

Private Mobile eXchange

Mobile communications when and where you need it



Private Mobile eXchange (PMX) enables the creation of a Private Mobile Network, that is a secure and private GSM network able to be used as an alternative to the macro GSM network.

Private Mobile eXchange (PMX) enables mobile phones to become part of a company voice and data networks while in the vicinity of the workplace, similar to the standard telephone handsets on the desk.

With a private mobile network, mobile phones can be used to make calls from the workplace for the same cost as calling from an internal telephone extension. Staff can call colleagues at the premises, or on-net over the corporate network, without incurring any call costs and mobile calls from the office to external destinations are charged at the company's normal landline tariff.

Private Mobile Networks enable a Business to deploy mobile networks into remote regions or isolated user communities where network integration and infrastructure costs would otherwise be prohibitive. This is particularly suited to mining, shipping and tactical deployment situations. A standard mobile phone can be used in environments where there is limited or no coverage which would normally render it useless.

PMX integrates with any 2G mobile phone and any PBX type.

Features and Benefits

- Allows mobile phones to operate as PBX extensions while user is on-site.
- Vendor independence protects investment in infrastructure as PMX integrates with legacy (TDM) and IP-PBXs using industry standard gateways. This means that telephony hardware changes, for example, as a result of mergers and acquisitions or to meet new requirements, can be readily accommodated.
- Maintains staff contactability to provide a high level of customer service.
- Supports business continuity - the private mobile network continues to operate when the macro network (public mobile network) is not available.
- PMX is built on industry standards and utilises standard Intel architecture, protecting investment with ability to accommodate future developments on standard hardware.
- External mobile calls made on-site at landline rates.
- Coverage in black spot areas.
- Free on-site calls and messages.
- Reduced cabling requirements.
- Ability to rapidly deploy at new locations.
- PMX allows users of the private mobile network to send and receive SMS messages within the network.
- The GPRS option allows data traffic to be sent and received between a standard IP network GPRS enabled mobile handset.

Architecture Features and Benefits

- Software based solution.
- Ability to function in a mixed telephony network environment.
- Built on industry standards and utilises standard Intel architecture, protecting investment with ability to accommodate future developments on standard hardware.
- Supports standard mobile handsets.

Implementation Overview

PMX creates a self contained, privately owned and managed mobile network based on standard GSM protocols. This enabling technology allows an organisation to manage staff mobile phones on the corporate telecoms infrastructure.

The solution comprises both hardware and software components. The hardware requirements include:

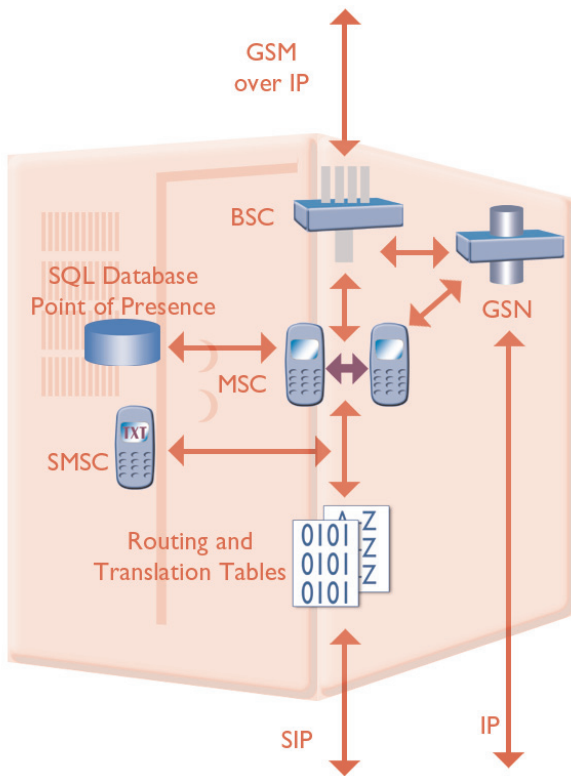
- mobile phone access points, known as BTS (base transceiver station) units.
- a base station controller (BSC) to manage the BTS.
- an industry standard server to run the PMX software.

The PMX software consists of three software components: a mobile switching centre (MSC), translation and routing database and a short message service centre (SMSC). The PMX includes a fourth option to provide GPRS using an industry standard GSN (GPRS Service Node)

The BTS uses the internet protocol (IP) to communicate with the BSC, enabling the placement of BTS at any location on the LAN or WAN. A single BSC manages the functionality of several BTS. This includes their operating frequency, power output, IP addressing and other network characteristics. The BSC and MSC communicate using the (GSM) A-Interface over IP. The mobile switching centre has two main roles, control of registration and call control.

