Minimizing the Cost of Downtime for Rugged IoT Edge Solutions

As end customers work to quantify the cost of edge systems as part of Internet of Things (IoT) implementations, they must look beyond the initial expense of acquisition and implementation and consider total cost of ownership (TCO) over the life of the solution. In addition to ongoing support and maintenance, downtime can be a major contributor to TCO. In the case of business-critical systems, the associated expenses as measured in lost productivity, lost opportunity, and damaged reputation can inflict great harm on the business.

It follows that mitigating the impact of downtime on the bottom line is critical to the overall value and cost-effectiveness of the solution. Therefore, considerations both to avoid downtime in the first place and to minimize its impact when it does occur should be incorporated into project planning from the very first stages. While the details necessarily vary by industry and the needs of individual implementations, many core considerations are constant.

Rugged IoT edge systems such as gateways and embedded PCs can play a significant role by standing up to the harshness of conditions where they may be deployed, including extremes of temperature, moisture, shock, vibration, and dust. Computing at the edge is especially valuable when communicating full data sets back to the core network is impractical, such as the following:

- **Interpretation of monitoring data** from sources that include remote video surveillance systems or sensors on industrial equipment, to respond quickly and generate alerts when events of interest take place

- **Coordination of remote fleets** of autonomous vehicles based on patterns in real-time data collected during operations such as crop or equipment inspection

- **Optimization of supply chains** by maintaining and predicting inventories for goods in a warehouse, industrial parts at a repair facility, or medical supplies at a trauma center

Dell is the only Tier-1 manufacturer with a full line of rugged mobility and IoT edge computing systems designed to help avoid the direct and indirect costs of downtime.
Dell is the only Tier-1 manufacturer with a full line of rugged mobility and edge computing systems, providing its customers with the advantage of full-lifecycle resources and services including deployment and post-deployment support. Robust, flexible capabilities in this area are vital to help reduce the recovery time objective (RTO) in the event of outages. In addition, Dell delivers broad geographic coverage for these services, which is valuable to support end customers’ operational growth into new markets.

The Multi-Faceted Costs of Downtime

Specific to IoT is the reality that the systems and devices that may fail are typically spread out over a large area and may be installed in more challenging environments or locations to access, making their direct support by hands-on personnel more complex than with servers or desktop machines in a data center or office environment. The impact of physical distance in maintenance of IoT infrastructure is that the ancillary costs associated with an outage can greatly exceed the cost of the actual equipment.

A study by the Service Council suggests that with an average truck-roll cost of $286 and fully burdened labor costs of $79/hour, a three-hour gateway replacement would incur hard costs of $523. Taking that study a step further by adding in the cost of equipment downtime, slow application deployment, development expenses, and engineering opportunity cost, leads to a total cost of $750 to $1,000 beyond the cost of the gateway itself. These figures illustrate the reality that mean time between failures (MTBF) is a more important factor in reducing TCO than equipment cost.

Research commissioned by Stratus Technologies finds that the true impacts of such losses are widely misunderstood. In fact, the study found that 71 percent of IT decision makers do not track downtime with a quantified measure of its cost to the organization. Moreover, this illustration does not include many costs that may be associated with the gateway downtime. Outages of IoT edge systems lead to both direct and indirect costs, both of which must be considered to produce a full reckoning of their impacts.

Direct Costs

Immediate expenses from the outage itself constitute the direct costs of downtime. These begin with lost productivity, due to employees or equipment being idled by interrupted access to the data they depend on. As a related consequence, opportunity costs occur because of lost profitability that may range from breaks in production to inefficiencies because of suboptimal routing of goods to market. Other direct costs include both capital and labor costs to replace failed equipment, as well as goods lost as a result of an outage, such as spoiled food in a refrigerated truck.

Indirect Costs

Downstream effects of an outage, or the indirect costs of downtime, are often more difficult to quantify and predict than
direct costs. For example, the legal and human costs that result from an outage can be enormous, as exemplified by failure of a transportation-safety system or a chemical spill. Expenses associated with liability for personal injuries, fines, and environmental cleanup can potentially be disastrous. In addition, the effects from lost revenue due to poor user experience and bad publicity can persist for long after the direct consequences of outages are resolved.

