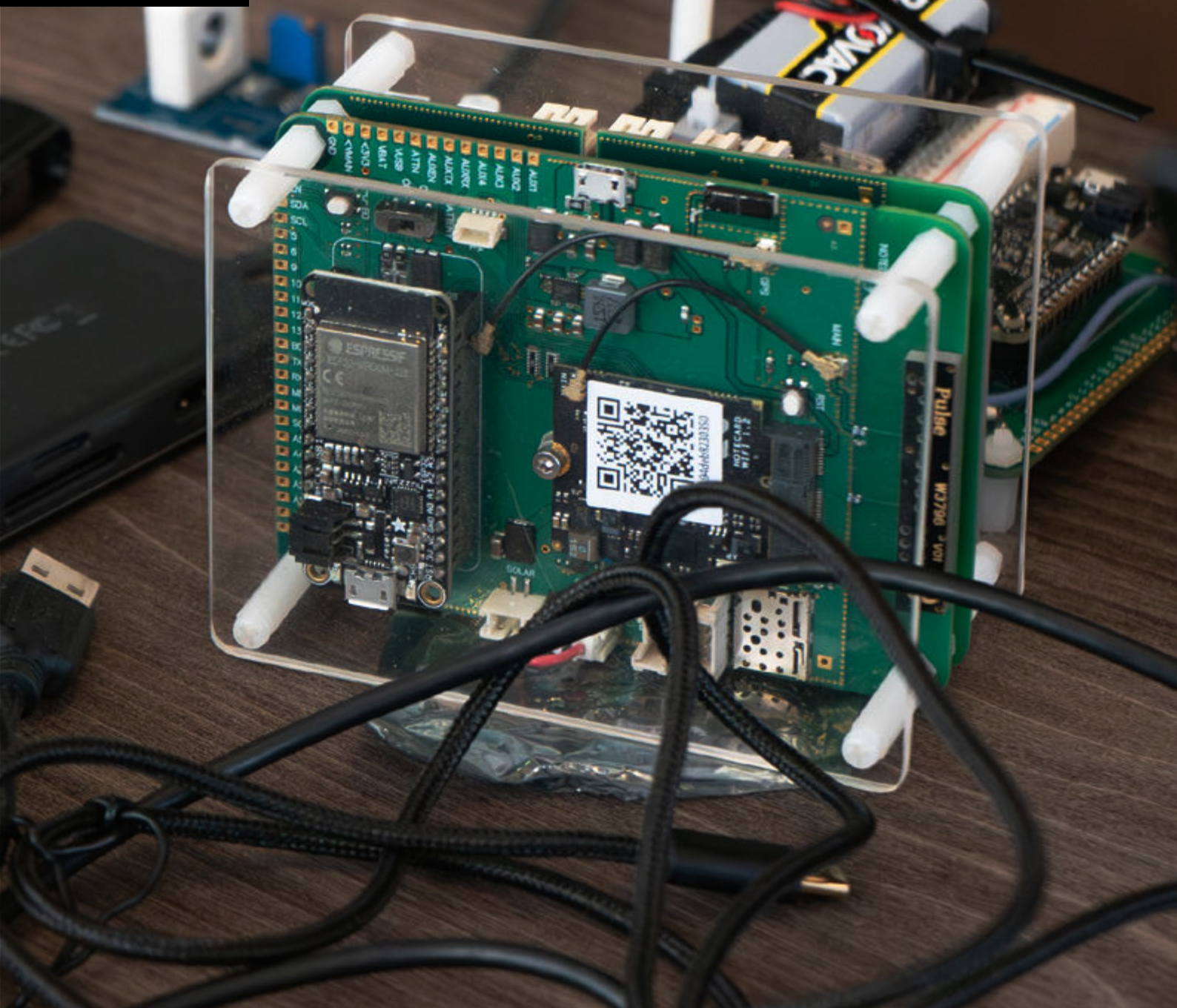




Build or Buy:

The Real Cost of Developing Wireless Connected Devices

Table of Contents

Expected Costs: Bill of Materials (BOM)	4
Hidden Costs: The New BOM	5
Connectivity Without Compromise: How Evexia Telehealth Brought Healthcare to the Caribbean with Blues	12
Make or Buy: Embracing Comprehensive Connectivity	14

Building cloud-connected devices is more complex – and expensive – than most businesses expect. While it's obvious to factor in the cost of materials, many hidden expenses can derail both budgets and timelines. In fact, [building an enterprise-level IoT product can quickly reach \\$200,000 in development costs alone](#). Complex projects with years-long timelines can cost millions.