The MSC component of PMX controls the access to the private mobile network and restricts this to known users, provides standard PBX features such as intelligent call routing and short code dialling. The route out of the PMX to non GSM destinations uses SIP for messaging and the GSM full rate codec for audio.

PMX Operational Functionality



Using SMS

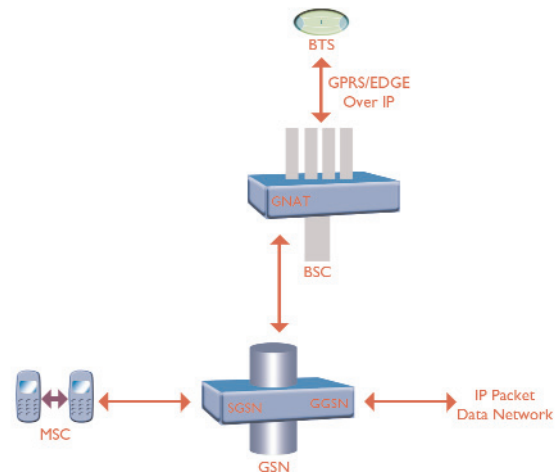
The SMSC allows mobile phones registered to the private mobile network to send and receive SMS text messages. Text messages are routed to phones on the network or are stored until they register to the network.

Using GPRS

The optional GSN allows IP traffic to be exchanged between the mobile handset and the standard IP network. The PMX is also able to support the EDGE protocol which allows for higher data transfer rates than are achieved using standard GPRS.

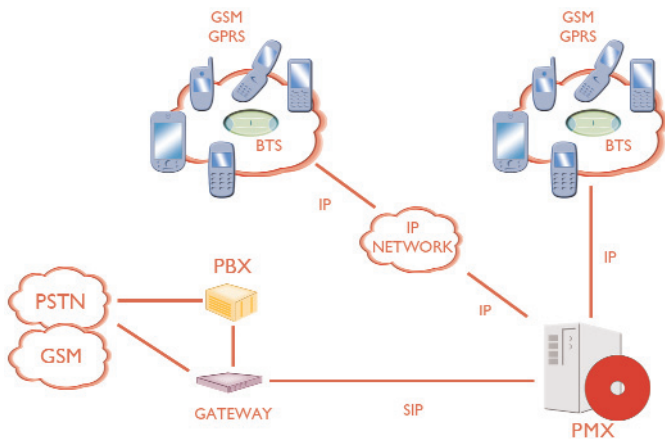
PMX in Operation

The PMX BTS units are connected to the enterprise IP network and utilise Power over Ethernet. Each BTS creates a cell in much the same way as on a macro mobile network. Each PMX implementation is made up of one or more cells depending on the number of users, coverage area and call volumes required. A single BTS supports seven concurrent calls and BTS can be clustered to support up to 31 concurrent calls.



Integration into the Corporate PBX Network

In order for PMX to connect conventional mobile phones to most legacy PBX equipment, a hardware gateway is required to convert between protocols. PMX is able to use industry standard gateway that convert from SIP to protocols such as DPNSS and Q-SIG.



Protocols Supported

SIP	– RFC 3261
SDP	– RFC 2327
Hold requests	– RFC 2543 and RFC 3261
RTP	– RFC 1889 and RFC 1890
Audio	– GSM FR, G.711 (a- and μ-law) and G.729
XML	– 1.0
HTTP	– 1.1
GSM	– including 08.06, 08.08
GPRS	– including SIGTRAN interfaces

Sizing a PMX system

A radio planning survey of the chosen location/campus is required to ensure sufficient network coverage. This would be performed by a Private Mobile Networks approved radio networks engineer. The survey will produce a map of the location showing how many BTS are needed and where they have to be positioned to ensure maximum network coverage.

Hardware Requirements

- Minimum Server Hardware Requirements
 - 2 GHz P4
 - 2 GB RAM
 - 38 GB harddisk
- Connection Options
 - SIP to DPNSS gateway (E1 or ISDN)
 - SIP to Q-Sig gateway (E1 or ISDN)
 - SIP to Q.931 gateway (E1 or ISDN)
 - Direct SIP interface