

# *Hearty Welcome*



## *Matrix GSM Family*

- GSM FCTs (Data ,Voice and FAX Services)
- Multi-Port GSM-FXO-FXS Gateways
- Multi-Port GSM-ISDN BRI Gateways

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## *Pre-eminent Features*

- Reliable, Compact and Sturdy Design
- ETSI GSM Phase2/2+ Compliance
- Superior Call Routing Techniques
- Quad-band 2G and Tri-band 3G Network Support
- CE, FCC15 and RoHS Certified
- Compatible With Any Make of PBX

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# MATRIX SIMADO GBR



Multi-Port GSM/3G-ISDN BRI Gateway



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## *Introduction*

- Bridges ISDN and GSM Network
- Direct Call Routing between ISDN and GSM Networks
- Can Interface With BRI Port of a PBX System
- Powerful Least Cost Router
- Ideal for Small and Mid-sized Businesses

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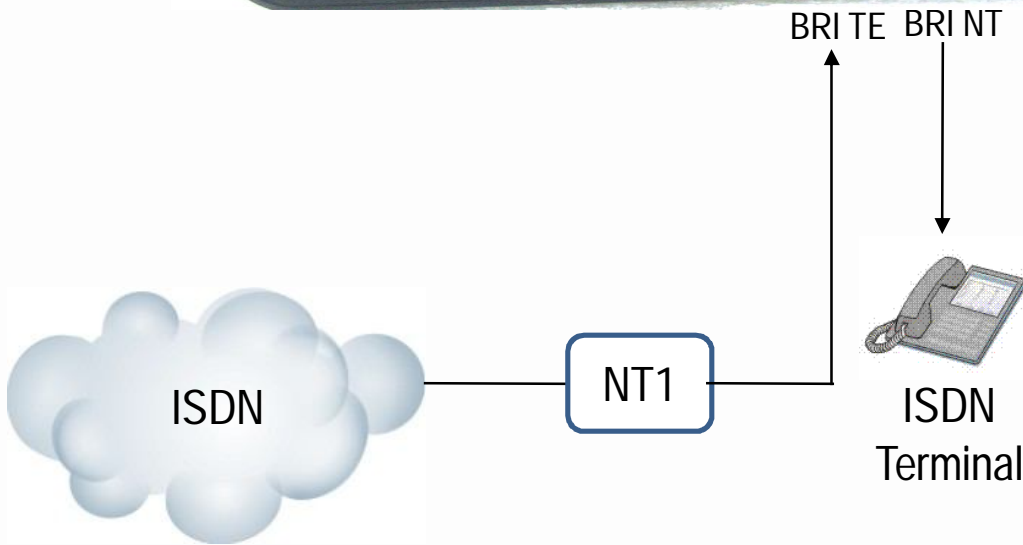
# *ISDN: Integrated Services Digital Network*

- Delivers 2 or More Channels in Any Combination of Data, Voice, Video and FAX, Over Single Line
- Dynamic Allocation of Bandwidth for Applications
- 64 Kbps Bearer Channel
- 16 Kbps (64 Kbps for PRI Line) Common Signaling/D-Channel
- BRI: (Basic Rate Interface)
  - ✓ 2B+D
- PRI: (Primary Rate Interface)
  - ✓ 23B+D: (North American, Japan and Korean Standard)
  - ✓ 30B+D: (Standard for Rest of the World)
- DDI Numbers are Used to Route Calls to Respective BRI Terminal

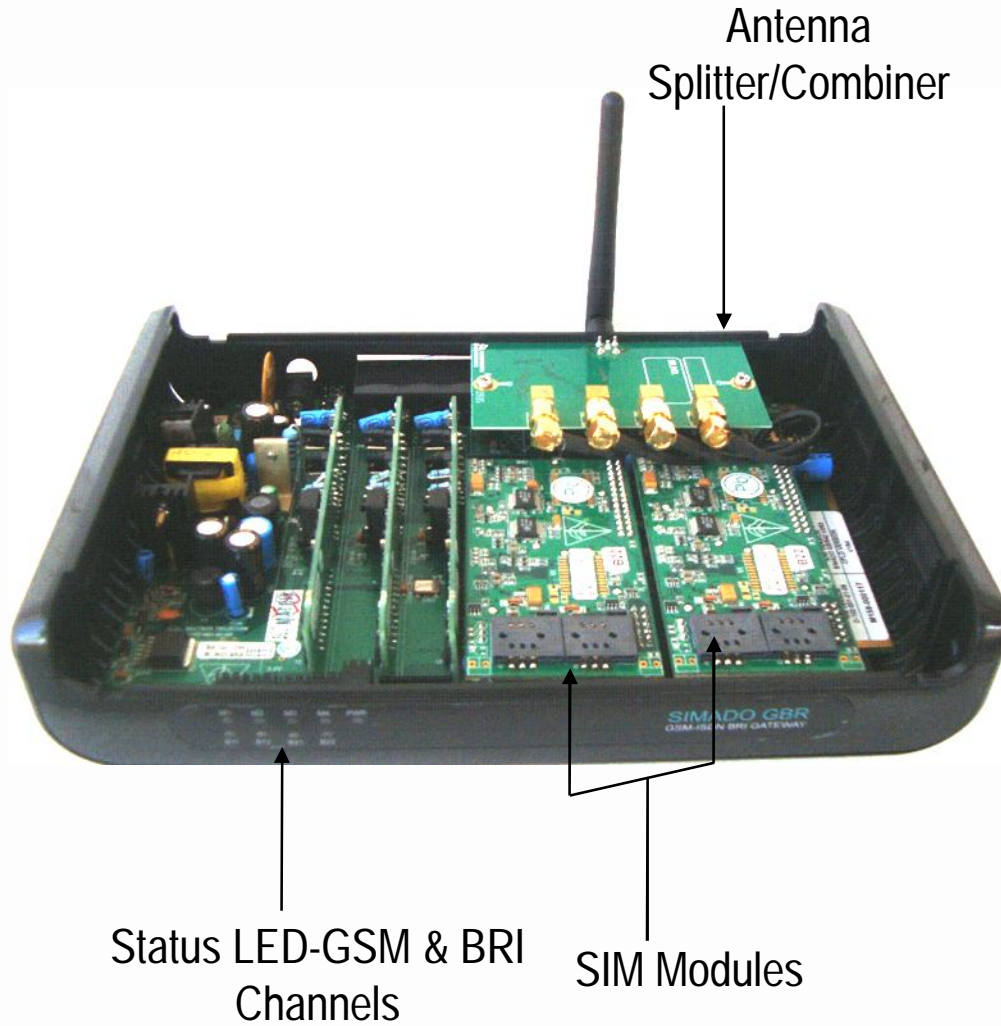
# *System Interfaces*



# System ISDN Interfaces



# System Modules



# *System Models*

SIMADO GBR21	GSM-ISDN BRI Gateway With 2 GSM Ports and 1 ISDN BRI Port
SIMADO GBR21 3G	GSM/3G-ISDN BRI Gateway With 2 GSM Ports and 1 ISDN BRI Port With 3G Support
SIMADO GBR42	GSM-ISDN BRI Gateway With 4 GSM Ports and 2 ISDN BRI Ports
SIMADO GBR42 3G	GSM/3G-ISDN BRI Gateway With 4 GSM Ports and 2 ISDN BRI Ports With 3G Support

