The Internet of Things

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JS: Hello and welcome to TechNJ. I'm John Silvestri. Think about people's day-to-day lives - you can check a dozen social media websites on your phone before rolling out of bed. Your thermostat can check the weather, and adjust accordingly. Company vehicles can report back location and gas mileage data. Law enforcement have cameras now, not only on their dashboards but on their person. A wristband can monitor your health and activity, report back to your doctor. Ten years ago a lot of these technologies would have sounded like science fiction, however today the internet and things has exploded. From internet-enabled appliances to wearables that record day-to-day activities, it's clear that things are more and more interconnected with every passing day. Today, I have with me Chad Vander Veen. Chad's the former editor of Future Structure magazine. He's also served as Associate Editor of Government Technology magazine. Presently, he's the Communication Manager for Purchase Green, one of the country's largest artificial grass manufacturers. Chad, thanks for joining us today.

CV: My pleasure, John, thanks for having me!

JS: Sure! So first question - what kind of devices make up the internet of things? What kind of things are being connected more and more?

CV: Well, you know sort of as the name implies, the internet of things can really be anything. And, you know, how it gets a bad rap in a lot of the press because, you know people mock it or you know connecting your toaster or your refrigerator… there was a particularly eye-opening and sort of humiliating story that came out a couple of months ago about a juicing company out of San Francisco that launched a Wi-Fi enabled juicer, and as the writer of the story said, "It was a $400 Wi-Fi juicer, and it cost that much because it had to be for $400, otherwise you couldn't justify it". Those kind of stories tend to make the internet of things sound a little ridiculous when we wonder why do I need a juicer that's Wi-Fi enabled, or a coffee maker…but it's so much more than that. It's devices that you wear for health reasons, for public safety reasons, for transportation reasons. It's our cars, it's our phones, it's our televisions, it's everything we interact with in the world that kind of makeup this the system of things. The idea is that with internet of things, all of these devices and ultimately each of us individually become these points of data, and the data that's generated by the things or the people wearing the things, ultimately help decision makers make better decisions about… whether it's an office building, or a city itself, or a state… all these systems interconnect, and the data generated by the interconnectedness of the things that are internet-enabled ideally will lead to more intelligent decision making and ultimately a better existence for everybody. So it's got a grand design behind it, or grand concepts, but it kind of gets bogged down with some of the seemingly

unnecessary things that get internet-enabled. So, it's kind of this interesting conundrum of well, just because I can connect this thing to the internet, should I? But then, once it is, well, let's find out what kind of data this internet-connected thing yields, and how can we make use of it.

JS: It seems like the internet of things, it's crawling before it's walking. One of the things that comes to mind when I think of wearables was the eyewear that several companies developed, you know, that would basically show you images and take pictures and be this device that would be with you everywhere. But that seemed to be a flash in the pan, as opposed as maybe some of the more humdrum devices that are just sitting out there dutifully collecting data for us.

CV: The Google Glass-type of appliance is actually, I think, really interesting. And I think they were, maybe, just a bit ahead of their time. Like most sort of Technology gold rushes, I think, you know, everybody goes out and creates something. Eventually, the actually useful inventions will rise to the top, and the others will sort of float away, but if you think about the Google Glass, some of that stuff you're seeing now in its next evolution as VR, it's a sad life, and future reality gets a second life in largely entertainment-based formats, but increasingly in, perceived anyway, applications for education purposes, for training purposes, and that google glass was just sort of incorporating that on a more consumer-friendly level. But there are applications for that in training police officers for tactical awareness situations, and science classes where you can perhaps do like a… they call it a mixed reality situation, where you take like a virtual reality and determining the others as well an augmented reality, and basically overlay under the real world. It sound crazy, but holograms… this stuff is really being developed for… for purposes beyond video games.

JS: It always seems to start with video games, though. It seems everybody wants, wants the cool new video game to play and then somehow it leaks its way out into the greater world. Obviously, the advantages, as you said, for personal use and for entertainment use, seem to be more evident on the front of things, but how could governments leverage these items for data or for training as you said?

CV: What you're seeing now, and for the last few years, really, when your time about IoT and in the public sector landscape, a lot of people are talking about wearable devices specifically, and I think the two biggest areas you see those being deployed is in, or people wanting to deploy them is in the healthcare space and in public safety. In the healthcare space, obviously, most of us are familiar with the fitness bands, you know, your fitbits and what not, which are really useful if you want to monitor your own physical activity, your own wellness… but, there's a lot more that can be done with that. Those are all, sort of…they don't take a real deep dive in your health. They give you some cursory data about what you're doing, but you can get a lot more data it just depends on how much you want your device to know about you, or how much you want your doctor to be able to access through that device. For example If you want to do some sort of health monitoring solution with your physician. And in the public safety space, there's all kinds of fascinating developments we're seeing. Already the body cam issues, before a lot of police agencies, a number of police agencies all over the country have already been active in deploying body cams. In fact, if you just go online, most days you probably see some video

uploaded by some agency somewhere, showing a crazy situation a police officer encountered because of body cams and they've been in the news and over last couple years and various trials for officer-involved shootings, but beyond that, you know, there's all kinds of tactical and situational awareness possibilities with like a heads-up display on, throwing back to like a Google Glass type of appliance, so the public safety and health care space I think is the breeding ground for where will see wearable internet-enabled devices really continue to prosper and take off from there. Then you can sort of get into more granular stuff like well, if law enforcement using it out on the streets, maybe we have, in the prisons, is there a way to integrate that in with inmate uniforms so they can both monitor for safety and for the inmate health. So there's another area in the public sector that you might see wearable technology be deployed.

