | Channel 2: Idle |

| Slot5/BRI4 [Configure] |                 |
|------------------------|-----------------|
| Physical Link: Up      |                 |
| Signaling: Up          |                 |
| <b>Bearer Group</b>    |                 |
| Channel 1: Idle        | Channel 2: Idle |

### Next Step

[Configuring ISDN Preset \(p.11\)](#)

## Configuring ISDN Preset

### Steps

- 1) Go to **ISDN/Status**.
- 2) In the **ISDN Preset Configuration** table, set the following parameters:
  - a) Using the dropdown menu, select a **Local Preset**

**Note:** Depending on your unit's profile, it may be possible that no preset file are available.

- b) Using the **Preset Name** field, give a name to the preset.

- 3) Click **Apply**.

## Result

| ISDN Preset Configuration |                                                       |                                      |
|---------------------------|-------------------------------------------------------|--------------------------------------|
| Local Preset:             | <input type="text" value="PRI_NorthAmerica-NI2.cfg"/> | <input type="button" value="Apply"/> |
| Preset Name:              | <input type="text"/>                                  | <input type="button" value="Save"/>  |

### Next Step

[Verifying BRI Connection \(p.12\)](#)

## Verifying BRI Connection

### Steps

- 1) Check the cable on your BRI interface.
- 2) Verify the cable length.

#### Note:

The cable length between the Mediatrix gateway and the PBX must not exceed 600 metres

For short Bus application (all terminals / wall-plugs are put in parallel at arbitrary positions of the bus): max 120 metres.

For extended bus installation (all terminals / wall-plugs are hooked in parallel on the bus on the last 30 to 50 metres of the bus): max 450 metres.

Proper termination of the ISDN bus / ISDN line on both ends with 100 Ohms is mandatory.

### Next Step

[Verifying PRI Connection \(p.12\)](#)

## Verifying PRI Connection

### Steps

- 1) Check the cable on your PRI interface.
- 2) Straight cable versus PRI Cross-over.

**Next Step**[Modifying Port Pinout \(p.13\)](#)

## Modifying Port Pinout

### Steps

- 1) Go to **ISDN/Primary Rate Interface**.

**Note:** Not all PRI and/or BRI platforms support Port Pinout.

- 2) In the **Interface Configuration** table, set the **Port Pinout** to reflect your configuration.

### Result

| Interface Configuration                |          |
|----------------------------------------|----------|
| Line Type: <a href="#">[Configure]</a> | E1       |
| Endpoint Type:                         | NT ▼     |
| Clock Mode:                            | Master ▼ |
| Port Pinout:                           | NT ▼     |
| Monitor Link State:                    | Auto ▼   |
| Line Coding:                           | TE       |
|                                        | NT       |

# Signalling Down Troubleshooting

Make sure you have correctly configured the following:

- Endpoint Type
- Signalling Protocol
- Line Coding
- Line Framing

On some BRI connections, the Signaling status can be *Down* even when the link is functional. When the variable Link Establishment is at its default setting "On Demand", the signaling link will be seen as up only when calls occur.

If the link is correctly configured, we suggest trying a call in both directions even if the Signaling Status is Down.

# Troubleshooting Failed Calls when Physical and Signalling Status is up

## Troubleshooting SIP to ISDN Calls

### Steps

- 1) Go to **Call Router/Route Config** to verify if a route from a SIP gateway to an ISDN interface is configured.
- 2) Go to **ISDN/Primary Rate Interface**, and set **Calling Name Max Length** to 0.

**Note:** Some providers do not accept User-to-user information (UUI) to be sent in setup messages. Any setup containing a UUI Information Element (IE) will be rejected by the provider, most likely with an ISDN Status message. One reason for this is that this feature might not be provided for free.