# Network Support



# 3G Network Support



- Matrix SIMADO GBR 3G Model Supports:
  - ✓ 2G Network: Quad-band Support for GSM Network
  - ✓ 3G Network: Tri-band Support for WCDMA Network
- Call Established over 3G Network offer:
  - ✓ Noise-free, Stanch Voice Quality
  - ✓ Enhanced Security
- Fallback Compatibility
  - ✓ In Case Preferred (3G) Network is Not Available
  - ✓ Flexibility to Switchover to Alternate Network (2G)
  - ✓ Assures Network Connectivity Round the-Clock
  - ✓ Users Can Traverse between Regions Uninterruptedly

2001 Japan Used WCDMA as a Commercial Service, Bypassing Earlier GSM Generations <b>Source: Mobile Communications Systems and Security/Man Young Rhee</b>
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## *RS232C Port*



- RS232C (DB9 Connector) Communication Port for:
  - ✓ System Debug
  - ✓ Downloading Call Detail Reports
  - ✓ System Programming (Through Jeeves)

# LED Indications



GSM	1 LED per Port for Network and Call Status
BRI	2 LED per Port for Each B-channel Status
Power	1 LED for On/Off Status

## *Real Time Clock (RTC)*

- Built-in RTC Circuit
- Ensures Accurate Functioning of System Features Like:
  - ✓ Time Table (Routing Calls as per Time), Setting Alarms, Call Reports and Many Others
- The System's RTC Automatically Tunes With a Country's Day Light Saving Adjustment

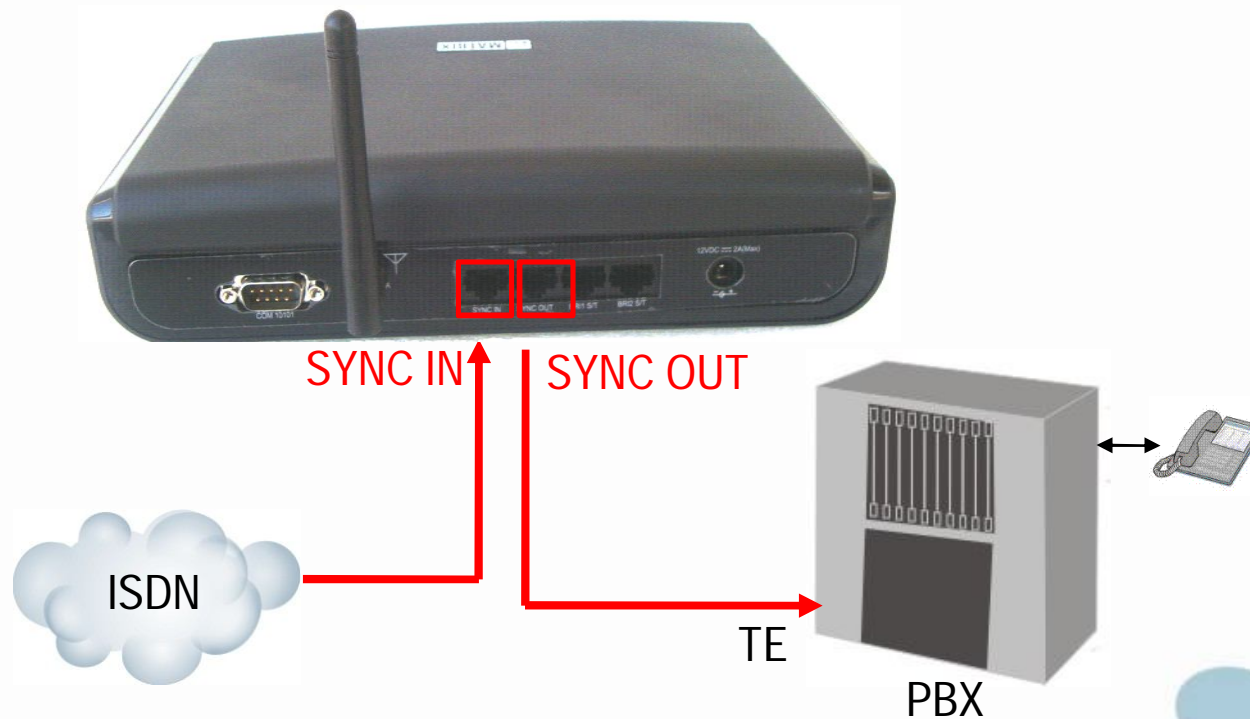
# *Network Clock Synchronization*

- Intermittent Clock Slips between Two System Interfaced Together,  
Results in:
  - ✓ Poor Voice Quality
  - ✓ Interoperability Issues
- SYNC IN and SYNC OUT Port of SIMADO GBR Serve the Purpose of  
Clock Synchronization Between:
  - ✓ SIMADO GBR
  - ✓ Connected PBX System
  - ✓ ISDN Network
- Clock Available From the Network is Highly-stable
- Network Clock Serves as the Most Accurate Clock Source

# *Network Clock Synchronization*

- As Per Assigned Priority, One of the Following Clock Source is Selected:
  - ✓ Clock of Network Line Terminated to SYNC Port
  - ✓ Internal System Clock
  - ✓ Clock of Network Line Terminated on TE1 Port of SIMADO GBR
  - ✓ Clock of Network Line Terminated on TE2 Port of SIMADO GBR

# Network Clock Synchronization



- SIMADO GBR Utilizes Network Clock Though the Network Line is Terminated on the PBX and Not on SIMADO GBR

# *System Features*

- Allowed and Denied Lists
- Automatic Number Translation
- Call Detail Recording (CDR)
- Call Duration Control (CDC)
- Call Proceeding Tone
- Call Progress Tones
- CLIP on GSM/BRI Ports
- CLI Based Routing



# *System Features*

- Day Light Saving Time Adjustment
- Dialed Number Based Routing
- Emergency Number Dialing
- Fixed Number Dialing
- International Mobile Equipment Identity (IMEI)
- Jeeves: Windows-based Programming Tool
- Network Selection
- RCOC

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# *System Features*

- Reinstatement Default Settings
- Routing Group
- Routing Type
- SIM PIN
- System Version/Revision Display
- System Event Log
- System Programming
- Time Table

