Intelligent Everything

With continuing advances in computing, it is becoming possible to add senses and intelligence to everything around us. The possibilities are endless as tiny processors – or "chips" – and sensors can be placed virtually anywhere, even on a person's skin or in a running shoe.

Imagine, for a moment, living in a home where '"everything" is connected and whatever you need for the day is available the moment you woke up. In this home, your bed knows when you wake up. It tells the radio to switch on so you can listen to the traffic and weather report or music it knows you enjoy. It tells the coffee machine to make a fresh pot. When you prepare for the day, your toothbrush notifies you that it's time to see the dentist, and it schedules an appointment based on your availability. Your shower adjusts its temperature based on your preference, and when you go to the bathroom mirror, it reminds you to take your vitamins. As you get dressed, your closet mirror helps you choose an outfit based on the weather and what activities you have planned. As you leave the house, a display on the way lets you know you forgot your wallet.

We are on the verge of translating vast tomes of information and data into knowledge that can change our lives for the better. When we operate in a trusting environment in which we – and our things – put our information to use, we can improve and live our lives in unimaginable new ways.

As a leader in computing innovation, Intel Corporation is designing and building key technologies that are the foundation for this wide range of computing devices and applications. Intel is creating tools that put complex, connected data and intelligence to work in ways that are simpler, easier and almost invisible to us – even as they reshape our world to bring us improved experiences.

More Intelligent Things

In our houses, cars and offices, we're surrounded by tiny, intelligent devices that capture data about how we live and what we do. Intelligent everything means also having that connectivity in unexpected places, in things we'd normally never call a device. It means a shoe, an armband or a pair of sunglasses can tell us where to go jogging. Or, sensors in a phone, a car or a street sign could tell us the pollution level that day. We are entering an era when the most mundane items in our lives can talk to us, and each other, performing tasks on command, giving us data we've never had before.

So, we have these billions of devices poised to make more than a trillion connections, and in the process, generate enormous volumes of data. But without "digital intelligence" to connect

those devices and make sense of the data, that information will be overwhelming and of little use for people. Let's say, for instance, you're going for your morning run around a nearby park. It's summer and there's smog. Sensors in the park are actively monitoring air quality, but what good is that if those sensors don't realize that poor air quality negatively impacts your health. Even still, what good is that if they don't know your running route? And lastly, how does it help you if those sensors don't alert you through your devices that you should consider a different route?

Intelligent everything is about more than equipping things with the ability to collect data. Intelligent everything will change everything because smart chips will allow things to make sense of information in ways that benefit us. It's the addition of intelligence and connectivity that will make devices and environments "come alive."

Innovations for Sustainable and Smart Living

Intelligent everything is an imminent reality that promises to connect people and possessions in ways that will save us time and effort and enable things never before possible.

Most of us own smartphones these days, some of us have smart TVs, and we often see smart cars on the road. Soon, other connected devices will enter our lives – smart watches that can count calories, silverware that can monitor our eating, and shades that can adjust themselves based on the time of day. Sensors can be programmed to do all kinds of things, sensing the environment around them, sending out data, and sharing their temperature, weight, speed, etcetera. One example is the intelligent street lighting in Helsinki, Finland. These lights contain sensors that can detect environmental conditions and automatically dim or brighten depending on the amount of sunlight available, weather conditions and more.

One of the most exciting aspects of intelligent everything is how quickly it's becoming a part of our everyday reality. We see it all around us, with the many devices getting smarter, from your electricity meter to your running shoes.

And, each year, we'll see even more everyday devices that suddenly become smart. It's estimated that by 2020 there will be over 50 billion connected devices around the globe, that averages to about six per person.

Challenges Facing Intelligent Everything

We've been hearing about the smart city of the future for a long time, so why hasn't it arrived yet? There are three major pieces in making this vision a reality. Cost needs to come down in order to make implementation ubiquitous, energy efficiency must go up for the sensors and chips, and devices must maintain constant connectivity to deliver information and share it 24/7.

If there are 50 billion devices connected by 2020, it means there will be more than three times the amount of connected devices as people on the planet by that time. In terms of energy efficiency, how will the world power all of these gadgets and machine-driven devices? The vision is about connected devices improving our lives seamlessly without us knowing – and this will only work if we aren't worried about changing the batteries. Energy harvesting is one possible solution. Farming tiny slices of power when available, from such sources as the sun, TV antennas, solar panels, or even the walking motion of a shoe.

Regarding cost, consumers right now pay a high margin for the extra chips and sensors associated with connecting a door lock, a thermostat or a lightbulb up to a network. But Moore's Law almost guarantees that the chips and sensors embedded in these items will continue to get faster, smaller and less expensive as time goes on. Together with declining data communication costs, innovative consumers and startups are inventing their own low-cost, smart, standardized sensor networks, hosting sensor efforts that allow consumers to deploy large numbers of sensors around the home and office.

In the future, smart devices will do more than simply offers alerts; they'll seamlessly connect and receive updates from other devices and can literally be set and forgotten about. We've already seen this in smart homes that automatically turn the lights and heating off when no one is in a room, and in smart traffic lights that react to traffic congestion and car accidents in order to improve traffic to flow.

With devices and sensor technology getting less costly, smaller and more efficient, we are seeing this vision finally become a reality, allowing us to connect more and learn more. As more devices are brought into the fold, the power and potential for what they will make possible will continue to grow exponentially. This shift will help connect the things that are still unconnected in the world, creating real value for all of us.

About Intel
Intel (NASDAQ: INTC) is a world leader in computing innovation. The company designs and builds the essential technologies that serve as the foundation for the world's computing devices. Additional information about Intel is available at newsroom.intel.com and blogs.intel.com.

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