- 3) Verify the setup sent to the ISDN interface by looking at the syslog messages.
- 4) Go to **ISDN/Primary Rate Interface** and set **Preferred Encoding Scheme** to **G.711 u-law**

**Note:** By default, the Mediatrix units are configured to use the a-law codec as encoding scheme in ISDN SETUP messages. A-law is usually used in Europe. Some North-American providers and PBX reject the SETUP message unless it uses the u-law codec

## Party Number Parameters Default Value

DGW sets the following default values:

| SIP to ISDN Calls        | Default value                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TON (called and calling) | Unknown                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| NPI (calling and called) | Unknown                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SI (calling)             | User-side: not-screened Network-side: network                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| ITC (calling)            | 3.1 kHz audio                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| PI (calling)             | <ol style="list-style-type: none"> <li>1. When the Calling Party Number E.164 is missing: interworking. In this case, this value overrides any value set by the call router.</li> <li>2. When CLIR is enabled (user-side only): restricted. In this case, this value overrides any value set by the call router.</li> <li>3. All other cases: allowed. This is the default value if the two cases above do not apply and no value has been set by the call router.</li> </ol> |

## Troubleshooting Generic Non-Working Calls

### Steps

- 1) Go to **ISDN/Interop**.
- 2) In the **Interop Configuration** table, set **Progress Indicator In Call Proceeding** to **Disable**

### Result

| Interop Configuration                  |           |
|----------------------------------------|-----------|
| Progress Indicator In Setup:           | Enable ▼  |
| Progress Indicator In Setup Ack:       | Enable ▼  |
| Progress Indicator In Call Proceeding: | Disable ▼ |

### Example

- Depending on the provider or the Pbx, the Mediatrix unit can receive an ISDN STATUS message such as the following:

IsdnStackL3Msg [1C9F] 0 < Call 22182-Inbound TEI 0 Unicast **RECV Status** (125)

IsdnStackL3Msg [1CA0] 0 < IE Cause [Coding: CCITT (0) Location: Public network serving local user (2) Cause: **Information element non-existent or not implemented (99)**]

IsdnStackL3Msg [1CA1] 0 < IE Call State [Coding standard: CCITT (0) State value: 9\_INCOMING\_CALL\_PROCEEDING (9)]

The cause 99, Information element non-existent or not implemented, refers to the previous ISDN message sent. If the previous message contains an IE Progress Indicator like in this example:

IsdnStackL3Msg [1C48] 0 > Call 22182-Inbound TEI 0 **SENDCall Proceeding** (2)

IsdnStackL3Msg [1C49] 0 > IE Channel Id 1/2 [IntID: Implicit Primary (1) 0 Preferred DChan: Is not D channel Pref: Exclusive]

IsdnStackL3Msg [1C4A] 0 > IE Channel Id 2/2 [Chan Sel: 1]

IsdnStackL3Msg [1C4B] 0 > **IE Progress Indicator** [Coding standard: CCITT (0) Location: User (0) Description: Destination address is non-ISDN (2)]

## Troubleshooting ISDN to SIP Calls

### Steps

- 1) Go to **Call Router/Route Config** to verify if a route from an ISDN interface to a SIP gateway is configured.
- 2) Using syslog traces, verify if a SIP INVITE was generated by the gateway after it received the ISDN Setup from the ISDN interface.

**Note:** SIP debug must be enabled.

- 3) Verify if the provider is sending a ISDN Setup message without the Called Number, with an empty Called number or only part of the Called number (last 4 digits for example). If this is the case, it is possible, via the call router, to manipulate the Called number before it is sent via SIP.

# Enabling Calling Line Information Presentation

## Steps

- 1) Go to **ISDN/Services**.
- 2) From the **Select Interface** drop-down menu, select the interface you want to configure.
- 3) In the **Services Configuration** table, set **Facility Services** to **Enable**.
- 4) Set **Calling Line Information Presentation** to **Enable**.
- 5) In the **MSN** field, enter the numbers that will be allowed when a call is incoming from the SIP side.

**Note:** Please refer to **Show Help** to apply the appropriate syntax.

- 6) From the **Apply To The Following Interfaces** section, select the interfaces for which the configuration will be applied to.
- 7) Click **Apply**.

## Result

Support of ISDN FACILITY messages will be enabled.

## Services

Select Interface: Bri1 ▼

| Services Configuration                              |                                  |  |
|-----------------------------------------------------|----------------------------------|--|
| Facility Services:                                  | <span>Enable ▼</span>            |  |
| Calling Line Information Presentation:              | <span>Enable ▼</span>            |  |
| Calling Line Information Restriction:               | <span>Disable ▼</span>           |  |
| Calling Line Information Restriction Override:      | <span>Disable ▼</span>           |  |
| Connected Line Identification Presentation:         | <span>Disable ▼</span>           |  |
| Connected Line Identification Restriction:          | <span>Disable ▼</span>           |  |
| Connected Line Identification Restriction Override: | <span>Disable ▼</span>           |  |
| Outgoing Notify:                                    | <span>Disable ▼</span>           |  |
| Maintenance Service Call Termination:               | <span>Graceful ▼</span>          |  |
| Date/Time IE Support:                               | <span>Disable ▼</span>           |  |
| AOC-E Support:                                      | <span>No ▼</span>                |  |
| AOC-D Support:                                      | <span>No ▼</span>                |  |
| Call Rerouting Behavior:                            | <span>Unsupported ▼</span>       |  |
| MSN:                                                | <span>MSN 1, MSN 2, MSN 3</span> |  |