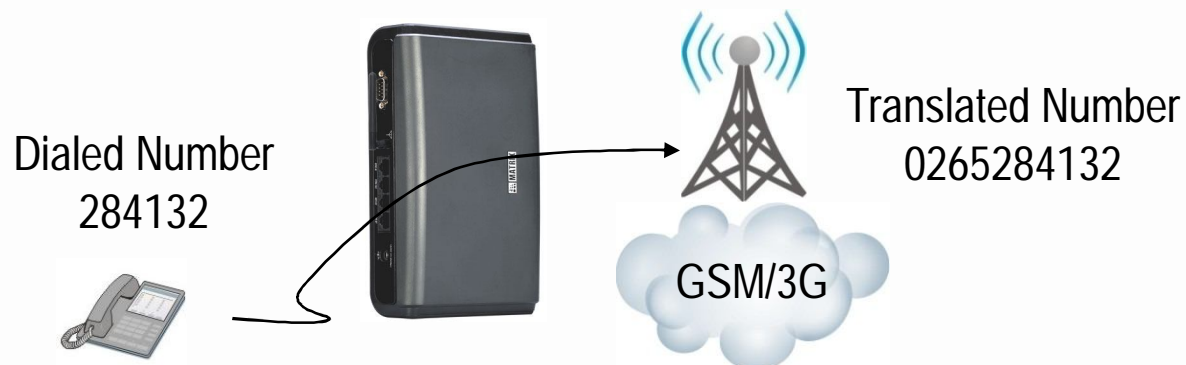
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## *Allowed and Denied Lists*

- Allow/Deny Dialing of Specific Numbers
- An Allowed/Denied Number List Can be Programmed for Each System Port
  - ✓ Supports 16 Number Lists
  - ✓ Each List Can be Programmed to Allow/Deny 24 Numbers
- Programmed Emergency Numbers are Excluded From Such Verification
- Useful to Control Telephone Call Cost
- Limit Use of System National/International Dialing Facility as per Requirement
- Example: Restrict 0-Dialing Facility for One System Port While Allow the Same on Another System Port

# *Automatic Number Translation*

- Translates Dialed Number String to a Format Understood by the GSM/3G Network, Example:
  - ✓ While Placing Calls to Landline Numbers
  - ✓ User May Dial Only the Number
  - ✓ SIMADO GBR Prefixes the Area Code
  - ✓ The Number String Can then be Understood by the GSM Network
- No Need to Change Habituated Dialing Practices
- Aids in Speed Dialing and Multi-stage Dialing Set-ups



## *Call Detail Recording(CDR)*

- Records Details of Calls Made Through the Gateway
- 200 Calls Can be Recorded in Memory
- Only Answered Calls are Stored in Memory
- Reports Can be generated Using Varied Filters Like:
  - ✓ Port Number, Dialed or Received Numbers, Date and Duration
- Easy Transfer of CDR to PC

## *Call Duration Control(CDC)*

- Control the Duration of Call Made Through the System
- Calls Get Disconnected After a Pre-defined Duration
- Different Time Limit Can be Set On Each Port
- Duration Can be Set for Specific Location Calls
- Sends Notification to the Caller Prior to Disconnection of Call
- Controls Misuse of Dialing Facilities
- Ensures Ports are Released on Call Completion

## *Call Proceeding Tone*

- Special Tone Played When Call is Terminated on Mobile/TE/NT Port
- The Tone Can be Either Generated From the Network or the Gateway
- In Case, Destination Network Does Not Presents an Audible Indication of Call Progress Activity
- SIMADO GBR is Capable of Playing the Feature Tone Locally to the Caller

## *Call Progress Tones*

- Different Tones to Indicate the Progress of Call Activity
- Example: Dial Tone, Ring Back Tone, Busy Tone, Error Tone
- CPT Tones With Difference Cadence is Offered to Match With the Ones Used in a Region

## *CLI Based Routing*

- Calls Get Routed as per CLI of Calling Party
- A Calling Party Number Table Can be Programmed for 200 Numbers
- The CLI of Calling Party is Talled With the Table Entries
- Calls are then Routed to Defined Stations as per Routing Groups

## *Day Light Saving (DST)*

	<p><b>Department of Transportation, U.S, Reports:</b> We Trim the Entire Country's Electricity Usage by About One Percent EACH DAY With Daylight Saving Time Adjustments</p>	
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- DST: Assignment of New Local Time to the Region for a Part of Year
- As per the Day Light Saving Adjustment Observed by a Country
- System's Real Time Clock (RTC) Shift Forward or Backward Accordingly
- Set DST Week-Day-Month Wise or Date-Month Wise

## *Dialed Number Based Routing*

- Dial-out Calls Through Specific Ports as per Dialed Number String
- A Dialed Number is Compared With Entries in “Dialed Number String Table”
- 500 Entries Can be Programmed in the Table
- Once a Match is Found, Call Will be Routed as per Assigned Routing Group
- Option to Program Prefixes before Dialing-out a Number From the Port
- Flexibility to Route Calls Through the Least Cost Route, as per Dialed String

## *Emergency Number Dialing*

- Program Up to 4 Emergency (Ambulance, Police, Fire Brigade and Others) Numbers
- Place Emergency Calls From ISDN/GSM Network
- Place Calls Even if a SIM is Not Inserted in the GSM Module
- Placing an Emergency Call is Not Subject to Verification With the Allowed-Denied Number List
- In Case, No Emergency Number is Programmed, Emergency Number Stored in the SIM Will be Dialed
- Else Default Emergency Number Stored in the Firmware Will be Dialed

## *Fixed Number Dialing*

- Specific Numbers Can be Pre-defined in the Gateway
- As Soon As a Call Lands on a Port
- The Pre-defined Number Can be Dialed-out
- For Number Called Frequently, Avoid Repetitive Number Dialing
- Delay After Which the Fixed Number Will be Dialed is Also Programmable
- Helpful for Establishing Point-to-Point Connectivity
- Feature Can be Activated / De-activated for Each GSM / BRI Port

## *International Mobile Equipment Identity(IMEI)*

- 15/17 Digit Code Used to Identify a GSM Module on GSM Network
- When SIMADO GBR is Switched on, the IMEI Number is Verified With the Service Providers List of Authorized Users
- In Case of Lost/Stolen Equipment
  - ✓ Get IMEI Number Blocked
  - ✓ Prevents Misuse of Information Stored in the Gateway

