SORACOM

CELLULAR IOT SURVIVAL GUIDE:

What the Telcos Won't Tell You.

10 questions every developer needs to ask

soracom.io

A smarter connection for a smarter world

Success in IoT requires deep expertise and strong partnerships across multiple disciplines, from hardware and manufacturing to software, security and cloud architecture. Add in the challenge of sorting out wireless connectivity and it's no wonder that study after study shows the majority of IoT projects struggling with cost overruns, delivery delays, and unmet expectations.

While cellular data networks provide the range and reliability that most ioT projects need, existing telecom business models were not designed to support the needs of IoT devices and developers. Long-term contracts, restrictive NDAs, minimum data commitments, and lack of skilled support can stop a project before it even gets off the whiteboard. The absence of tools for network management, device provisioning, and cloud integration can block the path to scale.

The truth is, the smart devices of IoT need smart connectivity to match. Since 2015, Soracom has worked with developers around the world, from hands-on makers to Fortune 500 enterprises, to bring IoT projects to market successfully. As a global provider of smart connectivity designed specifically for IoT, we've learned a lot about what works, what doesn't, and how to navigate the challenges between a great idea and a full commercial deployment.

If you're ready to tackle the challenges of IoT connectivity, we're here to help. Before you choose your connectivity provider, be sure to ask these 10 questions.

1 How quickly can I get into field?

2 Will you make me pay for data I don't use?

3 Do you include a user console and API at no additional cost?

4 Can I start, stop, or pause connections in real time?

5 Can I count on coverage across multiple networks?

6 Can you help my devices use less power and data?

7 Can I create my own private network?

8 Can you connect me to the cloud without SDKs or custom integrations?

9 Will my data cost go down automatically as my network grows?

10 Can I provision devices remotely and manage credentials on the fly?

1 How quickly can I get into field?

You develop in sprints and your team moves at Internet speed. Your connectivity partner needs to keep pace. But when it comes to IoT development, the big telcos just aren't built to offer that kind of speed or flexibility.

If you just need a few SIMs to get started, you won't find them at your local retailer. Those come with consumer voice and data plans built in and might cost $40 or more per month just to activate. Getting the right SIMs can often take weeks or more.

Negotiating service terms can take even longer, and often requires long term commitments and minimum costs, even for SIMs you don't use. Soracom was built specifically for the needs of IoT developers, with speed and self-service in mind from Day One. If you're an Amazon Prime customer, you can usually get a SIM active and live in field within a day or two. No commitment, no NDA, and no cost for data until you actually start using your connections.

The Soracom user console and API give you everything you need to manage each connection in your network, and the Soracom team will also be with you every step of the way. From connecting your first prototype to supporting hundreds of thousands of devices in field, nothing makes us happier than seeing IoT developers succeed.

> "We were able to start testing in field within just 48 hours of contacting Soracom, but more than that, it was clear Soracom put the customer first."
>
> *Omer Davidi, CEO, BeeHero*

> "The ability to see a detailed history of connections and the status of each SIM is extremely useful when trying to debug... custom hardware. It would have taken twice as long to get most of our sites up without it."
>
> *Nathaniel Kale, Water Resources Specialist, Thurston County, WA*

2 Will you make me pay for data I don't use?

Your data provider shouldn't force you to treat your IoT devices like smartphones. Subscriptions and contracts make sense for continuous-usage devices like phones and tablets. For IoT, they're a killer.

IoT development isn't always smooth and steady. That's why long-term commitments just don't work. If you need to pause your service while you design and code, pay-as-you-go gives you the flexibility to do your best work without watching costs pile up for unused data. The same goes for minimum SIM or data usage requirements.

When you're getting started, you need a provider who can offer the same level of service whether you're developing with one or two SIMs or deploying with a thousand or more. You also need a provider who understands your need to monitor network activity and costs. If you're only seeing data usage in your bill at the end of the month – or worse, getting a separate bill for every SIM – your project will be stuck before it even gets to field.

Smart IoT connectivity is designed to grow with your deployment and help you scale up when the time is right. Pooled data and real-time access to usage data ensure that you never pay for data you don't use, and automatic volume discounts let you focus on your product or service instead of wasting time and effort on endless contract negotiations.