What makes it so expensive? Everything from supply chain delays to security vulnerabilities can add unexpected costs. Many businesses discover these challenges only after they've committed to building devices themselves.

Blues offers a way to jumpstart developing your connectivity product in-house. We figured out connectivity, freeing up your team to address other challenges and opportunities associated with building your ideal product. Together, Notecard and Notehub handle the complex parts of cloud connectivity so you can focus on building great products.

Notecard is a plug-and-play system-on-module which, when added to your device, will seamlessly connect to the cloud.

Notehub, our data orchestration layer, enables bi-directional communication with your device and a simple dashboard for managing your devices.

In this whitepaper we will run through the true cost of building a wireless cloud-connected device so that you can make an informed decision. Ready to accelerate your product development journey? Let's dive in.



Expected Costs: Bill of Materials (BOM)

Most companies start planning their costs by looking at the Bill of Materials (BOM) - the basic parts list for building their device. The BOM includes the direct expenses tied to creating the device, such as component costs, manufacturing fees, and related expenditures. This traditional approach to BOM calculation provides insights into the tangible expenses linked to assembling the device, offering a clear picture of the financial investment required for the project.

Think of the BOM as just the cost of ingredients when opening a restaurant. Yes, you need to know how much the food costs, but that's only the beginning of your expenses. Similarly, while your BOM might show that each device costs \$50 in parts to build, that number doesn't tell the whole story.

Navigating Supply Chain Complexity

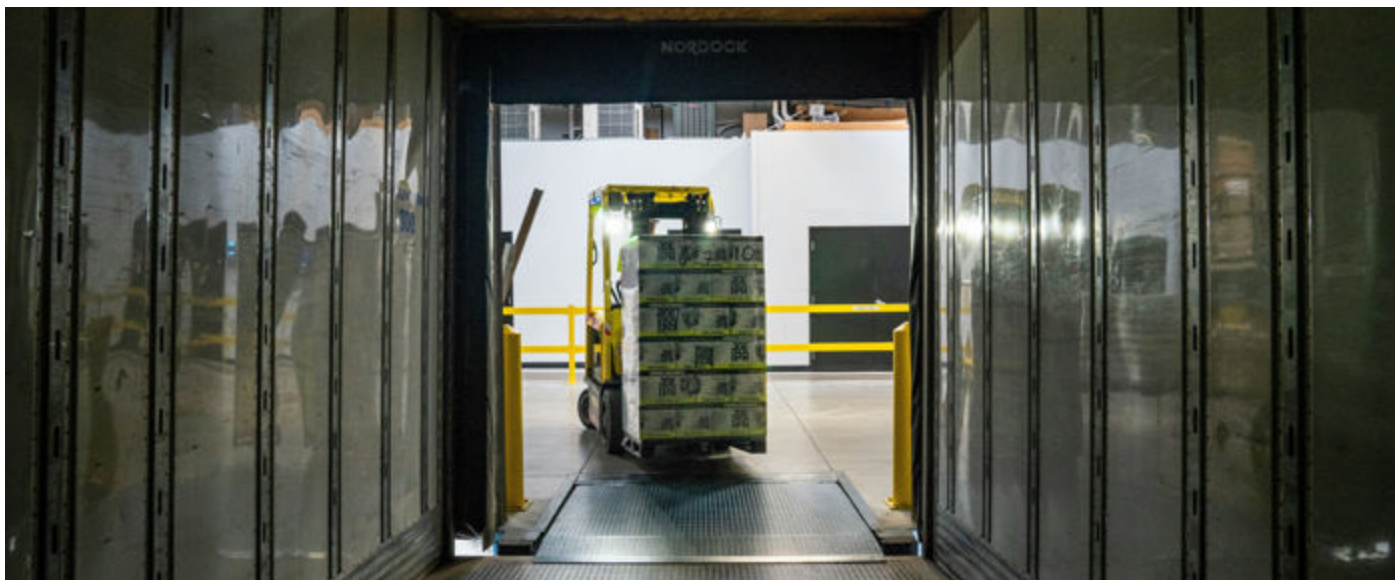
In cloud-connected device development, the supply chain represents a complex ecosystem filled with potential pitfalls and financial risks. This intricate network harbors numerous uncertainties where disruptions can rapidly escalate, impacting both budgets and product timelines.