# *Jeeves*

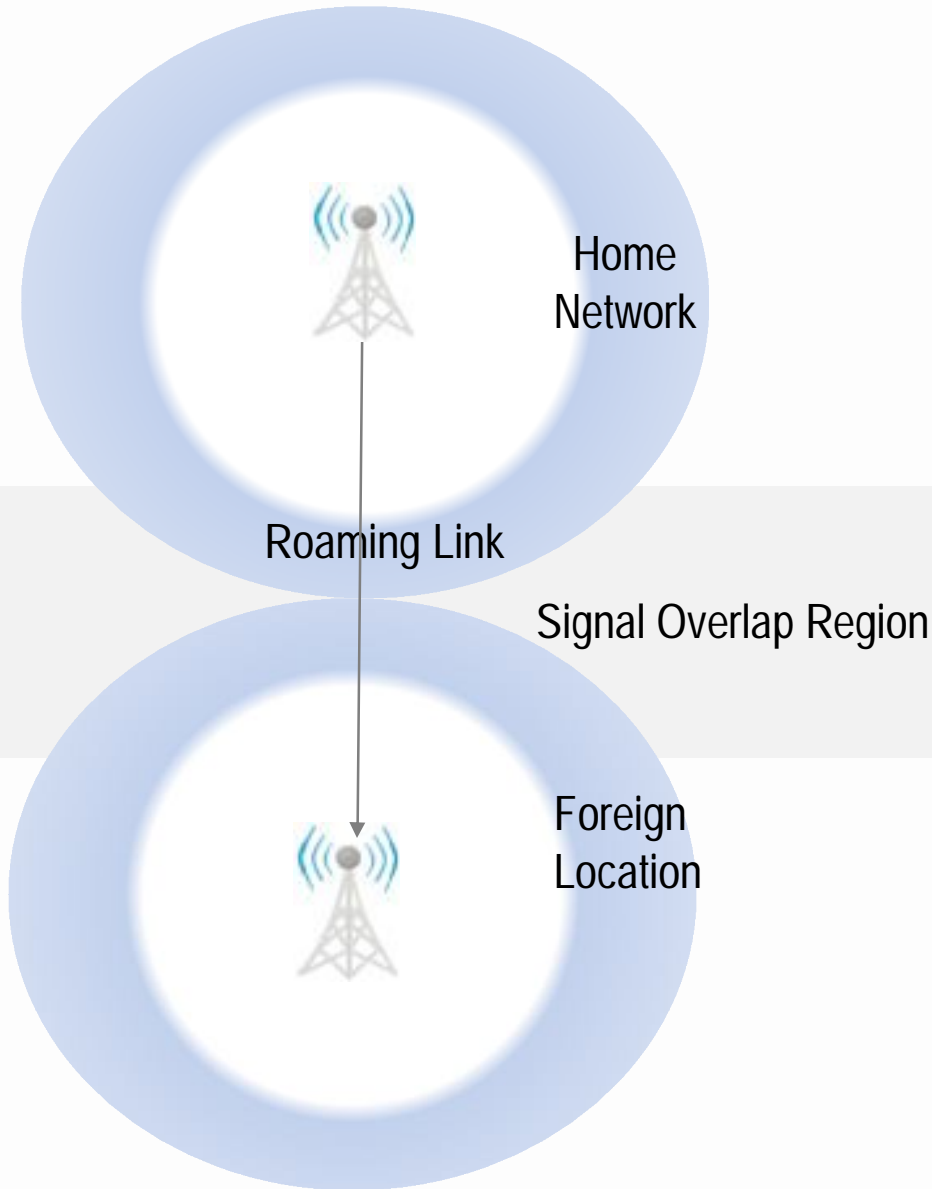
- Customized, Windows Based Programming Tool
- User-Friendly Tool With Mouse Operated GUI
- Multi-Lingual Interface



# *Network Selection*

- At Each Power-On, System Auto Searches and Registers With Available Network (Automatic Network Selection Mode)
  - ✓ Network is Selected as per Network Signal Strength
  - ✓ Ensures Round-the-Clock Connectivity by Registering With an Available Network
- System Can be Programmed for Manual Network Selection Mode
  - ✓ Avoids Unnecessary Charges Due to Registration With Unwanted Networks
  - ✓ Network is Selected as per Assigned Priority in a Priority Table
- Each GSM Port Can be Programmed for Maximum of 9 Networks
- Multiple Attempts are Made to Register on the Available Network

# Network Selection



- Network Signals May Overlap in the Expanse of a National Border
- Set the System for Manual Network Selection Mode
- Avoid False Roaming Charges, due to Registration With a Foreign Network

## *Return Call to Original Caller(RCOC)*

- If a Call Attempted From the System is Not Answered or Found Busy
- The System Keeps a Record of BRI/GSM Port Number, Calling Party's Number and the Called Party Number in its Database
- On Receiving a Call From the Called Party, System Identifies the Called Party Number
- The Call is then Routed to the Caller who had Attempted to Call the Concerned Party

# Return Call to Original Caller(RCOC)



System Stores Called Party's no, Calling Party's no With its Extension no

When the User Calls Back, Call Gets Routed to the Same Extension

# *Reinstate Default Settings*

- SIMADO GBR is Supplied With Default Settings for Various Parameters
- A Programming Error or an Operating Mistake May Necessitate Defaulting the System
- In Cases When Default Settings Near a User Requirement
  - ✓ Minimizes Programming Inputs to bring System to an Operational State

## *Call Routing Scenarios*

- A Call May be Attended by Any Member of the Group
  - ✓ A Call to Sales Team , May be Attended by Any Team Member
- Certain Incoming Calls are Intended for Fixed Destinations
- Routing a Call May be Restricted to/Through a Particular Port
- Screening (Denial) of Dialing Facilities May be Imposed Differently on Users

