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# Cellular Connectivity Explained

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All cellular M2M applications involve powering and interfacing to a modem. Cellular modems are available with a variety of interfaces, and form factors. For many applications, a surface mount module with a serial interface to a microcontroller is the most cost-effective solution. In other applications, where the application includes an operating system, or when upgrading from a wired connection to wireless, a separate modem with a USB or Ethernet interface is more efficient.

## Mobile network coverage

For many industrial applications, using the services of one mobile network is sufficient as most mobile operators provide a good level of coverage, or have their own private roaming agreements with other in-territory operators. This is how personal mobile phones work and is available within Eseye's AnyNet™ services.

However, in many M2M applications, the SIM is fitted at manufacture, and may be a chip SIM which means it is an integral part of the device and can never be changed. In these instances, certainty of a connection quickly overrides any other consideration as the cost of an engineer visit to swap the SIM is simply uneconomic or simply impossible. Smart Meters are a prime example of this conundrum, and field experience shows that any one mobile network only offers coverage in 80-90% of household or business locations.

## Connectivity control

Software embedded in M2M devices is the heart of any M2M application. Due to the remote nature of most M2M applications there is no opportunity to recover from a problem by human intervention. As such, the connectivity control application in the remote device must work reliably at all times.

Furthermore, it must continue to work for many years without user intervention as the cost of visiting a remote unit to perform a fix such as resetting the software can be over £500 per visit – probably more than the lifetime cost of the connection. But it is not just the connection that needs to be managed!

Control must also be applied to how the device operates as operation patterns will directly affect power consumption, battery life / capacity required and thus the physical product size. Eseye can undertake all or part of the engineering required to get your wireless connected product from concept to market. Our specific expertise in M2M, telemetry and low power radio design mean that we can design and build these products more reliably and less expensively than generic systems integrators.

Where the embedded application uses Eseye M2M intelligent management to supervise connectivity and manage the data synchronisation, customers will benefit from shorter development cycles as Eseye has a suite of hardware designs, firmware and enterprise software code, as well as proven test servers and procedures.