Component lead times—the critical period between order placement and delivery—significantly influence project economics. Extended lead times create cascading delays that increase costs while fluctuating component availability introduces additional planning challenges. International sourcing further complicates matters through substantial tariffs and import taxes that can dramatically affect product economics.

Many companies attempt to mitigate these risks through component pre-purchasing, but this strategy introduces its own financial burdens. Inventory storage requires dedicated space, management resources, and environmental compliance considerations for proper component disposal when materials become obsolete.

Blues addresses these challenges by maintaining comprehensive fulfillment operations within our core business model. This approach eliminates the need for customers to engage in speculative pre-purchasing and inventory management. As these materials represent the foundation of our business, we maintain continuous supply chain vigilance and preparedness.

As only you can know what your BOM costs look like, let's focus on the hidden costs you might not know you need to factor in when building your budget.



Hidden Costs: The New BOM

When building cloud-connected devices, you need to think beyond just the cost of parts. We call this the “New BOM” - a complete picture of what your device will really cost to build, deploy, and maintain.

What makes this new approach different? It looks at everything. Typically, new BOM will fall into six categories:

1. **Getting devices up and running in the field** – Including provisioning, configuration, and the basic communication costs that ensure a smooth integration into the network.
2. **Keeping devices secure and updated** – These costs include safeguarding devices from vulnerabilities and ensuring they remain up-to-date.
3. **Managing devices through a cloud platform** – Costs in this category include the cloud services essential to efficient device operation.
4. **Getting devices tested and certified** – In a world where regulations are tightening, all devices must comply with testing and certification standards to enter the market.
5. **Fulfillment and deployment** - Costs associated with getting your product into the hands of your customers.
6. **Employee time** - The cost of employee and contractor time needed for the development, deployment, and ongoing support of your embedded device.

This broader view helps you understand if your project will actually make money in the long run. After all, a device that’s cheap to build could still be expensive to maintain. By considering all these costs upfront, you can make smarter decisions about your connected product and avoid expensive surprises later.

At Blues, we focus on simplifying the connectivity challenges within this complex landscape. While our products can’t solve every challenge you’ll face, they provide a solid foundation for the communication infrastructure your product needs, allowing your team to focus on other critical aspects of your development roadmap.

Let's look at each of these six components and how they affect your bottom line:

1. Provisioning Costs: More Than Just Dollars

Getting devices up and running in the field—otherwise known as provisioning—often hits budgets harder than expected. A seemingly straightforward setup process can hide significant expenses. Beyond the hardware and software components, you're paying for technicians' time, travel, accommodations, and dealing with unexpected downtime. These extra costs quickly add up and can drain your project's budget.

Provisioning requires skilled staff who understand your devices and how to deploy them properly. But their cost goes far beyond just their salary. Every day these experts spend in the field is a day they're not improving your product or working on other critical projects. You're not just paying their hourly rate, but also losing the value they could have added elsewhere in your business during that time.

The cost of a single day of provisioning can build up, [costing between \\$1,000-3,750 when you factor in configuration, deployment, and training personnel](#). When you build with Blues, instead of developing your own strategy for provisioning devices, you eliminate the complexities of dealing with cellular networks and SIM cards, speeding up the time taken to provision a single device. What used to take days now takes minutes, dramatically reducing time and costs.