What to look for:

- Can I monitor data usage across all SIMs in real time?
- Is there a minimum SIM requirement?
- Is data pooled across all devices?
- Do I have to make any commitments?
- Do I get automatic discounts as my network grows?

3 Do you include a user console and API at no additional cost?

If you work with a traditional telecom provider, you may be surprised to find that you might only see your data usage when you get your bill at the end of the month. Even worse, you might get a separate billing statement for each SIM in your network.

If you want real-time monitoring and some degree of control, that might be available at an additional cost. Or it might not even be an option at all.

Smart IoT connectivity gives you full control of your network right from the start. To manage costs and optimize performance, you need continuous insight into the behavior of every connection in your network, and the ability to make necessary changes in real time.

Make sure that your provider includes a full-featured user console and API to keep you in control. That starts with basic features like managing your account and monitoring your network for unusual behavior, but that's the least that you should expect. You should also be able to set up warnings and actions, send SMS between your servers and devices, pull information from devices, lock SIMs to IMEIs to prevent tampering, and establish custom DNS to control access points.

The Soracom User Console and API are fully accessible at no additional cost, even if you only use a single SIM.

If you're curious about the range of capabilities available, full documentation and API reference are always publicly available on our Developer site. No sign-in required.

# Can I start, stop, or pause connections in real time?

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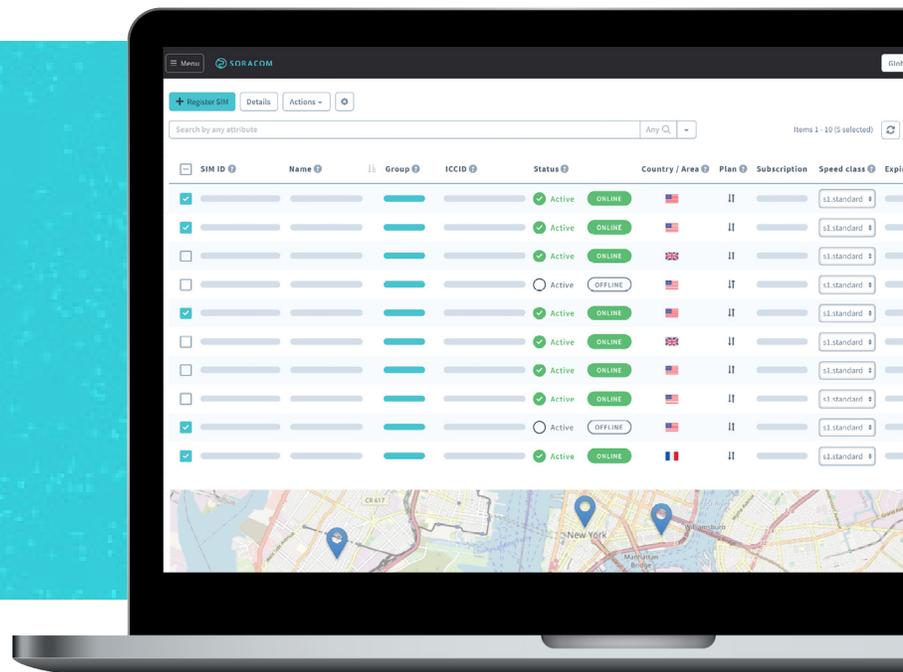
Traditional cellular service is designed for always-connected devices. But managing connections is a crucial component of any IoT deployment.

If you're shipping devices across the country (or the ocean) you don't want them active during transit. If you're operating a fleet of snowplows, you don't need them to stay connected in July. And if you're still prototyping, you'll want the flexibility to pause connections while you whiteboard.

It's not unusual for an IoT project to stretch across continents, with design in California, manufacturing in China, and delivery to markets around the world. With proper connection management, wireless data can be activated for on-site testing in Shenzhen, paused via user console, API, CLI or SMS for shipping and storage, and reactivated when devices arrive in-market.

Even if your deployment is stable and straightforward, it's possible for devices to occasionally misbehave. If a device suddenly begins to consume large amounts of data, you need to be able to suspend it immediately for troubleshooting.