JS: Ok - With all this data being collected, either privately or publicly, by your company, by the government… is there a concern with just privacy in general? GPS can pinpoint me where I'm at on the road, you know, the wristband can see if I'm eating healthy or moving around… is there a potential for privacy basically being eroded over time?

CV: There's certainly is. It's not a potential problem, probably a likelihood of privacy being eroded, but the issue is… not really whether it will, it's how much tolerance we have for it. Just, you know, we're all aware this week there was a giant hack that occurred, we had exposing millions of people's personal information, but more and more I think we're… as a whole, less and less concerned with privacy. Not that it doesn't matter, but I think it's an issue we like to bring up to sort of debate the merits of a particular technology when, for the most part, people are pretty willing to put out a lot of information online without a second thought. That doesn't mean it's something we should be cavalier about. One of the things you probably heard about with wearable devices, companies or organizations doing like a wellness contest with employees. And just by doing so, if you participate in something like that, you expose yourself to some, or you expose some of your personal privacy details to your employer, to potentially other coworkers. The issue is real, but I think it's more of an issue of… with the actual people and how much concern you actually have for your own privacy. We kind of blurred the lines between privacy information and personal information, and what I mean by that is you certainly don't want your bank account information, your credit card details, your home address, things like that publicly available. But at the same time we're all more than happy to post pictures of where we're traveling to. Obviously, if you post to Facebook that you're on vacation, if a crook is smart enough to realize "well, that obviously means they're not home, that's a house I can go burglarize". So it's "where do we draw the line on what we want to do with social media, and sharing, and communicating with people around us through social media and other technologies and where do we want to say no. That's where privacy becomes actual concern for me.

JS: That's more of a societal issue, and it seems like that, at least from what you said, that Society is becoming more and more acceptant of having their information out there. Not necessarily personal identifying information but, you know, "hey who cares if you knew I was on I-95 going south yesterday", or "who cares if you knew I was on vacation down in the Bahamas" something like that.

CV: Yeah, and I think it is a "who cares" attitude until something results from that that impact people personally, and then they're going to say "oh, well I wish that information hadn't been available". But up until that time I think we're fine with it.

JS: It doesn't matter until it does.

CV: Exactly.

JS: So, I think you briefly mentioned it, we have these devices now. They're all connected to the internet, they're all talking to each other, they're sending data to social media websites or sending data to professionals to review that data. How secure are all these devices? Are these devices being targeted by hackers? Is this another avenue into being attacked by, you know, a nefarious hacker?

JS: Yeah, you know, they're not really very secure. I wrote a story a couple years ago for of course, on my magazine, about the death of the password or… and if that will ever come to pass because we're still securing a lot of things, a lot of personal use devices, with passwords. In most cases, we all rely on a safety in numbers-kind of philosophy for security. It's pretty easy to hack most things, you just kind of hope that, because there's billions of devices that yours isn't among them…

JS: Security via obscurity.

CV: Yeah, exactly. That I think is the real concern, much more than the privacy. If we're starting to… not if, we are starting to kind of create these complete environments where useful, meaningful things are online. Things like your car, traffic signals, devices in hospitals that are monitoring patient health… if those are able to be hacked, then you're going to have serious problems. Because we all… we are heading toward a future where our cities and even the surrounding cities as well become this… part of this larger system of interconnectedness so, you know, as driverless cars proliferate, other transportation energy generation, our water resources, water storage facilities… as all these things interconnect with each other, they generate vast amounts of amazing data, and help decision-makers be smarter. But it also exposes us to real legitimate threats, not the… some of your personal photos you didn't want online got put online but that maybe somebody can hack the gates on a dam from a flood control facility or your driverless car decided or someone decides, "you're not going to go wherever you want to go, we're going to take you and kidnap you via your driverless car". That sounds…

JS: That sounds terrifying!

CV: It does, and tt sounds unlikely and it probably is but it's, it's a potential threat that exists and will continue to grow. But it does need to be addressed, that's the real… beyond the

personal privacy thing I think that's the real issue that makes me look as we bring more and more devices online.

JS: So with all these wearables, all these internet of things coming together here in the next few years, where do you see the biggest growth? Where do you see the biggest advantage for The Internet of Things?