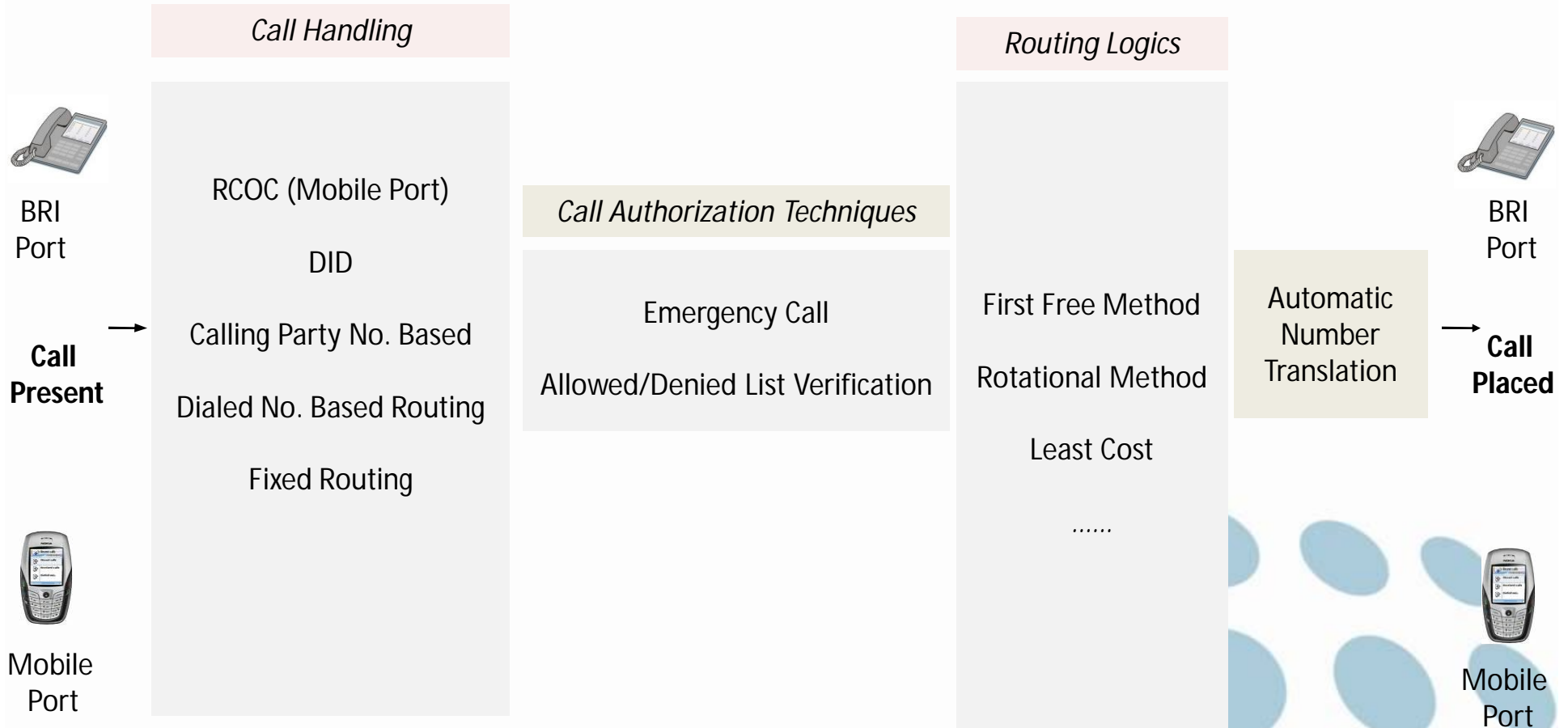
## *Routing Group*

- Each System Port is Given a Specific Group Number  
(Routing Group No.)
- Each Routing Group Consists of Members With Assigned Priorities
- 16 Such Groups of 8 Members May be Defined

## *Routing Type*

- Routing Types Delineate the Way to Route Calls
- Specific Routing Types May be Assigned to System Ports for Specific Timezones
- Various Routing Types Supported by the System are:
  - ✓ Fixed: Calls get Routed to Fixed, Pre-defined Destinations
  - ✓ Dialed Number Based: Routing on the Basis of Dialed Number
  - ✓ Calling Party Number Based: Call is Routed Referring the Calling Party Number Table Entries

# Ingenious Call Management



## *SIM PIN*

- SIM is a Smart Card With Subscriber Specific Data Stored in it
- SIM PIN is a Security Feature used by the GSM Network
- A PIN (Personal Identification Number) Check Can be Enabled in the SIM
- At Each Power-On, System is Authenticated for PIN
- This PIN Should Match With the One Stored in SIM as SIM PIN
- Only Once Correct SIM PIN is Issued, System Will Attempt Registration to a GSM Network
- Prevents Misuse of the SIM card

## *Software Version/Revision Display*

- Regular Adherence to Customer Feedbacks Directs Software Upgradation
- Current Software Version Should be Known before Upgrading to the Higher One
- No Need to Open the System
- View the Software Revision of Current System Software Through Jeeves

## *System Event Log*

- Generate Event Log for Port States and Activities
- Event Log Generation Can be Enabled/Disabled on Each Port Individually
- Event Logging Can be Initiated From Any Port Using SE Commands
- Helpful to SE in Troubleshooting Processes

# *System Programming*

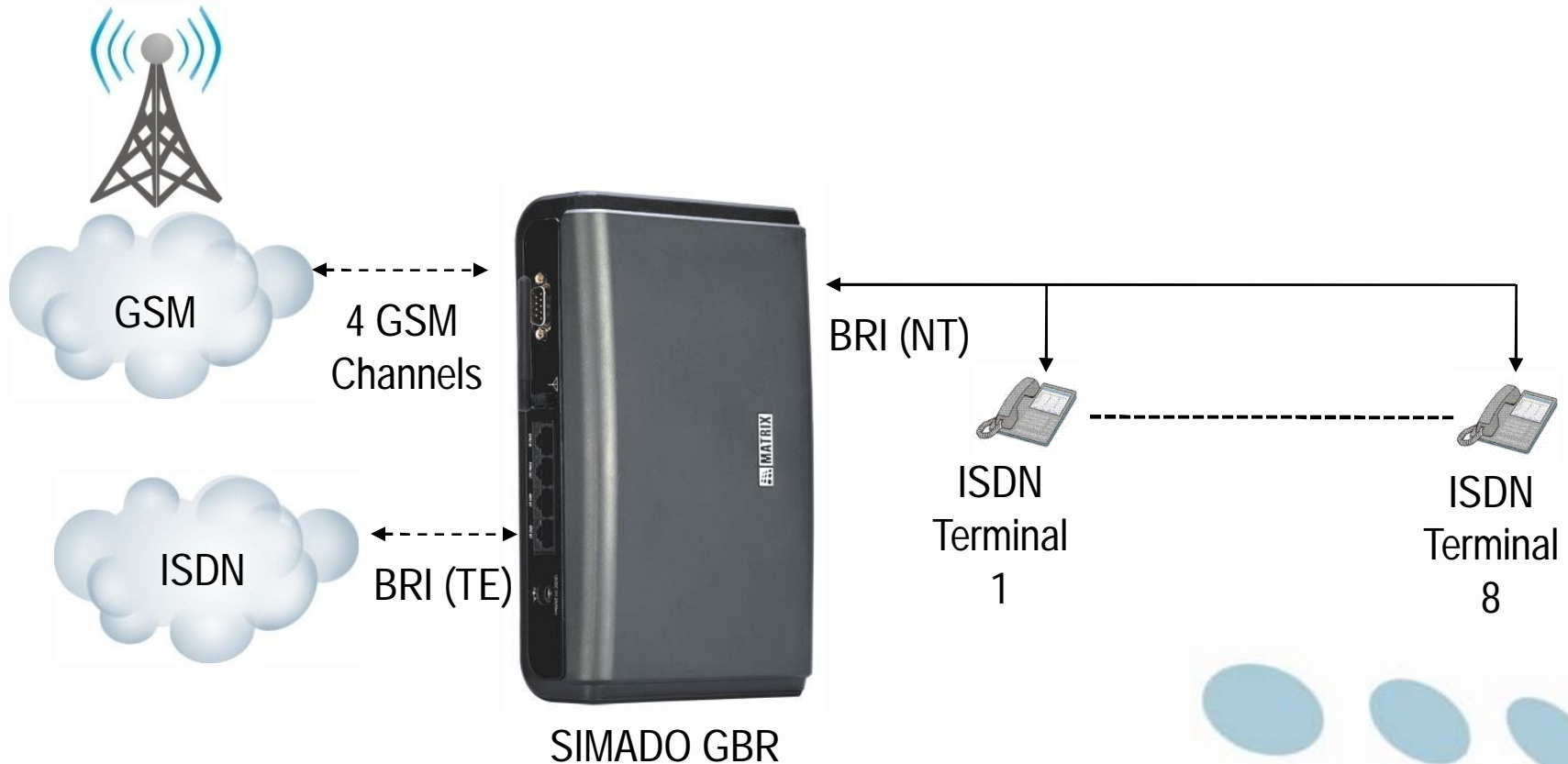
- Program the System Via:
  - ✓ From NT Port
  - ✓ From TE Port/Mobile Port (With Enabled DID)
  - ✓ From Jeeves (Windows Based Programming Tool)