# Disabling Double DTMF

By default, Mediatrix units listen for out-of-band and inband DTMF. Some ISDN links provide, for the same DTMF, an out-of-band and inband signal, resulting in two DTMFs being sent to the SIP proxy.

## Steps

- 1) Go to **ISDN/Primary Rate Interface**.
- 2) Using **Select Interface** drop down menu, select the interface you want to configure.
- 3) In the **Interface Configuration** table, set **Inband DTMF Dialing** to **Disable**.
- 4) Click **Apply**.

## Result

| Interface Configuration                |               |
|----------------------------------------|---------------|
| Line Type: <a href="#">[Configure]</a> | E1            |
| Endpoint Type:                         | NT ▼          |
| Clock Mode:                            | Master ▼      |
| Port Pinout:                           | NT ▼          |
| Monitor Link State:                    | Enable ▼      |
| Line Coding:                           | HDB3 ▼        |
| Line Framing:                          | NO-CRC4 ▼     |
| Signaling Protocol:                    | DSS1 ▼        |
| Network Location:                      | User ▼        |
| Preferred Encoding Scheme:             | G.711 a-Law ▼ |
| Fallback Encoding Scheme:              | G.711 u-Law ▼ |
| Channel Range:                         | 1-30          |
| Channels Reserved for Incoming Calls:  |               |
| Channels Reserved for Outgoing Calls:  |               |
| Channel Allocation Strategy:           | Ascending ▼   |
| Maximum Active Calls:                  | 0             |
| Signal Information Element:            | Disable ▼     |
| Inband Tone Generation:                | Enable ▼      |
| Inband DTMF Dialing:                   | Disable ▼     |

## Country/Provider Specific Configuration - France

- Connection to France Telecom

In France, the prevalent protocol is VN6 (a variant of ISDN protocol)

If you are having issues with the ISDN connection, verify with your ISDN provider if it is possible to set the ISDN link to Euro ISDN.

## Online Help

If you are not familiar with the meaning of the fields and buttons, click **Show Help**, located at the upper right corner of the Web page. When activated, the fields and buttons that offer online help will change to green and if you hover over them, the description will be displayed.

# DGW Documentation

Mediatrix devices are supplied with an exhaustive set of documentation.

Mediatrix user documentation is available on the [Media5 Documentation Portal](#).

Several types of documents were created to clearly present the information you are looking for. Our documentation includes:

- **Release notes:** Generated at each GA release, this document includes the known and solved issues of the software. It also outlines the changes and the new features the release includes.
- **Configuration notes:** These documents are created to facilitate the configuration of a specific use case. They address a configuration aspect we consider that most users will need to perform. However, in some cases, a configuration note is created after receiving a question from a customer. They provide standard step-by-step procedures detailing the values of the parameters to use. They provide a means of validation and present some conceptual information. The configuration notes are specifically created to guide the user through an aspect of the configuration.
- **Technical bulletins:** These documents are created to facilitate the configuration of a specific technical action, such as performing a firmware upgrade.
- **Hardware installation guide:** They provide the detailed procedure on how to safely and adequately install the unit. It provides information on card installation, cable connections, and how to access for the first time the Management interface.
- **User guide:** The user guide explains how to customise to your needs the configuration of the unit. Although this document is task oriented, it provides conceptual information to help the user understand the purpose and impact of each task. The User Guide will provide information such as where and how TR-069 can be configured in the Management Interface, how to set firewalls, or how to use the CLI to configure parameters that are not available in the Management Interface.
- **Reference guide:** This exhaustive document has been created for advanced users. It includes a description of all the parameters used by all the services of the Mediatrix units. You will find, for example, scripts to configure a specific parameter, notification messages sent by a service, or an action description used to create Rulesets. This document includes reference information such as a dictionary, and it does not include any step-by-step procedures.

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