An API that lets you program usage alerts, set limits, and investigate each connection in your network isn't just a valuable tool to ensure peace of mind – it's the least that any developer should expect.
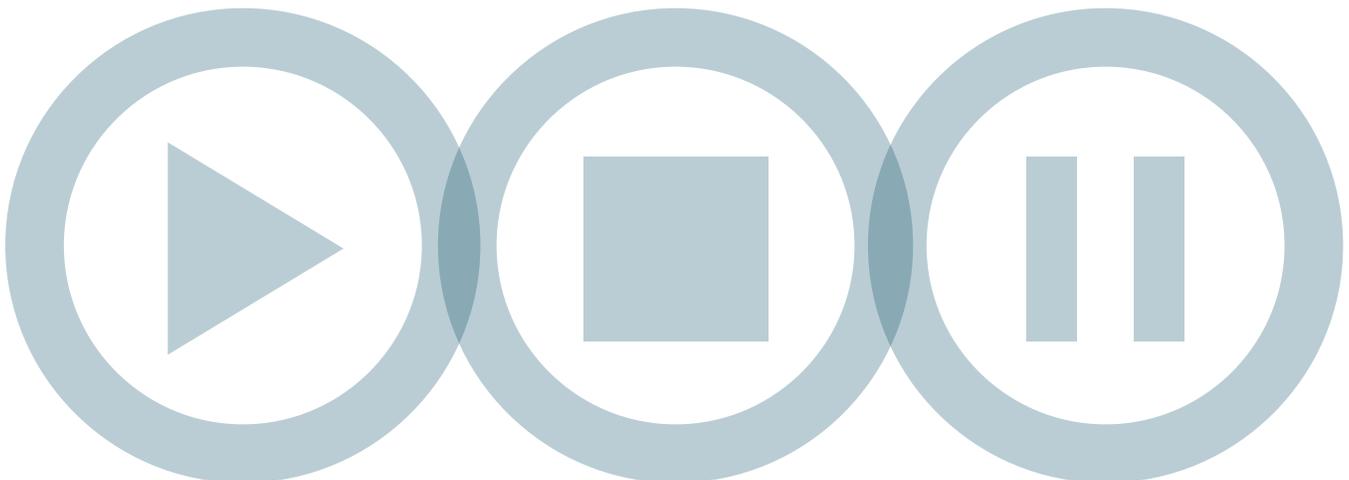
5   Can I count on coverage across multiple networks?

No wireless connectivity offers broader geographic coverage than cellular, but no network is perfect. Every provider has stronger and weaker areas of coverage, sometimes even within the same ZIP code, or even on the same block. That's why so many IoT developers choose multicarrier services like Soracom.

With multicarrier, your devices can automatically connect to the strongest available network, almost anywhere in the world. Soracom's hardware-optimized IoT SIMs and eSIMs deliver reliable data in over 120 countries worldwide, with 2G, 3G, LTE and Cat-M1 all offered where available. Our full list of countries, networks and services is updated continuously and always available on our developer site, so you can see at a glance where you'll have coverage and what it will cost.

And that global coverage matters. Even if you're only deploying in a single country, it's not unusual to design a product in California, manufacture and test in Shenzhen, and then ship to the US, or around the world. You don't want to have to negotiate agreements and install different SIMs at every point. Global coverage ensures a streamlined process from development through delivery and lets you keep your focus on delivering a great experience.

What to look for:

- Can I connect where I deploy?
- Can I connect where I develop?
- Can I connect where I test and manufacture?

- From 3G to Cat M1, do I get the data my devices need?
- Can I transition easily from SIMs to embedded SIMs/ EUICCs?

6 Can you help my devices use less power and data?

The more limited your devices are in terms of power and memory, the smarter your connection needs to be. If all you can do is transfer data between two points, you're missing out on valuable opportunities to reduce bandwidth and power usage, ensure network security, and remotely manage devices.

Many IoT devices lack the onboard memory to handle secure protocols like HTTPS. And even for those that can handle secure protocols, the required encryption headers can impose a data and power penalty of as much as 80%.

IoT connectivity lets devices use lightweight protocols like MQTT and UDP, reducing data and power needs while ensuring that communications are still encrypted all the way from devices to the cloud.

This approach also supports a variety of remote device management capabilities, including server-side credential management, remote monitoring of device activity, on-the-fly firmware updates, and API-driven remote operation.