## *Time Table*

- Route Incoming/Outgoing Calls on Each Port (GSM/BRI) as per 'Time of the Day' (Time Zone)
  - ✓ Defined Schedule for a Day is Called Timetable
  - ✓ A Timetable Divides Entire Day in to Four Time Zones
  - ✓ Calls are Routed as per the Timetable, Following the Routing Logic (Routing Group and Routing Type) of the Port
- Benefit From the "Minimum Call Charging Schemes', Offered by Various Service Providers based on Cal Time (Off-Peak Hours)
- Notable Reduction in Call Charges
- 8 Such Timetables Can be Defined
- Provides Flexibility to Receive Ones Calls on Different Terminals as per the Time

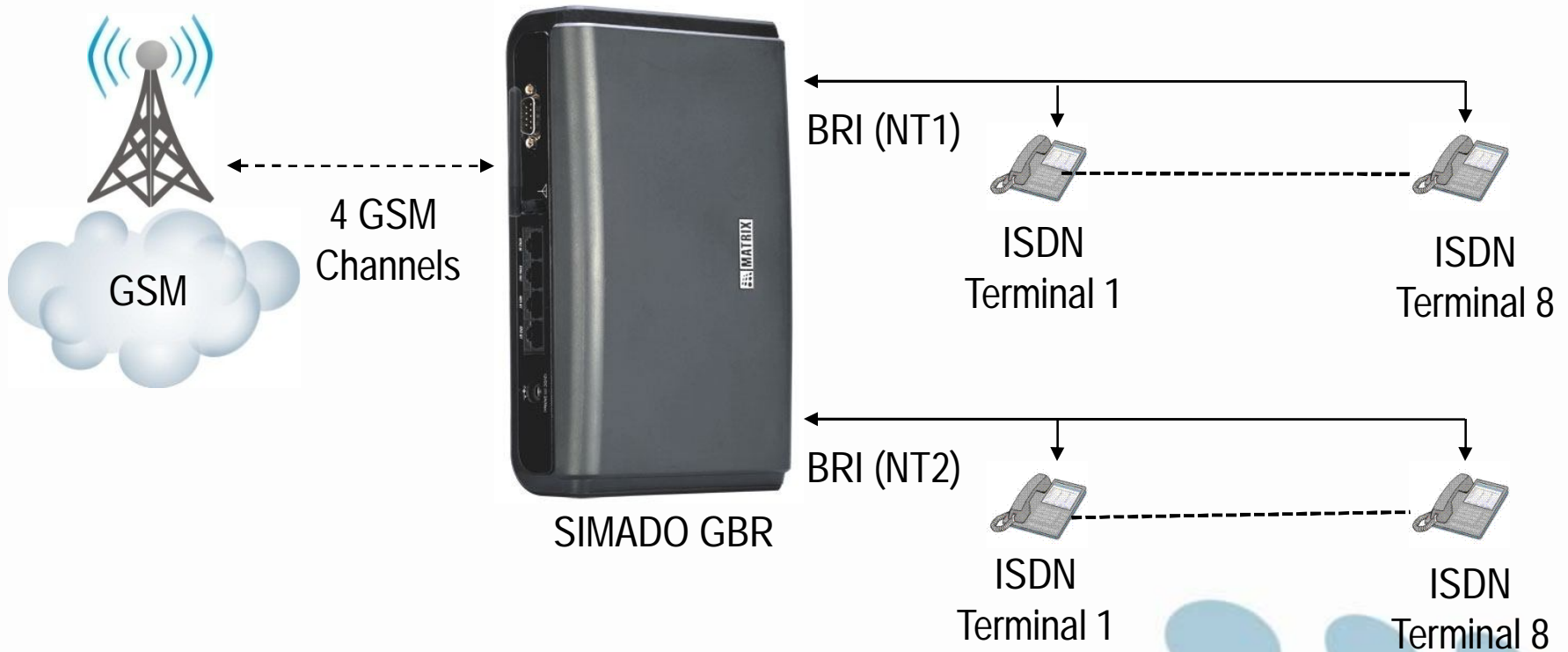
# *Applications*

# Stand-alone Application



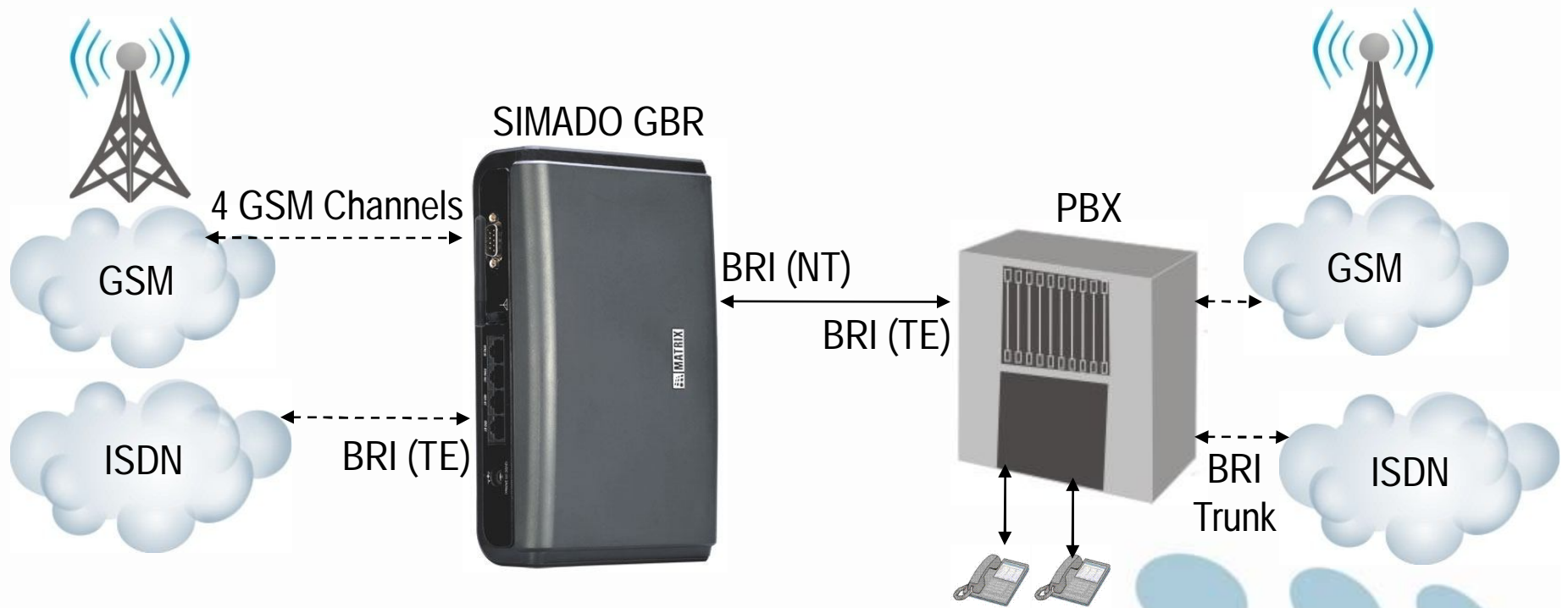
- 8 ISDN Phones Can be Connected to NT Port of SIMADO GBR
- Calls Originated From ISDN Phones Can be Routed Through GSM Network or BRI TE Port

