**RedZone Podcast Episode #60: The Most Innovative CIO in Washington D.C. Shares His Secrets – with David Bray, CIO of FCC**

Bill: Well, David, I want to welcome you to the show today.

David: Thanks for having me, Bill.

Bill: What got you to where you are today? Maybe we can go back to high school and college. Did you always have aspirations of being at the top, a leader in that regard, or did this sort of evolve throughout time?

David:  
[00:00:30] I can remember being about 5 or 6 and honestly seeing James Bond movies. I think that's what I wanted to do.

Bill: James Bond. I love it.

David:

[00:01:00] I don't know that's where I ended up. I can't say probably. One, I think James Bond is probably a myth but it's an interesting myth. Probably by about 12 or 13, two things happened. One, my parents said, "We fully support you going to college. However, if you want to go to anything other than a state school ... " My father was a Methodist minister, my mom was a school teacher, "If you want anything other than a state school, you're probably going to have to get a scholarship," and so that then triggered a second thing, which was at the time, the two classes I was really good at were both English and Science and when you survey landscape of what's likely to give you a scholarship, it's probably science.

Bill: Yeah, those were the two strengths of yours? English and science?

David: Yes.

Bill: Wow. Okay.

David:

[00:01:30] My father actually was a British literature major and again later chose to be a Methodist minister. My mom was also a school teacher, English as a second language and so I think that helped with the English bit. In terms of science, they actually claim they don't know where I came from. They said maybe I fell on my head at an early age, which might be the case. My grandfather had bought a personal computer, an IBM PC, when I was 5. Nobody else in the family really touched it so starting at 5 on up, this was an IBM PC with 64 kilobytes of Ram, taught myself how to program, started with basic and then later C and then assembly. Take it apart, put it back together again, and then ended up building my own computers throughout the years.

[00:02:00]

[00:02:30] That then motivated me to start doing computer simulations and things I could do with computer simulations. Just to sort of model the natural world because again you look around, go to my dad's sermons on Sunday and I'd try to understand what exactly is he trying to describe and can I model it on a machine? That led to science fair projects that actually caught the eye of the U.S. government and they ended up offering me a job at what was called, at the time it was called the Continuous Electron Beam Accelerator facility. It's now called Jefferson Lab which is much easier to say, but it was electron beam accelerator facility and they said can you help build some computer models of the electron beam.

Which, for a 15 year old, is great. This was about the summer of 1993 that I actually did the internship. It was between my freshman and my sophomore years and to be able to have access to the early days of the internet, pre world wide web, I mean mosaic was a web browser.

Bill: This is prior to the real consumer ...

David:  
[00:03:00] Exactly. Mosaic 1.0. Netscape was still a gleam in the eye in some respects of Marc Andreessen. Go for an [inaudible 00:02:59] of the protocols and so it was ...

Bill: Gopher.

David: Yeah gopher.

Bill: Oh my goodness.

David:

[00:03:30] I sort of got in at the ground floor and then watched what happened. Maybe it's because I wasn't a government environment. Between my freshman year and my sophomore year after that summer at the electron bean accelerator facility my parents moved up to a different church in the D.C. area, in Alexandria. I went to TC Williams High School and that's when I first volunteered with the soil conservation movement while I was a sophomore. I was still going to school but I was one of those people that school by itself didn't necessarily always interest me, so I needed something on the side. This was a chance to maybe build a computer model. Again, I was doing model of natural events.

Bill: What exactly is a model?

David:  
[00:04:00] Yes, one of the examples I did was an oil spill in the gulf of Mexico. It'd be a model of what are the current currents based on what NOAA's knows about what is the different weights of different oils and how might they spread. Then can I build something that says if I release this much oil at this much rate at this location, what are the different Monte Carlo probabilistic scenarios, this is where it might go.

[00:04:30]

[00:05:00] Again, this was pretty much self-taught. It was just fun. It was like trying to understand the natural world. First worked with the soil conservation movement and then got approached by the Department of Defense for what was called Walter Reed Army Medical Center. They were transferring images back and forth, x-ray images, the Belkin's conflict was getting heated up and they said well right now we're using a mainframe system, do you have any recommendations? I said well you could scrap the mainframe system and try and write something from scratch but that's a lot of work and it's going to cost a whole lot of money and not what I recommend. I actually recommended they just do a new graphical user interface with the existing mainframe system. As a result that saved them probably about 1/6th, 1/8th of the price and they could still do everything and get it done much faster than trying to commission a whole system from scratch. Also, I helped out with, they were moving towards Ethernet and have their own.

Bill: Yes, that's right. Their own proprietary networks that didn't even mess with the IP networks.

David:

[00:05:30] Yes, and it was inoperable, so that was a lot of fun. Then it was my junior year of high school, I got called down to the principal's office and I was like, and literally there are 4 individuals, they were all in suits, 3 of them had dark glasses. I won't say sunglasses but dark glasses, and another one was a man by the name of Doctor William Jeffrey. He was with the Institute for Defense Analysis, it's a federally funded research development center. He said would you like to work on some classified projects? The science fair projects had caught their eyes and I was like sure.

Bill: It's well behind your science fair right? Well behind the science fair.

David:  
[00:06:00]

[00:06:30] Basically it was, there were small satellites that were legacies from the ballistic missile defense organization days, the [inaudible 00:06:01] programs days. Could we find somebody and use this for it? I mean, again, not even 18 yet. It was interesting. I had to fill out my security clearance form and they said what have you done since you're 18 and I'm like I'm not 18 yet. Their like okay what did you do in the last 6 months? It was probably a very easy adjudication process but underneath the tutelage of Doctor William Jeffrey, he said well what project do you want to do? I said well can we model the spread of forest fires from space? If we can pick up a forest fire from space, we can probably do that, could we scan the foliage, could we scan the wind conditions and then based on that guess where the forest fire might go? He gave me front launch.

[00:07:00] I worked part time well I was in high school. Summer I worked full time. Senior year it was my Westinghouse science fair project. Part of the challenge was I couldn't fully declassify because the meter resolution that we were offering was at the time, was kind of sensitive but it was a wonderful exposure that there are exciting things that can happen within government. It's not everywhere and I think I had a very rare opportunity at any age to be exposed to that. I guess maybe that was how I pivoted from wanting to be James Bond to what this is.

