M2M: A Growing Need for Reliable, Secure Data Communications

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The first Machine-to-Machine (M2M) applications can be traced back to World War II, and the ability to have machines “talk” to each other (via data communication networks) is essential for monitoring and controlling assets within homes, businesses, and even critical national infrastructure projects of today.

As the automation of manual processes through M2M data communication technologies continues to grow in both popularity and necessity, decision makers will have an opportunity to select from a variety of technical options available to the marketplace.

Benefits

M2M data communication technologies offer a variety of potential benefits, underscoring why an increasing number of businesses and consumers are either currently deploying them, or anticipate using them in the future. The benefits gained from M2M data communication technologies vary based on the application served, but in general, the overall benefits that can be achieved through these solutions include:

- Leveraging resources in a valuable way.
- Mitigating or responding to issues via enhanced monitoring capabilities.
- Achieving greater efficiencies and, therefore, enhancing productivity.
- Increasing data consumption and supporting analysis key operational

factors.
- Diminishing the impact on the environment via monitoring/control across large geographic regions.
- Aiding the development of increased safety and security measures.
- Securing greater adherence to regulatory and compliance factors.
- Improving product quality and organizational innovation.

While it is important to highlight the general benefits of integrating M2M data communications, an individual or business can't realize them unless the solutions are integrated into their existing systems or networks. Decision makers need to review the following factors that will help them define which type of M2M data communication technology is more appropriate for their individual situations:

- Reliability.
- Throughput.
- Security.
- Flexibility/compatibility.
- Ease of installation.
- Cost.

Businesses must also consider the specific data communication technology that serves M2M applications when looking at the above success factors:

- Unlicensed spectrum wireless data radio technology.
- Licensed spectrum wireless data radio technology.
- Cellular technology.

- Satellite technology.
- Wired technology or Ethernet.
- Traditional Wi-Fi or off-the-shelf wireless networking technology.
- ZigBee.

Choosing the Right Technology

Each of the above technologies has positive and negative attributes, but end users must realize that certain technologies are more effective than others in particular applications. Users should analyze the communication requirements for each M2M application by the characteristics of the technology that are most relevant for operational success; for example, users would benefit from employing a more cost-effective technology if there aren't any mandatory requirements for high security levels or operational reliability, such as a home or mobile Internet connection.

It would make sense to invest in a proven, reliable, and secure technology if the application supported a critical societal function, such as managing an emergency shut-off valve in a public utility application.

Most of M2M data communication technologies discussed in this article are wireless solutions. Interestingly, over the past several years, especially with the emergence of M2M technology, wireless communication has been perceived to have security concerns, lack high throughput, and cause serious reliability issues. While these negative connotations may be true for some technologies, there are many proven wireless solutions that have operated reliably in mission-critical situations and in the harshest environments.

It's important for decision makers to review all of the available technologies and analyze what is needed to drive their own operational success. According to independent research firms, there are going to be hundreds of billions of wireless M2M connections worldwide in the forthcoming years.* Therefore, it is very likely that a wireless solution will be the data communication technology of choice.

In addition, people and companies will continue to have a large appetite for data and knowledge, and therefore will demand more of it at a faster rate. This idea, in conjunction with increasing security standards and lowering the power consumption required to run wireless communication devices, will continue to be key drivers of demand and innovation. Therefore, more sophisticated ways of operating machines – specifically with M2M data communications – will continue to emerge in the wireless world. WDD

*Ryberg, Tobias. "The Global Wireless M2M Market" Berg Insights' M2M Research Series 2010 (http://www.berginsight.com/ReportPDF/ProductSheet/bi-globalm2m4-ps.pdf [1])

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