Sarian Systems GR2410 GPRS Router
Concepts

Introduction

The Sarian Systems GR2410 is a novel combination of a TCP/IP router, an asynchronous multiplexer and a GPRS engine. It was designed to extend the potential applications for GPRS beyond mobile e-mail and "fast WAP" into the telemetry and fixed line replacement markets.

The main issue with currently available GPRS devices is that they assume user interaction in order to initiate and maintain the GPRS link. This is especially true of the PCMCIA card concept where connection to the GPRS network is often achieved via Windows Dial Up Networking (DUN). In general, windows applications are very intolerant of breaks in DUN sessions often causing the application to crash or hang.

Most PC applications running over Ethernet LANS, on the other hand, are reasonably tolerant of temporary breaks in the LAN connection. The GR2410 exploits this and acts as a "proxy" to the GPRS network initiating and reconnecting to the network automatically so the user need not be aware that there was a temporary break in connectivity.

A 4 port Switch Hub is included in the GR2410. This can be configured as a four ports which are connected to the same Ethernet segment or it can be configured such that one port is WAN looking and the other three ports are LAN looking (a so-called DMZ). This is useful where the site has ADSL capability delivered by a low cost ADSL modem. By connecting the WAN Ethernet port of the GR2410 to the DSL modem, three independent VPN's can be delivered to the DMZ ports.

The GR2410 also provides support for legacy protocols such as X.25, TPAD and basic "AT" type asynchronous protocols. It does this in two ways :

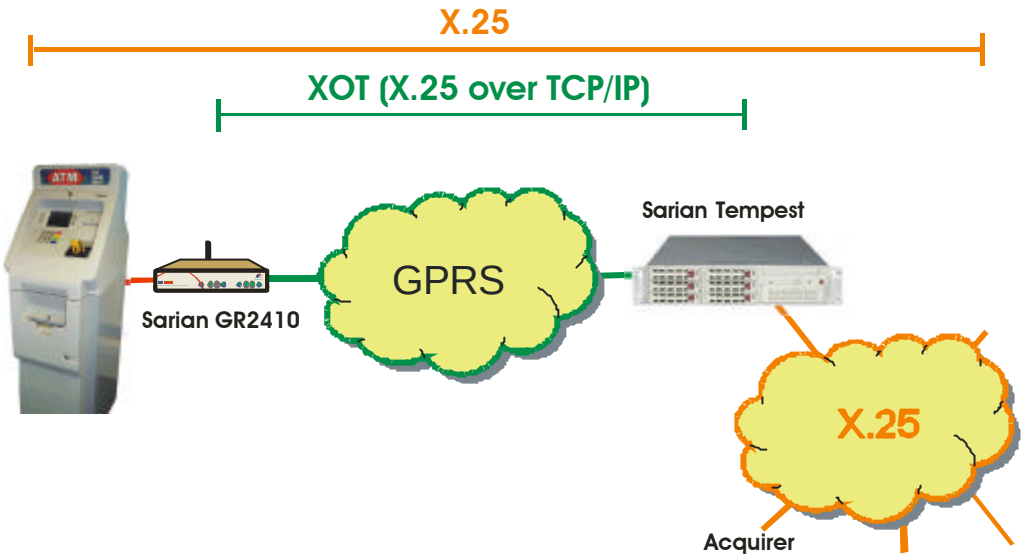
- By "spoofing" protocols on the local LAN or Asynchronous ports
- By supporting protocol tunnelling over the GPRS network.

The main purpose of this is to seamlessly port applications from fixed line legacy networks to GPRS without impacting either the end user device or the host. Customers have often invested a considerable amount of money in telemetry or terminal devices and have a well bedded down application which they are reluctant to change. By using the GR2410 they can keep the best parts of their existing system and still migrate to GPRS.

Example 1 – ATM Network

An example is the use of the GR2410 to carry transaction data from ATMs (Automated Teller Machines) – see the diagram below.

These machines often use X.25 as the communication protocol with the bank. Normally this would be a problem for GPRS and the network only carries TCP/IP data, but by using tunnelling capability of the GR2410, it becomes possible to carry X.25 data over a tunnelled GPRS link.