[00:07:30] Then went off to college. While I was good at computers I said I was going to make myself understand biology, in particular evolutionary biology because I had looked at it that in some respects evolution is how selection pressures have programmed species. Not deterministic but we have been shaped by, in some respects, what our environment has selected for. I want to understand how that happened so then I can understand the interface between something we designed versus something that's not necessarily intentional design, it's just a current result of biology. Briefly did a summer at NIH, also doing computer simulations. While I loved, it was really complex protein folding. There was no human interaction. I realized that I need to have some human interaction or else I'll go stir crazy.

[00:08:00] that led to me my sophomore year building a computer model of the spread of HIV Aids in South Africa. South Africa was interesting because while apartheid ended in 1994 and that was a good thing, unfortunately it also opened up their borders to the rest of Africa. They went from having less than 5,000 cases reported with HIV Aids in 1994 for a country of about 40 million, to 2.4 million in only 4 years.

Bill: Oh my. In 4 years?

David:  
[00:08:30] In less than 4 years, in a country of 40 million, my model was saying that if they didn't take an intervention the next 5 years, it was easily going to be 1 in 8 South Africans was going to have HIV Aids, in 5 million. That was hugely challenging because the challenge was one the existing government [inaudible 00:08:41] was claiming that HIV Aids was a western myth. There had also been some scandals where some scientists in South Africa had used a medication without going through any clinical trials that they claimed cured HIV Aids. It ended up, it caused chronic liver failure and so it wasn't really a cure.

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[00:09:30] I always try to convince the papers to write about this issue. I was a volunteer journalist in addition to doing computer science. Kept on hitting my head against the wall. After talking to my journalism professor he's like well maybe you just can't be objective. I'm like maybe I can't. Maybe that's my problem. Instead of focusing on the paper I ended up using my last month of my internship teaching HIV Aids in the schools, in the town of Calesha, which is outside of Cape Town. I ask them, I said so where do you get your information? They said we don't. Nobody ever talks about it. It's a taboo subject. If we do get any information we have to go to the library. I'm like that's a problem.

[00:10:00] I came back from that experience in 1998 and I talked to my advisor/mentor, his name was Garland Richmond, Doctor Garland Richmond at Emory and I said, I'm kind of disillusioned, I'm kind of in this ivory tower, yet all these things are going on in the world. I might need to take a year off. He said take a year off, hopefully you'll come back. Just know, wherever you go you will always make a larger difference as an insider than you will as an outsider. I didn't quite understand what he meant at the time but I took it under my wing. Ended up I would work for Microsoft or Yahoo as a short-term stint, 2 to 3 months programmer. Ended up being a project manager and software developer. This was the early days of the dot com boom. Then I would take time off, about a month or 2 months using those funds to volunteer as a habitat for humanity international crew there. My first place was the Philippians, and then I later did Romania, Guiana, Honduras, South Korea.

[00:10:30]  
Bill:  
This public service piece was very early on for you?

David:

[00:11:00]

[00:11:30] Very early on. Actually I'd say it was party, for me I mean, again my parents chose what they did to be of service and for me, I think I was doing the habitat for humanity international experiences because I was trying to one, understand how the world can have a combination of good and bad at the same time happening. I was trying to understand what can I do to try to address that. One I found, that was amazing, was you'd come to these areas like Nepal, I was in Pokhara, which is to the southeast. They have generally not a lot. Here you are and they would invite you as a stranger to your house and they would offer you crackers and coke, which you know is probably 2 to 3 weeks of their salary. You can't say no because that would be offending but how many of us would welcome a complete stranger off the street into our house and offer anything near 2 to 3 weeks of our salary. I came to a theory that actually the less you have, you're sometimes happier.

Bill: Absolutely, yeah. It's an advantage to be able to want what you have.

David:

[00:12:00] Right, and just all of you know the children play in the field but you could do a pickup game of soccer with, and again their complete strangers and they would welcome you. Came back after all that, did finish my degree, and in the process of coming back to finish my degree got approached by the Centers of Disease Control and they said, which was right next to where I was going to school, Emery University, and they said we have this thing called a bioterrorism preparedness response program.

[00:12:30] It was created because the Syrian gas attacks happened in 1990. Also because in 1970s the former Russian republics, some of them had stock piled small pox, couldn't find all the viles of small pox, couldn't find all the scientists, it was a concern. They said well you have a background in computer science and biology, you also have some clearances, would you do it? I said sure I'll do it while I'm still going to college and maybe a year or two after I graduate. I don't see this as my career but sure. It's kind of a mood killer at a party when people say what do you do? I do bioterrorism preparedness. It's like okay next. It's not the most enthralling subject but it is maybe getting close to James Bond, who knows.

Bill: Right.

David:  
[00:13:00]

[00:13:30] I graduated and shifted to full time status with the program and literally was supposed to brief the CIA and the FBI on September 11, 2001 at 9:00 in the morning as to what we do, technology wise, if a [inaudible 00:13:01] happened. Of course 8:34 the world change, we literally piled computers into cars, set up an underground bunker and then flew people to both D.C. and New York to deal with the response. Did not sleep. If we slept it was on the floor and then we got back up, but we didn't sleep for about 3 weeks. October 1 we stood down. October 3 is when I flew up to [inaudible 00:13:23], gave my briefing and then 24 hours later the first case of Anthrax shows up. Initially when I got back they told me I was [inaudible 00:13:31]. I just gave a briefing.

Bill: 24 hours later it showed?

David: Yeah. The first case was in Florida. It was one case.

Bill: The postal service around that time, right?

David:

[00:14:00] So far it had not shown up in postal service yet. It was just 1 case of an individual presenting anthrax in Florida. He worked at a publication but we couldn't find any threat letters at the time and so part of how medicine works is [inaudible 00:13:52], which is what's the most likely. At the time they thought well maybe he'd been exposed to anthrax through a sheep or sheep bowl or something like that, but we did say in the program we said that if you find out that there are threat letters or something's through the postal system, you're going to need to start doing [inaudible 00:14:06].

[00:14:30] A little bit of things also saying background with that whole experience. Prior to all of this, so the agile manifesto came out in March 2001. I had been an early proponent of doing [inaudible 00:14:17] development partly from my days at Microsoft and Yahoo I was like you don't want to do waterfall stuff. Of course we want to do sprints. What was interesting was the existing machine said well no you've got to buy in to the 5-year plan, the 5-year enterprise architecture. You don't get your budget for another 3 years because it takes 3 years to go through Congress and I was like we don't have a deal with the terrorists not to strike until we've got something ready.

Bill: We've got to move fast here.

