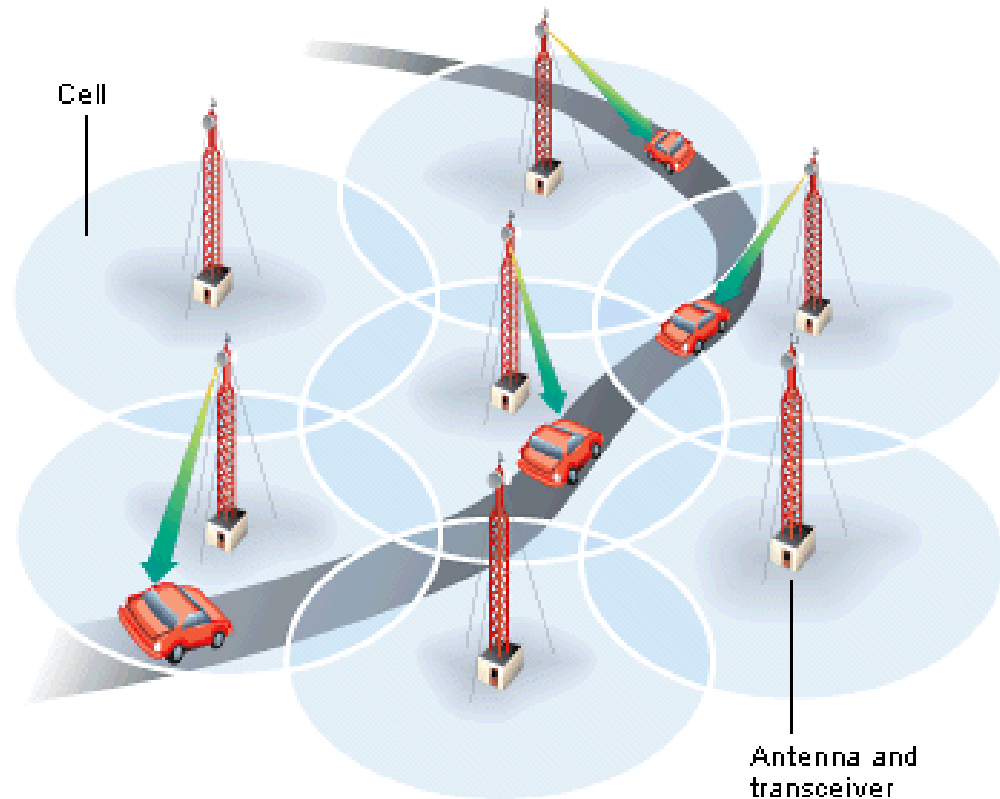


GPRS & 3G communications



What is a cellular network?

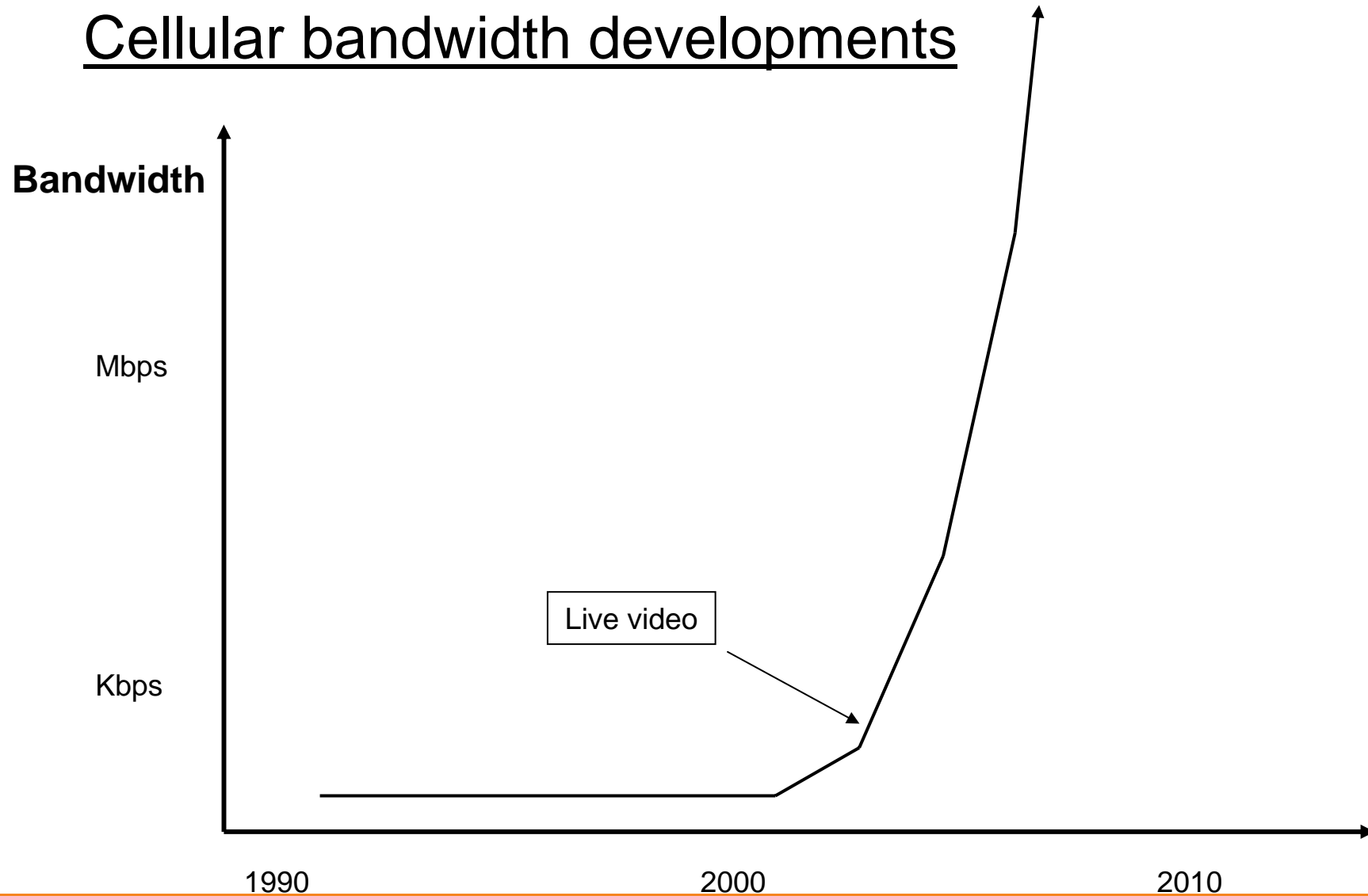


Approximately 2.6 billion GSM & 3GSM connections to date

Network evolution (UK)

