Building an IoT Solution Using Eseye and AWS to Provide Customers in East Africa with Secure Access to Solar Energy

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- Peter Huisman, CTO at SolarNow

Providing solar energy to those who need it most through financial access and high-quality service

For many communities around the world, particularly those living off the electrical grid, energy access is limited and unreliable. Even when options like solar energy become available in these communities, there are often financing challenges that prevent the ability to harness this energy, which limits access and reliability.

SolarNow envisions a better way to provide last-mile distribution of solar energy at an affordable price: by focusing on people first.

"Our company is different because we started by looking at how we could solve accessibility and financing challenges for end users," says Peter Huisman, chief technology officer at SolarNow. "We knew the technology was there and we sought to bring advanced technology together with viable financing options to provide a better solar energy service solution and thus more opportunities to our customers." SolarNow addresses the unmet need for sustainable, quality solar energy in the region through the provision of solar-powered equipment, appliances, and services to remote or off-grid homes, farms, schools, health centers, and businesses. To make a deployment achievable, the company offers affordable and flexible credit with every solution, a key feature in widening access to solar energy in the East African market.

As SolarNow's customer base grew, the company began identifying areas for business growth and improvement. "Over time, we noted pain points for customers, such as a short battery lifespan or inefficient solar panel usage, that we felt we could proactively address and prevent these issues using Internet of Things (IoT) technology to build a connected device and monitoring solution," says Huisman.

SolarNow needed to be able to enhance access to and use of device data to remotely monitor system performance and alert customers of inefficient device usage. The team wanted to build cellular device connectivity and IoT technology into its solar solutions to address significant business use cases, and have the ability to: Optimize device longevity, prevent service interruptions, identify and address recurring patterns in device challenges, collect and analyze data to improve customer service response times, and further credit provisioning through better insights into customer behavior.

About SolarNow

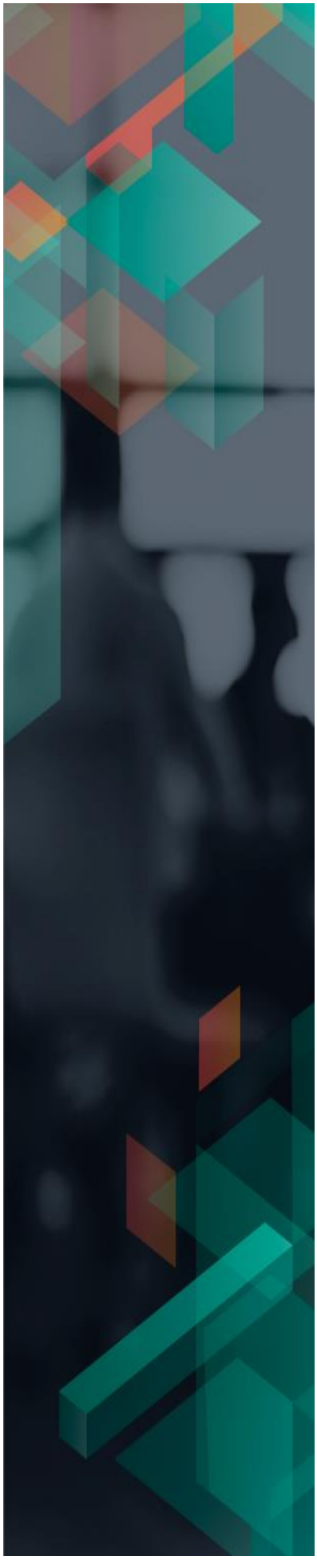
SolarNow is a for-profit social business with Dutch origins that is passionate about transforming lives by providing quality solar energy products and financing solutions in East Africa. Beginning its operations in Uganda in 2011, the company has provided solar energy at affordable prices to over 35,000 customers.

Challenges

- Identifying common device pain points for customers
- Optimizing device longevity

Benefits

- Driving valuable insights into customer device usage and service patterns
- Improving customer service response times
- Furthering credit provisioning for new customers through better insights



Engaging with the experts at Eseye to integrate M2M cellular connectivity and AWS IoT services

SolarNow began researching technology partners and providers who could deliver the expertise and guidance needed to build a cellular-connected IoT device management solution with reliable connectivity, scalability, and security.

After vetting different connected device and IoT experts and engaging with colleagues for recommendations, SolarNow chose to work with Eseye, an Amazon Web Services (AWS) IoT Competency Partner and a leading global machine to machine (M2M) cellular connectivity and device provider in the IoT space. Eseye's proven customer success in the energy industry and within developing communities appealed to the SolarNow team. "We clicked with Eseye immediately," says Huisman. "We aligned with their team's thinking and we felt they had the right experience to understand the business outcome we needed, and how to implement a solution to achieve this."