2. Security: The Ongoing Investment

Security for cloud-connected devices isn't a one-time expense – it's like maintaining a home security system that needs constant attention and upgrades. You need skilled security experts, regular system checks, and quick responses to new threats. Skip any of these, and you risk costly data breaches that can damage your reputation and bottom line.

Your choice of connection type—WiFi or cellular—makes a big difference to security costs. WiFi might seem cheaper at first, but it comes with hidden expenses. You'll need your own security team to protect devices, run regular security checks, and fix vulnerabilities as they appear. It's like being your own security company, complete with all the staffing and maintenance costs.

Cellular connectivity works differently. The carrier handles most of the security heavy lifting, similar to how your phone carrier protects your smartphone. This means you need fewer in-house security experts, significantly reducing your ongoing costs.

Blues takes this protection even further by ensuring that only authorized users can access your devices, much like a digital key card system. This is particularly important since [most hardware solutions rely on existing code libraries that could contain security weak points](#).

Blues works behind the scenes to handle many of the complex security challenges you will face whilst developing your own connectivity solution, carefully managing our code and systems to protect your devices. This lets you focus on making great products while knowing your device is secure.



3. Using a Platform to Manage Devices

Traditional IoT development often entangles companies in the complex web of cloud platform creation and management. This process demands substantial technical expertise and resource allocation that many organizations underestimate.

Establishing a functional IoT cloud platform requires navigating numerous technical decisions: selecting appropriate cloud providers, designing scalable architecture, implementing secure communication protocols, and developing reliable software components. Once operational, the platform demands continuous attention through security updates, performance optimization, and feature enhancements—creating an ongoing burden of maintenance and expertise.

Simplified Cloud Connectivity

Blues offers an integrated approach to cloud connectivity. Rather than requiring businesses to build complex cloud solutions, Blues delivers a comprehensive system that abstracts away the complexity of connecting your devices via cellular, WiFi, satellite or LoRa. A key advantage lies in Blues' intelligent data management system, which employs advanced packaging and compression techniques to dramatically reduce data transmission requirements, resulting in more efficient and economical transfers.

Notecard users benefit from an unprecedented 10-year inclusion of 500MB of data for cellular, significantly reducing lifetime connectivity costs. This approach provides more predictable pricing structures. Unlike the variable and often escalating costs associated with mainstream cloud providers (AWS, Azure, Google Cloud), Blues' straightforward pricing model ensures cost clarity and eliminates budget surprises—providing both immediate savings and long-term financial predictability.

Updates and Maintenance: Continuous Commitment

In the IoT ecosystem, staying current isn't optional—it's essential. Yet many businesses underestimate the ongoing costs of device maintenance, leading to unexpected budget impacts.

Field-deployed device maintenance represents a continuous investment cycle. It encompasses security patches, performance optimizations, and compatibility updates. The true cost extends beyond development and deployment to include potential service interruptions, enhanced support requirements, and the impact on customer experience and loyalty.

OTA and DFU: Understanding Your Update Options

OTA (Over-The-Air) updates provide remote software delivery without physical device access. This wireless approach efficiently implements software improvements and security patches, allowing you to enhance functionality without recalling or physically accessing deployed devices.

DFU (Device Firmware Updates) delivers more fundamental control. These updates can modify the device's core firmware, allowing hardware functionality adjustments and ensuring adaptability as technology evolves. DFU capability keeps your hardware investment relevant despite changing technical requirements.

Blues technology integrates both update approaches. Notecard devices maintain Notehub connectivity throughout the update process, minimizing update failures. In rare cases where issues occur, remote recovery capabilities eliminate the need for on-site intervention. This comprehensive approach significantly reduces downtime risk and field maintenance expenses.

4. Navigating the Complex Landscape of Testing and Certification

Testing and certification represent critical milestones in bringing connected products to market, ensuring regulatory compliance, network compatibility, and safety standards adherence. However, these processes conceal significant expenses that can substantially impact project economics and launch timelines.