- 1G Non-standardised 'analogue' cellular networks – 1980s
- 2G GSM - ETSI standards based technology formally announced - 1991
- 2.5G GPRS - 'IP' based extension to GSM for low speed data transfer - 2001
- 3G UMTS – New carrier for voice and data, 2.1GHz RF band - 2003
- 3.5G HSPA – HSUPA & HSDPA – Megabit cellular technology – 2005
- 4G HSOPA - wire speed Ethernet over the air - 2010?

Cellular bandwidth developments



Real-world Bandwidth

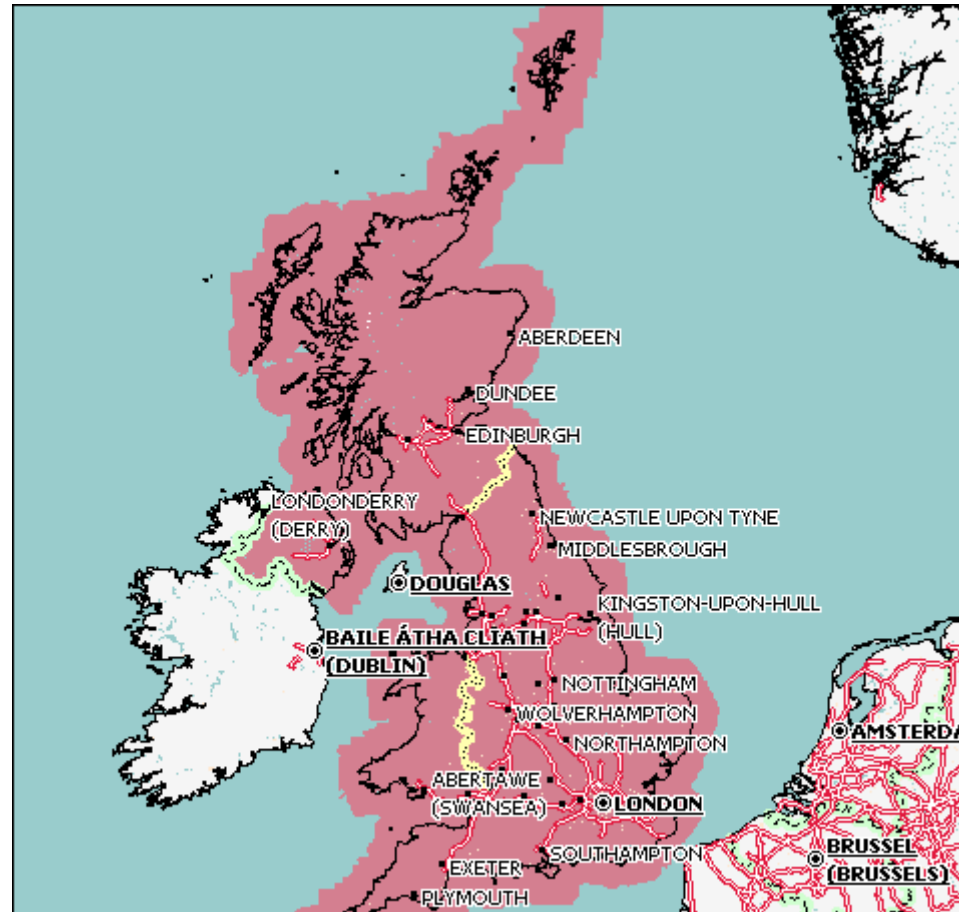
	GPRS	EDGE	3G	HSDPA	HSUPA
Theoretical maximum upload (kbps)	42.8	118.4	64	384	1.8Mbps
Typical real world upload (kbps)	10-20	80-100	50-60	200-300	
Theoretical maximum download (kbps)	85.6	177.6	384	7.2Mbps	7.2Mbps
Typical real world download (kbps)	30-40	130-160	180-230	600-900	

(All units are kbps unless otherwise stated)

