# Connecting everything: A conversation with Cisco's Padmasree Warrior

Cisco's chief technology and strategy officer describes how the exponential growth of connectivity between people and devices, both mobile and network, will change commerce, business systems, and individual behavior.

**Despite two decades** of increasing connectivity between people and devices over high-tech networks, only 1 percent of what could be connected in the world actually is, argues Padmasree Warrior, Cisco Systems' chief technology and strategy officer. As the level of connection swells over mobile and other platforms during the next decade, she expects sweeping changes in how consumers shop, businesses handle data, and individuals grapple with the data available about themselves. This interview was conducted by McKinsey's Rik Kirkland in Davos, Switzerland. What follows is an edited version of Warrior's remarks.

## Connecting everything

We believe that today only 1 percent of what can be connected in the world is actually connected. As an industry, it took us about 20 years to connect 1 percent of the world. And in the next ten years, we believe that number will go up dramatically. We'll make significant progress in connecting the 99 percent that's still unconnected. That will be people, that will be devices, and that will be a lot more information on the network.

So when we say "the Internet of Everything," we mean an intelligent way to connect processes with data and things. Not just the Internet of Things, not just connecting the devices onto the network, but how can you use the information that's being collected to drive better processes, better decision making for businesses, and better lifestyles for users and consumers? And we mean more efficient ways to analyze that data through analytics from the network—which is our expertise—to make every single vertical (manufacturing, retail, transportation) significantly different than what it is today.

So if I drill deeper into this, one of the things that I think we find to be inevitable is that there will be a lot more connectivity, and there will be two kinds of connectivity. One kind of connectivity will deliver very rich media experiences to us, through video. Video will be much more prevalent than it is today.

There will be another set of data or implications, which is all of these sensors that will connect—not necessarily high bandwidth data, but low bandwidth data, continuous streaming of low bit-rate data. And the patterns in these two kinds of data and applications are going to be very different.

Think about retail, for example, how people shop today. Now, that's dramatically changed with the mobile platform and the e-commerce platform in the first evolution of the Internet. In the last 20 years, with the Internet, and now more recently with tablets, the data actually now says that people shop more on a tablet than they do on a smartphone or on a PC. And so the commerce and how we make purchases and the shopping experience in the entire retail vertical has changed, and it will continue to change. And how might it change? This is perhaps an example of the "Internet of Things."

If we can enable location for people, when you walk into the store, we will know which aisle you are going to. We know you were in this aisle, but you didn't purchase something. And so if we can analyze that data and tell you when there's a sale going on, that benefits you as a user as well as the retailer. And so that could be an example where there may be sensors. There will be sensors for indoor location (think of it as GPS for indoor location) and knowledge of your preferences.

So it's really a combination of a recommendation engine, or a preference engine, of a coupon or a discount engine, and a loyalty program, combined with indoor location. So it's a combination of all these things—which today are very discreet applications—that will make retail a very different experience in the future.

## Changing IT

We think IT in the future will really be a different IT industry than it has been in the past. The first differential is what I call the experience differential, and that's actually being driven by consumers. We did a survey recently of people between the ages of 18 and 32 across multiple countries, multiple geographies.

The interesting thing in that data is that two out of five kids, or young people, basically said they would take a lower-paying job than work for a company that doesn't allow them to bring their own device or allow them access to their favorite social network. They think the Internet is more

important than having a car. So it's just a very different workforce that we will see. They demand a very different experience. It's the consumer experience that you want in the enterprise.

The second differential is a velocity differential, and that's actually driving the shift to cloud computing. Businesses now demand a much faster way to bring up IT infrastructure applications to be delivered, for capacity to be provisioned. They're not going to wait. You, as a businessperson, will not wait a year for a data center to come up and for the capacity to be delivered. You would rather consume that as a service. And this is where companies like Amazon and others are making forays. So that's creating, for the IT organization, a velocity differential that has to be solved in the future.

And the third differential is a data differential. And that goes to the fact that there will be more and more things getting connected, and so we have to deal with the question of "What do we do with this data?" It's not just enough to store all the data; we have to use the data. People talk about this in the context of big data, but it's the analytics. It's not just the analytics, actually, but how do you apply the analytics to make the business process a better process? That is the third problem that the IT company of the future has to solve.

## Opting in, opting out

The scale of change, even in the next five years, will be dramatic. And I think everyone has to get ready for it, and I think we as users have to get ready for it. I'm a technologist, and I have to get ready for it because a lot of things will happen that we don't even anticipate today.

In the next three to five years, as users we'll actually lean forward to use technology more versus what we had done in the past, where technology was just coming at us. That will change everything, right? It will change health care; it could even change farming. There are new companies thinking about how you can farm differently using technology; sensors connected that use water more efficiently, use light, sunlight, more efficiently.

So I think there are multiple aspects of the human life that will be touched by how dramatic this change will be. I mean, who knows what we'll see in the next ten years. But at least we can see somewhat into the changes that will happen in the next five years.

Data. Usage of data. Do we opt in? There's a lot of discussion about, let's say, the data that is available about you. Today you don't even know what data is about you. If it can predict and prevent some illness that I may be getting because of my gene analysis, and I don't know about it, then I can't do anything about it. In that case, I'd actually like for that data to be used in a constructive fashion in a health-care situation. But if it's being used in such a way that it's going to drive my insurance higher, then I have an issue with that. I'd like to know about that.

So far, we've focused around data on, "Do you opt in or opt out?" In the future, there's going to be a lot more work that has to be done that gives me a choice on, "When do I opt in, when do I opt out?" And I may want to change my mind. I may opt in at the beginning but as I find what that data is being used for, I may opt out. So all of this requires very sophisticated analytics—a different way to present that data. Again, up until now, it has not been the problem most creative people have been handling.

Until now, we've mostly been creatively centered around the user experience. Just the experience of how information is moving, not how it's being presented back to you. So I think there's going to be lots of shifts in the way we deal with technology in the next three to five years.

**Padmasree Warrior** is the chief technology and strategy officer of Cisco Systems. This interview was conducted by McKinsey Publishing's **Rik Kirkland.**