David:

[00:15:00] We've got to move fast. I was a bit of a hair tick. In fact I think I irked some of the IT leadership at CDC because I was not buying into their enterprise architecture. They were like he doesn't understand, he's new, we'll get him to understand it. He doesn't understand waterfall, we've got this all planned out and it's like I just got to get the program stuff done. That happened and then the other thing that happened, when the Anthrax event started to unfold what I witnessed was a lot of good people, but not working together well. In the sense that ...

Bill: Kind of working as independently but not as collaboratively?

David:

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[00:16:00] Each had their own different hierarchy's. I mean CDC obviously was dealing with it as a public health event but the anthrax events were also a crime science, so FBI also needed to be involved. I mean I think the statistics are, at the time, this was 2001, so it may have changed. For any bioterrorism or chemical terrorism event, there would be at least 50 different agencies at the state, local, and federal level involved. Anyone that was on the road or that was in a park, just because it's all these different jurisdictions. Clearly when the constitution was written, the founders were not thinking about who gets over site for a terrorism event. That's not. What I think we're dealing with is there are new emergent threats as a result of technology that was never conceived of before and that are existing organizational structures can't respond to well. It's not that these people don't mean well, in fact their extremely smart, it's just their reporting systems, their hierarchy's, their incentives, are all in verticals, when in fact we need them to be horizontal.

[00:16:30] I saw then, then we dealt with the response to West Nile and we dealt with, I was literally going to go home at about 6:00 at night when I got a call about this thing called atypical febrile illness in 2003. That later turned out to be SARS, so we dealt with this severe acute respiratory syndrome. Monkey pox happened. There were some other things like Risen. Kind of eventful. At the time, my boss, which was with the U.S. Public Health Core. He was a captain, later became an admiral. He said you really want to make a difference you can either get a rank of admiral or general and be your PhD or wait 20 years.

Bill: To be heard you had to sort of be at ...

[00:17:00]  
David:

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Be at the right place. I said it seems like a PhD is the easiest one I think. After about 2 or 3 years I'd want to go study something else and their like well no you have to focus and you have to get through this. A PhD seemed like that was the easiest. Applied to 15 different places at ended up back at Emory. They just made the best offer and I actually could use the data that I had done at the CDC to earn my PhD, but it was in the business school, which was kind of interesting because fortunately my dissertation chair, Doctor Ben Guzunski, he knew that I wanted to actually look at how to improve organizational response to disruptive events with the idea of applying it to public service.

Bill: Interesting.

David: The premise being that there's going to be more and more disruptive events, partly because of exponential change, but laso just because globalization, our world is now increasingly connected. We should not be surprised that there's both disruptive in a negative sense, but also disruption in a positive sense. There's going to be these opportunities ...

Bill: Sure, their models are going to be turning upside down.

David:  
[00:18:00] Right, and that it worked well in the 1770's when packet latency between New York and D.C. was 3 days and that was only on horseback, but we know that milliseconds they are connected, so to me that was a fascinating question. It was interesting because I applied to schools of public policy and their like we don't get what you're saying. How does technology impact public policy and I was like ...

Bill: You actually, when you were applying for those schools, what year was it?

David: This was 2005.

Bill: Yeah, because this is actually ahead of, I could say there would probably be more schools that understand it today.

David: They do now.

Bill: But not then.

David:  
[00:18:30] No. Literally, 2005 people said what does technology have to do with public policy and I was like a lot. There's also some cases where, once I got accepted in a program, I would write articles for an organizational science and how to improve responsiveness to disruptive events and I'd submit them to schools, to journals that did public policy or political sciences and they said what does business and organizational science have to teach us about doing political science and public policy? It's like ah.

Bill:  
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[00:19:30] Well it's interesting that evolutionary biology interests and health interests and this response because it seems to me a lot of the models of how we respond to digital lead to threats, if we follow a biological model, because if we deploy, the body deploys automatically to deal with and it's very efficient. I mean it's not always succeeding in winning in battles but it deploys quickly. White blood cells go where they need to go, it's deployed without shutting down other systems. If you ever need to go to work, sometimes, as long as you're ... It's constantly, so it's interesting how this intersection for you, follow this evolutionary biology interest, doing modeling, what are your thoughts about that?

David:

[00:20:00] I think we have to, exactly as you said, we have to emulate ecosystems, we have to emulate networks if we're going to be resilient and responsive and move with speed for the exponential area ahead. For public service that's why I use the word public service. If I want to be deliberately provocative I'll say federal government is a 20th century word that is increasingly out of date because if you think about it, most of us have a, either a regular phone or a smart phone. Smart phones now a days have more computing power than what president Reagan apparently had in the early 1981 period.

Bill: You can see it now.

David: So you have a super computer in your pocket per 1980s standards. How many of us would be willing to volunteer if we knew it was going to be treated anonymously and with our privacy intact, air quality information, water quality information, transportation quality information, that if we volunteered that information would make our local communities healthier or even safer.

[00:20:30]

[00:21:00] I mean you look at what happened 3 weeks ago in New York, there was the incident where they were trying to find someone who was a suspect and by involving the community they were able to quickly identify and deal with it. What I would submit is that prior to the era of internet connectivity and essentially people getting the equivalent of super computers in their pockets, the work of what was called government had to be done by government professionals because you just didn't have the connectivity. I think that's increasingly outdated and that's why I use the word public service because now if the public wants, they can volunteer information, they can even volunteer to actually remix the data in interesting ways. If they want, they don't have to. In ways that would actually inform.

Bill: I think I've listened to a video of yours where you talked about that, a real practical example of how kind of scaling to the public sort of breaks the model where we've got to go to get the permission from, if we're not getting permission from government and if we can go right to the public. I think it was on broadband.

David:  
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[00:22:00] Right. I'll give you 2 examples. One was what we did here at the FCC and the other ones outside. At the federal communications commission I arrived in late 2013 and they had been spending about 4 or $5 million a year to monitor whether or not the broadband connection that you were getting from an ISP was actually the speed that they had promised you. This was with volunteer support and Neilson ratings. We wanted to crowd source it and see if people would be willing to actually share their mobile broadband connections to really getting it, however you can imagine in late 2013 saying hi I'm with the U.S. government, would you like to download an app that would monitor your broadband connection, not going to succeed, but we made it open source and I think that was the brilliance of what was done at the FCC was by making open source, people could check and see one their not collecting your IP address so you don't know who you are.

Bill: It's like on git hub, do you just ...