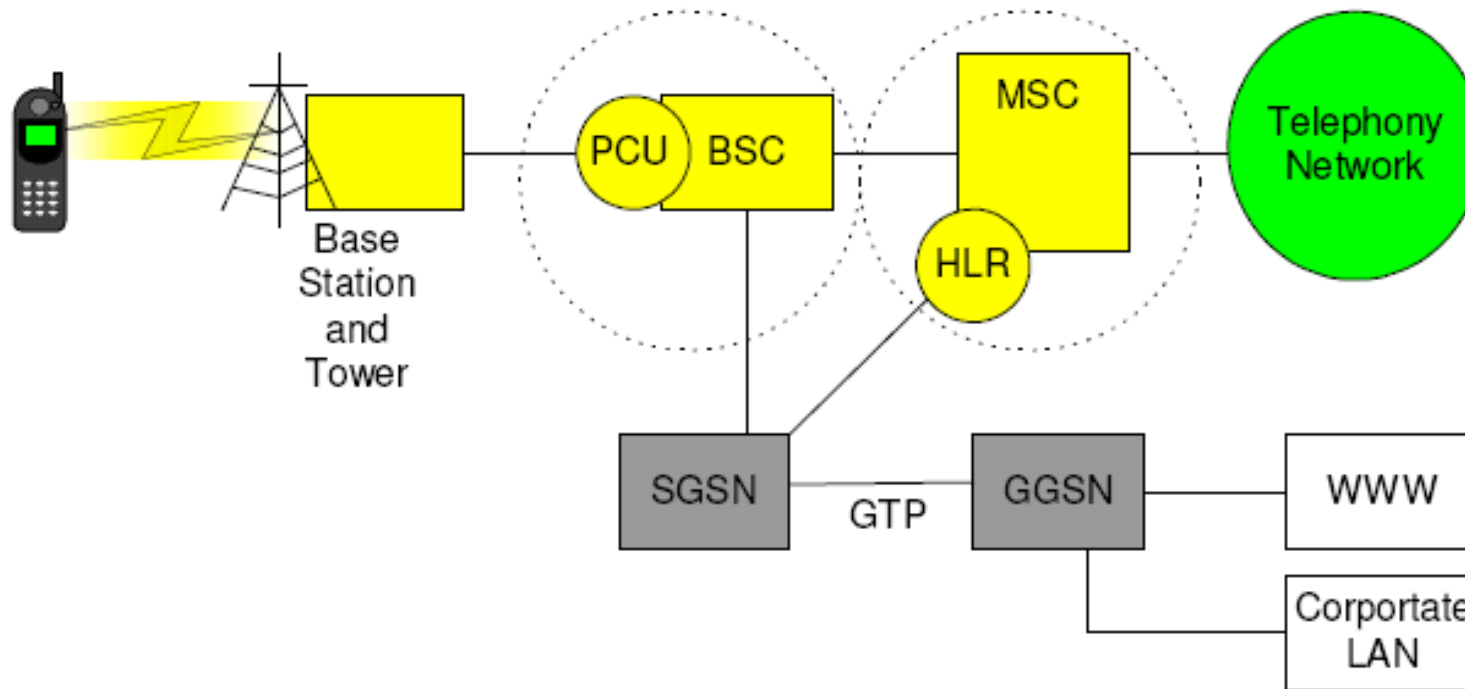
GSM vs. GPRS*

	GSM	GPRS*
Service	Dial-up	Always on
Data rate	9600bps	40kbps / 20kbps
Coverage (UK)	99% (population)	99% (population)
Billing	Connection time	Per MB / GB
Addressing	Telephone No's	IP addresses