Certification requirements create a complex financial matrix, varying by geographic region and network operator. Products targeting global markets require multiple certifications—FCC for North America, CE for Europe, PTCRB for cellular networks—each with unique testing protocols that often duplicate efforts and multiply costs. Most manufacturers must engage specialized testing laboratories that command premium rates for compliance validation services.

Failed certification tests introduce particularly disruptive costs. When devices fail electromagnetic compatibility or safety assessments, companies face expensive hardware redesigns and component modifications. Each subsequent testing cycle compounds expenses through additional laboratory fees, engineering time, and development materials.

The certification process typically necessitates specialized regulatory consultants who understand the requirements across different jurisdictions. This expertise comes at a premium, yet the alternative—non-compliance—risks costly product recalls, market restrictions, or regulatory penalties.

Perhaps most significant are the opportunity costs created by certification delays. Extended testing cycles postpone market entry, potentially sacrificing competitive positioning and early-adopter revenue streams. Effective budgeting must account for these hidden costs to prevent last-minute financial pressures.

Pre-certified solutions offer a strategic alternative to this challenge. By utilizing modules like Blues Notecard—which arrive with comprehensive certifications already secured—manufacturers can circumvent separate testing requirements, dramatically reducing both expenses and development timelines. These pre-approved components streamline global deployment while allowing engineering resources to focus on core product innovation rather than compliance navigation.

5. Fulfillment Strategies and Hidden Deployment Costs

Device manufacturers face unique fulfillment complexities beyond traditional shipping concerns. Connected devices require specialized handling for firmware, security protocols, and activation processes. Your fulfillment strategy directly impacts device integrity, customer experience, and market success—making the choice between in-house control and outsourced expertise a critical decision with significant technical and financial implications.

Fulfillment Strategies: In-House or Outsourced?

When launching your device, the final prototype marks just one milestone. A crucial decision remains: how to handle fulfillment—should you manage it internally or partner with specialists?

Cost Considerations: The In-House Dilemma

While in-house fulfillment offers direct control over your product's journey, it demands substantial resources. You'll need warehouse space, dedicated staff for packing and shipping, and sophisticated logistics systems. These requirements often introduce unexpected expenses that can significantly impact your project budget.

Outsourcing: A Calculated Strategy

Outsourcing fulfillment to experienced partners can be strategically advantageous, providing access to specialized expertise while avoiding the overhead costs of building internal fulfillment infrastructure.

However, this approach isn't without challenges, particularly when your fulfillment partner operates in isolation from your IoT development process. Potential issues include compromised quality control, data security vulnerabilities, and unexpected costs that can undermine your fulfillment budget when working with third parties.

Blues products can simplify certain aspects of fulfillment by reducing the need for configuration during the process. Since Notecards come pre-configured for connectivity, this eliminates some complex activation steps that might otherwise need to happen during fulfillment. However, the broader fulfillment strategy—including warehousing, shipping logistics, and inventory management—remains a critical business decision.

Taxation and Tariffs: Hidden Costs of Global Expansion

Taking your connected device global? Be ready for a maze of taxes and tariffs that can eat into your profits. These costs often catch companies off guard and can turn a promising product into a financial headache.

Here's a common scenario: You've built a great device and lined up international customers. But now your product needs to cross borders, and that's where the complications begin. Each country has its own set of charges – import duties, value-added taxes (VAT), excise taxes, and more. While each fee might look manageable on its own, they add up quickly. A device that costs \$100 to make could end up with \$30-40 in extra charges just to enter a new market. These international fees do more than just increase your costs – they can start a chain reaction of financial problems.

6. Employee time: From Development to Ongoing Support

Your product's journey doesn't end when it leaves your facility – in fact, that's when some of the biggest challenges begin. From customer support and product launches to creating working prototypes, each phase brings its own set of hidden costs and complexities.

Let's explore these critical stages and see how choosing to work with a partner can help you navigate them successfully.

