Reducing Development Costs for IoT Edge Solutions with Pre-Certified Hardware

In search of competitive advantage, edge gateway providers and embedded PC system manufacturers have to keep looking for ways to decrease the cost and time requirements to bring their products to market. Balancing those needs with assurances that equipment can withstand harsh conditions in the field over the course of years only adds to the complexity. And if that were not enough, many scenarios require components to be certified by government or industry organizations before solutions can effectively be sold.

Certifying hardware is simply not a core competency for most solution providers. Building up the needed expertise and facilities is often prohibitive, and in any event, doing so is unlikely to be cost-effective for most. Performing and maintaining various types of certifications, in multiple parts of the world, can burden an otherwise-successful product offering with runaway costs and time horizons, perhaps even making it unviable.

Using building blocks such as edge gateways and embedded PCs for Internet of Things (IoT) solutions that have been pre-certified at the factory can mitigate the cost, time, and complexity of developing solutions. Pre-certification by the computer manufacturer can dramatically simplify certification of the larger solutions in which those computers are embedded. This approach means that embedded-solution developers do not need to reinvent the wheel, relying instead on the established expertise and global reach of their supplier.

Meeting Certification Challenges for Embedded Solutions

Embedded solutions must perform at full processing capacity over an extended lifespan, in the face of a broad range of adverse conditions. They must support enterprise-grade functionality with an added set of design requirements, including those in the following broad areas:

- Certifying edge-computing building blocks can increase a solution's time to market and cost
- Deploying pre-certified rugged hardware can reduce the effort, timelines, and costs of edge systems
- Dell provides out of box certification on its IoT edge computing systems, helping customers save money and deploy solutions faster
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**Environment**, including smooth operation without airflow in the presence of extremes in temperature, shock, vibration, dust, moisture, and other factors. Ability to meet these challenges can be gauged through test regimens that subject systems to harsh treatment to simulate extreme conditions in the field.

**Connectivity**, based on various network types that may range from local area networks to cellular or satellite connectivity, potentially with sporadic availability. Solutions often must meet standards and requirements set by carriers, regulators, and industry organizations.

**Security**, in remote locations outside of the owner’s control and operating over public networks where the public may have physical access to the system. A combination of best practices and security measures based in both hardware and software help optimize data protection in embedded solutions.

To formalize assurances that solutions can meet these and other challenges, a range of certifications have been created. These may be required or voluntary, and they may be maintained by the public sector or by private industry. Without required certifications such as those associated with government or industry regulations, a solution often cannot even be offered for sale in a given country. Likewise, voluntary certifications and endorsements may provide a competitive advantage by demonstrating stability, interoperability, and full functionality in a given environment.

Depending on the geography, type of certification, and other factors, certification can take weeks or even months and cost tens of thousands of dollars. The process can be daunting and require samples, testing, and reports for each type of certification, with substantial variation in requirements for different geographic regions. Because the complexity swells as a solution is offered in different countries, it can significantly restrict the scope of an offering.

What’s more, certification of solutions is not a "once and done" proposition. Certifications must be maintained over time to retain their viability, and the responsibility for doing so often falls to the embedded-solution provider. The complexity of achieving a given set of certifications tends to become more complex as time goes on, with the evolution of technologies (e.g., from 4G to 5G data connectivity) or with the introduction of new regulations (e.g., stricter environmental requirements).

In the case of computing equipment that has been pre-certified out of the box by the manufacturer, re-certification is typically handled by that same manufacturer. Ongoing requirements to maintain certifications therefore don’t place additional costs or other requirements on the embedded-solution provider. This factor substantially strengthens the case for using pre-certified computing equipment from a top-tier manufacturer.

