

# IoT Device Monitoring and Remote Diagnostics Propel Continuous Improvement

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Even the best developers cannot anticipate all the problems that may occur in deployed Internet of Things (IoT) devices: software bugs, hardware glitches, and product performance, and user interface issues. To address this challenge, DevAlert® enables continuous improvement, so you can build flawless products. The solution monitors the software in your deployed IoT devices and provides automatic feedback from the field to enable data-driven improvements in product performance, reliability, and the overall user experience. Greater customer satisfaction leads to more product sales and lower support costs.

*Detect, debug, and deploy fixes faster—with far fewer customers affected.*

## CHALLENGE: Lack of Insight Into Deployed IoT Devices

Most software has bugs and other issues when it ships—typically 5-10 major defects per 10,000 lines of code. But different users interact with the system in different ways, and some stumble on the remaining issues sooner than others. Such information is extremely valuable to device developers, if received right away and with sufficient detail to pinpoint the problem. Often, however, users don't report a problem or provide only a vague description that a developer can't reproduce. As a result, many issues remain in the deployed products for a long time and affect many customers.

What if you could capture these real-world issues automatically and systematically and get detailed diagnostics? With secure IoT connectivity, your support team won't have to depend on customer calls for such feedback. Your connected devices can report issues automatically—in real time, in full detail and directly to your development team.

*“Perceptio DevAlert is a game-changer in that it enables instant feedback from systems deployed in the field to ensure your firmware quality is constantly improving.”*

— Jack Ganssle, Principle Consultant, TGG

## SOLUTION: IoT Device Monitoring

Secure and scalable IoT cloud connectivity, such as AWS IoT Core, enables IoT device monitoring at scale. DevAlert offers embedded developers a new way to perform software improvements and software quality assurance. Along with over-the-air (OTA) updates, DevAlert enables rapid continuous improvement of device software.

Perceptio DevAlert makes it easy to generate alerts for any condition that is observable in the device software. The development team is notified within seconds of the first occurrence. The alert can prompt resolution of situations as varied as a software bug, a glitchy cable, or usability issues due to an unclear user interface.

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Perceptio DevAlert provides IoT device monitoring with remote diagnostics for use in system testing, field testing and deployment. DevAlert notifies developers about important conditions in IoT software, such as runtime errors, and provides a recording for visual trace diagnostics. Once an improved solution is ready, it can be dispatched as an over-the-air update via AWS IoT Core.

### Business Drivers for IoT Device Developers

- Surpass the competition with data-driven software improvements based on real-world usage of your product
- Drive customer satisfaction and positive reviews through continuous improvement—which in turn drives product sales
- Increase product reliability and reduce liability risks through immediate awareness and response to product issues
- Decrease the costs of customer support and product returns
- Get your products to market faster

### Benefits of IoT Device Monitoring

- Improve software reliability—detect and fix bugs quickly and with confidence
- Improve hardware reliability—detect software errors caused by hardware glitches
- Improve product performance—find out how your software performs in real-world situations and improve your algorithms
- Understand the user experience—gain insight into how your customers interact with your devices

### Integrated Solution Set

- Perceptio® DevAlert®
- AWS® IoT Core
- Perceptio® Tracealyzer®



When triggered, the DevAlert agent on the device uploads a small report to the developer's AWS account. The solution protects the data transmission by using the AWS IoT infrastructure and messaging, which employs best practices for authentication and encryption, such as X.509 certificates and TLS.

The alert signature, containing only meta data such as a numeric type code, is forwarded from AWS to the DevAlert cloud service, which compares it with previous alerts and notifies the IoT device developers when a new issue is detected. The alert includes a short trace of the most recent software events preceding the alert, such

as OS scheduling, API calls, and any application data logged by the developers. The trace data remains in the customer's cloud account and is not forwarded to the DevAlert service.

The trace data, paired with the visual trace diagnostics of Perceprio Tracealyzer, makes it easier for a developer to analyze and fix the problem. Perceprio Tracealyzer enables the exploratory top-down analysis that is essential for system-level debugging.

Combined with over-the-air (OTA) updates from AWS IoT Core, the result is a DevOps-style feedback loop for IoT devices that enables continuous improvement throughout the product life cycle.

*Perceprio DevAlert is early to the market and original. IoT developers need this sort of direct feedback from their deployed systems.*

– William E. Lamie, President, Express Logic

## RESULT: Rapid Continuous Improvement

A cloud-connected event recorder is the next step in IoT software quality assurance. With DevAlert and AWS, IoT developers can achieve continuous improvement, the core of DevOps methodology.

Real-world device feedback, fast troubleshooting, and over-the-air updates improve IoT device quality and deliver the best user experiences and product success rates.

## About Us

Perceprio® is the leading provider of visual trace diagnostics for embedded and IoT software systems, during development and in the field. Perceprio® Tracealyzer® allows users to visually spot and analyze issues in embedded software recordings during development and testing. Perceprio® DevAlert®, a cloud service for deployed IoT devices that combines automated error reporting with visual trace diagnostics, is powered by Tracealyzer. DevAlert provides a DevOps-style feedback loop from IoT devices to developers, speeding awareness and resolution of any remaining software issues during field testing and customer use.

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