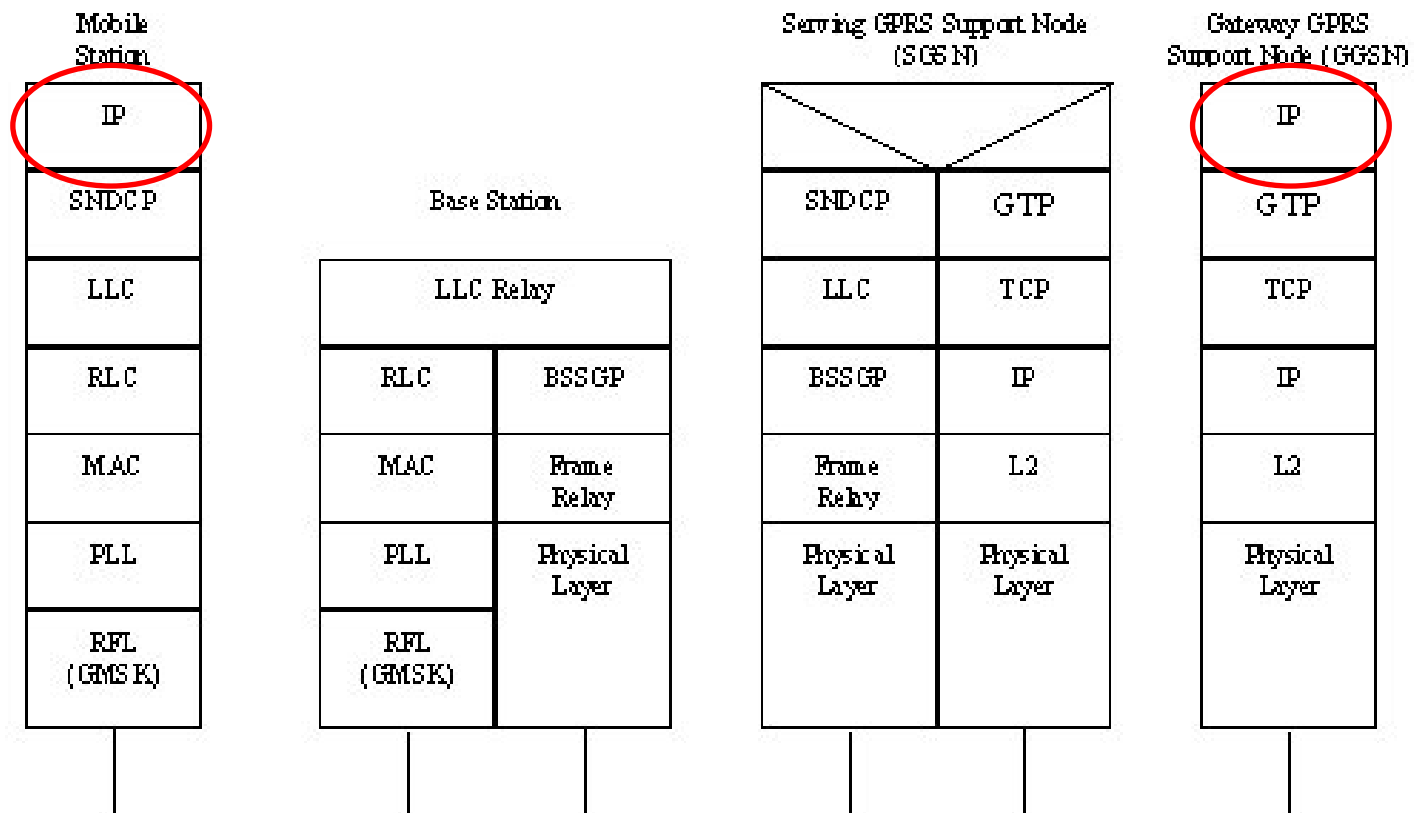
GSM / GPRS Geographical

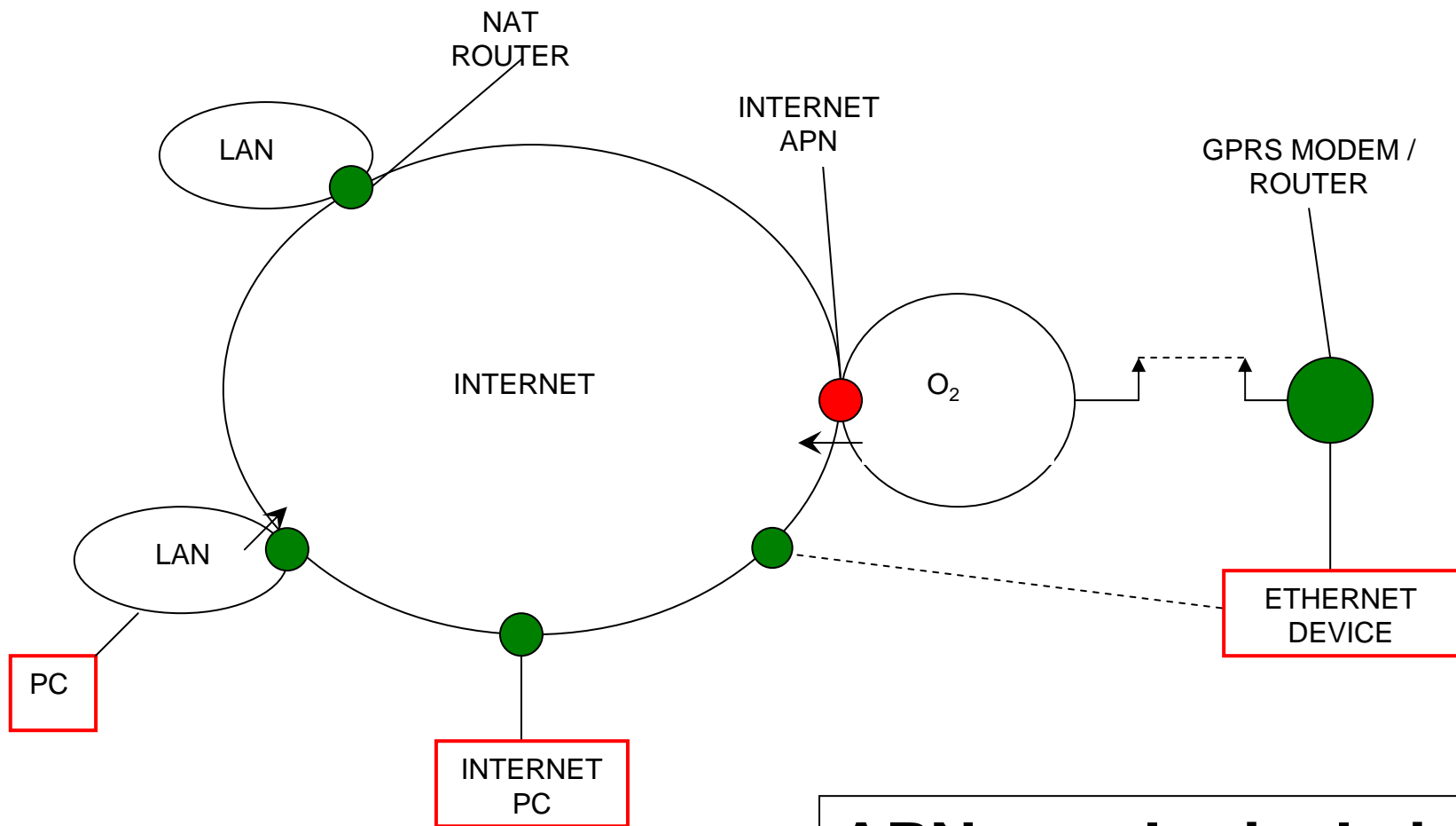


GSM vs. GPRS*



GPRS Protocol Stack





APNs – a logical view

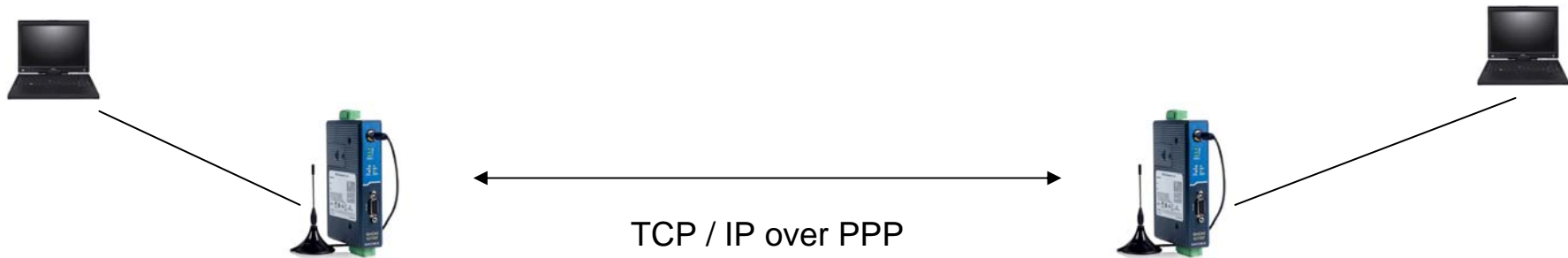
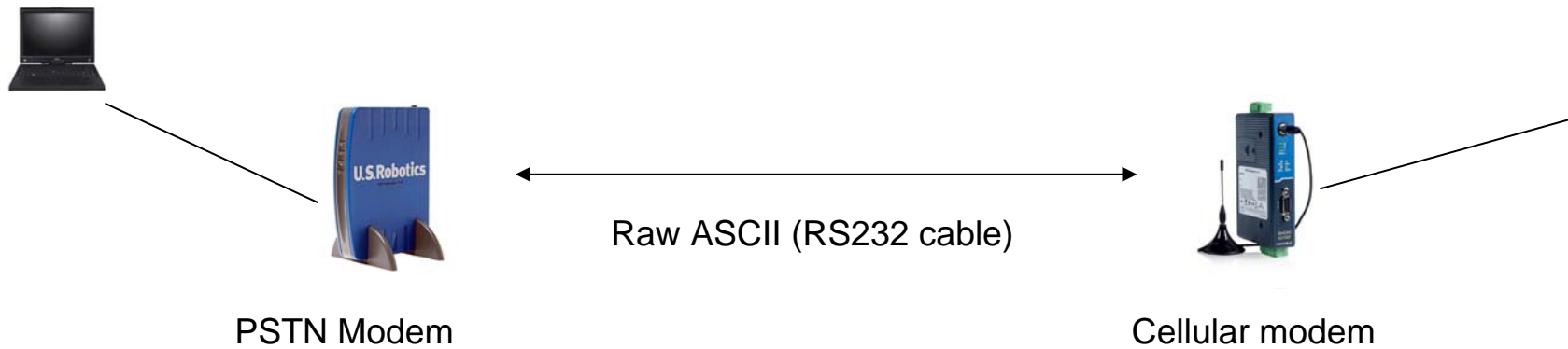
PC