CV: I think there's kind of… it boils down two four things I personally believe are what we're going to see the most growth. Number one is going to continue to be in health monitoring with personal health care wearable devices. Things you can communicate with your doctor in real time. If your diabetic, for example, you can monitor your insulin levels. I think it just depends on how invasive we want these devices to become. I mean, if people were willing, I'm sure manufacturers would love to be able to create implantable things you can wear… or not wear, implant in your body, that will get all kinds of data that you couldn't get from an external device. But I think healthcare monitoring is going to be number one. Also, you know, there's been a lot of development and this, this may be it's slower in coming, but there is a lot of development in transactional technologies-- wearable technologies that reduce the need for cash or even credit cards. Already we're seeing things like Apple pay and Samsung pay. There's a company I believe they're called Ringly, where they have a ring you can wear that has your E-Commerce information. You tap the ring on the device, and your transaction is paid for. Those have a lot of potential, I think, when it comes to money, people are going to be in account numbers and issues like that, I think there will be slower uptake, but there's certainly a lot of potential there. Some of the more interesting ones, I think, CR and things like hearing and translation devices, or real-time AI assistance. I'm sure a lot of listeners have either an Amazon Echo or Google home device, which are great. I love are Echo, we use it all the time, but imagine you're trying to communicate with somebody and you can get real-time translation in your ear for what they're saying. That's a bit Star Trek-ky with the universal translater type of...

JS: A Real life Babelfish!

CV: Yeah, exactly! Or, one are the coolest ideas with something like that would be for first responders or police officers going into an area where maybe English isn't the first language and being able to communicate better with the people that live there without having to, you know, go back and forth with a translator or a manual or anything. You could actually communicate with people that live there, that would obviously be good for both the people that live there and the police certainly in that particular area. And then, lastly, I feel like I mentioned it briefly a little bit ago, this idea of mixed-reality, overlaying virtual on to the real world and there's… if you just think about that for a couple of seconds you can envision all kinds of educational and training opportunities beyond the entertainment value. Educational and training opportunities that exist with something like that in a classroom, even in things like, you know, code enforcement for local agencies. If you have… you could do training without having to send people to actual facilities. You could show them, "this is the kind of violations you're looking for". Or you could even have, you know, if you see a comeback of Google glass-type of appliance, assistance with identifying issues. If say you're a code enforcement officer, you

could recognize right away that "this is in violation", or "this particular thing is not installed correctly", or there's a… have infrared monitor for heat where it shouldn't be…

JS: Almost like your personal assistant that's just checking all the things for you, and you're verifying. Just like a little voice in your ear, just letting you know "oh, you know, that pipe's not to code" or something like that.

CV: Yeah, and you know and a lot of these ideas have been around in… in… certainly in film and television for a long time. You have your officers out and there's a guy back at the command center has a screen with the red dots that are blinking, showing where they're going. But, you know, all that stuff is doable if we want to do it. It's going to be a collective decision that that's the way we want to go, but some of those really cool ideas have been around are, you know, the potential to take them from the screen to reality is there now. It'll certainly be a fascinating development to watch.

JS: I can't help but thinking about wearing mixed reality eyepiece and getting advertisement pop-ups but for real this time as opposed to on my computer screen.

CV: (Laughs) Yeah, that's certainly a likelihood. You can't ever quite get away from that. Its cool if you think about it, but when i was at Future Structure, we would always talk about living in this sort of system of systems. Your energy production system is, you know, is all sort of seemingly self-contained, but when your energy is talking to your transportation is talking to your water is talking to your infrastructure itself, you know, all these things start learning and sharing and communicating with each other, but then ultimately it comes back to us. Being citizens of these environments, where we create data by what we do how we interact with the world around us, and ideally just getting back to this concept of this internet of things, the data we create as individuals in our societies hopefully helps us make better choices, helps the people we elect to office make better choices, helps people managing our infrastructure make better decisions, with the end goal of making all of our lives better and the world itself a better place to live. It sounds like a grandiose, overtly-noble idea, but I do think there's a lot of value in that.

JS: How much of this is sort of the self-fulfilling prophecy? You know, we grew up, you know, they had Star Trek in the sixties, and the next generation and, you know, you see Star Wars, and you see all these things, you know, the handheld communicators, you see the tri quarter and now, here in 2017, people have handheld communicators - they're called cell phones and smart phones. You can scan something, you know, with your phone and it kind of does a thing. Is this sort of, you know, science fiction becoming science fact? Because, you know, we grew up with it and we all wanted it when we were growing up?

CV: I guess that's what you would call the real visionaries right? I mean if you look back at Jules Verne or an H.G. Wells and the things they wrote about were fantastic and unbelieveable at the time, but are commonplace or even old-fashioned now. So yeah, I think we look to those kind of people to create the things that inspire us to get our imaginations working, then a

generation or two later, the technology catches up and were able, if we so choose, to make those things a reality

JS: Well, I can't wait! Chad, thank you for joining us today via the phone. I appreciate you bringing your insight to TechNJ.

CV: Thanks a lot, John!

JS: That's all the time we have here today for TechNJ. Do you have any questions or comments? Feel free to send us an email to podcast@tech.nj.gov . For TechNJ, I'm John Silvestri, thanks for listening.