David:

[00:22:30] [inaudible 00:22:56] code, don't let your IP address, they don't know who you are in a 5 mile radius and their terms and conditions are only 2 pages wrong. When was the last time you downloaded anything that was 2 pages long. Well most people never took the time to check the code, a few trusted authorities like BFF did, and as a result by them saying yes their actually doing what they said, they dimmed security and privacy by design. It was the fourth most selling app, right behind Google Chrome for awhile in the iOS store. To me that shows that the public, if you can get trust, and part of the trust is being transparent about what the algorithm is doing, they do want to get involved with public service. That was a motivating factor.

[00:23:00]  
Bill:  
Instead of going to you to govern the private sector, essentially it's almost, not a malitia, but it's almost like people are volunteerign to go in there and do it themselves.

David:

[00:23:30] Their doing it themselves, their doing it across the entire nation. All across the country. It wasn't just certain pockets. It was the entire, different parts of the nation, people just volunteered to use their existing phone as a sensor that could help inform where was broadband fast, where is broadband slow, where are things that we need to address and so I think, I would imagine doing a similar app for air quality or water quality if you could collect it on your phone. As long as you were open and transparent about what you were collecting and you make sure you do privacy by design. The public probably would be interested.

[00:24:00] Another example happened with the earthquake that happened in Haiti. When the earthquake happened in Haiti, SMS still was usable and so people were using SMS to send text updates like hospital, need some supplies over here, this bridge is down, and there was actually apparently a case where there were 2 women, they were sisters, one which was 9 months pregnant. She started to go into labor so her sisters trying to bring her to the hospital and by using SMS text updates for her phone, and using updating on Facebook as to what was going on, this was actually to provide awareness as to where they were, how they couldn't get around certain roads where these bridges were down, and actually the U.S. Navy was actually able to dispatch a team to bring her back to a hospital ship so she could actually successfully give birth there.

[00:24:30] It's what David Brin talks about which is called suveillance instead of surveillance. Surveillance is done by some authority. Suveillance is what we choose to do, it's what we do to each other. It's a su part.

Bill: This is possibly one of the bleed out effects of privacy sort of disappearing in some effects than the theory, one of the theories is that essentially makes more transparent, so makes people better, or makes people essentially, you can't hide so you make better decisions?

David:

[00:25:00] Well, yeah. Or it's just to try and collect all that information from any one organization as to what happened in a disaster or a crisis it would be very time consuming but by breaking into smaller pieces as to what's going on with this disaster you get more localized, more specific information. It doesn't mean that people won't do misinformation. Someone might give misinformation and claim something's not working or is working when it's not, but the many eyes approach will begin to weigh in and even if someone tries to give misinformation ...

Bill: The numbers are so big.

David: Yeah. It's hard to do. It's sort of taking a huge problem and breaking it into smaller chunks and using, in some respects peoples own self interest to report about what's going on in their environment.

[00:25:30]  
Bill:  
You, early on, were learning how to solve or beware of big problems and solve it with technology, have a lens on a human problem that was exponential, big in scope, and then how you could make your impact in that particular area with technology.

David: Right.

Bill:

[00:26:00] Interesting, and I've been talking on the show a lot recently about exponential change, exponential technologies. There's a lot of technology folks that listen to the show and maybe this is a good way for us to kind of maybe talk about how you lead, in a world of exponential change, how are you making bite size wins towards the bigger whole? Because I think that's, otherwise people can get overwhelmed by the scope of the problem but you've been dealing with it since you've been 15, 13 years old so these are not overwhelming to you. You just take them. How do you frame it and how do you take action?

David:

[00:26:30] Sure. For any leader, technology leader or C-suite leader, trying to grapple with the fact that the world is changing exponentially. I think the first thing you have to recognize is even a startup today, in 5 or 6 years, will have legacy technologies that are out of date. The good news is were all going to be burdened with legacy technologies. We have to come up with strategy of trying to avoid having them draw us down too much. Now, FCC when I first arrived, they had 207 different systems all on premise, average age more than 10 years old, we had some that were 19, 20 years old. They were consuming more than 85% of our IT budget just to maintain them.

Bill: Wow. 85%.

[00:27:00]  
David:

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85% and growing. It's just not sustainable. Plus there had been 9 CO's in 8 years and so I'm number 10 and I'm sure everyone was looking at their watch saying how long is this guy going to last? I put forward 3 things, which is 1, we have to get out of the business of trying to maintain systems ourselves. We have to get out of the business of maintaining code ourselves because that's not our forte. Our forte is trying to meet the mission with the public, with our different stakeholders and industry, to essentially be that trusted broker on issues involving communication. With that proposition then we actually were able to say well let's move to public cloud. Let's move to commercial service provider. Let's get out of the business of trying to run IT ourselves because that's just not scalable.

[00:28:00] In 2013 that was kind of controversial. People were like well if you go to public cloud how do you know it's not going to be hacked into. I was like nothing on the internet is going to be completely secure, however what you can do is you can increase your resiliency and increase again the number of eyes looking at it and if I just do it on premise, it's just my people. If I do it public cloud solution it's my people plus whatever that vendor is, so I get economy of scale, plus that vendor is going to have their economy of scale updating the system and doing the right patching as opposed to be having to take that burden on. That's what we did. At the time there were a lot of people that said this guy is going to flame out. It's not going to work. Maybe it will still flame out, who knows. Hasn't yet.

[00:28:30]

[00:29:00] Second thing, though, was I had seen, again referencing my days with the bioprevention program at the CDC, that top down can not respond fast enough in a rapidly changing world. I wanted to empower the edge. I told all of the team members, both the existing government employees but also the contractors, I said I want to empower the edge. If you see something that we can do that will allow us to get an exponential increase in speed or efficiency or resiliency, make me a pitch. Give me 3 reasons why we should do it, give me 3 reasons why we should not because a lot of time people don't think about that. With those 3 reasons why we should not, then come with how are we going to mitigate those 3 reasons why we should not do it. Maybe it's that this is going to create some distress because people are used to having their data on premise.

Bill: Show me why it won't work. Come up with your great ideas, show me why it won't work, give me 3 ideas, and then how it's going to work.

David: Yes, and how you're going to actually get around the challenges of it not working.

Bill: Okay, but that's a concept that I think a lot of enterprise CIOs struggle with but that's exactly the, you're pulling ideas from the edge which is essentially, it'd be too astroturick but the reality is it's a biological response. You're getting data right from the edge of the ecosystem to make decisions.

[00:29:30]  
David:  
I mean it's rare that you ever get a chance to write a PhD that can then get put in practice but that's exactly what my PhD was on.

Bill: Really? Interesting.