ETHERNET

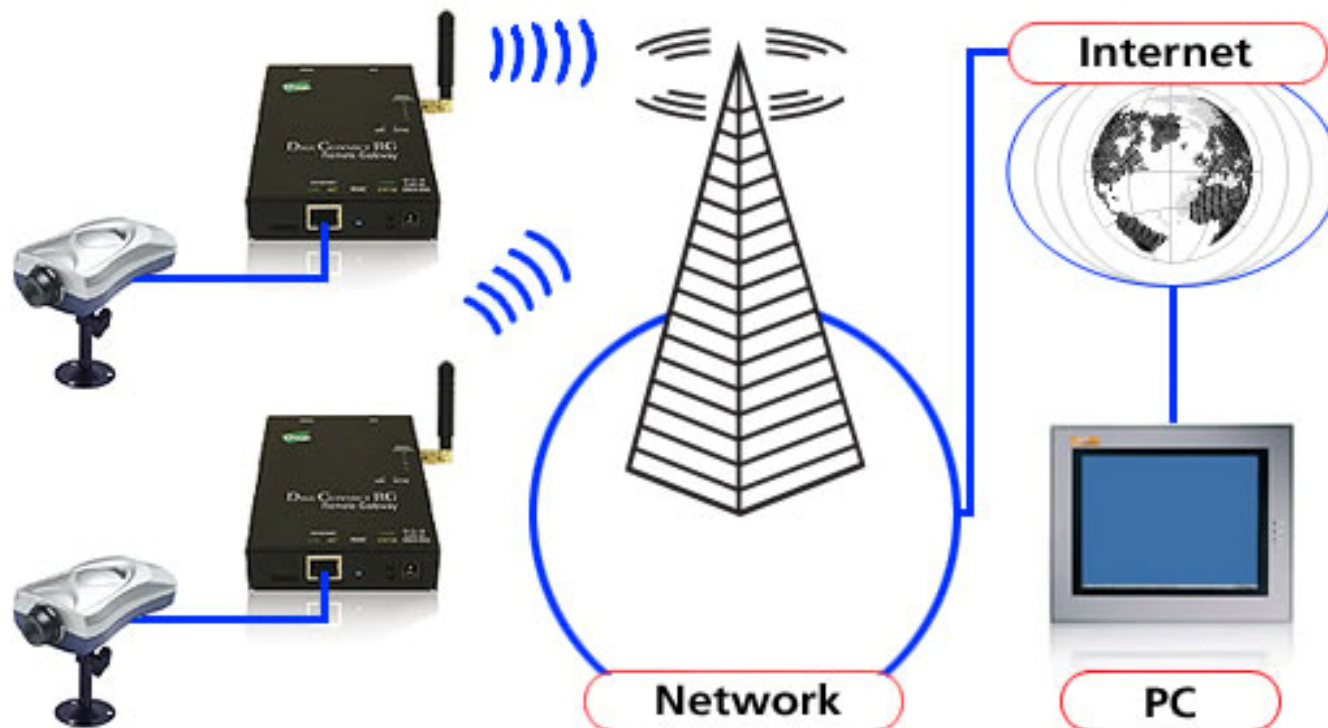
5 solutions for MT connections

- 1) Public IP address on SIM card - £10/mth
- 2) End to end VPN connection
- 3) VPN connection into MVNO
- 4) Buy your own APN – very expensive
- 5) Ask Amplicon !

Typical GSM topology (modems)

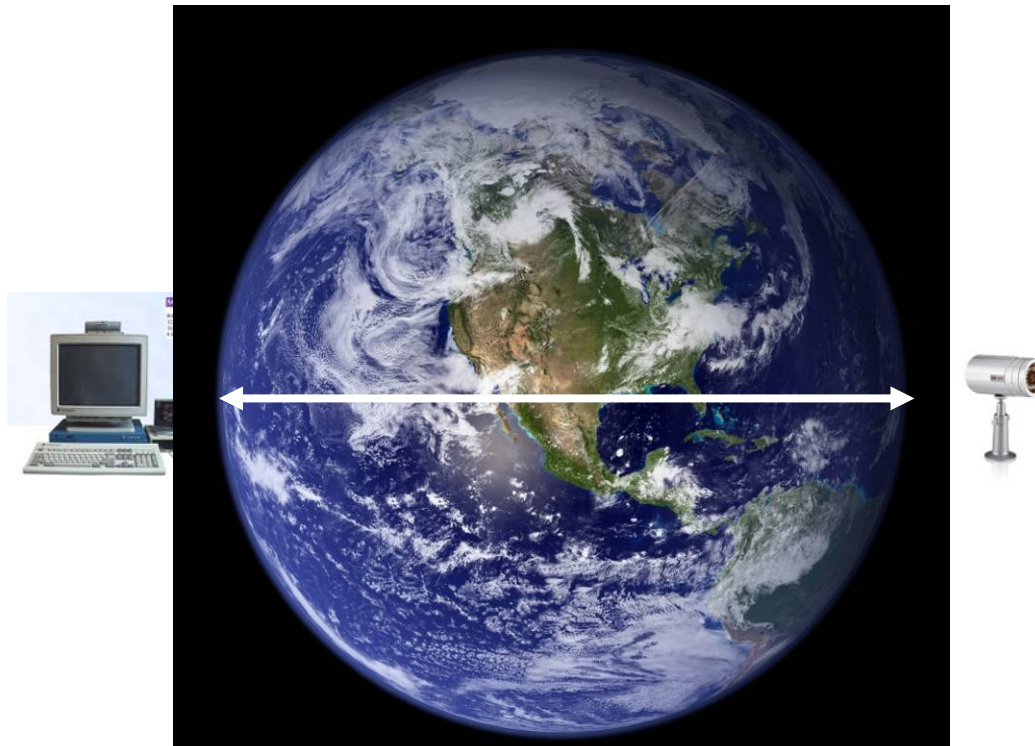


Typical GPRS* topology



The Marketing perspective

“A serial or Ethernet cable the length and breadth of the globe.....”