**Compliance Made Simpler with Dell**

Dell rugged IoT edge systems streamline the certification path for embedded solutions, both for initial product launches and
for ongoing maintenance. Systems arrive with a broad range of certifications already completed right out of the box, for safety, connectivity (e.g., mobile broadband, Wi-Fi, Bluetooth), and electromagnetic compatibility. What’s more, an operating presence all over the world means that those certifications meet the requirements in countries where embedded-solution providers want to do business, both now and into the future.

To meet requirements and to give both providers and their customers confidence in embedded solutions, Dell draws on expertise in technical, regulatory, and industry-specific domains. Technical certifications may span host systems, wireless radio modules, or combinations of both. Regulatory requirements vary by geography and may change unexpectedly based on political and other factors. Certifications specific to given industries (e.g., marine, rail, automotive, and aerospace) are a necessary consideration to allow solutions to proliferate across verticals.

To support the full breadth of certification requirements that embedded-solution providers are concerned with, Dell maintains diverse expertise and relationships. Examples of prominent organizations and frameworks that Dell certifies for on an ongoing basis include the following:

- **Government regulators and standards.** Examples of common entities to be considered include the U.S. Federal Communications Commission (FCC) as well as RoHS compliance for hazardous substances and the CE Marking for health, safety, and environmental standards in the European Union.

- **Industry forums, trade associations, and consortia.** Network operators, device manufacturers, and others participate in these organizations to verify and maintain compliance. Examples include PTCRB (PCS Test Certification Review Board) and GCF (Global Certification Forum).

Dell’s global prominence and participation in the development of international standards provides insight and influence that embedded-solution providers typically lack. Certification of Dell ingredients can benefit the broader solution, and Dell can also provide guidance on certification of the entire solution offering, in many cases. Test data and many other types of documentation are available on request; for details, see Dell’s Regulatory Compliance Policy at [dell.com/learn/us/en/uscorp1/regulatory-compliance](dell.com/learn/us/en/uscorp1/regulatory-compliance).

By adopting Dell building blocks into their solutions, embedded-solution providers can benefit from Dell’s ongoing work, even as they offload certification effort so they can focus on value-added innovation based on their core competencies.
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Reaping the Benefits of Dell Pre-Certified Ingredients

The pre-work done by Dell to certify solution ingredients in similar implementations provides a de-facto point of collaboration for embedded-solution providers. Niche vendors of rugged computer equipment simply do not have equivalent capabilities to offer.

As a Tier-1 provider, Dell offers established expertise and methods to meet rigorous requirements, which inform the entire design process for rugged IoT edge systems. For example, these systems are designed to meet the shock and vibration specifications of the MIL-STD-810G standard, as a best practice established internally by Dell.

The robust design and certification of Dell rugged edge systems such as embedded box PCs and gateways is a value-added element available to solution providers of any size, serving any industry. Dell’s volume and scale offers favorable pricing and quality compared to competitors, with the ability to deliver in quantities as small as one unit up to hundreds or thousands on demand, anywhere in the world. Because the hardware is available in weeks instead of months, it enables providers to commission their solutions faster and realize revenue sooner.

Dell also offers industry-leading global service and support, available in multiple tiers for the life of the solution, including next-day onsite service or return-to-depot repair options depending on specific needs. Flexible leasing and financing options are available to provision and pay, pay as you grow, or scale on demand. Dell’s rugged edge systems also offer the same advantages as general-purpose Dell computing products, including the following:

- **Scalability**, for implementations that range from compact, power-constrained projects to those with massive processing and high-throughput requirements.

- **Flexibility**, with availability of a broad range of processing power, wired and wireless I/O options, and solution-tailored form factors, for the full scope of industrial and other challenging use cases.

- **Configurability**, to cost-effectively meet solution-specific needs; Dell rugged edge systems arrive fully configured, with out-of-the-box certifications in place, wherever and whenever they are needed.

By choosing pre-certified rugged building blocks from Dell, embedded-solution providers can effectively reduce development costs and time to market, while positioning themselves to grow into new markets, as fast as their innovation can carry them.


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