Customer Support: The Price of Customer Satisfaction

When it comes to embedded devices, great customer support isn't optional—it's essential for success. One bad support experience can lead to lost customers, negative reviews, and fewer sales.

The reality is that embedded devices will occasionally have problems, and customers expect quick fixes when they do. Without proper support systems, simple issues can spiral into lengthy troubleshooting sessions that drain both time and money. Many companies end up building entire support teams just to handle device-related calls, which significantly increases operating costs and can still leave customers unhappy.

This is where Blues can help with connectivity-related issues. We handle the complicated carrier relationships for you – it's like having an expert telecommunications team without the cost of hiring one. Instead of your customers getting stuck between device issues and carrier problems, they get straightforward help that solves their problems. Our deep cellular expertise means faster solutions and lower support costs for your business.

Launch: Beyond Development

Building your device is just the beginning. Launching an embedded product successfully requires careful planning and significant investment beyond development. Your entire team – from sales and support to distribution and field technicians – needs training on the new product. And when those devices start reaching customers, support calls often flood in, creating unexpected costs if you're not prepared.

Think of launch costs like an iceberg. The visible part is training your team, but beneath the surface lurks ongoing support expenses that grow with each new device you ship. As your device count increases, so does the strain on your support team. Call times get longer, and costs spiral upward. Some companies spend more than expected on support for issues they can't control – like devices failing to work with certain WiFi networks.

Blues help simplify this challenging phase. We provide resources to help your team understand how the connectivity operates while handling the complex carrier relationships ourselves. This means you can launch with your team fully prepared to respond to customer questions about setting up their devices.



Getting a Working Prototype: Time and Effort

Getting to a working prototype feels like crossing the finish line – but it's actually more like reaching a pit stop in a long race. Building an in-house prototype involves more than just assembling parts. You need to navigate complex setup processes: configuring SIM cards, adjusting network settings, and establishing stable connections to the cloud.

These tasks can be time-consuming and prone to errors, often translating into unexpected costs and project delays. This phase typically requires quite a bit of manual setup, such as typing in numbers and codes, making it not only prone to error but challenging to pinpoint where the error occurs. Teams often find themselves in a trial-and-error loop: Is it the SIM card? The network settings? The cloud connection? Each hour spent troubleshooting is time and money lost. The time and effort invested in deciphering which specific setting caused a glitch can quickly accumulate, dragging down the project's overall efficiency.

Blues takes a different approach to embedded intelligence. Our Notecards arrive ready to work, with pre-loaded SIM cards and pre-configured settings – like a smartphone that works right out of the box. Just enter your unique code in Notehub, and the system automatically handles the rest. No more manual configuration headaches or lengthy debugging sessions. Your team can focus on what matters: making your product great.

Balancing the true costs of development

As we've explored throughout this chapter, building connected products involves a complex web of costs that extend far beyond the physical components on your BOM. From provisioning and security to testing, fulfillment, and ongoing support, each stage presents its own financial challenges that must be carefully managed.

By building with Blues for your connectivity needs, you can address one of the most complex aspects of IoT development with pre-certified, ready-to-deploy technology. This allows your team to focus their expertise and resources on developing your product's unique value proposition rather than reinventing connectivity infrastructure.

In the next chapter, we'll see these principles in action through a real-world case study. We'll explore how a healthcare company successfully navigated these hidden costs by leveraging Blues' wireless connectivity to create an innovative connected product that improved patient outcomes while maintaining a healthy bottom line.



Connectivity Without Compromise: How Evexia Telehealth Brought Healthcare to the Caribbean with Blues

Imagine a world where your access to healthcare depends on your internet connection. For vulnerable populations across the Caribbean, this isn't hypothetical—it's reality. Despite the region's natural beauty, many residents face deep poverty and high rates of chronic health conditions with limited medical support.

For Evexia Telehealth, this disparity wasn't just a problem, it was a call to action. Their vision was powerful yet straightforward: create a remote patient monitoring solution that could work for everyone. The potential impact was immense—consistent healthcare monitoring for patients in remote areas, early intervention for chronic conditions, and ultimately, lives saved.

