REPORT REPRINT

# Cloudleaf's connectivity devices and cloud-native applications aim to make IIoT a breeze

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The company's portfolio of sensors, gateways, cloud technologies and purpose-built applications are designed to allow industrial enterprises to easily implement an IoT network to monitor supply chains.



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Talk of the 'digital transformation' of industrial networks has outpaced actual implementation, especially in brownfield environments. The intertwined problems of interoperability, cost and security often prevent companies from realizing their industrial IoT (IIoT) plans. Cloudleaf seeks to address these entrenched complexities with its portfolio of cloud-connected gateways and sensors. The company's comprehensive 'edge-to-cloud' offering allows industrial enterprises to quickly and cheaply upgrade their manufacturing and distribution processes, resulting in a 'network mesh' of connected devices that collect and aggregate data throughout the system.

## THE 451 TAKE

Cloudleaf might be a young company, but it has a relatively mature product offering. A brownfield environment represents one of the more complex challenges for IIoT implementation, but Cloudleaf seeks to make the digital transformation of these systems seamless and cost-effective. Its portfolio of sensors and gateways can be deployed in any standard supply chain, allowing administrators to both monitor processes and gain insight into the operational efficiency of the entire system. And with its suite of security measures, Cloudleaf has preempted a typical obstacle to IIoT implementation. In sum, if an industrial enterprise is looking to use IoT to update its existing supply chain, Cloudleaf seems to check all the boxes.

## CONTEXT

San Francisco-based Cloudleaf was founded in 2014 by a group of professionals with deep knowledge in networking and cloud technologies and extensive experience with the Silicon Valley technology scene. In late 2017, the company secured $13m in series A funding from IndusAge Partners, Bold Capital Partners, Tandem Capital and Mahindra Partners. Cloudleaf currently employs about 40 individuals across its offices in San Francisco and India. It has already received two patents for its product and has applied for 40 others and boasts a list of customers that includes Shire plc, Magna International, ArcelorMittal, Ryder System and Mahindra USA. 451 Research estimates Cloudleaf's revenue to be less than $1m.

## TECHNOLOGY

Cloudleaf's offerings can be deployed throughout the enterprise manufacturing and distribution processes to provide a holistic view into the journey of products through the supply chain. The Cloudleaf portfolio includes both sensors and gateways that have a standard battery life of 3-5 years, depending on ping rates.

Cloudleaf sensors gather location and environmental data, such as temperature, humidity, shock and vibration, which is then relayed to Cloudleaf gateways and then to the cloud. Cloudleaf has a family of sensors including analog input modules that sense analog current from 4-20mA current loops, analog voltage and discrete voltage inputs, connecting thousands of third-party sensors into the Cloudleaf Sensor Data Platform. Each gateway covers roughly 70,000 square feet of indoor space, aggregating data regardless of line of sight, before transmitting the information to the cloud via cellular or Wi-Fi connections. Together, Cloudleaf's sensors and gateways create a sensor fabric for the digital enterprise.

Sitting atop this hardware infrastructure is Cloudleaf's operations monitoring and network management platform, which provides administrators with a centralized and comprehensive view of assets in real time. Users can provision and update sensors and gateways directly from the platform, while dashboard alerts, metrics and analytics allow administrators to instantaneously monitor the operational efficiency of their networks.

As with any IoT deployment, security is an important consideration, and Cloudleaf uses a variety of measures to ensure the integrity of its networks. Data transactions between gateways and cloud and between gateways and sensors are encrypted at 256-bit and 128-bit, respectively. Virtualized tunneling is used to secure private network traffic traveling over unsecured networks. Identity Access Management (IAM) capabilities ensure that the correct users have access at the right time, and unique fingerprinting of sensors and gateways allow for the management of device authority throughout the network.

## STRATEGY

Cloudleaf has chosen to take a go-it-alone approach to digital transformation, providing its customers with all the tools and features necessary to digitize their industrial processes. In doing so, Cloudleaf has carved out a niche space for itself within the industrial IIoT sector where it doesn't have to worry about partnering with OEMs. This strategy allows Cloudleaf a vendor-agnostic suite of products, which can be implemented in a variety of use cases, greatly expanding its potential customer base.

## COMPETITION

Cloudleaf faces off against an assembly of upstarts and established players seeking to bring digital transformation to industrial processes.

For example, in the realm of enterprise asset management, mojix has a set of RFID (radio frequency identification) readers and an associated platform that allow enterprises to track the movement of tagged assets over a wide area. Tracktio and TrackX both have adopted software-first approaches, offering vendor-agnostic platforms that connect various sensors and RFID readers. It should be noted that Cloudleaf's sensors measure other environmental features other than location, giving administrators a more holistic and continuous view of their networks.

Bolstered by its acquisition of Blue Tree Systems, ORBCOMM offers a wide-ranging set of IIoT products across a variety of use cases, including fleet tracking and cold chain monitoring. Honeywell, after forming the Honeywell Process Solutions division in 2016, has made a more concerted effort to develop IIoT offerings. As we wrote in 2017, Honeywell has placed its chips on network virtualization as a means to offer future-proofed industrial innovation. The newly formed Hitachi Ventara offers truly end-to-end services through its Lumada IoT platform.

Another ancillary competitor is FogHorn Systems, a company that offers edge analytics IIoT software.

## SWOT ANALYSIS

### STRENGTHS

Cloudleaf's value is in its mix of easily deployable hardware and software products that allow industrial customers to start small and scale up as needed.

### WEAKNESSES

Cloudleaf is not for every IIoT environment. While useful for upgrading brownfield supply chains, the Cloudleaf product line probably offers less upside for customers building systems from scratch. Furthermore, Cloudleaf's general monitoring capabilities might not be suitable for specialized manufacturing processes.

### OPPORTUNITIES

As next-generation industrial networks grow in complexity, edge computing will become more necessary to manage costs and reduce latency. Incorporating this functionality into its offerings will allow Cloudleaf to stay ahead of the curve.

### THREATS

Cloudleaf's niche in the IIoT landscape could be jeopardized by a litany of companies taking a hybrid OT-IT approach. There's also the possibility that industry consolidation around certain networking technologies could have an adverse impact on Cloudleaf.