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ONE ON ONE

Tim O'Reilly Explains the Internet of Things

By **Quentin Hardy** February 4, 2015 7:00 am

Tim O'Reilly has been at the cutting edge of the Internet since it went commercial. In fact, he helped take it there: In August 1993 he released the Global Network Navigator, a web page containing information, catalogs and a marketplace, which may have been the first site with advertising.

In 2004, he popularized the term “Web 2.0.” The idea was that, far from being just a vehicle for the dot-com bust, the web was a new kind of platform for software development, in which crunching data to manage crowds of developers and customers would be a critical skill. The idea, along with a hugely successful conference of the same name, signified the revival of Silicon Valley after the crash, presaging the dominance of companies like Google and Facebook.

Mr. O'Reilly, who also founded and runs the O'Reilly publishing and conference business, now says that the Internet of Things, or IoT, may be the most important online development yet. The term is something of a misnomer, he says, because it is really about giving people greater access to computer intelligence. His conference on the topic, called **Solid**, will meet for the second year this June.

He talked about the promise, and threats, of the IoT in this conversation, which has been condensed and edited.

Q.

The way most companies sell it, the Internet of Things is about gaining efficiency from putting all kinds of devices online. What is wrong with that definition?

A.

The IoT is really about human augmentation. The applications are profoundly different when you have sensors and data driving the decision-making.

Q.

Can you give me an example?

A.

Uber is a company built around location awareness. An Uber driver is an augmented taxi driver, with real-time location awareness. An Uber passenger is an augmented passenger, who knows when the cab will show up. Uber is about eliminating slack time and worry.

People would call it “IoT” if there was a driverless car, but it already is part of the IoT. You can measure, test and change things dynamically. The IoT is about the interpolation of computer hardware and software into all sorts of things.

Q.

But the IoT isn't just about one sensor in two-way contact with a remote cloud computing battery of servers, or a driver and a rider with a smartphone. There are going to be lots of different data sets, and lots of different feedback loops.

A.

The characteristics are that things are contingent, in relationship with other data. They are on demand. They are load-balanced, and aware of other parts of the system. That is why you get things like congestion pricing. It's a more context-oriented world, because there is better data.

Q.

Why do you think this isn't better understood?

A.

We're not letting the IoT teach us enough about what is possible once you add sensors. There is a complex interplay of humans, interfaces and machines. A big question is, How do we create feedback loops from devices to humans?

Q.

How will businesses learn about this?

A.

First thing in a new technology, people do all the obvious things that look like the old market, but more efficiently. In the Internet, GNN had web ads like old newspaper ads. Later there was Google search, which was a different way of doing advertising, by focusing more on data. Now we've got social search, social networks. The business model moves to something that is more native to the technology.

Uber is an early IoT company. Other businesses will pop up that do more native things.

Q.

Does more efficiency mean fewer workers?

A.

Not necessarily. Apple's retail stores give workers payment terminals. It puts more people on the floor in stores. Uber has put more drivers on the street in San Francisco than there were taxi drivers. It's about building information systems in which people make different choices and change their practices.

Q.

The history of tech is the history of automating things, so we generally need fewer workers in any given field. Yet tech seems to be led now by advertising and consumer-oriented businesses. Is this a disconnect?

A.

It's a weakness that the whole system relies on a consumer economy, when many people aren't benefiting. Google wanted to go mass with glasses; it would have worked better in some industries. Why not home health workers? If they had something like a Google Glass to show a hospital a picture of something, then that would be a much greater efficiency in an industrial framework.

The core now is the sensors, usually in two-way connections, so they deliver data and respond to changing conditions. It's a new way of exploiting data that makes things possible. There is big data analysis on the back end, understanding and managing things.

Q.

Can you give me an example?

A.

Google Now is such an important product, and people do not understand what it means that they are doing real-time prediction about so many people at once. It has context awareness, alerts and knowledge of my preferences. We will soon expect our devices to anticipate us in all sorts of ways.

Q.

That sounds creepy.

A.

People talk about being “disruptive” here, but I worry about real disruption. The social kind, with massive discontents.

Q.

Companies are becoming powerful in new ways, which raises questions.

A.

Because of their global reach, Google, Facebook, Twitter are all trying to figure out their own foreign policies. The rules are changing because of what happens online — when a hedge fund tries to break the euro with coordinated trading, why isn't that seen as cyberterrorism against a state?