But for five years, this vision remained frustratingly out of reach.

Stalled out

The path to bringing Evexia's life-saving technology to those who needed it most was blocked by a series of connectivity roadblocks that proved nearly impossible to overcome alone. For communities where even basic internet infrastructure is unreliable or non-existent, traditional telehealth solutions simply weren't viable.

Evexia faced a perfect storm of connectivity challenges. Remote Caribbean locations often had spotty cellular coverage at best, and the data plans available couldn't reliably transmit critical medical information. Environmental factors like tropical heat and frequent power surges threatened to damage equipment. Adding to these technical hurdles were the prohibitive costs of development and ongoing support—expenses that would ultimately be passed on to patients who could least afford them.

Evexia searched for solutions, testing various approaches only to find them inadequate for the demanding requirements of healthcare monitoring. What they needed wasn't just better technology—they needed a partner who understood that connectivity isn't just about moving data; it's about connecting people to care that could save their lives.

The Blues breakthrough

The implementation of Notecard and Notehub technologies finally provided the reliable connectivity foundation Evexia needed. As Francois Koutchouk, CTO of Evexia Telehealth, explains:

“The Blues system encapsulates the sensor data portion of our hardware product all the way through to our cloud. By offloading the complexity of moving sensor data over cellular networks, we get to market faster and there is less that can go wrong.”

Here’s how Blues jumpstarted product development:

Signal reliability in challenging environments - After six months of field testing, Notecard demonstrated exceptional reliability even in remote areas with poor infrastructure.

Development resources - By handling connectivity complexities, Blues allowed Evexia’s engineering team to focus on their core RPM application rather than wrangling wireless complexity.

Support costs - Before Blues, support costs alone made the technology unattainable. The simple interface made troubleshooting easier, reducing ongoing support requirements.

Time-to-market - By solving connectivity challenges that had stalled development for years, Blues enabled Evexia to finally bring their Gateway product to market.