David:

[00:30:00] I called it ecosystem reproaches and basically with an ecosystem if you shape the incentives, if you shape the normative values and you shape the trust of any environment, that will make people more willing to be free agents and identifying the edge what's going on and you'll get better organizational responses. I see as my levers as a leader is the narrative I'm using to motivate people, the incentives to motivate them and yes this is public service so we don't necessarily have an IPO, but I can give them a shout out at team meeting and recognize them on Twitter and say thank you for a great job. They could have a meeting with the chairman, the chairman can give them a kudos. In a lot of respects what science and psychology has shown is that if you give people autonomy and measurable progress and a meaningful mission, in some respects that's in a lot of ways worth it more to people than salary once you meet a certain threshold and that's what I tell people.

Bill: Autonomy?

[00:30:30]  
David:  
Autonomy, measurable progress, which actually is why we play video games. People play video games because you're racking points. It actually helps me to have measurable progress too because I want to know how their doing as to do I need to help them pivot or not and that meaningful purpose, I mean we've got plenty of needs here in public service that are really impactful for the nation. We actually had cases where there was one individual, Dusty Noun, change agent 001 I call him.

Bill: I love it, you're using that 00 theme here.

[00:31:00]  
David:

[00:31:30]  
Yes we do. They all have licenses to change. Not to kill but to change. Maybe kill old systems. He was one of our first change agents that parachuted in. He had been working on the west coast. He had his own company startup and initially we intrigued him and he met and he said well maybe I'll do one day a week. So he did it one day a week. He would telework. He said well maybe I'll do 3 days a week. Then he started flying here. He actually started liking the vibe and people. To his credit he brought his west coast vibe, however what he also did, which I think is really crucial to his success, is he took the time to also understand the existing narratives, the existing ecosystem that he sought to disrupt.

It wasn't as if he just parachuted in and said well everyone follow me. It was how is the different relationships here and then how am I going to intentionally disrupt that and he was very successful. He earned trust, he brought them along, but to his credit, and then he actually ended up moving here full time to D.C. he still has a startup on the side, which is like I'm fine. It's one of those things that you don't have to do either/or. If you want to do a startup and work for public service.

[00:32:00]  
Bill:  
That's an interesting piece though because as you know my work with singularity, that's one of the big pieces of looking for disrupters. Who's going to disrupt you and then either align with them, partner with them, which you did, bring them in. That's a core strategy to embrace the pace of change.

David: Yes, if we don't disrupt ourselves, somebody else will. For public service if we don't disrupt ourselves, then you start to have interesting issues.

[00:32:30]  
Bill:  
You've actually been vocal about this. You said you're not sure that government can keep pace with change and if it's ability to govern because some of these technologies are going right around government without asking for permission.

David:

[00:33:00] Right and I think that raises the question of how do we address that? I mean if we don't figure out a way to move with agility and speed, and I hope we've done a mini experiment but it's just that, it's just a mini experiment with the FCC to show that we can because 2 years after I had parachuted in, instead of spending 85% is now less than 50%. That was done on a flat budget. In the past if you had asked us to set up a new system it would have taken 6 or 7 months to set up a new system, if you gave us requirements we could have a working prototype in less than 48 hours now. That's because we're remixing micro cloud services in interesting ways.

Bill: So you can test and experiment a concept or an idea in less than 48 hours?

David: Exactly.

Bill: This is what this guy helped to bring this ethic in?

David: It was him, I want to give shout outs to Sarah Millican, Steve Bon, Mary Soul ...

Bill: No, no let's do that. I mean on the show notes we'll reference them.

David: Give my little shout outs.

Bill: Yeah. Yeah. We'll reference them.

[00:33:30]  
David:  
It really was a team. It was a network approach, which was, again, it was me, almost being like an internal ventracapitalist on the inside.

Bill: Oh I like that. That's great.

David: Then just saying run as fast as you can, I'll give you top cover. Work with the stakeholders. Recognize you've got to bring them along but run as fast as you can.

Bill: So you're kind of using like a Google incubator idea. I'm sure that ...

David: Yeah, only in public service.

Bill:

[00:34:00] Okay, in public service. Basically, how can you tell an idea that's just crap? I mean do you let them run and then put a governor on it saying if it doesn't produce, if I can't see something out of this micro experiment than you've got to move on to something else?

David:

[00:34:30] Well, part of it is if they come to me and they have 3 great reasons why but they don't have any real reasons why not. That tells me not talk to the stakeholders. I mean, the challenge is if you truly were in the private sector, you don't have laws that say you have to keep this existing system going. Often times we have this thing that says existing system needs to keep on going even though it's more than 15 years old and nobody's using it anymore. If they tee it up and they have that good reason which was why we shouldn't [inaudible 00:34:32]. We can't do this because there's a law against it and so you're going to have to go talk to Congress and I'm like okay I'll take that on. If they've not really thought through why we shouldn't, that tells me they've not talked to enough stakeholders yet.

Bill: Okay.

David:

[00:35:00] They don't understand the environment their trying to disrupt, but if they do, and then I can work with them as to how we're getting around it. Maybe it's going to be we have an image by the name of Tony Summerland. We call him light touch because he's kind of our negotiator. He's anything but light touch. When we send in the negotiator Tony Summerland is the negotiator. That, to me, when you show that you've done second and third order thinking it's great. If not, then I'm a little more cautious. I'm like why don't we come back to this in another 3 or 4 days after you've had a chance to talk to some more stakeholders. Then if they run for it and it turns out it's not working out, generally I'll be checking in about every 30 to 45 days. If say in 45 days it's not working, then we'll say well okay then how do we pivot?

[00:35:30] What we do do, when I first arrived there used to be these massively long meetings which made no point in terms of updates. We have now just 20 minutes on Mondays and Thursdays. That's the entire team update.

Bill: I love it. Yeah.

David: The change agents get to go up on stage themselves. We have this thing called a boardwalk. It's outside here. The top 10 things we're working on, they know we only have 20 minutes total for the entire, so they know if they talk more than 2 minutes their using someone else's time. It's just what's going well, okay, anything we need to fix? What do we need to pivot? Any issues and things like that. If there's anything more than that, it can be talked about after the meeting.

[00:36:00]  
Bill:  
Interesting, so you're almost like keeping like a portfolio of projects and ideas that are essentially your experiments at the edge and see which ones are going to have some bite and build some steam.

David: Yes, and I'm counting on them. I use the doctrine of, I call it the doctrine of no surprises, which is I know there's going to be 2 by 4's that are going to hit me in the back of the head, just let me know they're coming before they hit me in the back of the head.