Tools of the trade



GSM / GPRS / 3G
modules + engines

GSM/GPRS
modems



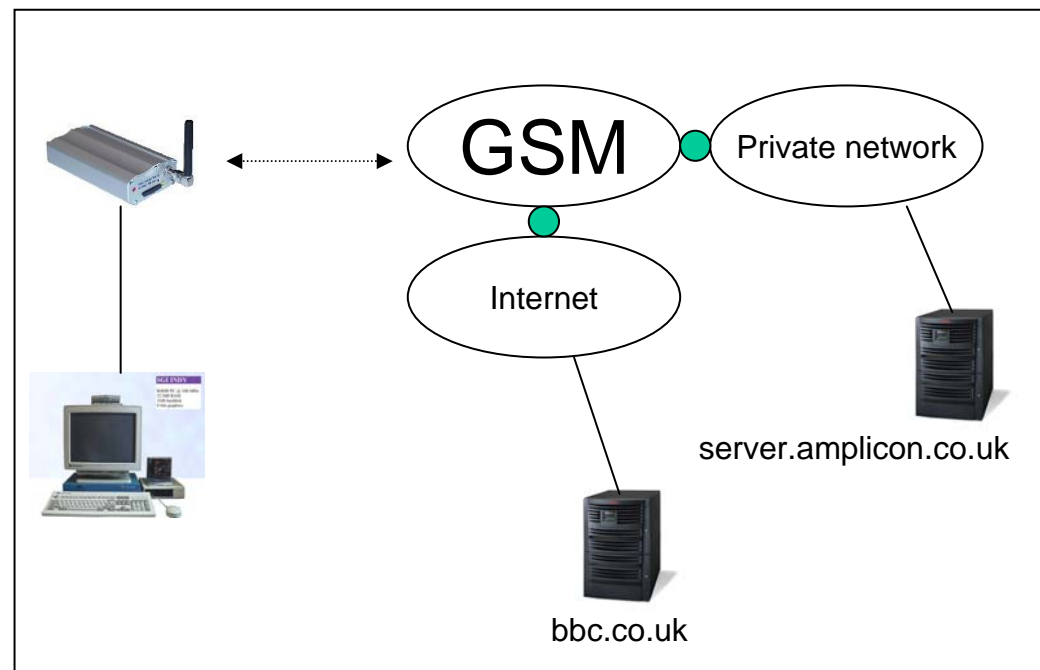
GPRS, 3G & HSDPA
Routers



GSM / GPRS modem

2.5G GPRS - 'IP' based extension to GSM for low speed data transfer
50kbps

Relatively slow
Always on
Billed per MByte
Complicated to implement
Requires dial-up control
Network connection

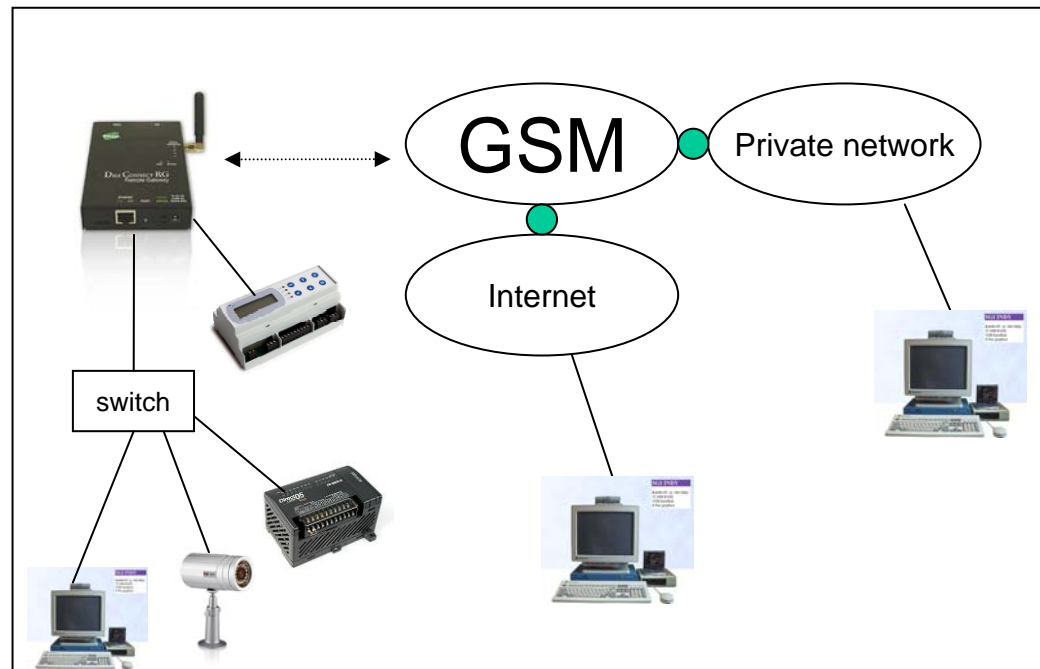


GPRS router

2.5G GPRS - 'IP' based extension to GSM for low speed data transfer
50kbps

Similar in operation to DSL
router

Relatively slow
Always on
Billed per MByte
Easier to implement
No dial-up control
Serial & Ethernet