**Mitigating the Risk of Downtime**

As the only Tier-1 manufacturer with a full line of rugged mobility and edge computing systems, Dell helps its customers reduce costs associated with system downtime. This approach includes both measures to reduce the incidence of downtime and to minimize the duration of that downtime if it does occur.

To reduce failure rates, Dell has developed state-of-the-art design and manufacturing processes for rugged systems. Long-standing expertise in this area and adherence to high production values includes designing systems to rigorous standards such as the military MIL-STD-810G for shock and vibration. These guidelines are augmented by industry leadership in comprehensive audit and product testing through in-house facilities that simulate a broad range of environmental hazards. By stressing products beyond their limits, designs are continually updated to withstand ever-greater punishment when deployed in the field.

Because failure rates can never be pushed down to zero, Dell also offers comprehensive service coverage to reduce the impact. Dell deployment and support services are designed to provide comprehensive means to respond to outages in a cost-effective and timely manner.

**Dell EMC Deployment Services**

Deployment services include loading production images onto replacement systems, making all needed system configurations (e.g., BIOS and firmware), asset tagging and reporting, laser etching, swapping out the old system for the new one, and testing to confirm correct operation.

Dell also provides logistics services, including warehousing, packaging, and transportation. These services are customizable to the needs of a specific implementation, with the appropriate logistics and procedures for a factory floor versus a refrigerated truck, for example, and they are available worldwide.

This global reach represents a dramatic advantage over the piecemeal support offerings from many competing providers, which are often available over only limited geographic areas. In addition, Dell services are applicable to solutions at any scale, from one system to hundreds or even thousands.

**Dell EMC Support Services**

Dell also offers a full complement of post-installation support services that build on the basic hardware support offering, including 24x7 technical support through tools, online, and phone. Self-service case management and parts dispatch are also available.

To be as comprehensive as possible, Dell offers a range of flexible support offerings that include both reactive and proactive measures.

- **ProSupport** offers global response to outages and other issues with direct access to in-region ProSupport engineers, plus next-business-day onsite service.
- **SupportAssist** provides predictive automated support that proactively detects and resolves issues.
Customer Benefits from the Dell Advantage

Many companies continue to underestimate the potential impact of downtime on their operations. As a result, they may tend toward an imbalanced focus on efforts to reduce capital expenses and day-to-day operating costs, without properly considering the potential impacts of unplanned downtime. Shifting that focus in favor of a more comprehensive, full-lifecycle view demonstrates the potential for TCO advantages from Dell rugged edge IoT systems.

Attention to preventing downtime—and mitigating its effects—can have distinctly positive effects on company outcomes. Uninterrupted operation enables IoT infrastructure to support the business needs it was built for and can also bolster a company’s position in the marketplace. For example, fostering a reputation for reliability can provide intangible benefits in terms of public perception that can strengthen brands and lead to a competitive advantage over peers that may not be able to offer the same level of customer experience.

As companies select platforms for their IoT implementations, they can benefit from Dell’s economies of scale, robust design and manufacturing processes, and configuration and support services to prevent and mitigate the effects of downtime. These aspects of working with Dell are a prescription for addressing a common set of concerns among customers as they work to modernize the embedded platforms that their businesses depend on.

As Andy Rhodes, vice president and general manager for Dell Commercial IoT Solutions observed, “Customers have consistently told us that current embedded solutions do not meet the level of cost-effective sophistication, scale, and support they need for these to be a critical, reliable component of their operations.

Dell rugged edge systems for IoT offer superior value to meet those challenges throughout the solution lifecycle, from high initial quality to business-critical reliability and second-to-none service and support. At the same time these measures control solution TCO, they also protect the business, allow it to innovate while functioning smoothly, and enable it to scale to new geographies and products with greater agility.”

These advantages continue to become even more valuable over time. The 2017 Veeam Availability Report shows a 36 percent increase year-over-year in unplanned downtime, with 87 percent of survey respondents expecting an increase in future costs associated with that downtime. As companies move to extend their use of IoT, it is vital that they move to mitigate those impacts, and Dell rugged systems can be instrumental.

Learn more about Dell rugged IoT edge systems at dell.com/us/business/p/embedded-box-pcs and dell.com/us/business/p/edge-gateway

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