Bill: Okay. How would you define a meaningful experiment? Is there a budget around it? Are you given a slush fund for $1,000, $5,000, $10,000 experiments or are a lot of these experiments just using free tools and people's time?

[00:36:30]  
David:  
By going to a platform approach and having us all part of the service platform in place, people can experiment with existing platform and services in place without having us to invest in a new one. In some respects I look at like we're giving you different pieces of the quilt. How you stitch them together, that's something you can do.

[00:37:00]

[00:37:30] In some cases there's not existing software service or platform of the service tool. Then, unfortunately, there's definitely no slush fund. The way that public service works is you have to tell administrative and congress how you're going to spend your budget and using it to tell the internet mans and so that makes it a little bit challenging. We do have funds that are earmarked for IT improvements or funds for upgrading our existing infrastructure and so in that then we have a process in which is called capital planning. In which people can actually propose I want to try and invest in this platform. Usually we'll work with the vendors and we'll work out some arrangement where it's not we just bought it for 5 years because then in 6 months you realize it's not working. It's usually to try it, see how it goes, if it goes well then we do the larger buy and larger buy after that.

When anyone calls me from the outside as a vendor, because I get a lot of calls, I say well you really need to work with one of our change agents first because they'll come to me. Again, I'm going to be assessing what are the different experiences.

Bill: You're the portfolio manager.

David:

[00:38:00] Yes. Work with one of our change agents that understands the mission context. Is this something that's needed for public safety or is this something that's needed for the international bureau or for wireless or consumers? They'll understand the mission context in which we're bringing this. This is what I like to say, there are no IT projects, there are mission projects that have IT baked into them. Then when you come and make the pitch you're actually pitching me on the value of the mission input that then happens to have IT base into it and it's that alignment of a vendor plus a change agent on the inside and then I invest in it. The vendor knows. Their as much as the change agent to see what they can do.

[00:38:30] Now, if it doesn't work out, we learned something. The only thing I say is let's make sure we don't repeat the same learning experiment twice. Lets learn from it and move on.

Bill: Have a tangible learning point.

David:

[00:39:00] But, I would say our batting average is pretty good and, again, as witness we've got in speed, and on a flat budget we now can use the money that we had been spending to maintain old systems by now going to public cloud and commercial service provider, to begin to actually untangle some of the really old systems, like we have some systems that are in 4 different languages. They have a data model that has been revised at least 5 or 6 different times and so you have to ... And so obviously if you try to bite that all at once you wouldn't be able to swallow, so what their doing now is running some things with the commercial service provider that are the old things and in the public cloud using existing platform with minimal changes to it than more customization, move modules over time. You can show that, basically it's like retrofitting a old MD80 to a Boeing 777 in mid-flight.

[00:39:30]  
Bill:  
Yeah. A huge impact 3 years reduced by 35%. Now, what I wanted to talk about next is your concept of some of the leadership principles. You made a difference between a leader. I think a lot of people could benefit from this, is your concept of leading versus managing. Maybe in the context of exponential change I'll let you give it some thunder because that ... I think I know where you're going to go but I love to hear your response to that.

David:

[00:40:00] Sure. One of the first things I share whenever I parachute into an organization is there is a difference between management and leadership. Management is when we do what's expected of us. To some degree we have to do that. If we don't meet the expectations of our boss to a degree or our peers or are reports, we'll be quickly out of a job and in public service we actually have expectations from the U.S. public, from the congress, the administration as well, so there's some added pressures.

[00:40:30] Leadership, however, is when we step outside of expectations. It actually comes from the Greek word meet, which means to sin unto death and that's because back in ancient Greece, the leach were the ones that carried the flag in the army and that's all well and good until one main army meets another navy army and the first to die of course are the leads because their carrying the flag. The reason why this is so crucial for exponential times is if all we do is meet expectations we will continue to fall behind, and not just fall behind incrementally, we'll fall behind exponentially because we'll be [inaudible 00:40:42]. We have to step outside expectations.

[00:41:00] However, I can tell you tons of stories throughout my career, I mean Aaron gave me one at the CDC where people are like buying into the 5 year plan, follow work and I was doing agile. There are other times too. There's been times the Department of Defense, intelligence community, the FCC even, where people say get back in your box and we're like but I enjoy being outside my box. Any effective leader needs to recognize that when you step outside expectations you're going to incur friction. Someone's not going to be happy.

Bill: Not comfortable.

David:

[00:41:30] Yeah, you're not doing what I expected of you, get back in and their going to try and pressure you back in. Interestingly enough, often times the people that pressure you back in, well it may come from your boss, often times it comes from your support base. Nelson Mandela said his most trying moment as a leader was when he had to turn to his own party, the African National Congress, and say we're going to make peace with the white minorities as opposed to having a violent revolution. He almost had a coo from his own support base. Izacrabeam in Israel, when he actually turned to his own Israeli people and said we're going to make peace with the Palestinians, he was actually assassinated by an Israeli.

[00:42:00] A good leader needs to recognize that your own support base may say yeah go further on the ice, go further on the ice, before you know it you're so far out on the ice that you fall through and you're like where'd he go? I don't know, and nobody's there to help you. When you incur friction, have a strategy for how you're going to control it and just the right level where it's enough to begin to melt through the jello and move the car forward. I often say that you need friction to move the car forward, but if all you're doing is spinning your wheels and just creating heat and light, that's not going to help anyone.

[00:42:30] Make sure you're moving forward and bringing people along. It doesn't mean you need to bring along everybody. Some people may not end up on the journey but make sure you're managing friction and that in the end you have a strategy that maybe in the end you do have to get killed, in some respects. There's examples of leaders that metaphorically had to be killed or physically had to be killed to help their people get to a better place but whatever it is, be aware of that, and also recognize that quite frankly when you're initially being a leader, people may not like you much.

Bill: You also talked about risk and transparency now too as a leader that I think you had a, maybe you can share that story too about in a very transparent world how do you hide your mistakes?

[00:43:00]  
David:

[00:43:30]  
Well I don't think you can hide your mistakes. Let's be honest. On that, when I arrived at the FCC I wanted to create an FCC\_CIO Twitter account and they said well why? And I said well communications. They said well you can do a personal account. I was like I don't think people care about me personally. I don't think I'm that interesting personally but I do think the FCC CIO would be useful. I ended up created the account in November of 2013 and the goal was to have conversations about the challenges that were facing. Just because I knew that it was going to be hard. Actually the first week that I created the account I was going through some old file folders and everything that had been left by my predecessors and I found a still unopened shrink wrapped 56K modem.