"Our mission is to connect the world by supplying cellular internet connectivity for intelligent IoT devices," says Paul Marshall, chief customer officer at Eseye. "Hearing stories of fields being irrigated, of food being delivered, of kids being educated, and of women starting their own businesses because they've got working electricity and can create more products to sell – that's the human side of this story that matters most to us. IoT can simply replace the lack of hard-wired infrastructure just through cellular activity, making resources more readily available to those who need them most. It's rewarding to know there's a part we can play in making that happen."

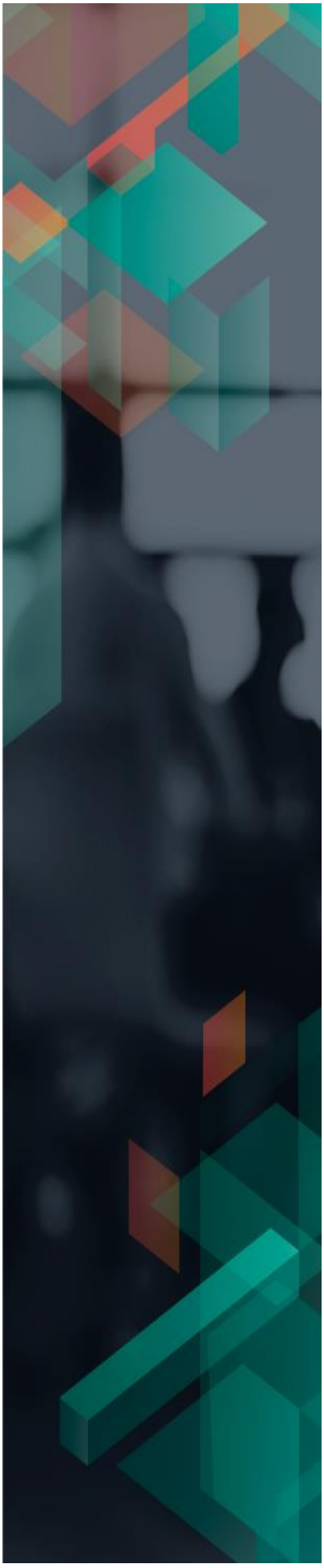
After evaluating SolarNow's short- and long-term goals and technical needs, the Eseye team recommended that SolarNow migrate to AWS to take advantage of the global availability, scalability, and security of AWS infrastructure and native services like AWS IoT, while also helping SolarNow begin to update its hardware to use Eseye's AnyNet Secure SIM solution. "For us, it was a no-brainer to leverage AWS to be able to scale and collect data in real time," says Huisman.

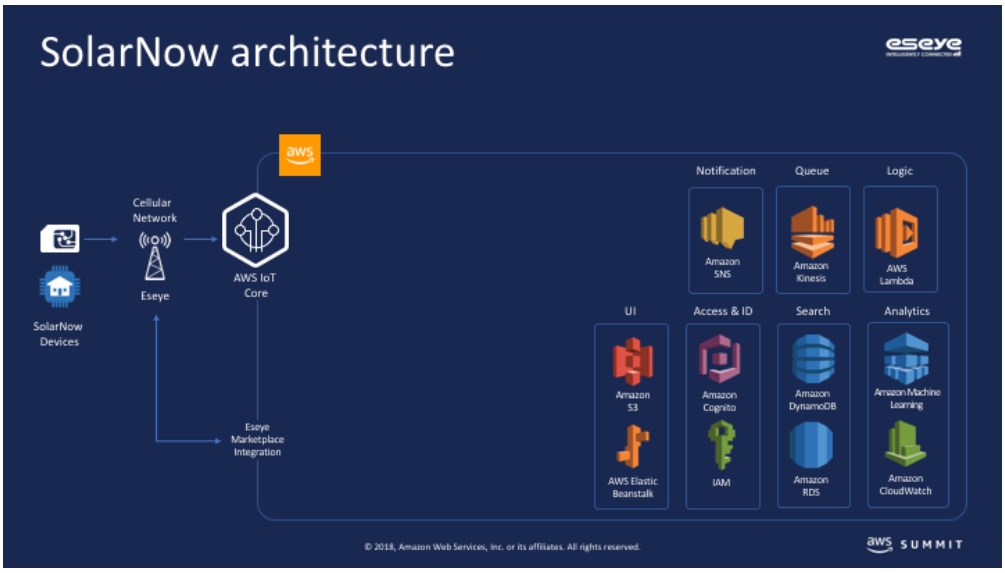
Using AWS IoT services and Eseye AnyNet Secure to monitor service performance, improve customer response times, and derive better insight into customer usage

Eseye connects SolarNow's devices with reliable global cellular network data through the Eseye AnyNet Secure SIM solution. The Eseye AnyNet Secure SIM is designed to be a one-stop global cellular connectivity solution. It connects SolarNow's devices securely through multiple wireless network carriers who provide wireless communication services to end users.