The result: Evexia Gateway

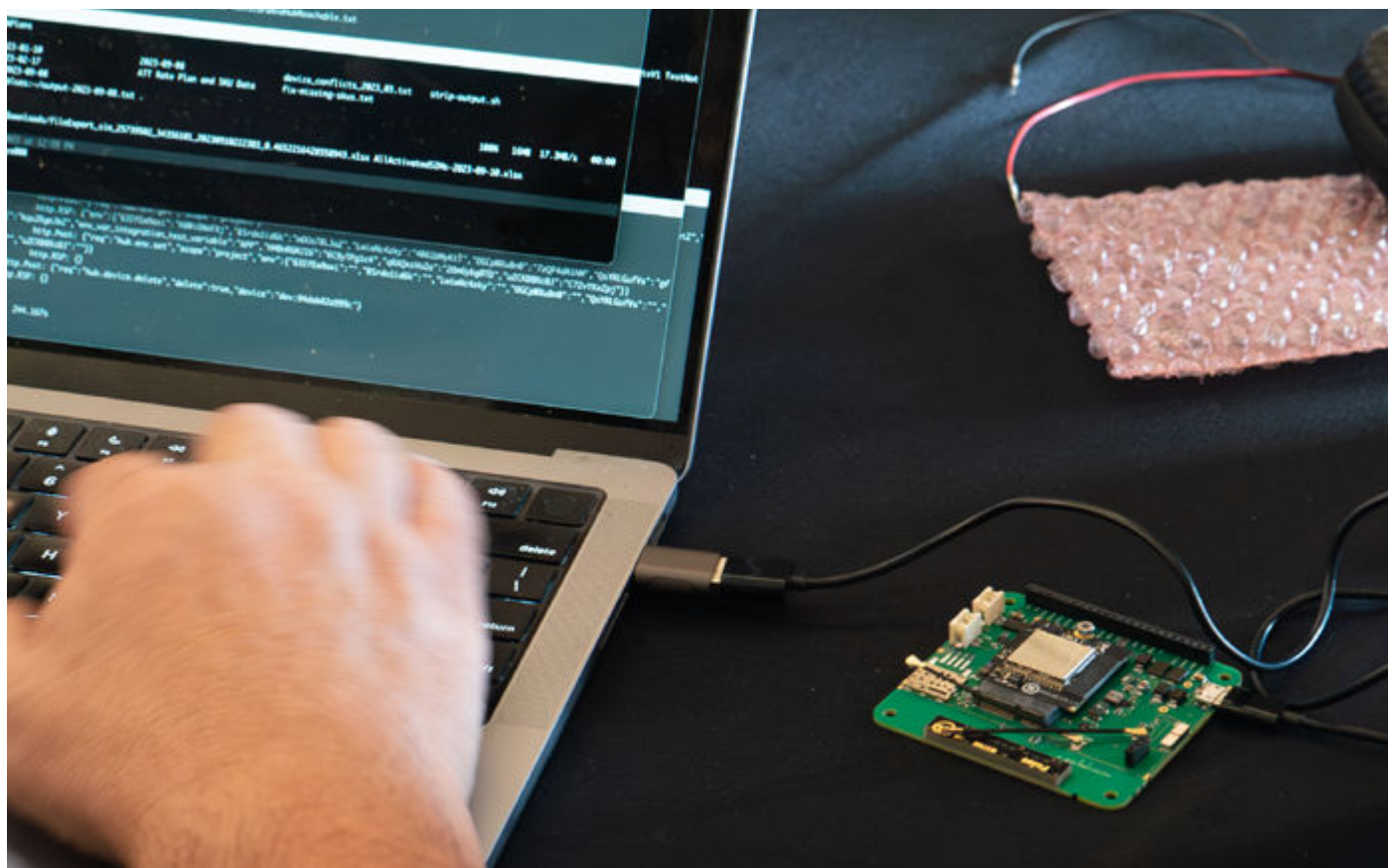
With connectivity challenges solved, [Evexia](#) could finally develop and deploy their bidirectional Gateway device. This system transmits vital sign data from patients to healthcare providers while enabling communication back to patients, making quality healthcare monitoring possible in previously underserved areas.

With its low power consumption, secure embedded SIM, and reliability, Notecard provided the foundation Evexia needed. The simplified interface for monitoring and troubleshooting connectivity issues meant Evexia could dedicate their resources to improving patient care rather than solving technical problems.

By addressing these hidden connectivity costs, Blues helped Evexia transform their vision into reality, ultimately creating a healthcare revolution that’s bringing modern telehealth capabilities to vulnerable populations across the Caribbean—people who had been left behind by traditional technology solutions.

Bridging the gap between vision and reality

Evexia’s story illustrates a fundamental truth about connected product development: even the most impactful innovations remain theoretical without reliable, cost-effective connectivity options. By removing these barriers, Blues doesn’t just accelerate product development—it makes possible what was previously unattainable. As we’ll explore in our final chapter, this case study exemplifies a broader shift in IoT economics, where the choice between making or buying connectivity solutions can determine whether groundbreaking ideas ever reach the people who need them most.



Make or Buy: Embracing Comprehensive Connectivity

As the rate of technological advancement accelerates, success requires more than innovative product development—it demands mastery of the complex cost ecosystem surrounding embedded intelligence. Blues provides an integrated platform that both simplifies development and eliminates the hidden expenses that undermine DIY connectivity solutions.

The Blues ecosystem—powered by Notecard and Notehub—is fundamentally changing IoT economics, delivering substantial efficiency savings while maintaining development flexibility, customization capability, and product quality standards.

The combination of Notecard and Notehub offers streamlined device configuration, enterprise-grade security frameworks, frictionless update delivery, and a cost-optimized cloud infrastructure—all backed by responsive technical support. By abstracting away technical complexities, Blues enables organizations to concentrate on their core innovation objectives without being hindered by wireless connectivity implementation challenges.

If you've decided that building your own connectivity solution isn't right for you, [contact us](#) to discuss your product requirements and learn more about Blues.