Bill: Really? Did you take a picture of it?

David: I did and I posted it on Twitter.

Bill: Oh, no way.

David:

[00:44:00] I was like I've got to have a sense of humor about this which is hopefully our upgrades will be better than this. What are you going to do? You either laugh or cry. I'll choose to laugh. What have I gotten myself into? That allowed me to begin to have conversations that said look, yes we know our systems are old. Yes we know they need to be updated. Some of them look like they were developed in 1999, in fact they may have very well been developed in 1999. We recognize that. We also have flat budget. We have constrained resources and so we're going to have to do a prioritized approach but I am open to your recommendations for the public as to what we should prioritize first.

[00:44:30] By being open that began to at least put some humanness to the role that it wasn't just some jerk. I think that was useful. The other thing though is also if things went wrong they knew they could e-mail me or tweet me. I think we knew that there are risks to what we are doing but, in my opinion, there was even more risk to not doing anything. Maintaining the status quot. By having that conversation if something's not working, we can talk about it.

Bill: It's an analogist to the Greek story you just mentioned with the guys that just walked out in front. That's your account to walk out in front.

David:  
[00:45:00] Carry the flag and hope they won't run into another flag that's going to spear me who knows. It was humanness and I think ... The other example I would give in terms of being transparent is let's think about the example of a young incident. Back in 1904, a young incimident with the U.S. Navy.

Bill: Incimident?

David:

[00:45:30] Incimident, Chester Nemetz, he ran his boat aground in 1904, U.S. [inaudible 00:45:13] in the Philippians. Was court marshaled, assigned to submarines, which at the time was not a glorious assignment. But 35 years later became one of only 2 5-star admirals we ever had. Now, let's play this in today's era. An incin, lieutenant, lieutenant commander runs his boat aground in the Philippians. One how long are Twitter and Facebook would have been fire him. How many news [inaudible 00:45:36] would have been what was he thinking?

Bill: Incompetent all this, right.

David:

[00:46:00] His bosses would have probably been called before congress and we would have probably been out a future 5-star admiral, and actually the thing that I found out even more recently is that apparently there's actually now against U.S. navy code. If you run your boat aground even once, you're automatically out. No exceptions. I asked the question, which is why I celebrate the internet has made us more transparent, does it make us less tolerate of individuals that take risks, learn from their mistakes, and as a result are we selecting for public leaders that are risk takers? Again, I mean I'm doing this interview with you right now, who knows maybe tomorrow I might have something that has [inaudible 00:46:18]

Bill:

[00:46:30] To your philosophy about taking innovation at the edge and being more agile whether in government or private sector. I mean this is a strategy but also we have to weave in empathy and mistakes and accountability and where can we brush things under the rug with like you know this is just a mistake. We're just going to keep moving along with this person. When the public can run in and have its say on that. That's very interesting.

David: Yeah. I think it's ...

Bill: It's like tolerance. It's very much a tolerance.

David:

[00:47:00] Tolerance I think is definitely needed and I think that maybe the challenges, does the internet make it easier to be tolerant or does the internet make it easier to be intolerant. It is unclear. I have seen interesting things where, so one statistic that's worth noting. Of the countries involved with the Arab awakening. This is according to World Bank. Every country, except for Tunisia is unfortunately now worse off as a result of the Arab awakening in terms of their economy or in terms of their social and economic structure than they were before it.

[00:47:30] The question is why? And there may be many different factors. I do wonder if the internet makes it easier for intolerance to be spread versus tolerance. It's harder for people when you're in an anonymized context to identify that really we're all human. When we're talking to each other right now, we see each other as human, we have eye contact, we lose that some on the internet. I think that's an interesting questions that's worth asking. The other question that's worth asking is how did the Berlin wall fall and not in 1989 but fall in 2009? Would have been easier for detractors to spread misinformation and make it less of a peaceful transition as it was as a result.

[00:48:00]

[00:48:30] This is where I think we really need to have conversations about what is the future of any type of representative democracy, any type of republic. I do think the future is, the thing we're going to be thinking about is public service and being networked. Involving the public in doing things if they want that in the past had to be done by government professionals. I also think it's involving more public private partnerships that don't have to have things always done by them. If there is a role for what the future public service is, we do need to have a place where you can establish trust and it's not just by government professionals. Again, by having that conversation on social media, we do make a lot of our data open source and I'm increasingly trying to liberate data from some of our old legacy systems that allows the public to weigh in and see why certain decisions are being made or actually be able to analyze the data themselves. Again, we're doing it on a flat budget, but we're moving as fast as we can.

Bill:

[00:49:00] Well, one of the things I'm curious about is artificial intelligence and this is sort of an interesting, people are in 2 different camps about this as we move forward. Can you talk to how you think artificial intelligence type technologies will essentially could assist and help amplify and do good with our existing workers both in public and private sector. I think it's important to hear your prospective on it because I think we're hearing a lot of the downside piece which is easy to find but I'd love to hear your thoughts on possibly the upside.

David:

[00:49:30] Sure. I think it's worth saying. It's interesting you talk about the downside versus upside. I mean, in my view technologies amoral. It's how we humans choose how to use technology that determines whether it's good or bad. For example, fire, you cook your food, keep your family warm, that's great, but fire can also burn and unfortunately kill. So it's how you use the tool that decides whether it's good or bad and so that's the choices we need to think about.

[00:50:00] In terms of AI, in 2013 there was a competition to see if anyone could write a algorithm that would grade papers as good as a 3rd grade teacher, find the same sentence mistakes and things like that and sure enough someone could. It was on Dragel and it was a hedge fund trader that had some free time. In 2014 there was a competition, Xerox came out with a copier that will take a handwritten test, handwritten answer and, again, at the 3rd grade level, grade it for the teacher. Now it's more expensive than teachers right now so teachers aren't out of a job yet, but who knows.

[00:50:30] In 2015, some of the AI's that are prominent out there by different vendors are actually being tested in Fortune 500 companies to see which meetings you should go to, which means you should not go to and if you do go to these meetings who you should take with you. There's actually also a case where a company elected to its board of directors an algorithm and gave it voting rights. Then this year, 2016, there are efforts afoot to see if they can actually do an AI that will be able to answer real estate law as good as, and real estate laws very rule based so it's a little bit easier. There's other parts of laws that's not as rule based. To see if you can do as good as a real estate lawyer. Early signs are it can be about 80% accurate right now.

