

Internet of Things

# Getting serious about IoT development

AnnaMGerber

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IoT has the potential to transform a wide range of industries and applications, from home automation to manufacturing to smart cars and connected cities. The benefits of applying IoT across these various industries result from the result of operational efficiencies. These efficiencies are achieved when the data from IoT devices, is analyzed to obtain insights that may be acted upon to save time, reduce costs, or deliver an improved

Insights provide the most value when IoT devices and the data they produce are reliable and secure. For these insights the data needs to be analyzed in a timely fashion. This data can be collected and integrated from distributed devices and analyzed at scale, because small productivity gains applied thousands of times in an IoT system such as a [connected city](#) quickly add up.

My first two developerWorks learning paths, [IoT 101: A quick-start guide for IoT developers](#) and [IoT development](#), introduced you to key skills, concepts, and technologies for IoT development. In this post, I'll help you tackle some of the most challenging issues that face developers: security, device management, and data.

## Security

An IoT development best practice is adopting a security-by-design. The task of securing IoT devices is a vast number of connected devices, the difficulty of updating devices once they have been deployed, and the nature of the data that is collected. In addition to securing the IoT devices themselves, IoT security involves securing the data, the network, and any applications that access the devices and data, including cloud and mobile applications. Developers understand the security challenges involved in developing IoT solutions and learn strategies to address them so that they can avoid repeating common mistakes that can compromise the security of an IoT system.

# Device management

Managing and maintaining IoT devices is a challenge, because IoT solutions mature and the scale towards thousands or even millions of connected devices. Device management is essential at every lifecycle, including the provisioning, on-boarding, and authentication of new IoT devices. This stage includes the monitoring of deployed devices, including the troubleshooting and remote debugging of devices and the decommissioning of devices when they are retired. By automating these processes, developers can

- Scale their IoT solutions rapidly
- Maintain consistent configurations across deployed devices
- Schedule over-the-air updates for device software to ensure that the devices continue to operate effectively, reliably, and securely

## Analytics

The data produced by the IoT devices alone is of limited value. Greater value can be discovered by analyzing the data to gain insights and then by performing actions automatically in response. IoT device data is currently underutilized because only a small fraction of the data that is collected and stored from IoT devices is actually analyzed. Turning raw data into analytics to the huge volumes of heterogeneous data that is captured across a range of locations and multiple data stores is a daunting task. The data likely requires filtering, normalization or transformation to account for variable quality or reliability, or might be time-sensitive and require immediate action to get the most out of it. This can be mitigated by adopting edge analytics or real-time analytics tools alongside a rules engine to automatically trigger actions.

## Are you ready to get serious about IoT development?

My upcoming developerWorks learning path, [IoT 301](#), focuses on these key IoT development technologies you need to apply when getting serious about IoT development.

In the coming weeks, we will be publishing a summary of [the top 10 security challenges in IoT](#) (published December 19, 2017), a [guide to device management](#) (published December 22, 2017), an overview of [IoT data analytics](#) (published December 19, 2017), and a [video tutorial on applying rules and actions to IoT data](#) (published December 20, 2017).

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by AnnaMGerber

 [Website](#)

Anna Gerber is a software engineer and maker based in Brisbane, Australia, and one of the organizers of NodeBots AU. With over 15 years of experience, Anna is currently a developer at Console Connect.

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## 1 comment on "Getting serious about IoT development"

**Aravind Krishnadeva** • May 14, 2018

Dear Ms Anna Gerber. I would like to introduce myself as a lecturer who is currently working in Oman. A passionate to work on IOT systems and development. My interests include, tinkering with IOT hardware designing hardware. Outside hardware, I am keen on Node JS for embedded systems, and WSN. Currer projects as of now.

I envision myself working on IOT in a startup in the next two years. Since my experience is limited as of map for moving further from my current position. I appreciate any suggestions from your side.

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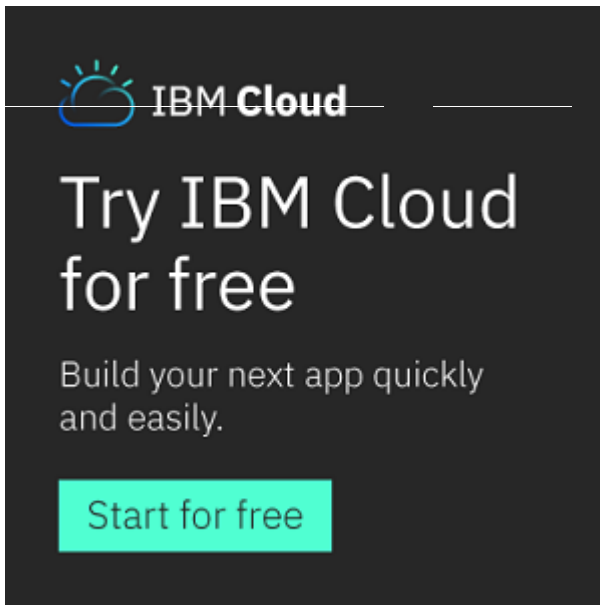
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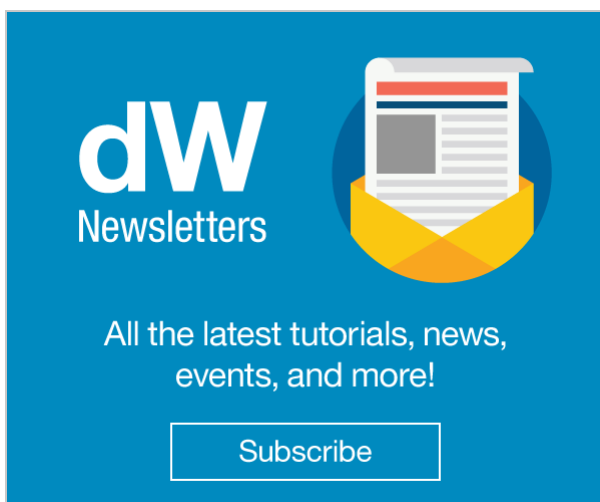
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