# Stand-alone Application



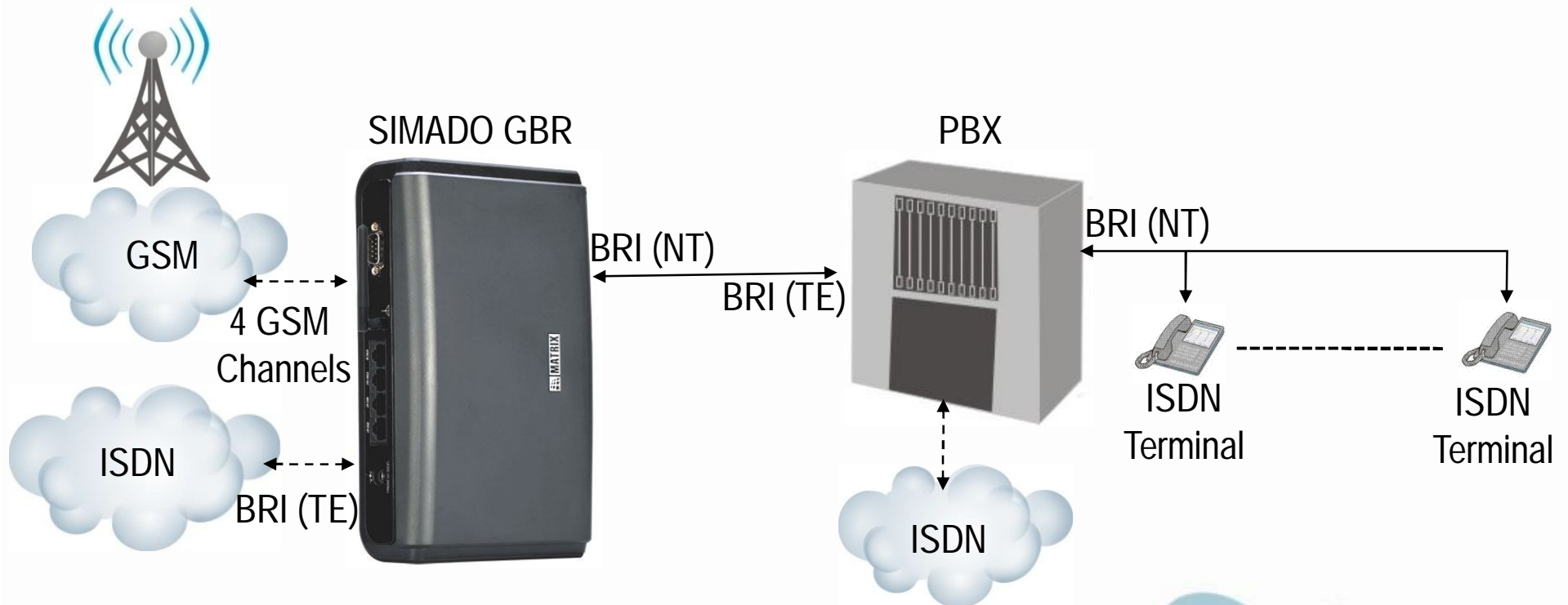
- 16 ISDN Phones Can be Connected to NT (NT1 and NT2) Port of SIMADO GBR
- Calls Originated From ISDN Phones are Routed Through Appropriate Mobile Port, as per Defined Least Routing Logics