Neither the bank or the ATM itself is aware that the link is being performed over GPRS enabling the implementation to be fast and painless.

Example 2 – Telemetry

Another application for the GR2410 is telemetry or M2M (Machine to Machine) Communication as it is often described.

Traditionally, remote communications via GSM has been achieved either via SMS or Circuit Switched Data (CSD), both these approaches can be made to work, but have significant drawbacks in terms of cost and speed.

For example, a telemetry device sending a 160 byte data packet every hour to a host via SMS could result in an annual cost of £1,026*. On current tariffs, this would cost less than £120 using GPRS even assuming a 100% network overhead due to TCP/IP traffic.

* SMS – (24hrs x 1 message x 10p per message x 365 days) plus £150 per annum network charge = £ 1,026
GPRS – (24hrs x 320 bytes x 365 days) = 2.8Mb, this is easily covered by a 1Mb/Month tariff @ £10 per month = £120 / Year

The GR2410 gives the telemetry operator the ability to obtain near real time data from remote outstations without the latency involved in SMS or the dial up delays associated with GSM CSD.

Current examples of Sarian GPRS devices performing telemetry applications are earthquake monitoring in Italy, weather stations in Finland, wind farm monitoring in Holland and real-time train engine monitoring in the UK.

Example 3 – Remote Viewing

There are many applications where a remote IP based video camera can be invaluable for security, safety or lone worker monitoring. However some of these applications demand that the camera is located in situations where it is difficult or impossible to obtain fixed ISDN or PSTN lines.

GPRS can provide a viable alternative to fixed lines, but one potential problem is its relatively limited bandwidth for uploading files. The GR2410 overcomes this problem by acting as an "FTP Relay Agent".

When the IP camera is triggered by movement sensing or some other mechanism, it can upload picture files the GR2410's file store over the 100Mb/s Ethernet link. Once safely there, they are retained even in the event of the camera being physically damaged or removed. The files are then silently transferred over GPRS to a remote web server and an e-mail can be sent to anywhere in the world to advise that an event has occurred and that the website should be checked.

Whilst there are some other solutions which can provide video to website file uploading, they usually involve PC's or complex LAN solutions. The GR2410 provides a completely plug and play environment requiring only itself and the camera.

Example 4 – "Parachute Teams"

Certain industries (construction, exploration , accountancy) often have teams of people who are expected to deploy themselves at a minutes notice at a remote location.

In many cases they are not able to take technically qualified IT staff with them, but still need to be able to sit down and connect immediately to a company intranet or the internet for e-mail or access to corporate servers.

The GR2410 enables this class of worker to connect his laptop or other device to a remote LAN with the same ease with which he plugs into the office LAN. The company VPN can also be extended right out to his location without the need to maintain special VPN clients on his laptop computer enabling secure communications without the hassle.

Often, the remote workers are provided with a mobile office or “portable cabin”. In this case the unit can be permanently installed ready to provide services as soon as power is applied.

Example 5 – Vehicle Location and Mobile Epay

Many business need to know where their vehicles and workers are located. By using the GR2410 with a standard GPS receiver, it is possible to relay position data in real time and at very little cost over the internet to a Head Office.

In addition, the Point Of Sale capabilities of the GR2410, mean that mobile operators can now accept credit cards without fear of fraud using a simple handheld card swipe terminal plugged into the serial port of the unit.

You could also connect an in-vehicle computer to a host back at base in order to print invoices or delivery notes on the spot.

GR2410 – Limited only by your Imagination !

For the first time, applications which require collection of data from very remote areas can now have on-line real-time data acquisition without the expense of land lines.

Applications which send small amounts of data, but which must do so quickly and without dial-up delays, such as lottery terminals or ATMs can now take advantage of wire-free communications without the running costs normally associated with wireless networks.

Moving vehicles can now have almost permanent connection to the internet for vehicle tracking and e-mail on the move.

In fact, the full range of applications for the GR2410 are limited only by your imagination!

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