[00:51:00] I think about a lot of what's done, particularly in public service, is wrote and repetitive and involves many different people because you want to remove as much bias as possible. By having many different people involved it's hard for any one person to be, yet founders did not want a [inaudible 00:51:04] individual. But, on things like procurement or hiring decisions, if instead of having many different people involved and a very prolonged, protractive process, if you made the algorithm open source, it would be interesting to see. Maybe it's not necessarily the hiring decisions but maybe it's just the job classification as to what type of job this is or maybe in the procurement it's like is this ....

Bill: The RFP process.

David:  
[00:51:30]

[00:52:00] Yes, is this a compliant RFP, far compliant, and you still have humans. I don't think it replaces but it's trying to shorten the time needed to do something and get involved in the human end or the creative part or the key decision making part. There's another example actually that just happened this year. I think California is actually trying to use algorithms to set bail and the idea that, again, it's just going to look at the facts of the case. It's not going to be bias as to whether your tall or not tall or if you're a certain gender or things like that. Again, I think the future, at least for the next 10 years is not an either/or, it's about how you pair artificial intelligence with humans to make better outcomes.

Bill:

[00:52:30] I spoke at the construction industry association meeting last week and I said 50, 60 years ago when we invented the steam shovel and the bulldozer and all these, people were upset because the manual labor was being replaced and the guy who had the 100 horses at the time the car was invented is really upset, however, looking at history, looking at years later, these efficiency gains are doing some of the more road and manual mental tasks frees us up to potentially do more higher order thinking, pushes us in a different path. Just we can't see it. It's an algorithm versus a tractor or a truck or something of that nature. Interesting.

David: I would love to have an AI help answer e-mails for me.

Bill:

[00:53:00] That's a good point. As we wrap up one of the things that I think would really help is what, you mentioned a couple mentors and a couple of people that, I love to give resources they can go to to kind of learn about some of your mentors that they may think, and do some further learning and possibly books and things that you found were really good from a leadership or a technology perspective, but maybe we'll start with your mentors first. Who do you think would be good for people to go to read about?

David:

[00:53:30] Probably most of them are behind the scenes, as is the nature of public service, but I would say they range from, as I mentioned already, there was Doctor William Jeffrey. I believe last I heard from him he's the president of SRI. He would be one. Another one, Doctor Tracy Trigwell. She was with the bioterrorism program with me, trained as both an epidemiologist and a veterinarian and was very key with me with the bioterrorism program. Then at Emery University it was at the business school, Doctor Benn Kazinsky.

Bill: Doctor Benn Kazinsky, okay.

David: That's Benn with two N's. In fact he likes to call his graduates SOBs or students of Benn, so I am a proud SOB.

Bill: That's great. What about books? Any books that you could recommend.

[00:54:00]  
David:  
That I recommend? Actually I probably will actually recommend some short articles. One is there's a wonderful article that's called in praise of the incomplete leader.

Bill: Oh, I heard you mention that.

David:

[00:54:30] It's Harvard Business Review. It's about the myth that, again, the leader has to know everything when in fact the reality is that they open themselves up to having people point out their blind spots, I think your a better leader as resolved and so that's what I do with my team is I know I'm going to have blind spots, the world is changing so fast but we can share amongst ourselves and point out these different blind spots and be better as a result. That would be a key one.

[00:55:00] There's also work. Tom Malone and others have done work on diversity and women of diversity. He's at the center for collective intelligence, so that would be, website would be cci.mit.edu. I did my post doc with him. He's done research as to when do different groups of people make better decisions versus similar groups of people. He finds out, there's some interesting findings. One is if there's equal turn taking in the conversations. If there's active listening. And then probably the most interesting provocative finding that he and other, [inaudible 00:55:05] has also helped with. There's a higher ratio of women to men, which might be because maybe there's two other things in terms of equal turn taking conversation and active listening but it's worth reading because it's empirical data.

Bill: Interesting.

David:  
[00:55:30] I think the bigger take away is at the C-suite level for any organization, particularly through public service, we need to make sure we have a diversity of cognitive thought because you'll have better outcome.

Bill: Actually I've actually heard that. I'm at an entrepreneurship, leadership group that meets in Philly every quarter and the woman who runs it, the first one she says we're just at the cusp of having too few woman. They actually know. They can tell. She says I can tell by the energy and the vibe and the ideas and the thought. There's a more holistic perspective when you have that so that's really interesting.

David:  
[00:56:00] Yeah, and in fact if I could do one final sort of plug is there's a thing called the executive leadership conference. It happens every year and I actually am going to be chairing it this year in late October. However, when they asked me way back in January this year to help chair, I said I would on only 3 conditions, which is one 50% of more of the speakers we invite are woman, 25% are more are Gen X, Gen Y, and 25% or more are outside of the D.C. area. Fortunately they said yes.

Bill: Oh wow. We'll put show notes to that as well.

David: Sure. Thank you.

Bill: Yeah, absolutley. Is there any final comments or anything that you're like itching to say that you wanted to?

[00:56:30]  
David:

[00:57:00]  
The one thing I would recommend, because you talked about empathy and I think that's so key. Organizational empathy is something that you can have the best intended, whether your scientists, biologists, public policy maker, if you don't have organizational empathy, that's a huge missing talent that often is not [inaudible 00:56:46]. The one thing that I'd recommend to any leader in any circumstance, when you're getting to know your other team members, ask them what brings them joy. Which I know is kind of odd because initially their going to be like well why are you asking me this but the reality is at the end of the day life's too short to not be doing something that at least brings us some intrinsic happiness or intrinsic innovation.

[00:57:30] By asking what brings us joy, that helps you one, you're actually listening to them and you're watching their facial expressions and you see what gets them excited, but then two if later there's a task that needs to be done and it happens to align closely to what their passion or joy is, their going to tackle it a whole lot more because they are intrinsically motivated. I think, interesting enough, since we've ranged from technology to artificial intelligence we still need to remember at the end of the day, humans we have motivations and if we can understand those motivations we can do great things.

Bill: There's a great book I just interviewed the author for called Joy Inc and another woman, your concept of EQ versus IQ the emotional quotient piece versus IQ, we're all very very top heavy on IQ but pulling that empathy piece in on the emotions side is huge for, I really appreciate your comments there.

David: Oh thank you, Bill. I've really enjoyed the conversation.

Bill: Well, until next time. Thanks.

David: Thanks a lot.

Bill: Yeah, thank you very much.

David: Appreciate it.