# GBR With PBX: BRI NT to PBX BRI TE



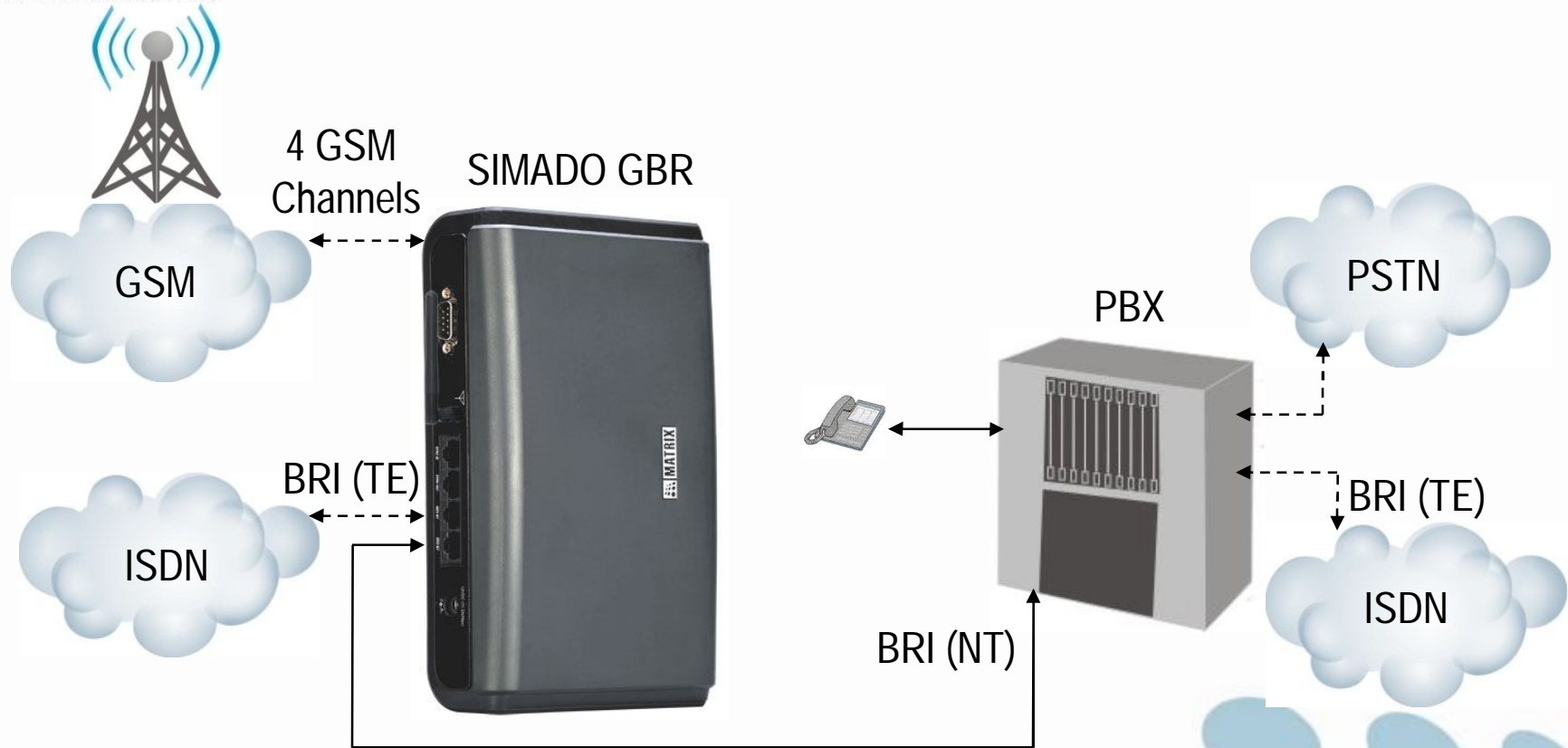
- Calls From Analog/ISDN Phones Can be Routed via TE Port of the Gateway or Through an Appropriate GSM Port

# GBR With PBX: BRI NT to PBX BRI TE



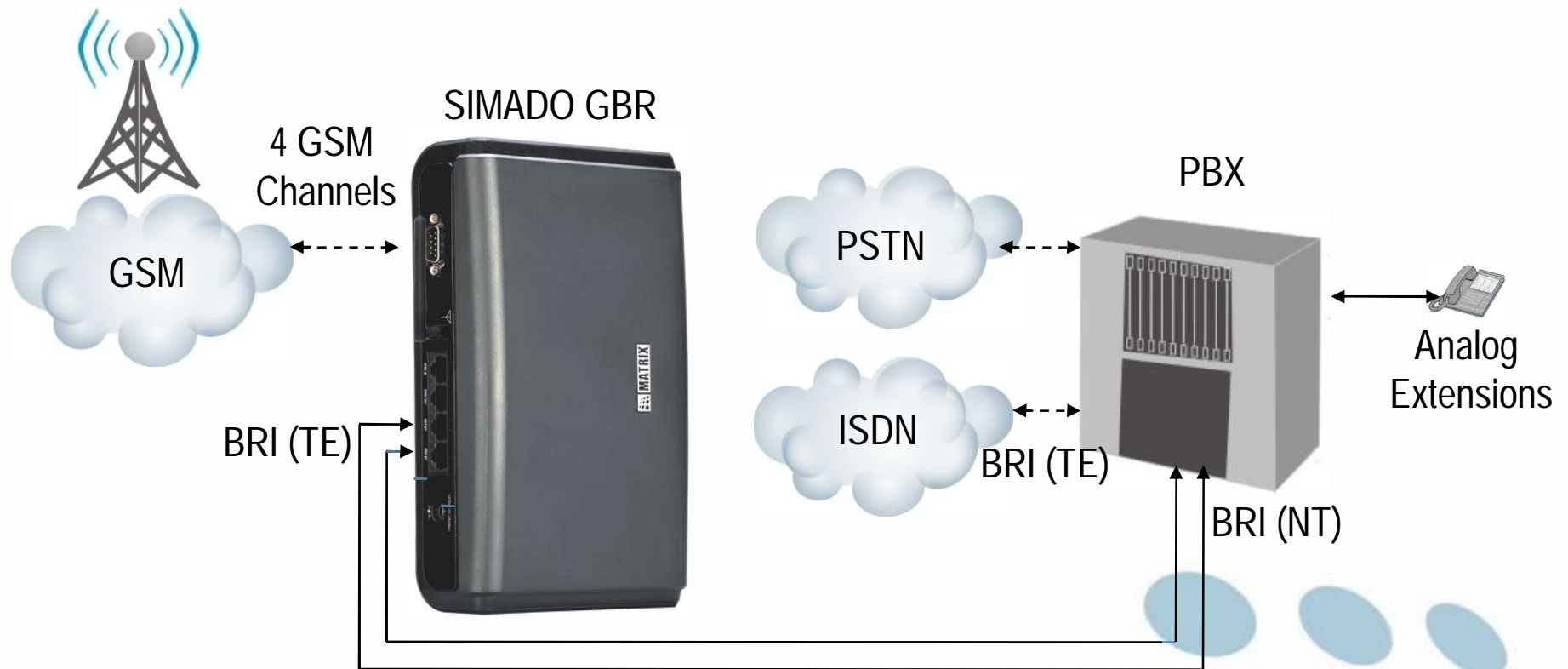
- Analog/ISDN Phones Can Place Calls Through GSM Network
- Calls Get Routed Via the Most Cost-effective GSM Channel as per the Routing Logics

# GBR With PBX: BRI TE to PBX BRI NT



- Calls Originated From Analog Phones Can be Routed Through ISDN or GSM Network

# GBR With PBX: BRI TE to PBX BRI NT



- Calls Originated From Analog Phones Can be Placed via the GSM Network
- One of the Four GSM Channel is Selected as per Pre-defined Routing Logics

# *Technical Specifications*

GSM SIM Slots	4/2
BRI Ports (RJ45)	2 /1
Power Supply	External Adaptor 12V DC/2A (Universal input range 90-265VAC, 47- 63Hz)
Power Consumption (Typical)	10 Watt
RF Sensitivity	Better than -106dBm at GSM850/EGSM900/DCS1800/PCS1900 Better than -106dBm at WCDMA 850 Better than -108dBm at WCDMA 1900/2100
Dimensions (W X H X D)	7.9" X 11.1" X 2.4"
Unit Weight	1500 Grams
Installation	Wall Mount and Table Top
Antenna Connector	SMA (Male)



*Thank You*



- Type of Presentation: SIMADO GBR Features and Applications
- Number of Slides: 58
- Revised On: 21<sup>st</sup> November, 2009
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