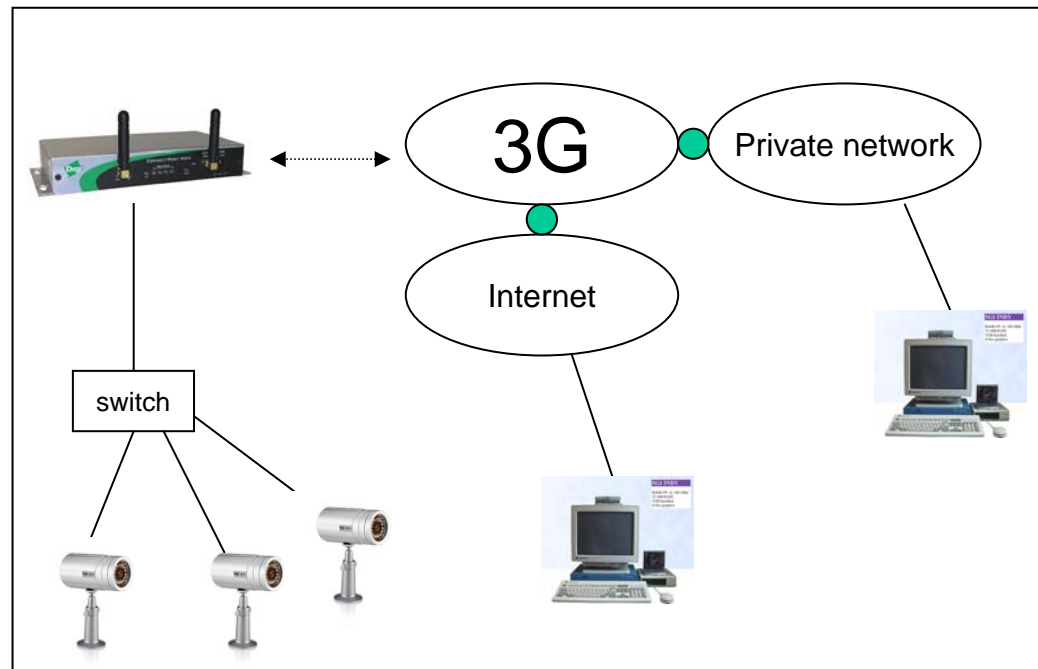


3G / HSDPA / HSUPA router

3G UMTS / HSDPA – ‘IP’ based carrier for voice and data, different RF band
300kbps to Multi-megabits!

High-speed!
Remote desktop
DSL fail-over
Mobile security example

Always on
Billed per MByte
Easier to implement
No dial-up control
Serial & Ethernet

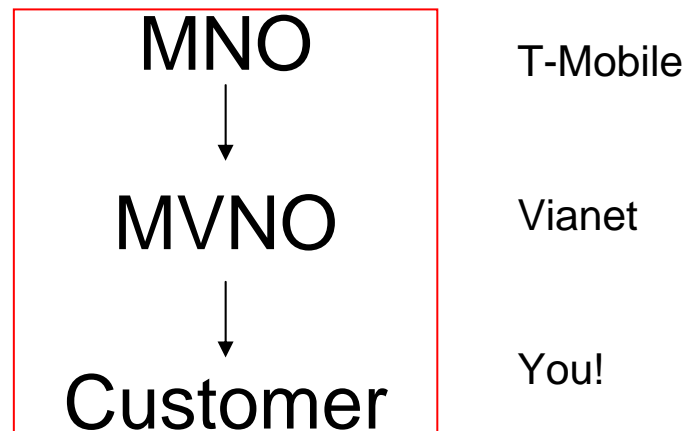


The Reality Check!

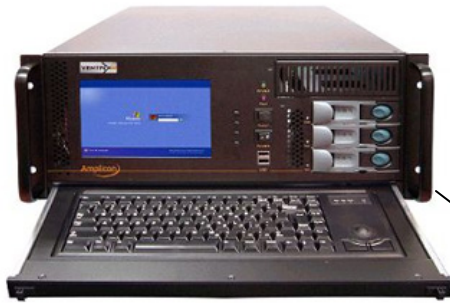
“A serial or Ethernet cable the length and breadth of the globe.....”

Bandwidth	Asymmetry / contention ratio / backhaul capacity
UK Coverage	GPRS = 99% 3G = 80% by end of 2007
Cost	£1 per MB for GPRS, 3G all you can eat tariffs look good Beware the fair usage policy!
SIM cards	Appropriate SIM card must be sourced for every site

MVNOs – Making SIM provision easier



Integration Ideas – Front-end processing

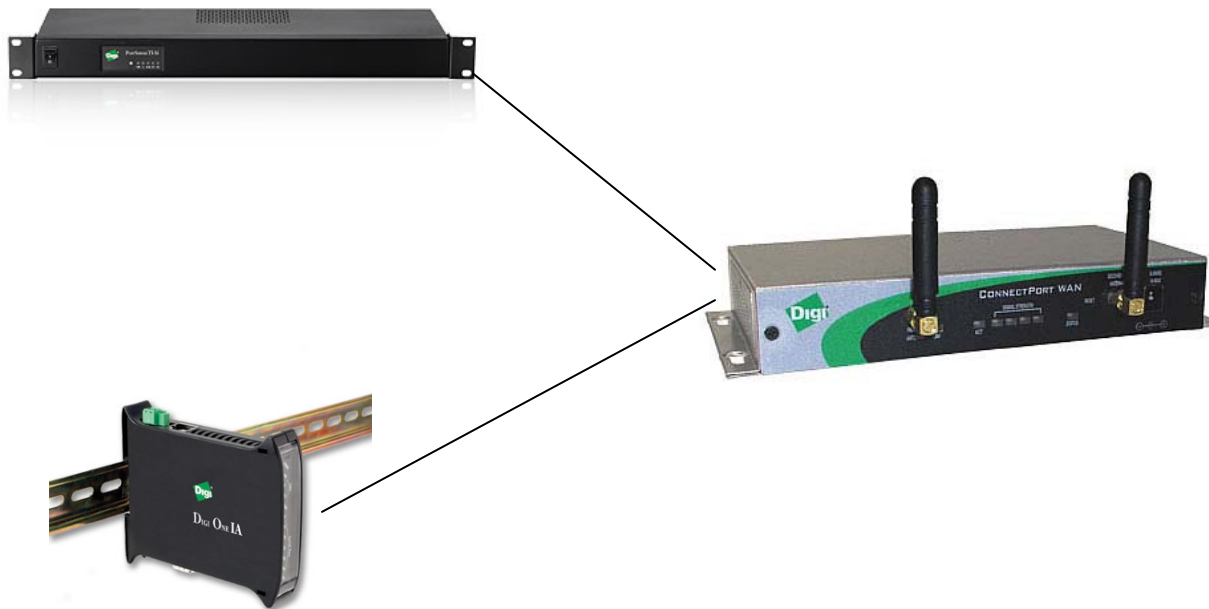


Buffers data in event of network outage
Reduce data size
Remove latency sensitive protocols
Security example = DVR / NVR