Case Study: WHILL
WHILL's award-winning, connected personal EVs are pushing boundaries in personal mobility. Smart IoT connectivity helps WHILL to provide cutting-edge cloud-powered capability while reducing battery consumption by 30%.

What to look for:

- Can I connect securely using light protocols?

- Can I reduce data and power needs?
- Can I monitor devices remotely?
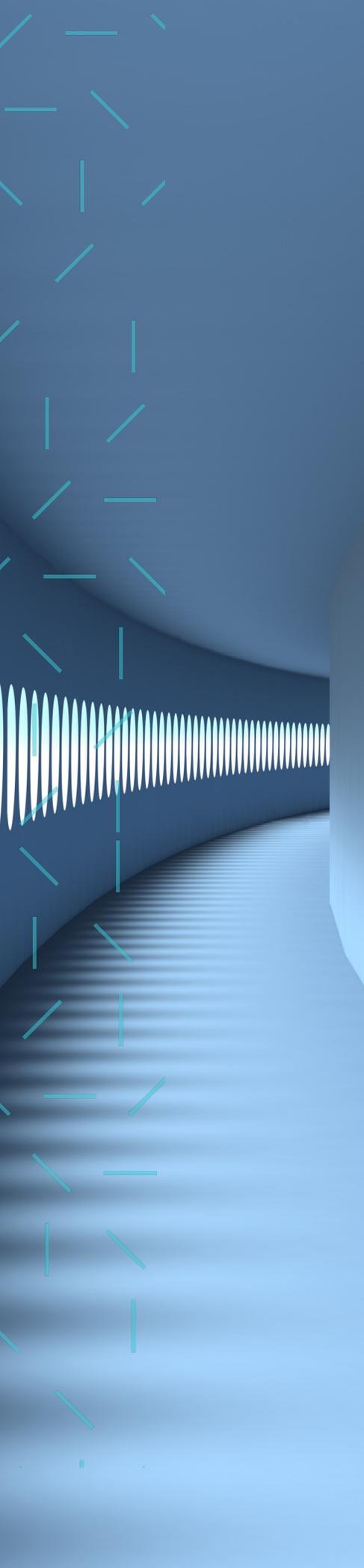
7 Can I create my own private network?

If you're considering cellular connectivity, you probably already know that it's more secure than Wi-Fi or Bluetooth. The encryption built into today's GSM networks made cell phone "cloning" ancient history, and between your devices and the nearest cell tower it's highly secure.

Once your data hits the Internet though, you'll want to make sure you're doing everything possible to keep it secure. That not only prevents malicious access, it also ensures that you stay ahead of emerging IoT security regulations, like California's SB-327 and similar legislation emerging at the Federal level in the U.S.

Soracom's guiding philosophy is to ensure that your data never passes over the public Internet at all. Because our network operations center is built in software on AWS, we're able to offer multiple private networking options. From dedicated two way IoT LANs to direct leased-line connections, you'll have all the options you need to make sure that your data is protected.

You can also use the tools available through the Soracom User Console to monitor, inspect, mirror, and redirect individual data packets to detect threats or intrusions or simply to optimize traffic flow.

What to look for:
- Can I access devices remotely?
- Can I create a bidirectional IoT LAN?
- Can I make a private connection to my AWS VPC?
- Can I inspect data packets passing through my network?
- Can I use packet mirroring to detect threats?

8 Can you connect me to the cloud without SDKS or custom integrations?

Most use cases in today's Internet of Things depend on the massive computing power made widely available by cloud providers like Amazon Web Services, Microsoft Azure, and Google Cloud Platform. Whether it's for machine learning and Big Data analytics, event management, or just storage, chances are if you're developing for IoT you'll also be working in the Cloud.

And that's the way it should be. When you're working with constrained devices, shifting as much as possible to the Cloud just makes sense. Unfortunately, you'll quickly find that cloud services weren't designed with constrained devices in mind. In IoT, connecting to the cloud typically requires setting up a relay server or using limited device memory to store SDKs and credentials.

Smart IoT connectivity lets you connect devices directly to leading cloud services without storing SDKs or credentials. In addition to saving memory, this approach also improves device security, ensuring that no credentials can be exposed even if a physical device is hacked.