The SIM's enhanced features, such as secure integration with the AWS IoT cloud, Bespoke Firewalls, and International Mobile Equipment Identity (IMEI) locking enable SolarNow to remotely and securely activate, provision, authenticate, and certify deployed devices over-the-air. To make it simple for SolarNow to use the AnyNet Secure solution, Eseye has integrated its services with the AWS IoT Core, which enables lifecycle management, certificate delivery, analytics, and anomaly detection at the click of a button.

SolarNow's devices communicate over the AnyNet Secure managed network into the AWS IoT Core. To keep costs down, SolarNow is able to access IoT Core through the AWS Marketplace, which offers subscription-based pricing and is managed from within the AWS IoT console. When new customers are onboarded and their systems registered, AWS IoT Core then creates the Thing and generates the certificate with all the required security material and device identity information, and through its integration with Eseye, delivers the certificate directly and securely into the secure file system in the SIM card using GSM signaling channels.

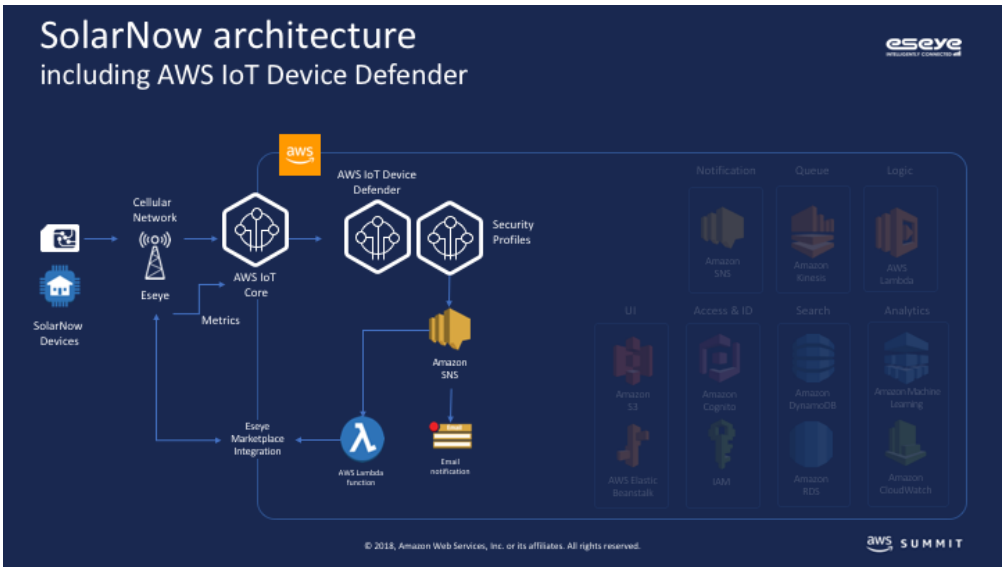




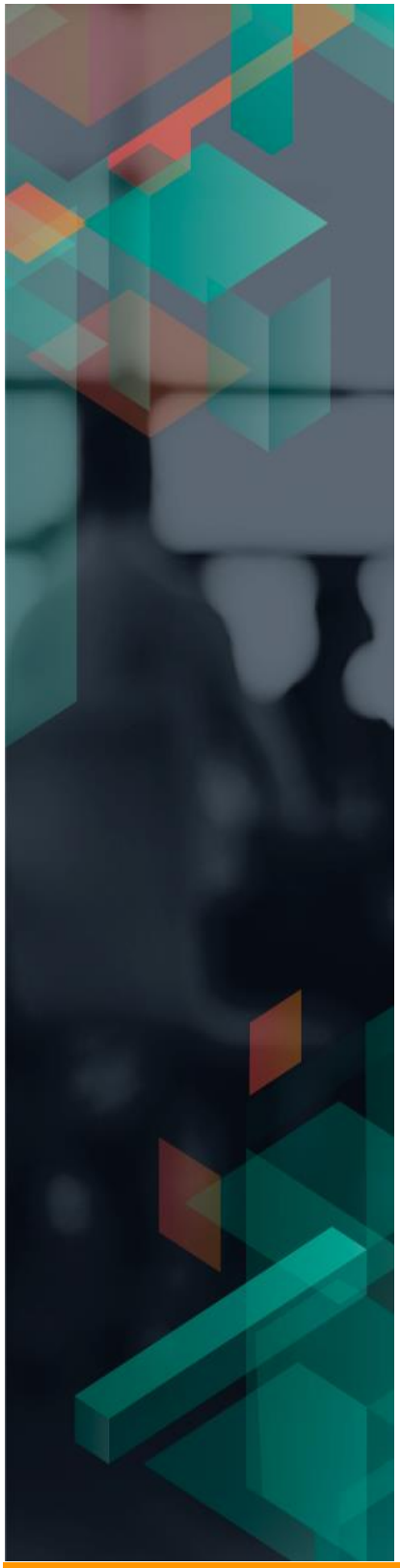
How SolarNow is using Eseye and AWS IoT Core to connect its solar devices