Integration Ideas – Serial to Ethernet

Convert serial field-busses such as Modbus & DF1
Connecting many serial ports from a single IP address

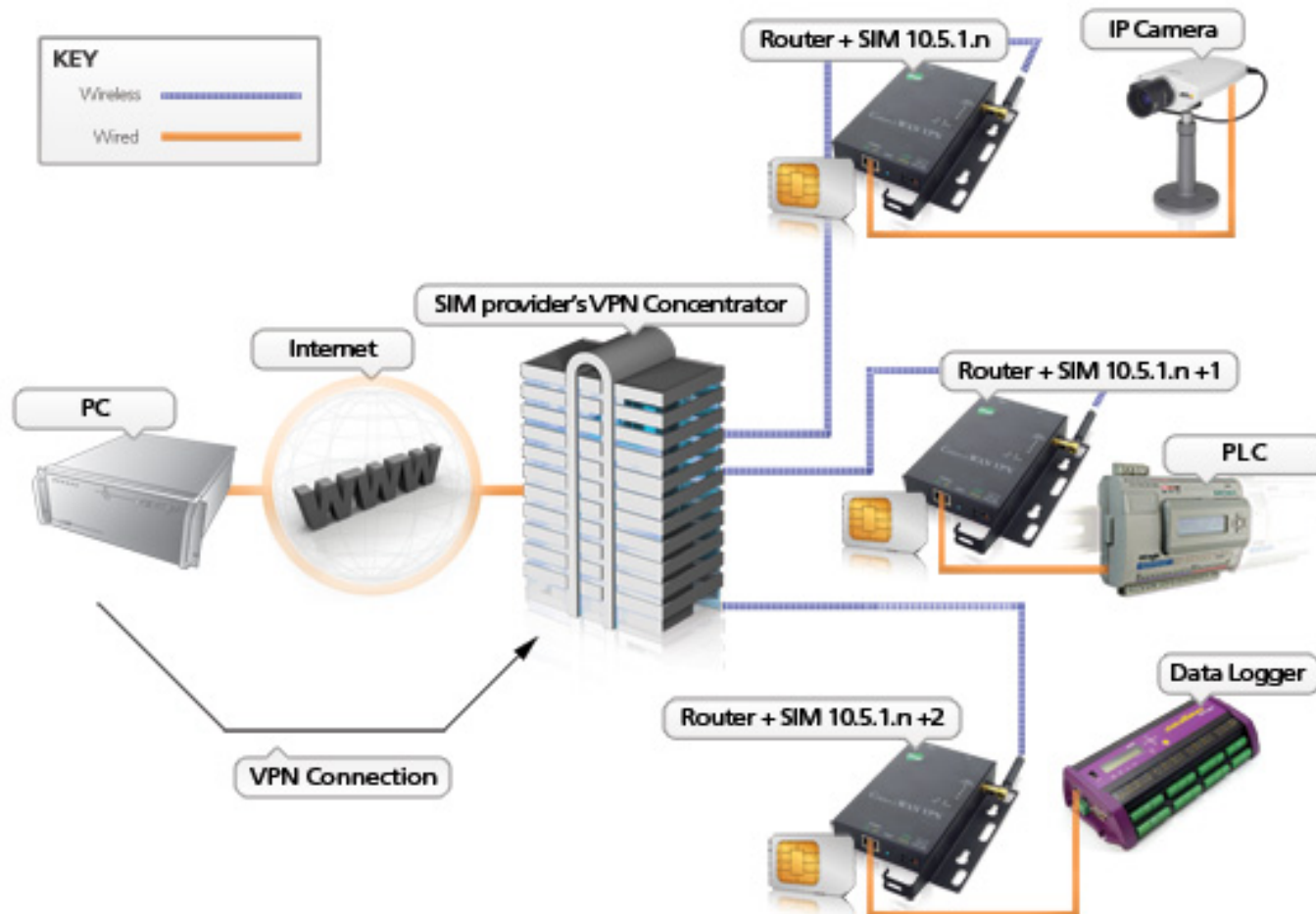


Integration Ideas – Distributed I/O

Capture any digital or analogue signal
Send email / SNMP trap on fault
Mirrored pairs make integration easy
Active I/O virtually removes data costs



Integration Ideas – Multiple sites, simple LAN



Any Questions ?

6. Case Studies

Real Life Examples & Markets Analysis

CCTV

- Cameras Watching Cameras



- Real Time
- Motion Detection
- Cost Savings
- Highways Agencies
- Crime Prevention
 - Speed Kills
 - Number Plate Recognition – Civil Enforcement
 - On board Cameras

CCTV



**VARIABLE
MESSAGE
SIGNS**



ANPR 003



**CREATIVE
CAR PARK**

Revenue generation / Minimum workforce

Remote Media



Remote Media



Remote Media



Remote Media



- Bespoke product development
- Software integration
- Hardware integration
- Built in connectivity
- External / Internal applications
- Content providers route to market

Mobile CCTV with PTZ over 3G communications



- Incident Support Units are deployed to traffic incidents to manage area, clear the roadway etc.
- Historically an engineer has had to be called to site if the barrier or roadway has been damaged

3G Modem

- Reliable
- Ease of Use
- Compact



Quick and Easy

Rapid Installation



Any Questions ?