This approach also minimizes setup requirements. Cloud interactions that would typically require custom development can be managed automatically, significantly accelerating speed to market and in-field flexibility. In large deployments, removing the need for custom cloud integration can save months of development time and hundreds of thousands of dollars in custom coding.

What to look for:

- Do I have to install any agent software on my devices?
- Do I have to store an SDK on each device?
- Do I have to store unique credentials on each device?
- Can I define endpoints without updating firmware?
- Can I connect to the cloud without custom code?

9 Will my data cost go down automatically as my network grows?

A successful IoT prototype or pilot represents a major milestone, but it's also just one step toward full-scale deployment. Scaling up brings new business and technical challenges, and what works for a few devices may not work for a network of hundreds, thousands, or more.

Smart IoT connectivity is designed to support you as your network expands, with features developed specifically to contain costs, streamline hardware production, and ensure a smooth transition to custom devices.

Volume discounts and data pooling

When you have just a few devices using just a little data, features like pay-as-you-go service and real-time network management may be more important than absolute cost per megabyte. But as you scale up to thousands of devices or more, total data cost can add up quickly.

Look for a provider that offers automatic volume discounts that don't require renegotiation or a new contract every time you expand. Also, make sure that data is pooled across all your devices with no minimum monthly cost per SIM. You want to be sure you're only paying for what you use.

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Can I provision devices remotely and manage credentials on the fly?

The more you scale, the more you'll appreciate the ability to automate device settings like endpoints and certificates. As you make the transition to large-volume production, you may find that simply provisioning large numbers of devices can add unexpected complexity to the manufacturing process.

To ensure security, public clouds require each device to carry unique credentials. But flashing each device individually at the point of manufacture adds significant time and cost. And because the credentials are stored locally on devices, it also opens up potential security risks.

Smart IoT connectivity can support remote, on-demand device provisioning and credential management to streamline device manufacturing and speed-to-market. This removes manufacturing dependencies, enhances device security, and also ensures compliance with California's new device security requirements.

Lifecycle management

As you make the transition to custom boards and form factors, you'll likely also make the transition from SIMs to eSIMs. If you make sure your that connectivity provider offers both, you can avoid re-architecting around a new provider when you upgrade your hardware.
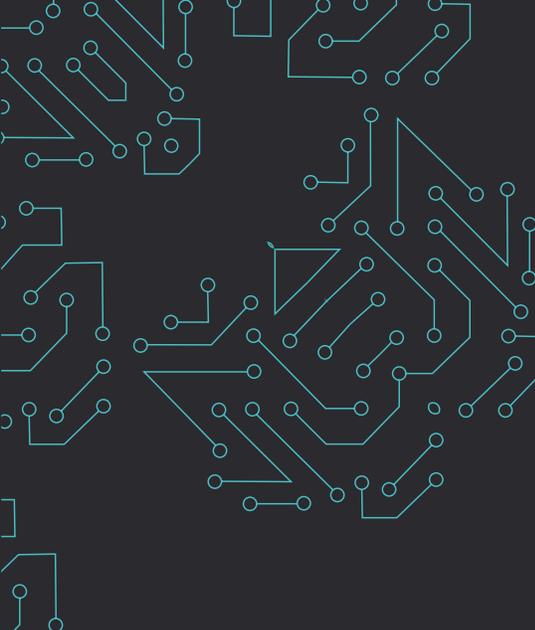
CASE STUDIES:

Sutro Connect

Sutro Connect uses Soracom smart connectivity to streamline mass production, enhance security, and accelerate time to market.

Sourcenext

Sourcenext, maker of the Pocketalk handheld global translator, made a seamless transition from SIMs to eSIMs on the path to 1 million units shipped.

A Smarter Connection

Success in IoT requires a deep understanding of hardware, software, cloud architecture, and connectivity… at the very least. That technical complexity has a lot to do with why most IoT projects never get past the prototype stage. But IoT is a team sport, and choosing the right partner can go a long way toward smoothing the path to success.

Since 2015, we've worked with developers around the world, from startups to global enterprises, to bring IoT projects from prototype to full worldwide deployment. We've grown to now serve over 10,000 customers worldwide, and we've learned a lot along the way.

Ready to get started with Soracom?
Our team of IoT experts is always ready to talk about your requirements.

To book your free IoT consultation, visit soracom.io/contact.

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