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Commentary

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# Wearables Require A New Approach To Power Management

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When we talk about the IoT, what we usually think of first is the surge of billions of connected devices flooding the market today and in the coming years: wearables that monitor your health and fitness levels, speakers that play songs on voice command and previously offline devices like cars, thermostats and lightbulbs that have suddenly become "smart" and given online functionality. From the smart home to the smart office to the smart city, the Internet of Things is extending its reach practically everywhere, offering everyone and everything an online connection.

But, what we *don't* talk about when we talk about the IoT—or at least, what we don't talk about nearly enough—is how we're powering all of these devices. After all, billions of new devices—estimated to total over 20 billion by 2020 (see the reference)—launching billions of new online connections also means even greater energy consumption. Our phones already can't last more than a few hours without needing to be plugged in. So, it begs the question, how is the power management space changing in order to accommodate this brave new IoT world's inevitably-much-larger energy footprint?

## The Battery Life Problem

The biggest impediment to the expanding reach of wearables and other IoT devices in our day-to-day lives is battery life. Wearing fitness trackers out on a 10-mile run to track your heart rate, mile splits and overall pace is great…unless the battery gives out somewhere on mile 5. Battery life that cannot keep up with consumer demand is not only frustrating for users, but reflects a design issue that can undermine the reputation of the device and manufacturer itself.

But even as we are pressured to improve battery life, there is simultaneously a desire to shrink the wearable's form factor and hence battery footprint. Creating more sophisticated wearables with more robust features, while simultaneously either maintaining or reducing that wearable's form factor, is a key bottleneck to reducing battery footprint.

And, we're currently seeing two ways the industry is trying to address these problems. On the one hand, ultra-low-power microcontrollers (MCUs) present an opportunity for addressing and optimizing power management in a more efficient way. On the other hand, we're also seeing greater attention being paid to newer battery technologies, like silicon anode, which promise greater energy density. Whichever direction the industry moves forward in, it's clear that the road to better wearables and a better IoT lies through better battery life.

## The Changing Power Management Landscape

Given those challenges, it should come as no surprise that the power management world is changing rapidly to better tailor itself to the needs of today's wearable applications—to say nothing of the wearables of the future. Integrated system-on-chip power management functionality is becoming an increasingly common design element of low-complexity, low-feature wearables. Meanwhile, external PMICs with increased efficiency and configurability provide a way of addressing the more complex wearables space.

Device sizes are driving these changes. Customers want smaller wearables, and the industry is responding accordingly. And, while there may not be one single way to achieve this, it's important that engineers and manufacturers keep their eyes on the one and only goal: providing longer battery life in a small wearable form factor. That may sound obvious on paper, but actually working toward that goal means that the power management space cannot stand still, and must continue to adapt with the times—facilitating newer battery technologies and lower-power, integrated components that provide a way forward on the battery life endgame.

## Looking Ahead Five Years Down The Line

With battery life concerns driving new innovations in the power management space, it begs the question: what exactly will wearables look like in the near future? And, what features seen as luxury items today will become standard in five years?

To name just a few examples of the more standardized changes just around the corner for wearables:

- More accurate heart rate monitors, with new types of sensors that can enable features like blood pressure measurement.
- Automatic activity classification that can, for instance, better determine whether the user is playing tennis or doing push-ups.
- Voice commands as a standard configuration for users to interact with their smart device environments, via their watches.
- Contactless payment enabled across all appropriate wearables.

That's just the tip of the iceberg. Long story short, in five years' time, wearables will effectively become the central device in a given consumer's IoT environment.

This has a knock-on effect on power management, too. As features like voice command and more accurate measurement of vital signs become mainstream features in the wearables of tomorrow, their inherent higher rates of power consumption will further drive the movement in the industry for significantly improved battery life *today*.

It's a simple formula: users want power-consuming features in their devices, and they want those devices to be able to run unplugged for hours and hours. IoT engineers and manufacturers have no choice but to find a way that bridges the gap between those two contrasting needs—and it's that drive that's drastically reshaping the power management landscape of today to produce more battery-efficient wearables tomorrow.

**Reference**

"IoT devices will outnumber the world's population this year for the first time" by Liam Tung, ZDNet, February 7, 2017.

## About The Author

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