What is the Difference Between a Modem and a Router & Is there a Different Approach?

Questions such as do you need a router if you have a modem and are modems and routers the same thing are commonplace. These devices remain of paramount importance in our digital world and historically have been regarded as very separate and non-interchangeable, both with a unique purpose. As technology moves forward it is understandable that a degree of confusion exists as in many instances the black boxes supplied by our internet service providers (ISP's) contain both technologies. As we look to explain their unique differences it is worth taking a short history lesson.

Let us travel back to the early days before the existence of the internet. Transmitting information and communicating between devices was achieved either using cables, or alternatively via radio signals. One of the earliest solutions developed was for teleprinters which used a carrier. The keystrokes where superimposed onto the carrier using a code developed by Hayes. This was similar to morse code as it produced a series of tones representing dashes and dots for each letter and symbol. Adding code to the carrier was termed modulation and unscrambling the code was called demodulation, giving birth to the familiar term modem (**Mod**ulation, **Dem**odulation).

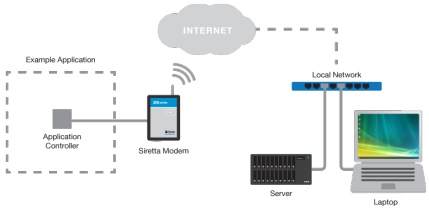
Nothing much has changed over the years except the speed and type of transmission. The speed of early modems was around 14 kilobits, today internet speeds are typically in the 50 to 200 megabit range and almost all modern broadband modems can achieve this. With the role out of fibre optics, connected device speeds in the low gigabit are now possible. As individuals we consume digital content at a significant rate and indeed require and expect communication speeds to support & enable this in real time. However, within the Industrial IoT (IIoT) sector speed of data transmission, albeit still a factor to consider, can be less important as the data packets transmitted are typically smaller and, in many instances, sent less frequently. Reliability and low power consumption are more likely to be critical requirements for such remote cellular applications. There are a number of products on the market that meet the power, reliability and speed required for these applications with

companies like Siretta 'The Industrial IoT Company' also offering ultra-low power products through their ZETA range of Industrial IoT modems.

Whether transmitting data over copper, fibre or wireless technologies, anything that communicates requires some form of modem. In brief a modem converts data into a form suitable for transmission with the objective of sending secure data easily that can be decoded reliably.

Multiprotocol routers were created in 1981, independently at MIT (Noel Chiappa) and Stanford (William Yeager), and were a critical component at the beginning of the computing revolution. Early computers depended on peripheral devices to enable data storage, printing and the use of remote dumb terminals. A system for connecting and routing data between these pieces of hardware was a necessity and this was initially achieved by extending & controlling the network within the main computer. This being dedicated to the installation it did not provide flexibility or speed & ease of reconfiguration when required.

To overcome this the 'Router' device was developed. This being a multi socketed product which connects all these peripheral devices together. Each socket or port has its own address and each device has its own IP address (network interface identification and location addressing). In most instances the main computer allocates dynamic addresses to the sub or peripheral with each device having its own buffers to transmit and



receive data. In the modern modem era nearly all networking devices use TCP/IP to facilitate this.

Routers have a number of in-built components. An internal processor controls the ports, the connection to the modem and WiFi for wireless connections, which enables first level security and that can be configured separately for each of the functions. Firewalls protect each separate system, and, under the control of the processor, some cross connections are allowed. These 'tunnels' only allow data (traffic) to cross according to strict security rules.

In short, the traditional function of the router is to manage your network of devices while that of the modem is to connect and communicate to the wider world. When you connect to WiFi, you are in essence connecting to your router, which in turn forwards traffic between the internet and your connected device.

Technology does however continue to evolve and challenge tradition and within the Industrial IoT there is soon to be an addition of a third option available from Siretta called SirettaLINK™.

SirettaLINK™ offers a fully managed modem network solution ideal for connecting remote applications to the Industrial IoT network. It enables

remote configuration, remote software updates, remote monitoring and connection integrity along with other management and reporting functionality. For more information please contact sales@siretta.com.

Various hardware choices and price points exist in the marketplace and can be broadly broken down into three distinct use cases:

- Industrial
- Enterprise
- Consumer

The hardware decision comes down to your application, intended scope of operation, environmental conditions, required reliability, risk analysis and overall cost of ownership; a subject we will discuss in a later article.

For many, in Industrial IoT applications, reliability is directly related to revenue. This along with the security of connectivity and data flow is enhanced through the use of an industrial grade solution.

Siretta offers a range of industrial modems, routers and managed network solutions. Their range of industrial low and ultra-low power modem solutions are a family of cellular enabled modems which have been designed to an industrial specification to allow an easy connection for remote devices over the internet. Their industrial router products are intelligent managed solutions which have been designed to connect remote devices over Ethernet LAN and Wireless LAN to the internet as well as RS232 serial equipment over a TCP/IP connection to a central location.

Siretta helps you to identify the ideal Industrial modem and router solution for your application through their unique *Modem Selector Tool* and *Router Selector Tool* filtering solutions to your exact requirements.