Maintaining secure device connectivity is critical for SolarNow's ability to thwart malicious activities and provide uninterrupted service to its customers. To provide intelligent device security management and monitoring, Eseye chose to integrate the AnyNet Secure SIM with AWS IoT Device Defender, a fully-managed service helping to secure SolarNow's fleet of IoT devices by receiving connectivity usage metrics.

Eseye creates device metrics in real time from the cellular network so that AWS IoT Device Defender can monitor normal behavior of the device, such as how many ports are open, who it can talk to, where it is connecting from, and how much data it sends or receives. Using the Detect features, any deviation from a set of predefined security profiles and behaviors will trigger a violation. Eseye creates device metrics in real time from the cellular network so that AWS IoT Device Defender can monitor normal behavior of the device. The AWS IoT Device Defender Security Profile classifies the severity of the violation and publishes it to a configured Amazon Simple Notification Service (Amazon SNS) topic. Amazon SNS invokes an AWS Lambda function that directly updates the IoT Thing Attribute to use the Eseye Marketplace integration to suspend the cellular service.



Eseye's pairing of AnyNet Secure SIM with AWS IoT Device Defender helps SolarNow monitor the security and activities of its devices



SolarNow is beginning to explore how it can use additional AWS services to collect more insight into customer usage patterns and proactively maintain devices. For example, the company is using Amazon Kinesis and Amazon Machine Learning to collect and process data streaming from its connected devices and identify and analyze patterns of consumption and use. SolarNow's engaged with additional APN partners to build out its predictive analytics capabilities. "It's been very easy for us to get access to other high-quality AWS technology implementors and providers who are a part of the APN," says Huisman.

Providing improved customer experiences and proactive service improvements using Eseye and IoT Services on AWS

Because SolarNow's high level of customer satisfaction and its business reputation are built on its zero-tolerance for any controllable service disruption, the insights it's driving with Eseye and AWS into customer device usage and service patterns is critical. Through its initial pilot of 150 units in Uganda, SolarNow is gaining vital insight into how its customers are using its systems and into device performance. SolarNow's devices impact livelihoods for users across a diverse number of environments and use cases, including household appliances, irrigation pumps, and power supplies to schools and health clinics.

"Building trust with clients is our most important priority," says Huisman. "Using the AWS IoT Core, AWS IoT Device Defender, and Eseye global AnyNet Secure connectivity to build a secure, connected solar product offering enables us to remotely monitor how customers are using our systems. It provides us the easiest, quickest, and most cost-effective way to achieve and scale a high level of device security and anomaly detection and protects our customers from service interruptions and SolarNow's reputation for excellent customer service."

"The insight into device behavior is critical so they can now see how that asset is being used," says Marshall. "They can now monitor the system to provide a better service to customers while identifying ways to improve and extend the lifespan of the devices."

SolarNow is just starting to explore how the company can use IoT and ML technology to drive more value to customers and improve operational efficiencies. "We aim to build cellular connectivity and IoT technology into all of our devices by the end of 2018. In addition to the full deployment rollout, the next step for us is to mature our predictive analytics capabilities," says Huisman. "We want to learn from and use the data we gather to build models that predict the possibility of service issues before they arise and create even better outcomes for our customers."

To learn more about how you can build and deploy an IoT solution on AWS, click here.

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Eseye is an AWS Advanced Technology Partner with IoT Competency. The company is a specialist provider of global M2M cellular connectivity, working exclusively with companies deploying IoT devices. Eseye provides an easy way to deploy cellular IoT devices onto the AWS Cloud using the AnyNet Secure connectivity solution. Global secure connectivity and device optimization expertise for IoT devices is included as part of AWS billing with easy setup, enabling all of the benefits of the AWS IoT Cloud.

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